

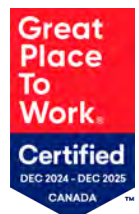


4873 and 4898 Kitchener Street, City of Niagara Falls

Traffic Impact Study and Parking Study

Paradigm Transportation Solutions Limited

2026-03
250550



Project Summary

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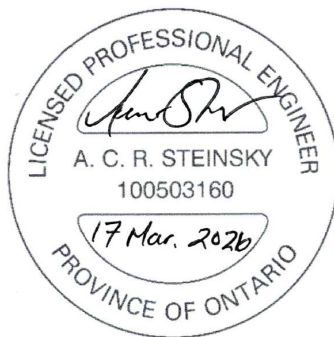
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Executive Summary

Content

1000052392 Ontario Inc. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Traffic Impact Study (TIS) and Parking Study for a proposed redevelopment of 4873 and 4898 Kitchener Street in the tourist area of the City of Niagara Falls.

The purpose of the study is to assess how the proposed development will affect traffic and parking in the surrounding area by evaluating trip generation, parking demand, and overall network conditions.

Development Concept

Redevelopment of the lands at 4898 Kitchener Street proposes a conversion of the existing place of worship into a 50-storey building with the following components:

- ▶ A hotel with 412 rooms;
- ▶ A music hall with a capacity of 500 people;
- ▶ A cafe on the first level with a capacity of 60 people;
- ▶ A restaurant on the top level with a capacity of 198 people;
- ▶ An event space on the fourth level with a capacity of 297 people;
- ▶ Office uses on the fifth level totaling 513 m² (5,520 sq. ft.) of leasable area; and
- ▶ Recording studios on the sixth level totaling 513 m² (5,520 sq. ft.) of leasable area.

Redevelopment of 4873 Kitchener Street (currently Municipal Parking Lot 18B), proposes a rezoning of the property to accommodate 1,023 m² (11,006 sq. ft.) of commercial space along with a parking garage and outdoor parking that will serve the redevelopment of both properties and provide municipal parking spaces within the garage. Vehicle access to the parking area is proposed via two driveways connecting to Kitchener Street and at the terminus of Second Avenue.

The parking supply for the development is proposed as:

- ▶ 38 off-street outdoor parking spaces (inclusive of 4 valet parking spaces);
- ▶ 447 off-street garage parking spaces (inclusive of 95 municipal parking spaces); and



- ▶ 5 on-street valet parking spaces provided along the south side of Kitchener Street directly east of Hunter Street.

Without the municipal parking supply (95 spaces) and the valet parking supply (9 spaces), the site's parking supply is 386 spaces. With the off-street valet spaces included the supply is 390 spaces.

Build-out and occupancy is estimated to be by Year 2028; however, this timing is subject to market conditions.

Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Base Year Traffic Conditions:** The study area intersections are currently operating within acceptable levels of service.
The intersections at Victoria Avenue and Bender Street and Falls Avenue and MacDonald Avenue experience some localized queuing during peak periods. At Victoria and Bender, westbound left-turn queues occasionally exceed available storage. At Falls and MacDonald, peak-hour queues in the eastbound and westbound through and right-turn lanes sometimes block the adjacent left-turn lane, and the northbound approach is moderately constrained on Saturdays. Overall, these issues are isolated to specific movements and peak periods.
- ▶ **Site Trip Generation:** The site is forecast to generate approximately 192 weekday AM peak hour, 559 weekday PM peak hour, and 449 Saturday peak hour net external trips.
- ▶ **Site Circulation Review:** The hotel loading zones can accommodate MSU and LSU design vehicles, and the two loading areas operate independently, which allows simultaneous loading activity without conflict. MSUs are limited to the north loading zone, while LSUs can use either location.
Exit movements for the HSU design vehicle from the parking structure loading zone require coordination with valet staff. Minor design refinements that increase the exit radius could reduce or eliminate this requirement.
Internal circulation within the parking structure is functional and follows typical structured parking design conventions. Low travel speeds and normal driver attentiveness are expected, and regular users will adapt to the environment over time.
- ▶ **On-Site Valet Operations:** The forecast maximum 95th percentile queue for the valet service is 10 vehicles. The current



site plan proposes 9 valet parking spaces therefore, one additional parking space on-site should be designated as valet parking.

- ▶ **Opening Year Background Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to existing traffic conditions with no additional critical movements noted during the weekday AM, weekday PM, and Saturday peak hours.
- ▶ **Opening Year Total Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening year background traffic conditions (without background developments).

The study intersections are expected to experience some localized constraints during peak periods. The westbound off-ramp at Victoria Avenue is forecast to operate at LOS D during the weekday PM and Saturday peaks. At Victoria Avenue and Kitchener Street, the eastbound approach is expected to operate at LOS E and F during the same periods. At Victoria Avenue and Bender Street, southbound through queues may occasionally block the adjacent left-turn lane during the Saturday peak hour, although typical queues remain contained.

- ▶ **Five-Year Background Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening year traffic conditions (without background developments) with no additional critical movements noted during the weekday AM, weekday PM, and Saturday peak hours.
- ▶ **Five-Year Total Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to five-year background traffic conditions (without background developments).

At the Victoria Avenue and Falls Avenue eastbound on and off-ramp, the northbound through and right-turn movement is forecast to operate with a v/c ratio above 0.85 during the weekday PM peak hour, indicating moderate congestion during this period.

- ▶ **Opening Year Background Traffic Conditions (with Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to



opening and five-year traffic conditions (without background developments) with no additional critical movements noted during the weekday AM, weekday PM, and Saturday peak hours.

- ▶ **Opening Year Total Traffic Conditions (with Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening year background traffic conditions (with background developments).

At Victoria Avenue and Bender Street, westbound right-turn queues are forecast to occasionally block the eastbound left-turn lane during the weekday PM and Saturday peak hours, although typical queues remain contained.

- ▶ **Five-Year Background Traffic Conditions (with Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening year traffic conditions (with background developments).

At the Victoria Avenue and Falls Avenue eastbound on and off-ramp, the eastbound right-turn movement is forecast to operate at LOS E with a v/c ratio above 0.85 during the Saturday peak hour. At Victoria Avenue and Bender Street, the southbound left-turn queue is expected to exceed the available 35 m storage by about 21 m during the Saturday peak hour, although typical queues remain contained. At Victoria Avenue and Walnut Street, the eastbound, northbound, and southbound movements are all forecast to operate with v/c ratios above 0.85 during the Saturday peak hour, indicating moderate peak-period congestion across multiple approaches.

- ▶ **Five-Year Total Traffic Conditions (with Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to five-year background traffic conditions (with background developments) with no additional critical movements noted during the weekday AM, weekday PM, and Saturday peak hours.
- ▶ **Traffic Control Signal Warrant:** A traffic control signal is unlikely to be installed (not warranted) at the intersections of Victoria Avenue at Kitchener Street and Victoria Avenue at the Westbound Off-Ramp for Falls Avenue. Therefore, the installation of a traffic control signal at both intersections is not recommended.
- ▶ **Pedestrian Crossover (PXO) Warrant:** A Type D Level 2 pedestrian crossover should be considered for the proposed midblock crossing over Kitchener Street connecting the hotel building and parking garage.



- ▶ **Road Improvements:** Several road improvement options were reviewed to address localized peak-period constraints, all of which appear to be possible through line painting without widening the roadway. These included extending the southbound left-turn storage at Victoria Avenue and Bender Street, adjusting the southbound lane configuration at Victoria Avenue and Walnut Street, converting the southbound right-turn lane to a shared lane at Victoria Avenue and Hunter Street, and adding a short northbound right-turn lane at Falls Avenue and MacDonald Avenue.

A sensitivity analysis under five-year total traffic conditions, including background growth, determined that these measures would not fully resolve the forecast critical movements, and operational constraints would remain.

The forecast capacity constraints are expected to occur regardless of the proposed development. Widening the roadway to address vehicle capacity would reduce the space available for active transportation, particularly the pedestrian realm. Pedestrian comfort and mobility in the tourist area is a key objective within the City's Official Plan.

- ▶ **Zoning By-law Parking Requirements:** The City of Niagara Falls Zoning By-law mandates a total parking supply of 448 spaces.

With a proposed parking supply of 386 spaces (excluding valet and municipal parking spaces), this represents a deficit of 62 spaces.

- ▶ **Forecast Parking Demand:** Based on shared parking analysis between the various development components, the maximum shared parking demand is forecast to be 360 spaces. With a proposed parking supply of 386 spaces, this represents a surplus of 26 spaces. The 95 spaces allocated to the municipal parking supply can be used by persons visiting the subject site or the surrounding area. With the municipal parking spaces included, there is a forecast parking surplus of 121 spaces.

Recommendations

Based on the findings of this study, it recommended that:

- ▶ Signage and warning lights should be installed at the loading zones to alert users when the areas are in active use;
- ▶ Valet parking be increased to 10 spaces; and



- ▶ A Level 2 Type D Level pedestrian crossover be installed at the proposed midblock crossing over Kitchener Street connecting the hotel building and parking garage.



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1 Introduction

1.1 Overview

1000052392 Ontario Inc. retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Traffic Impact Study (TIS) and Parking Study for a proposed redevelopment of 4873 and 4898 Kitchener Street in the tourist area of the City of Niagara Falls. **Figure 1.1** illustrates the site location.

This study examines the impact of site-generated traffic on the surrounding road network and identifies the remedial measures (if any) required to support the full build-out of the lands.

The scope of the study includes:

- ▶ Assessing the current traffic conditions within the study area outlined in **Section 1.2**;
- ▶ Estimating background traffic growth;
- ▶ Estimating traffic generated by the redevelopment;
- ▶ A review of the on-site circulation with applicable design vehicles;
- ▶ An assessment of the forecast queuing demand for the hotel valet service;
- ▶ Analyses of the impact of the future traffic on the surrounding road network;
- ▶ Estimates of the site's parking demand; and
- ▶ Recommendations necessary to mitigate this future traffic in a satisfactory manner.

Paradigm conducted pre-study consultation with City of Niagara Falls staff via email in August 2025. **Appendix A** contains the pre-study consultation material and responses from the City. The study generally follows the Niagara Region *Transportation Impact Assessment Guidelines*¹.

1.2 Study Area

The intersections assessed in this study include:

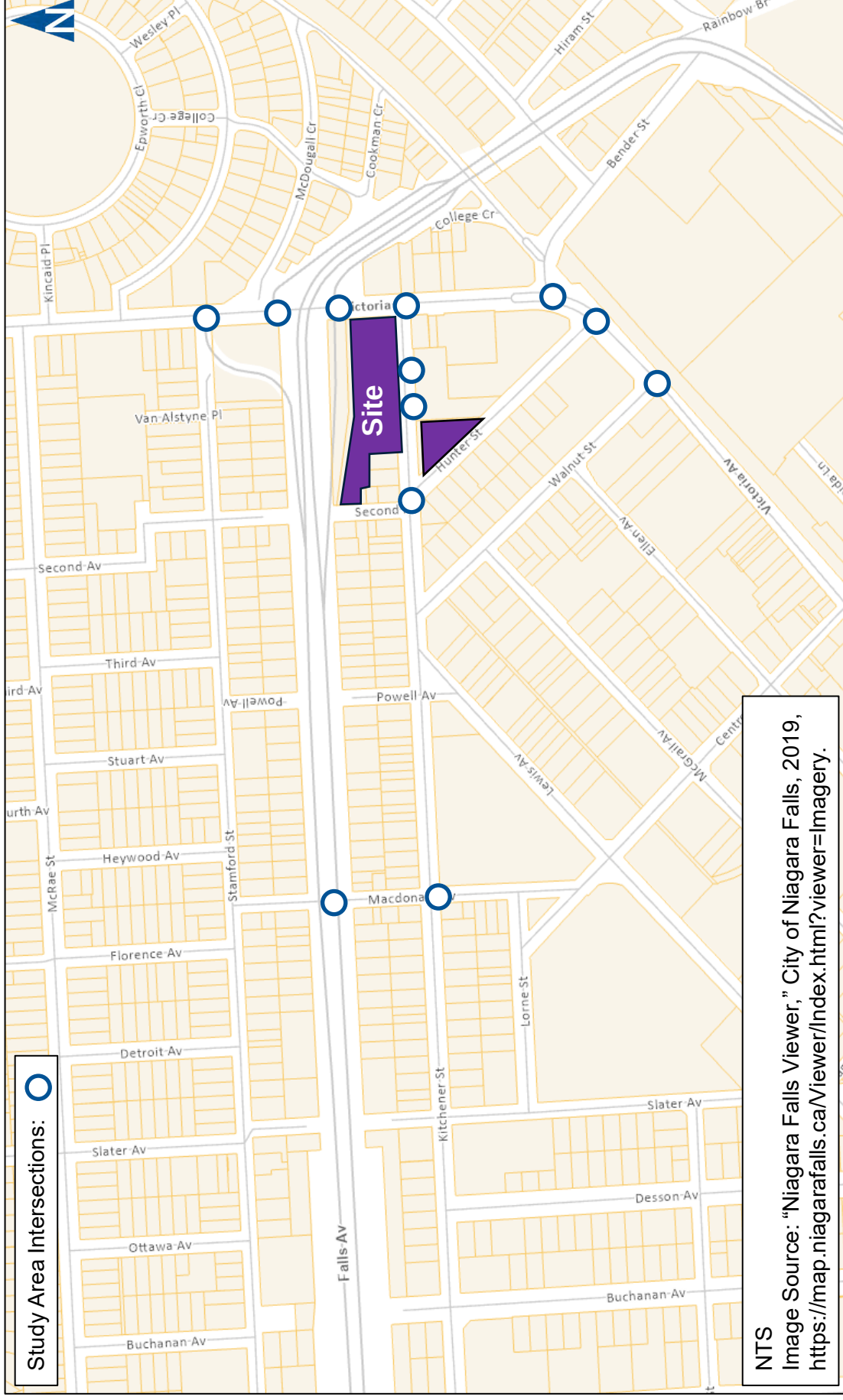
- ▶ Kitchener Street at Victoria Avenue (unsignalized);

¹ Niagara Region, *Transportation Impact Assessment Guidelines*, (Thorold: Niagara Region, 2023).



- ▶ Kitchener Street at Hunter Street/Second Avenue (unsignalized);
- ▶ Kitchener Street at MacDonald Avenue (unsignalized);
- ▶ Victoria Avenue at Hunter Street (unsignalized);
- ▶ Victoria Avenue at Bender Street (signalized);
- ▶ Victoria Avenue at Falls Avenue Eastbound Ramp (signalized);
- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp (unsignalized);
- ▶ Victoria Avenue at Falls Avenue Westbound On-Ramp (unsignalized);
- ▶ Victoria Avenue at Walnut Street (signalized);
- ▶ Falls Avenue at MacDonald Avenue (signalized); and
- ▶ Two site driveways along Kitchener Street connecting to the proposed parking area.





2 Existing Conditions

2.1 Road Network

The roadways of interest in the study area include Falls Avenue, Victoria Avenue, Kitchener Street, Bender Street, MacDonald Avenue, Walnut Street, Hunter Street, and Second Avenue. All roadways are under the jurisdiction of the City of Niagara Falls² except for Falls Avenue which is under the jurisdiction of Niagara Region³. Each roadway is generally described as follows:

- ▶ **Falls Avenue (Niagara Regional Road 420)** is a four-lane, arterial roadway within the study area. Between Stanley Avenue and the Eastbound On/Westbound Off Ramps for Victoria Avenue, the speed limit is 60 km/h. Between the Rainbow Bridge exit and the Eastbound On/Westbound Off Ramps for Victoria Avenue, the speed limit is 40 km/h. West of Stanley Avenue, the roadway continues as Ontario Highway 420;
- ▶ **Victoria Avenue** is a two-lane, 50 km/h roadway within the study area. North of Falls Avenue, the roadway is classified as a collector roadway. South of Falls Avenue, the roadway is classified as an arterial roadway. Sidewalks are provided on both sides of the roadway;
- ▶ **Kitchener Street** is a two-lane, 50 km/h collector roadway within the study area. Sidewalks are provided on both sides of the roadway;
- ▶ **Bender Street** is a 50 km/h collector roadway within the study area. Sidewalks are provided on both sides of the roadway;
- ▶ **MacDonald Avenue** is a two-lane, 50 km/h local roadway within the study area. North of Falls Avenue, a sidewalk is provided on the west side of the roadway. South of Falls Avenue, sidewalks are provided on both sides of the roadway;
- ▶ **Walnut Street** is a two-lane, 50 km/h local roadway within the study area. Sidewalks are provided on both sides of the roadway;
- ▶ **Hunter Street** is a two-lane, 50 km/h local roadway within the study area. Sidewalks are provided on both sides of the roadway. However, along the frontages for 4898 Kitchener Street (subject site) and 4893 Hunter Street, no sidewalk is provided; and

² City of Niagara Falls, *Official Plan: Schedule C - Roads*, (Niagara Falls: City of Niagara Falls, 2008).

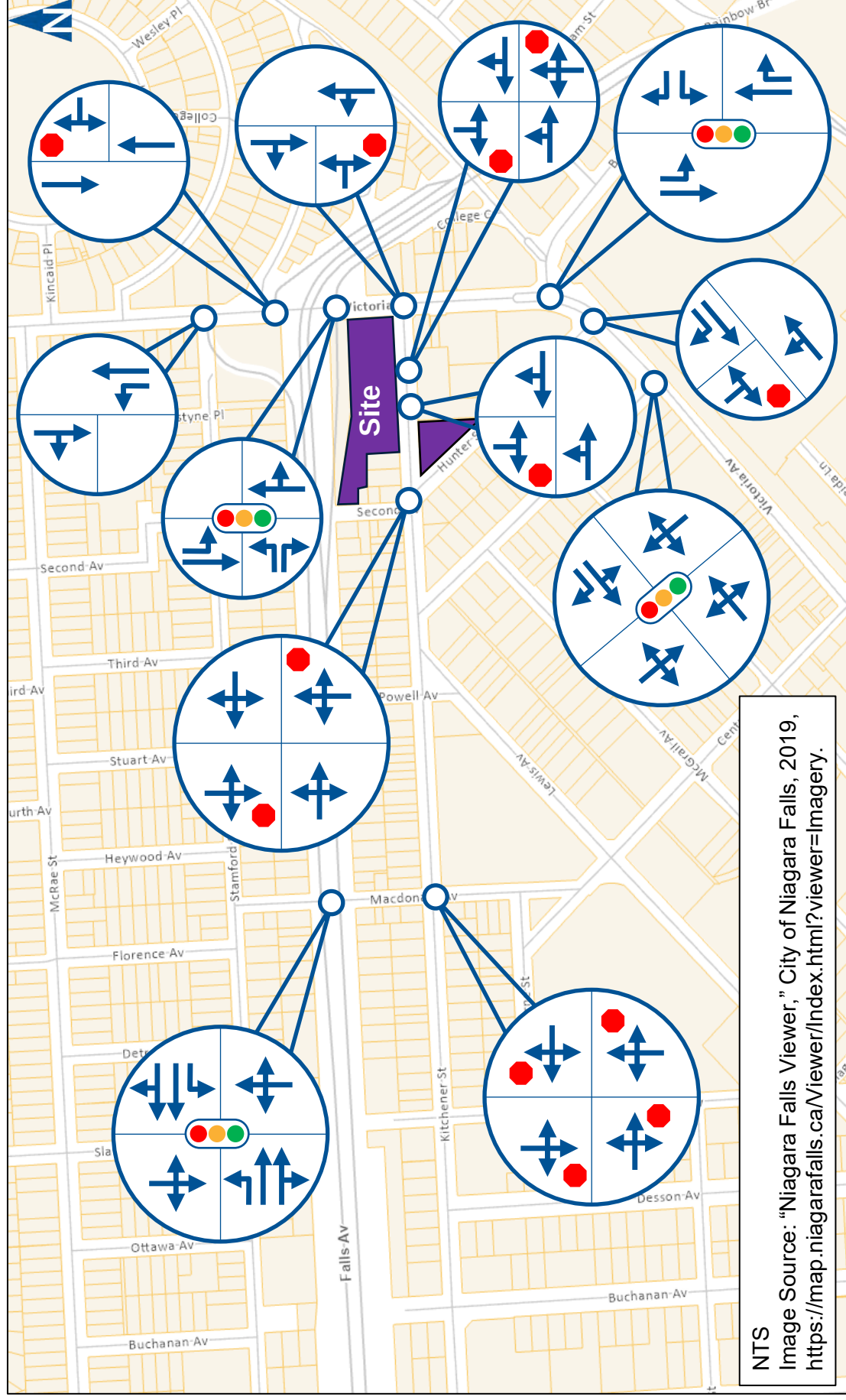
³ Niagara Region, *Niagara Official Plan: Schedule J-1 – Transportation Infrastructure*, (Thorold: Niagara Region, 2022).



- ▶ **Second Avenue** is a two-lane 50 km/h, local roadway within the study area. Sidewalks are provided on both sides of the roadway and the road terminates at a cul-de-sac south of Falls Avenue.

Figure 2.1 illustrates the existing traffic control and lane configurations at the study area intersections.





2.2 Cycling Network

Figure 2.2 illustrates the existing and proposed cycling network and includes the following:

- ▶ The Olympic Torch Run Legacy Trail running along the east side of Palmer Avenue;
- ▶ An infill link running along Victoria Avenue to the north of Bender Street; and
- ▶ Proposed cycling infrastructure (no type identified) running along Victoria Avenue to the south of Bender Street.

An infill cycling link is a short new piece of bike infrastructure built to close a gap between existing cycling routes. It connects missing segments so cyclists have a continuous and safer path.





2.3 Transit Service

Niagara Region Transit⁴ and WEGO⁵ operate the Niagara Falls public transit system and the following bus routes currently serve the study area:

- ▶ **Route 104/204 (Main Street Hub – Downtown)** travels between the Niagara Falls Bus Terminal and the Main/Ferry Bus Hub. Route 104 (daytime) operates Monday to Saturday from 6:15 AM to 6:45 PM with 30-minute headways. Route 204 (evening) operates Monday to Saturday from 7:00 PM to 11:45 PM with 30-minute headways; and
- ▶ **WEGO Route 602 (Blue Line – Fallsview/Clifton Hill)** travels between Casino Niagara and the Rapidsview Parking Lot. This route operates Monday to Sunday from 8:00 AM to 11:30 PM with 30-minute headways.

Figure 2.3 and **Figure 2.4** illustrate the existing daytime and evening transit network provided by Niagara Region Transit, respectively. **Figure 2.5** illustrates the existing WEGO transit network.

The closest Niagara Regional Transit stops to the subject site (four in total) are on both sides of Victoria Avenue (east of the site) between Bender Street and Eastwood Crescent (approximately 200 to 350 metres from the subject site or a 3-to-5-minute walk). Three of these four stops are only indicated by a sign and pole, whereas the stop along the west side of Victoria Avenue between the westbound on and off ramps for Falls Avenue provides both seating and a shelter.

The closest WEGO Transit stop to the subject site is at Casino Niagara and provides both seating and shelter. This stop is a 5-to-7-minute walk (400 to 450 metres) south of the site.

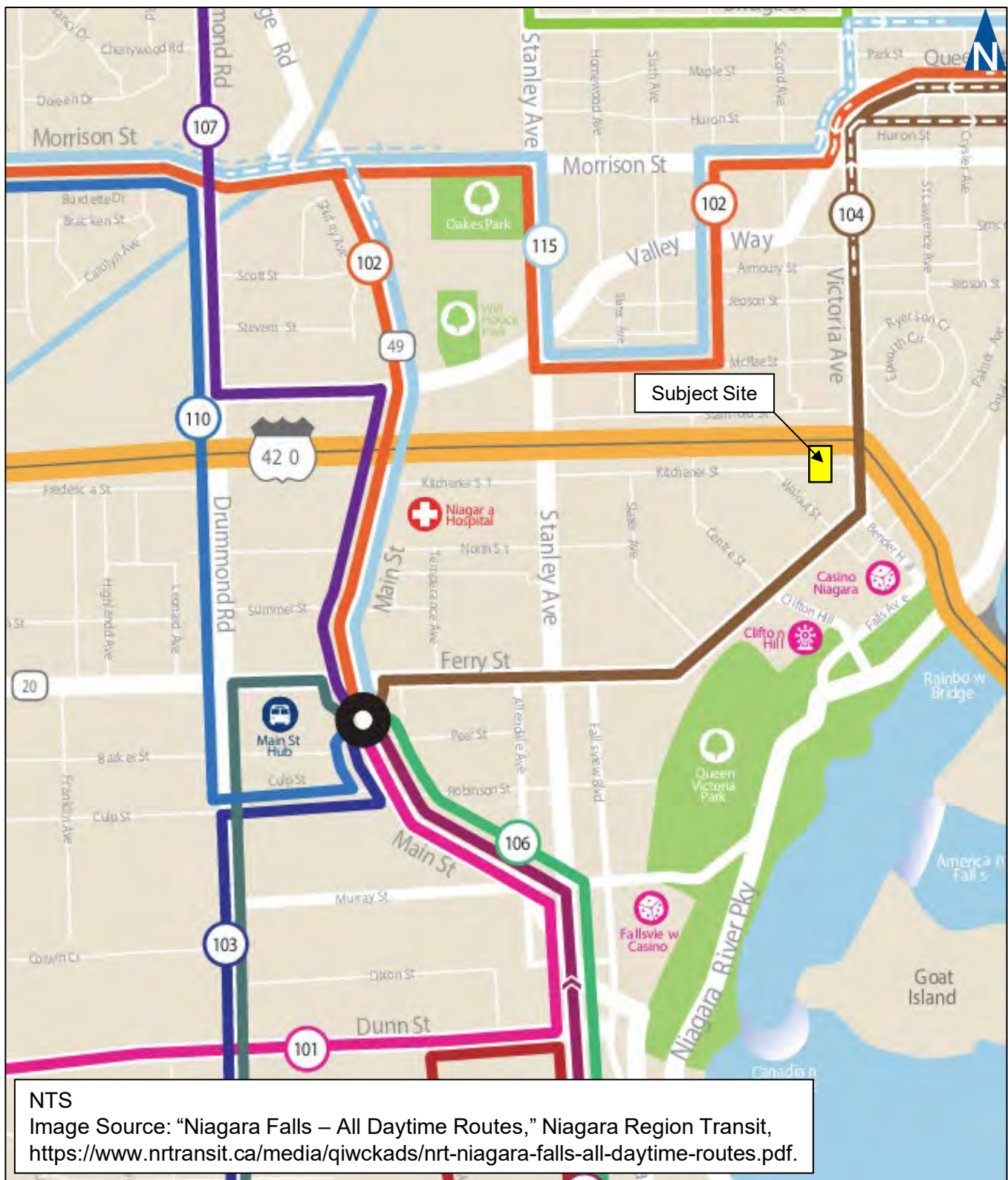
The existing sidewalk network and the following nearby signalized intersections (which feature pedestrian phases and push buttons) can assist transit users travelling between the site and adjacent transit stops on foot:

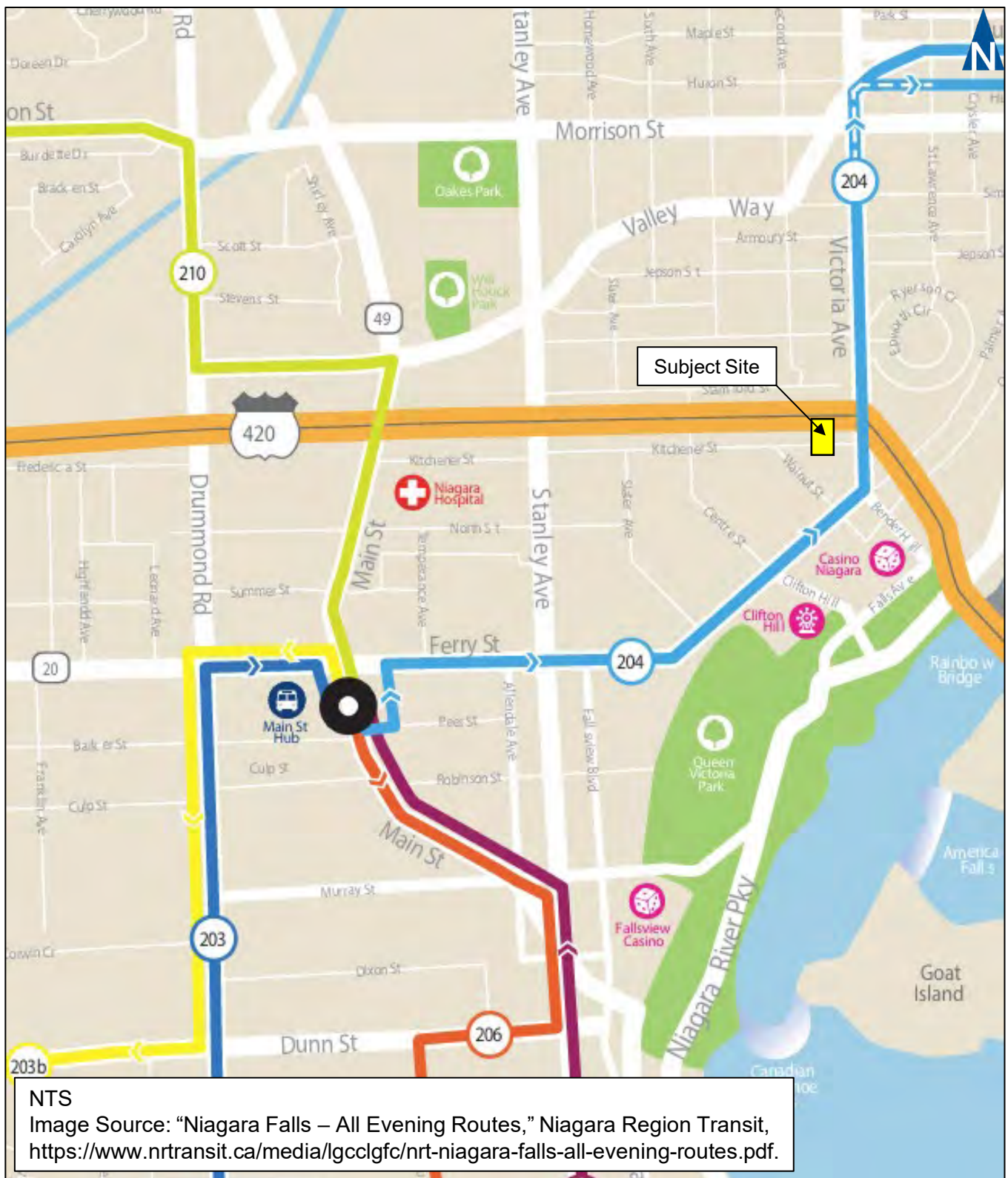
- ▶ Victoria Avenue at Bender Street;
- ▶ Victoria Avenue at Falls Avenue Eastbound Ramp; and
- ▶ Victoria Avenue at Walnut Street.

⁴ "Routes and Schedules Niagara Falls," Niagara Transit, <https://www.nrtransit.ca/routes/niagara-falls/>.

⁵ "WEGO Niagara Falls Visitor Transportation," Niagara Parks, 2025, <https://www.niagaraparks.com/getting-around/wego-niagara-falls-bus/>.









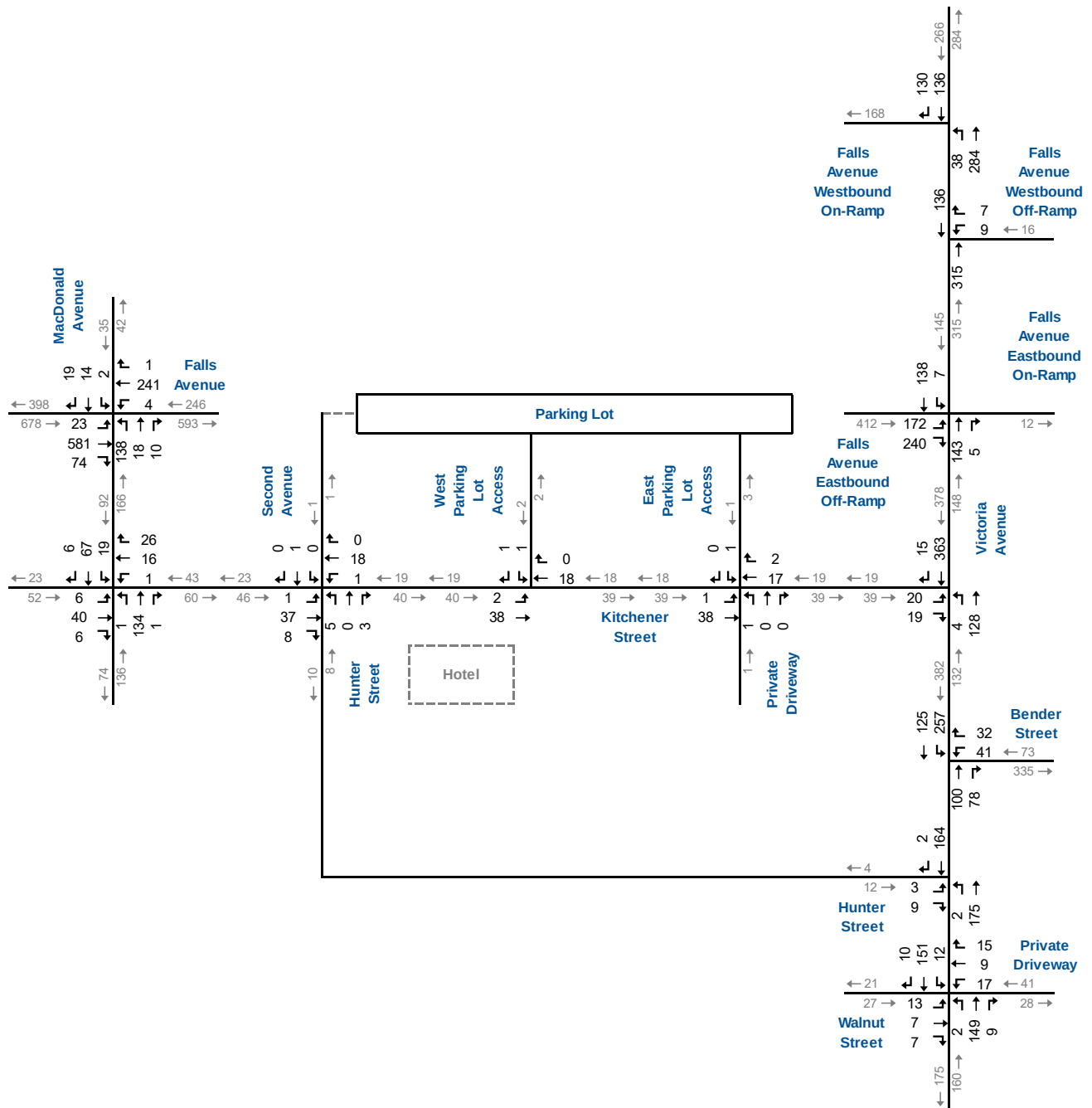
2.4 Traffic Volumes

Paradigm conducted turning movement counts (TMCs) at the study area intersections on Thursday, August 21, 2025 from 7 AM to 9 AM, 11 AM to 2 PM, and 3 PM to 6 PM (weekday counts) and on Saturday, August 23, 2025 from 9 AM to 5 PM (weekend counts). Summer data is used in this study because of the tourist area context and to ensure the analysis reflects the peak seasonal traffic conditions. **Appendix B** contains the existing count data for both days.

The TMC data collected in August 2025 has been factored to Year 2026 conditions based on a generalized background growth rate of 2% per annum, which is consistent with the growth rate used to forecast future background traffic growth in **Section 4.1**. Traffic volumes between intersections have also been balanced, except for the segment of Kitchener Street between Hunter Street/Second Avenue and MacDonald Avenue; and the entire length of Hunter Street. Volume imbalances on these segments are rationalized by the number of private driveways and intersecting streets which are not included in the study area.

Figure 2.6, Figure 2.7, and Figure 2.8 illustrate the adjusted 2026 base year weekday AM, weekday PM, and Saturday peak hour traffic volumes at the study area intersections.

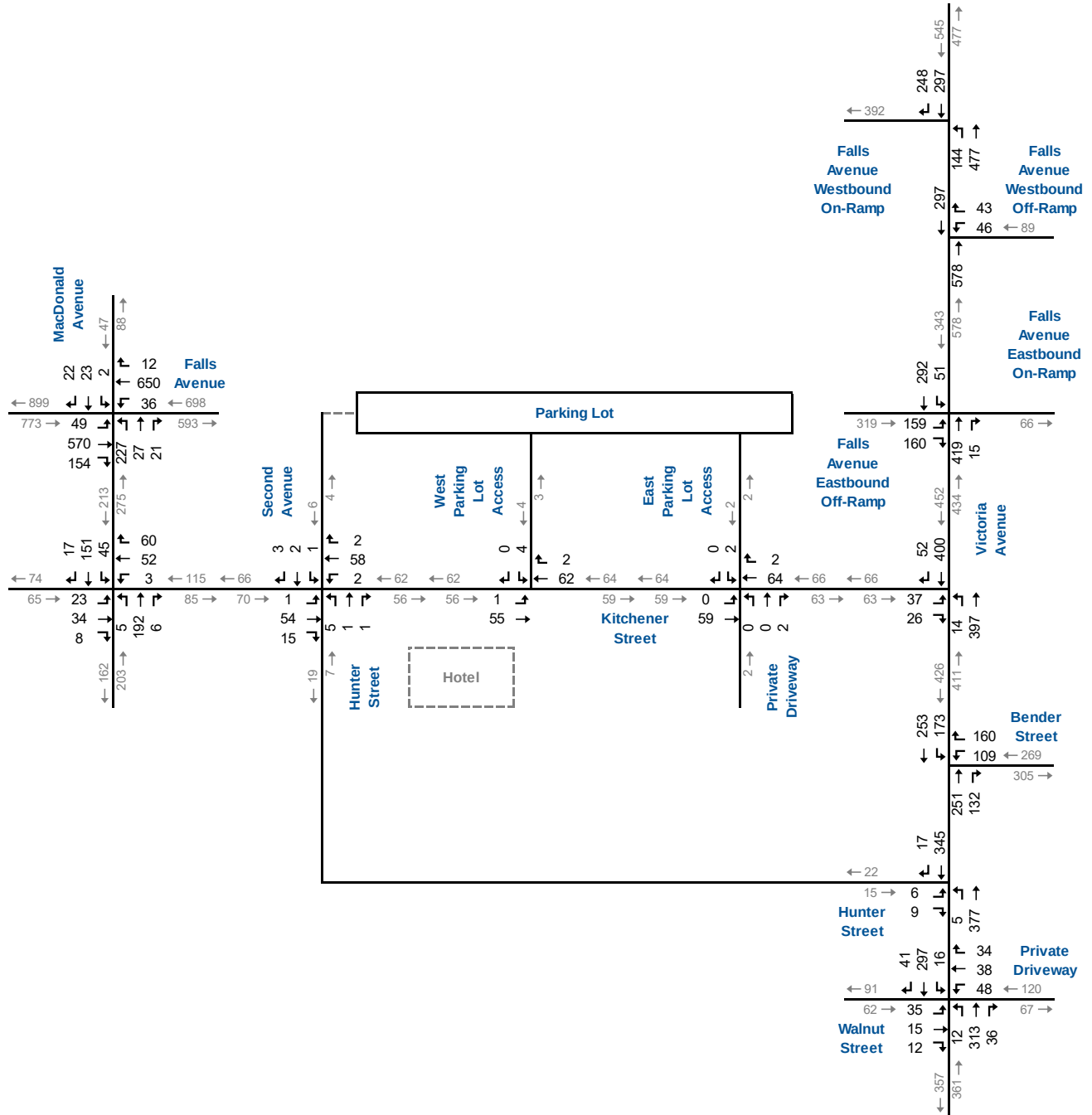


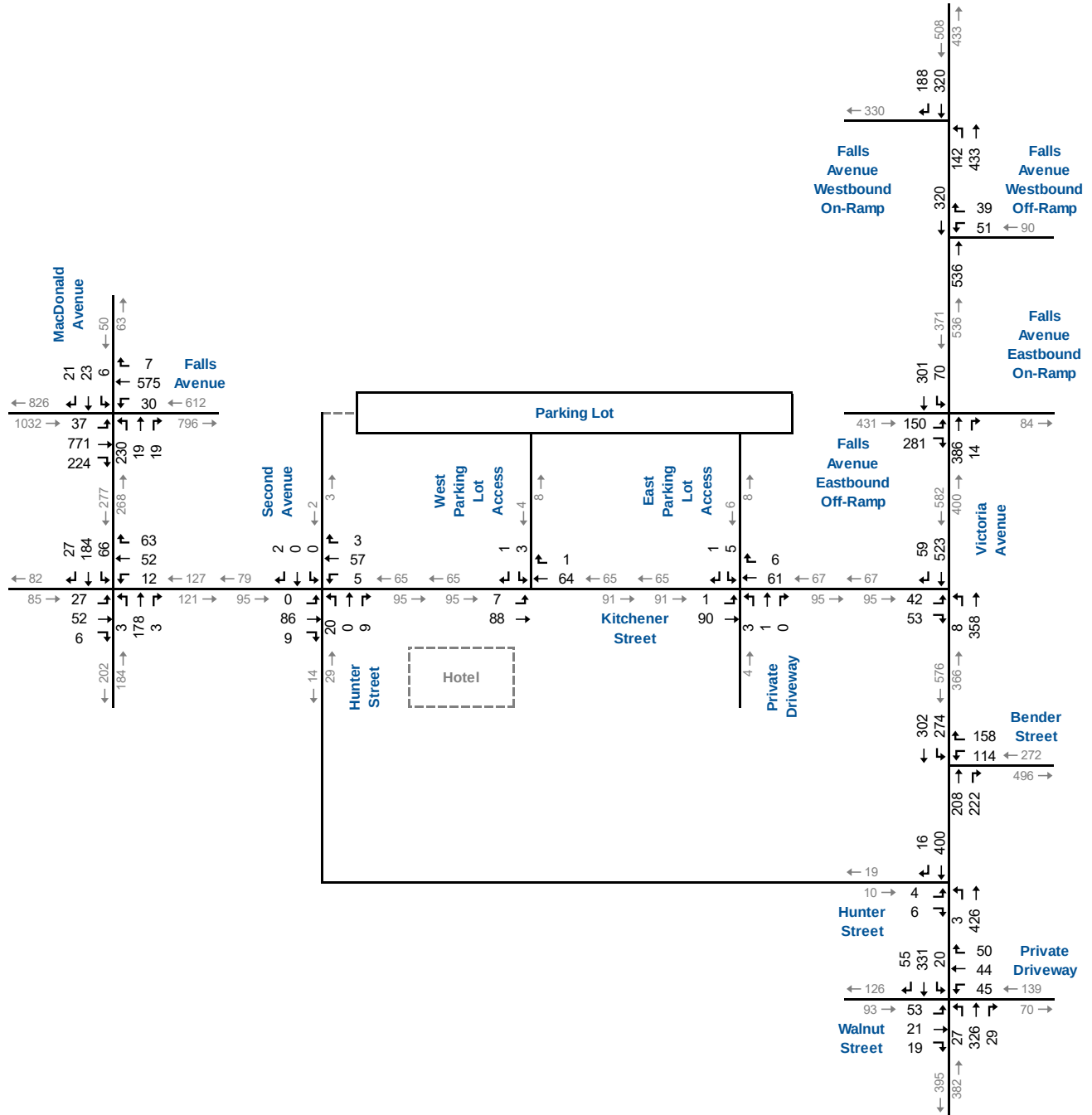


Base Year Traffic Volumes (Weekday AM Peak Hour)

4873 and 4898 Kitchener Street, Niagara Falls TIS and PS
250550

Figure 2.6





2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles intending to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows and intersection geometry.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections, or when the volume to capacity ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of the study area intersections have been evaluated using the existing lane configurations, traffic controls, and the adjusted 2026 base year traffic peak hour volumes. The traffic model also reflects existing signal timing at the signalized study intersections.

Appendix B contains the signal timing plans as provided by Niagara Region.

The level of service conditions on the existing road network have been assessed using Synchro 12 and Highway Capacity Manual (HCM) 2000 procedures. The intersection analysis considered three separate measures of performance:

- ▶ The LOS for each turning movement. LOS is based on the average control delay per vehicle;
- ▶ The volume to capacity ratio for each intersection; and
- ▶ 95th percentile queue lengths (m) estimated using Synchro.

As noted in the Region's TIS guidelines, movements are considered critical under the following conditions:

- ▶ Volume to Capacity ratios (v/c) for movements that exceed 0.85 at a signalized intersection;
- ▶ The 95th percentile queues for an individual movement are projected to exceed available turning lane storage, block site accesses, and left and right turn lanes are blocked by the through movement queues (same approach); and



- ▶ Based on the average delay per vehicle on individual movements, LOS operates at LOS D or worse for an unsignalized intersection and LOS E or worse for a signalized intersection.

Table 2.1, Table 2.2, and Table 2.3 summarize the base year intersection operations. All study area intersections are operating at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement has a 95th percentile queue length that exceeds its 15 m storage length by 11 and 12 m during the weekday PM and Saturday peak hours, respectively. The 50th percentile queue is contained by the current available storage.
- ▶ Falls Avenue at MacDonald Avenue:
 - The eastbound through/right-turn movement has a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue during the weekday AM peak hour does not block the adjacent left-turn lane;
 - The westbound through/right-turn movement has a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue during the Saturday peak hour does not block the adjacent left-turn lane; and
 - The northbound approach has a v/c ratio exceeding 0.85 during the Saturday peak hour.

Appendix C contains the detailed Synchro reports.



TABLE 2.1: BASE YEAR OPERATIONS (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 8 0.04 1	A 0 0.19 0		A 1		A 0 0.18 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					B 12 0.04 1		> > >	B 12		A 0 0.23 0		A 0		A 0 0.10 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	A 9 0.47 21		A 8 0.26 10	A 9				A 0		A 9 0.43 19	> > >	A 9	A 8 0.03 2	A 9 0.34 17		A 9	A 9 0.45
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	B 13 0.09 2		> > >	B 13					< < <	A 0 0.00 0		A 0		A 0 0.26 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 16 0.19 11 15 4		B 15 0.03 6 -	B 15		B 15 0.35 20 -	B 14 0.09 8 -	B 15	A 8 0.54 19 35 16	A 6 0.18 12 -		A 7	A 10 0.49
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 10 0.02 0		> > >	B 10					< < <	A 0 0.00 0		A 0		A 0 0.11 0	A 0 0.00 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 10 0.10 5	> > >	B 10	< < <	B 10 0.14 7	> > >	B 10	< < <	A 9 0.40 16	> > >	A 9	< < <	A 10 0.51 18	A 7 0.01 0	A 10	A 9 0.36
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 9 0.07 5 25 20	B 14 0.57 58 -	> > >	B 14	B 10 0.02 1 35 34	B 12 0.23 21 -	> > >	B 12	< < <	C 22 0.63 46 -	> > >	C 22	< < <	B 15 0.06 9 -	> > >	B 15	B 15 0.59
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.08 -	> > >	A 8	< < <	A 8 0.06 -	> > >	A 8	< < <	A 8 0.20 -	> > >	A 8	< < <	A 8 0.14 -	> > >	A 8	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 9 0.01 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.01 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 9 0.00 0	> > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 2.2: BASE YEAR OPERATIONS (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.16 4	A 0 0.30 0		A 2		A 0 0.34 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 20 0.28 9		> > >	C 20		A 0 0.37 0		A 0		A 0 0.19 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 15 0.48 36		B 13 0.16 13	B 14				A 0		B 15 0.76 69	> > >	B 15	A 7 0.19 9	A 8 0.43 36		A 8	B 13 0.66
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	B 15 0.15 4		> > >	B 15					< < <	A 0 0.02 0		A 0		A 0 0.28 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.41 26 15 -11		B 17 0.16 14 -	B 17		B 16 0.55 45 -	B 13 0.13 10 -	B 15	A 7 0.36 16 35 19	A 7 0.31 27 -		A 7	B 12 0.46
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 12 0.03 1		> > >	B 12					< < <	A 0 0.00 0		A 0		A 0 0.21 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 14 0.24 14	> > >	B 14	< < <	B 15 0.41 24	> > >	B 15	< < <	B 12 0.64 52	> > >	B 12	< < <	B 13 0.68 49	A 7 0.05 3	B 12	B 13 0.58
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 13 0.22 8 25 17	C 21 0.67 65 -	> > > >	C 20	B 13 0.18 6 35 29	C 20 0.62 61 -	> > > >	B 20	< < < <	D 40 0.85 104 -	> > > >	D 40	< < < <	B 17 0.08 12 -	> > > >	B 17	C 23 0.72
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.10 -	> > >	A 9	< < <	A 9 0.16 -	> > >	A 9	< < <	A 10 0.28 -	> > >	A 10	< < <	A 10 0.29 -	> > >	A 10	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0 0	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.04 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.04 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 2.3: BASE YEAR OPERATIONS (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.16 4	A 0 0.28 0		A 2		A 0 0.33 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 20 0.28 8		> > >	C 20		A 0 0.33 0		A 0		A 0 0.20 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 13 0.43 29		B 12 0.28 17	B 12				A 0		B 14 0.72 57	> > >	B 14	A 8 0.25 11	A 8 0.46 36		A 8	B 12 0.61
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 21 0.31 10		> > >	C 21					< < <	A 0 0.01 0		A 0		A 0 0.36 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 19 0.42 27 15 -12		B 17 0.17 15 -	B 18		B 17 0.50 41 -	B 15 0.23 16 -	B 16	A 8 0.53 26 35 9	A 7 0.36 32 -		A 7	B 13 0.53
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 15 0.03 1		> > >	C 15					< < <	A 0 0.00 0		A 0		A 0 0.24 0	A 0 0.00 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 15 0.36 20	> > >	B 15	< < <	B 15 0.44 26	> > >	B 15	< < <	B 13 0.68 58	> > >	B 13	< < <	B 16 0.73 58	A 7 0.07 5	B 14	B 14 0.63
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 11 0.12 6 25 19	C 22 0.76 95 -	> > > >	C 22	B 12 0.18 5 35 30	B 16 0.44 49 -	> > > >	B 16	< < < <	D 54 0.89 100 -	> > > >	D 54	< < < <	C 21 0.09 13 -	> > > >	C 21	C 24 0.78
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.13 -	> > >	A 9	< < <	A 9 0.18 -	> > >	A 9	< < <	A 10 0.26 -	> > >	A 10	< < <	B 11 0.38 -	> > >	B 11	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 1 0.00 0	> > >	A 1	< < <	A 10 0.04 1	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 1 0.00 0		A 1		A 0 0.05 0	> > >	A 0					A 10 0.00 0		> > >	A 10	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	A 10 0.00 0	> > >	A 10	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



3 Development Concept

3.1 Description

The subject site located at 4873 and 4898 Kitchener Street in the City of Niagara Falls.

Redevelopment of the lands at 4898 Kitchener Street proposes a conversion of the existing place of worship into a 50-storey building with the following components:

- ▶ A hotel with 412 rooms;
- ▶ A music hall with a capacity of 500 people;
- ▶ A cafe on the first level with a capacity of 60 people;
- ▶ A restaurant on the top level with a capacity of 198 people;
- ▶ An event space on the fourth level with a capacity of 297 people;
- ▶ Office uses on the fifth level totaling 513 m² (5,520 sq. ft.) of leasable area; and
- ▶ Recording studios on the sixth level totaling 513 m² (5,520 sq. ft.) of leasable area.

Redevelopment of 4873 Kitchener Street (currently Municipal Parking Lot 18B) proposes a rezoning of the property to accommodate 1,023 m² (11,006 sq. ft.) of commercial space along with a parking garage and outdoor parking that will serve the redevelopment of both properties and provide municipal parking spaces within the garage. Vehicle access to the parking area is proposed via two driveways connecting to Kitchener Street and at the terminus of Second Avenue.

The parking supply for the development is proposed as:

- ▶ 38 off-street outdoor parking spaces (inclusive of 4 valet parking spaces);
- ▶ 447 off-street garage parking spaces (inclusive of 95 municipal parking spaces); and
- ▶ 5 on-street valet parking spaces provided along the south side of Kitchener Street directly east of Hunter Street.

Without the municipal parking supply (95 spaces) and the valet parking supply (9 spaces), the site's parking supply is 386 spaces. With the off-street valet spaces included the supply is 390 spaces.



The site's frontage along Kitchener Street is proposed to consist of two laybys parking areas for on-street parking (valet service and general parking) which form a chicane acting as a traffic calming feature. In addition a pedestrian crossing over Kitchener Street is proposed to connect the parking garage to the main building. **Section 5.2** reviews the proposed crossing.

Build-out and occupancy is estimated to be by Year 2028; however, this timing is subject to market conditions. **Figure 3.1** illustrates the development concept.





3.2 Trip Generation

3.2.1 Institute of Transportation Engineers Data

The Institute of Transportation Engineers (ITE) Trip Generation manual⁶ methods forecast site-generated trips. The following Land Use Codes (LUCs) were used to estimate most of the site trip generation (no ITE trip generation data is available for a music hall venue):

- ▶ LUC 310 – Hotel;
- ▶ LUC 712 – Small Office Building; and
- ▶ LUC 822 – Strip Retail Plaza (<40k).

As indicated in the description for LUC 310, the hotel land use would capture trip generation activity generated from the guest rooms, cafe, restaurant, and the fourth level event space.

The office uses and recording studios provided on the fifth and sixth levels of the hotel are assumed to have trip generation activity similar to LUC 712. The commercial space provided in the parking garage is assumed to have trip generation activity similar to LUC 822.

3.2.2 Music Hall Trip Generation

To estimate the trip generation activity for the music hall, the following parameters from a traffic study⁷ for a Music Hall in California were considered:

- ▶ A mode split of 20% for individuals being dropped off (for example, taxi/rideshare service/drop-off passengers);
- ▶ A mode split of 75% for individuals travelling to the site by personal automobile;
- ▶ 2.3 individuals per vehicle (personal auto and taxi/rideshare)
- ▶ An on-site parking rate of 56% for personal automobiles; and
- ▶ An arrival rate of 65% (personal auto) and 70% (taxi/rideshare).

Appendix D contains the trip generation calculations for the California traffic study. To remain conservative, it is assumed that the vehicle occupancy for vehicle trips generated by the music hall (personal auto and taxi/rideshare) is two persons per vehicle and that all vehicle trips

⁶ Institute of Transportation Engineers, *Trip Generation Manual*, 12th ed., (Washington DC: ITE, 2025).

⁷ Fehr and Peers, *Final Transportation Impact Study for the Sacramento Music Hall and Performing Arts Center Project*, (Fehr and Peers, 2022).



enter the site during the designated peak hours for this study (a vehicle arrival rate of 100%).

Assuming that typical show times for the music hall would occur in the late afternoon or evening hours, there would be no trips generated by the music hall during the weekday AM peak hour. However, the weekday PM and Saturday peak hours would likely capture the pre-event trip generation activity for the music hall.

Based on the music hall's proposed capacity of 500 people and information from the California study, the music hall would generate the following during the weekday PM and Saturday peak hours:

- ▶ 105 total trips from personal automobiles parking on site (entering only); and
- ▶ 100 total trips generated from taxis and rideshare services (50 entering and 50 exiting).

3.2.3 Total Trip Generation

Table 3.1 summarizes the site's estimated trip generation. The development is forecast to generate 192 trips in the weekday AM peak hour, 559 trips in the weekday PM peak hour, and 449 trips in the Saturday peak hour.

Prior to the initial submission, the site stats were updated. The revised figures increase the site's trip generation by three trips during the weekday AM, weekday PM, and Saturday peak hours. This minor increase is not expected to affect the study's findings, conclusions, or recommendations.

The trip generation estimates account for trips internal the site (between the hotel, office, and commercial uses) based on the ITE internal capture methodology. **Appendix E** contains the internal capture calculations. The music hall component of the site is not included in the internal capture calculations because the land use is not applicable to the internal capture methodology. The trip generation estimates for the site are considered conservative because it is acknowledged that there will likely be travel (by walking) captured between hotel guests and the music hall.

The trip generation estimates also include a calculation of pass-by trips based on pass-by rates published by ITE. Rates are not published for LUC 822; therefore, reference is made to the rates for LUC 821, which is the most similar land use code with published rates. An ITE pass-by trip reduction of 40% and 31% has been applied to the estimates for



LUC 822 during the weekday PM peak hour and Saturday peak hour.
Pass-by rates are not published for the weekday AM peak hour.



TABLE 3.1: ESTIMATED SITE-TRIP GENERATION

Component	Peak	In	Out	Total
LUC 310 – 412 Hotel Rooms	AM	73	67	140
	PM	151	145	296
	Saturday	99	95	194
LUC 712 – Office Space and Recording Studios (11.04 ft ² /1000)	AM	13	2	15
	PM	7	13	20
	Saturday	5	4	9
LUC 822 – Commercial Space (11.01 ft ² /1000)	AM	24	19	43
	PM	41	41	82
	Saturday	37	36	73
Music Hall – 500 People	AM	0	0	0
	PM	155	50	205
	Saturday	155	50	205
Total Generation	AM	110	88	198
	PM	354	249	603
	Saturday	296	185	481
<i>Internal Capture</i>	<i>AM</i>	3	3	6
	<i>PM</i>	7	7	14
	<i>Saturday</i>	5	5	10
<i>Pass-By Trips (LUC 821)</i>	<i>AM</i>	0	0	0
	<i>PM</i>	15	15	30
	<i>Saturday</i>	11	11	22
Net External Trip Generation	AM	107	85	192
	PM	332	227	559
	Saturday	280	169	449

LUC 310: AM – Average Rate = 0.34 | PM – $T = 0.85(X) - 55.22$ | SAT – Average Rate = 0.47

LUC 712: AM – Average Rate = 1.64 | PM – Average Rate = 2.16 | SAT – Average Rate = 0.98

LUC 822: AM – Average Rate = 3.93 | PM – $\ln(T) = 0.68 \ln(X) + 2.77$ | SAT – Average Rate = 6.63

3.3 Trip Distribution and Assignment

Table 3.2 summarizes the estimated trip distribution. The trip distribution for site generated traffic is based on the adjusted base year distribution and the 2022 Transportation Tomorrow Survey (TTS) data.⁸ The site is located within 2022 TTS zone 11283 and the data is reflective of travel patterns from 7:00 AM to 6:00 PM.

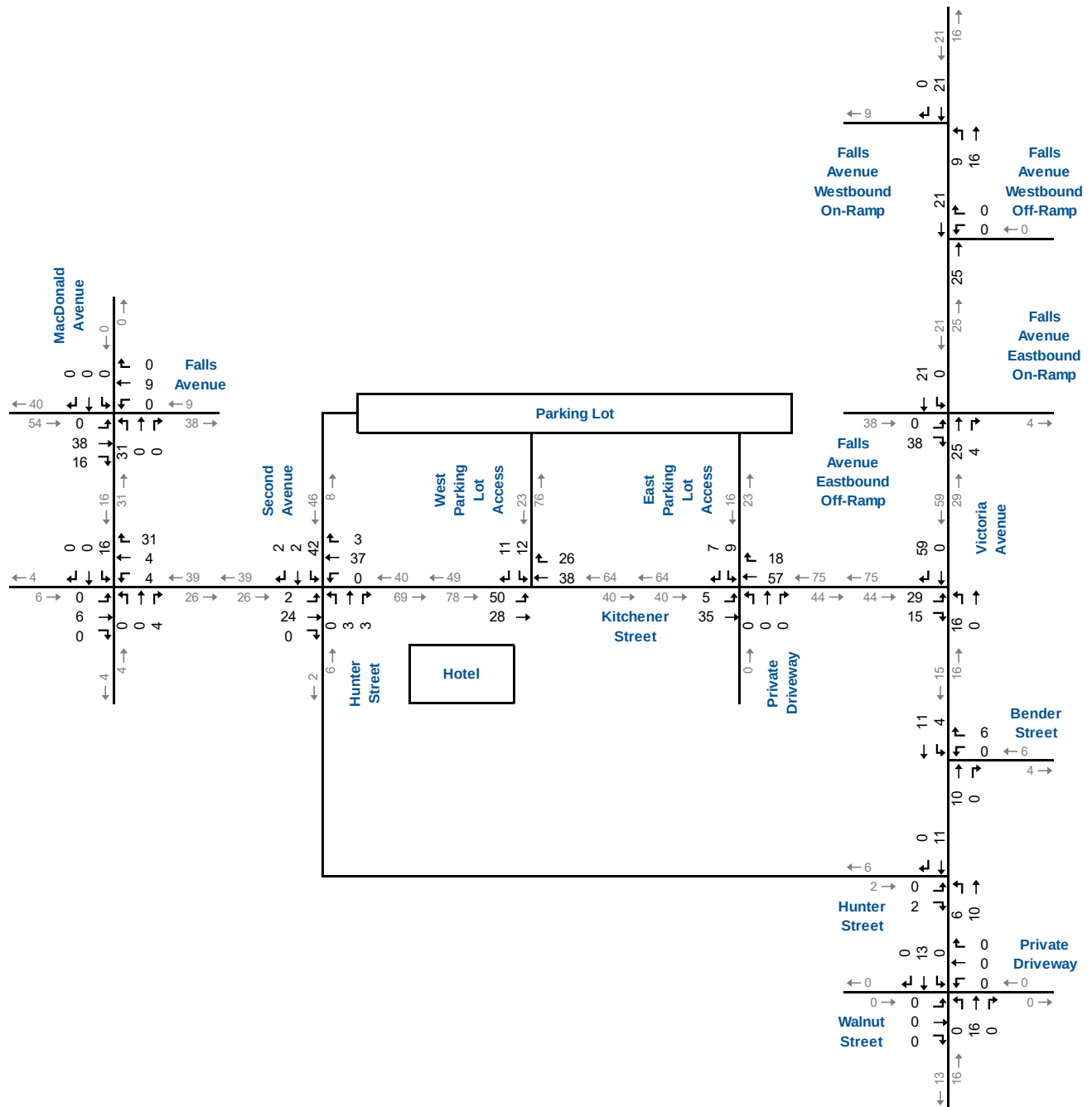
Figure 3.2, Figure 3.3, and Figure 3.4 illustrate the site-generated traffic estimates during the weekday AM, weekday PM, and Saturday peak hours.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Distribution	AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
	In	Out	In	Out	In	Out
North via Victoria Avenue	20%	20%	20%	15%	20%	15%
South via Victoria Avenue	15%	15%	20%	20%	15%	20%
South via Macdonald Avenue	5%	5%	5%	5%	5%	5%
East via Bender Street	5%	5%	5%	5%	5%	5%
East via Falls Avenue	0%	5%	0%	0%	0%	5%
West via Falls Avenue	50%	45%	45%	50%	50%	45%
West via Kitchener Street	5%	5%	5%	5%	5%	5%
Total	100%	100%	100%	100%	100%	100%

⁸ Data Management Group, *Transportation Tomorrow Survey 2022*, University of Toronto, 2025, <http://www.transportationtomorrow.on.ca/>

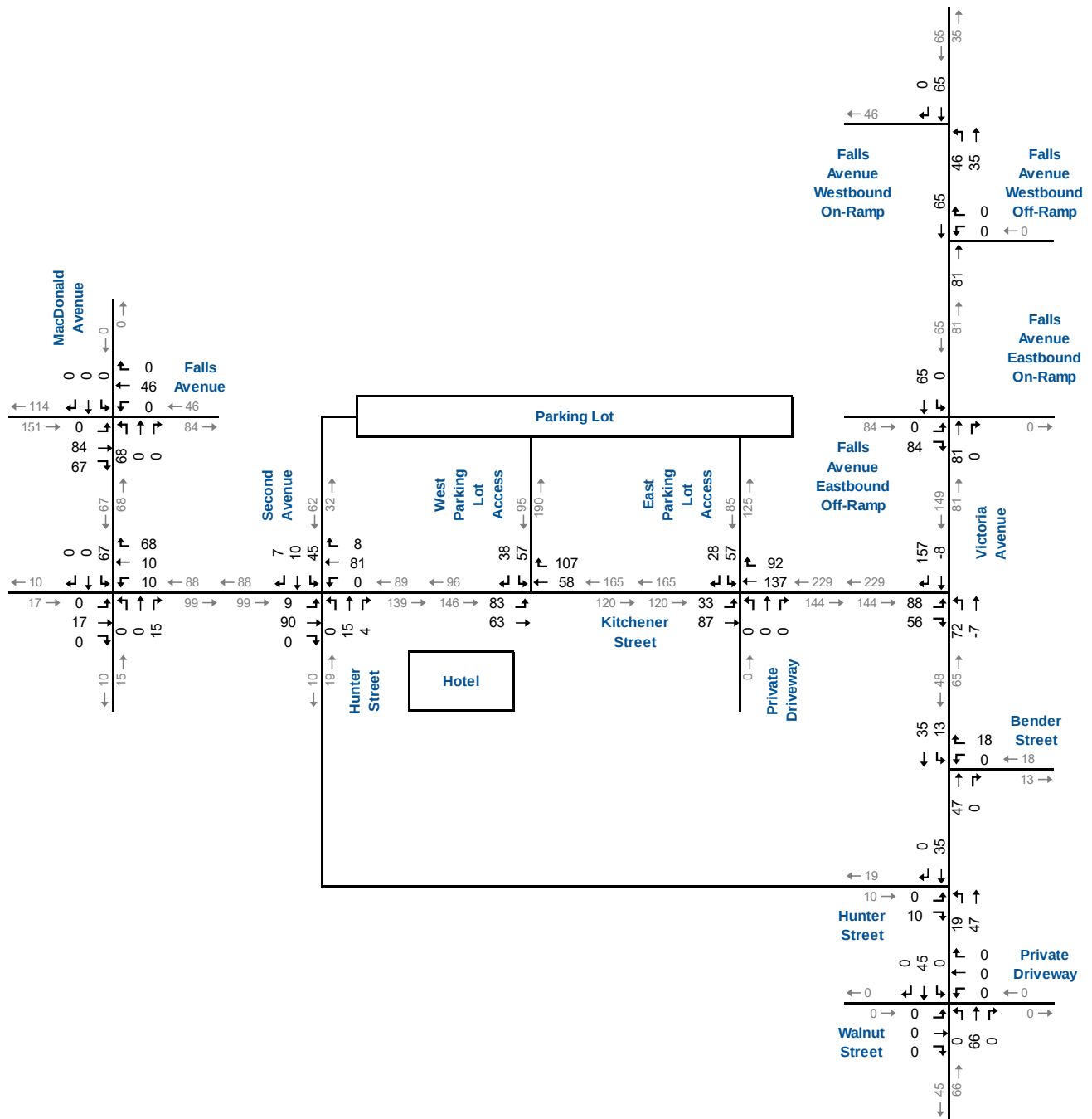




Site-Generated Traffic Volumes (Weekday AM Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

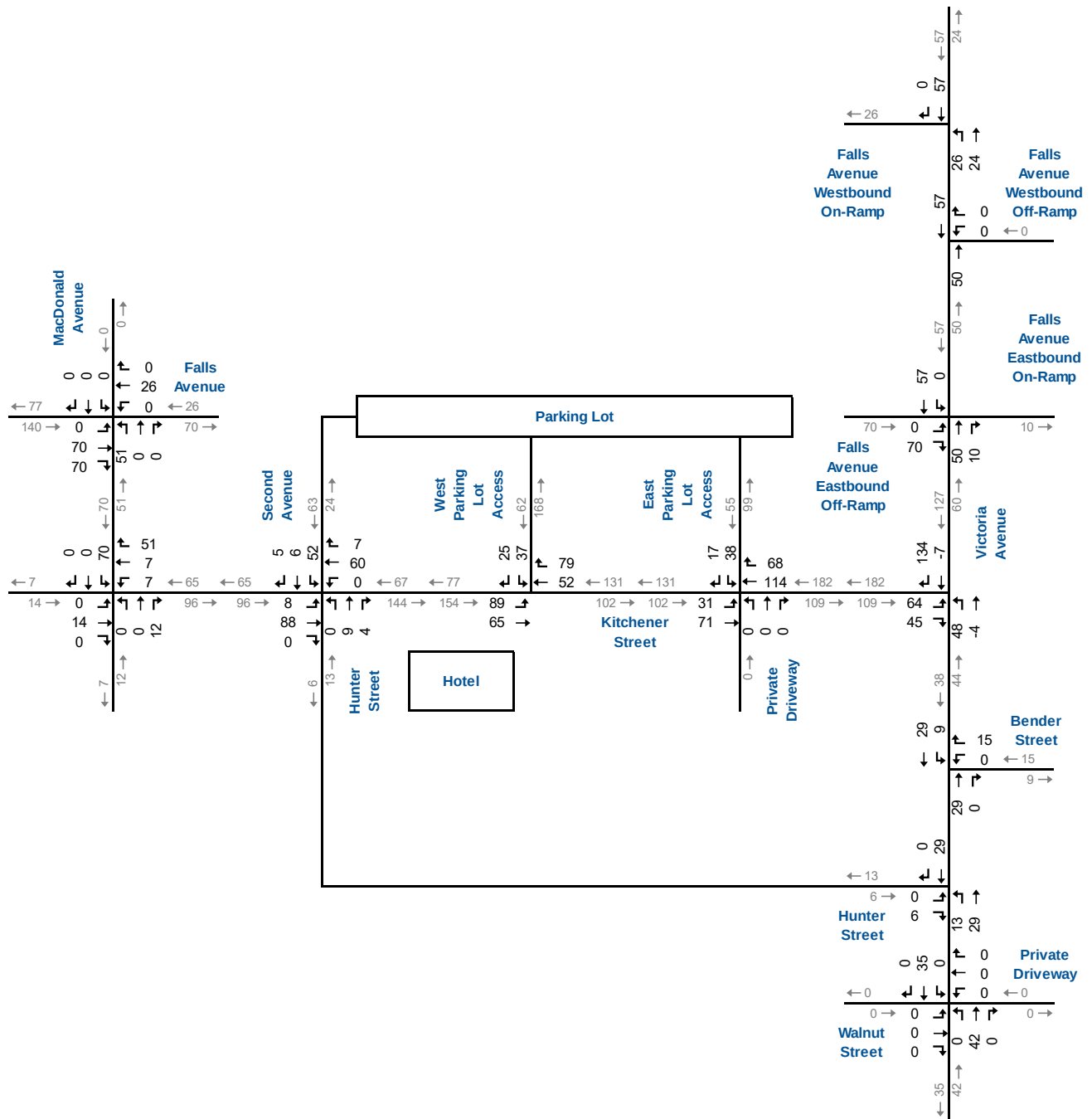
Figure 3.2



Site-Generated Traffic Volumes (Weekday PM Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

Figure 3.3



Site-Generated Traffic Volumes (Saturday Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

Figure 3.4

3.4 Site Circulation Review

The site circulation has been assessed using the following design vehicles:

- ▶ Transportation Association of Canada (TAC)⁹ Heavy Single Unit (HSU);
- ▶ TAC Medium Single Unit (MSU);
- ▶ TAC Light Single Unit (LSU); and
- ▶ TAC Passenger Car (P).

There are three loading zones. Two loading zones are located on the hotel site, and the third is located within the parking structure.

The hotel loading zones can accommodate MSU and LSU design vehicles. The MSU can access only the north loading zone, while LSUs can access both the north and south loading zones. The two loading areas operate independently, meaning an MSU can enter and use the north loading zone even when an LSU is occupying the south loading zone.

For the HSU design vehicle, exit movements from the loading space within the parking structure will need to be coordinated with valet operations because a small portion of the layby area is required for the vehicle to complete its maneuver. Alternatively, the exit radius could be increased through design refinements to reduce or eliminate the need for operational coordination.

The internal circulation within the parking garage follows typical design conventions for structured parking facilities and is considered functional.

Vehicles travelling within the parking structure are expected to be travelling at a low speed. Driver attention is required to navigate and circulate within the structure as well while undertaking parking manoeuvres adjacent to structural columns or walls. Typical of residential parking structures, building residents will become accustomed and learn the necessary driving behaviours required.

Signage and warning lights will be provided at the loading zones to warn others while the loading zone is in active use.

Appendix F contains the vehicle maneuvering diagrams.

⁹ Transportation Association of Canada, *Geometric Design Guide for Canadian Roads*, (Ottawa: TAC, 2017).



3.5 Valet Operations

The valet service operations for the proposed hotel were assessed during the weekday AM, weekday PM, and Saturday peak hours based on a valet parking survey¹⁰ completed for an existing hotel (6740 Fallsview Boulevard) in the City of Niagara Falls.

Based on a room count of 412 for the proposed hotel and the average arrival rates from proxy site survey, the valet parking demand for the proposed development is:

- ▶ 41 vehicles per hour during the weekday AM peak hour;
- ▶ 38 vehicles per hour during the weekday PM peak hour; and
- ▶ 48 vehicles per hour during the Saturday peak hour.

It is noted that the valet parking demand for the site is assumed to consist of hotel guests checking in and checking out.

The maximum 95th percentile queue length (or valet service demand) for the proposed development at one specific moment is based on the maximum average arrival rate (48 vehicles per hour), an average service time of 7.5 minutes (used the proxy study), and statistical analysis.

Appendix G contains the valet trip assignments for the proposed development during the weekday AM, weekday PM, and Saturday peak hours plus the calculations for vehicle queuing generated by the hotel's valet service.

The forecast 95th percentile queue for the valet service is 10 vehicles. Additionally, as a worst-case scenario, the valet trip assignments show the arrival demand (guests checking in) and the departure demand (guests checking out) as being equal to the valet parking demand listed above for the proposed development in each peak hour. It is also noted that imbalance of site valet trips are illustrated along Kitchener Street to resemble vehicles making a U-turn to enter/exit the on-street valet parking layby.

The proposed development proposes 9 valet spots (5 on-street and 4 off-street). To accommodate the valet queuing demand, one additional valet spot should be designated for valet parking.

¹⁰ Paradigm Transportation Solutions Limited, 6740 Fallsview Boulevard (Marriott Fallsview) Niagara Falls, ON *Transportation Impact Assessment – Update*, (Cambridge: PTSL, 2022).



4 Future Conditions

The assessment of the future traffic conditions reflects two horizon years: the estimated opening year (2028) and five (2033) years after the full build-out and occupancy.

The intersection operations analyses for the forecast background and total traffic scenarios (all horizon years) follow the same methodology used for the base year conditions; however, signal timings have been optimized at all signalized intersections.

4.1 Forecast Traffic

Future background traffic volumes reflect an annual growth rate of 2.0% per annum applied to the adjusted base year volumes as requested by city staff. No growth rate has been applied to traffic entering and exiting the private driveway connections along Kitchener Street.

Existing traffic using the parking lot driveway to Kitchener Street is assumed to remain on the network and will be attracted to the proposed municipal parking supply in the parking structure.

In addition to the generalized background traffic growth, the following developments are included in the background traffic volumes:

- ▶ 4709 Bender Street¹¹: The development is located southeast of the subject site at the intersection of Bender Street and Ontario Avenue. The proposed 402 room hotel is assumed to be built-out by 2028 and is forecast to generate 194, 270, and 283 trips during the weekday AM, weekday PM, and Saturday peak hours, respectively; and
- ▶ 5613 Victoria Avenue¹²: The mixed-use development is located south of the subject site along the southwest side of Walnut Street between Victoria Avenue and Ellen Avenue. The proposed development consists of a 404-bedroom hotel, high-rise condominium units (462 total), townhome units (7 total), plus a 687 m² commercial area. The site is forecast to generate 341, 412, and 472 new trips during the weekday AM, weekday PM, and Saturday peak hours, respectively. No build-out year for the development is listed in the TIS and only a ten-year horizon from the date of study (2031) was assessed for future

¹¹ R.V. Anderson Associates Limited, *Ice Sculpture Centre Hotel Development Traffic Impact Study*, (RVA, 2023).

¹² Paradigm Transportation Solutions Limited, *5613 Victoria Avenue, Niagara Falls, ON Transportation Impact & Parking Study (2nd Submission)*, (Cambridge: PTSL, 2021).



traffic conditions. It is assumed that site may not be built-out by 2028 and is only considered within the 2033 horizon year.

Appendix H contains the background development traffic volumes. As requested by the city, the future traffic analysis considers traffic volumes with and without background development traffic.

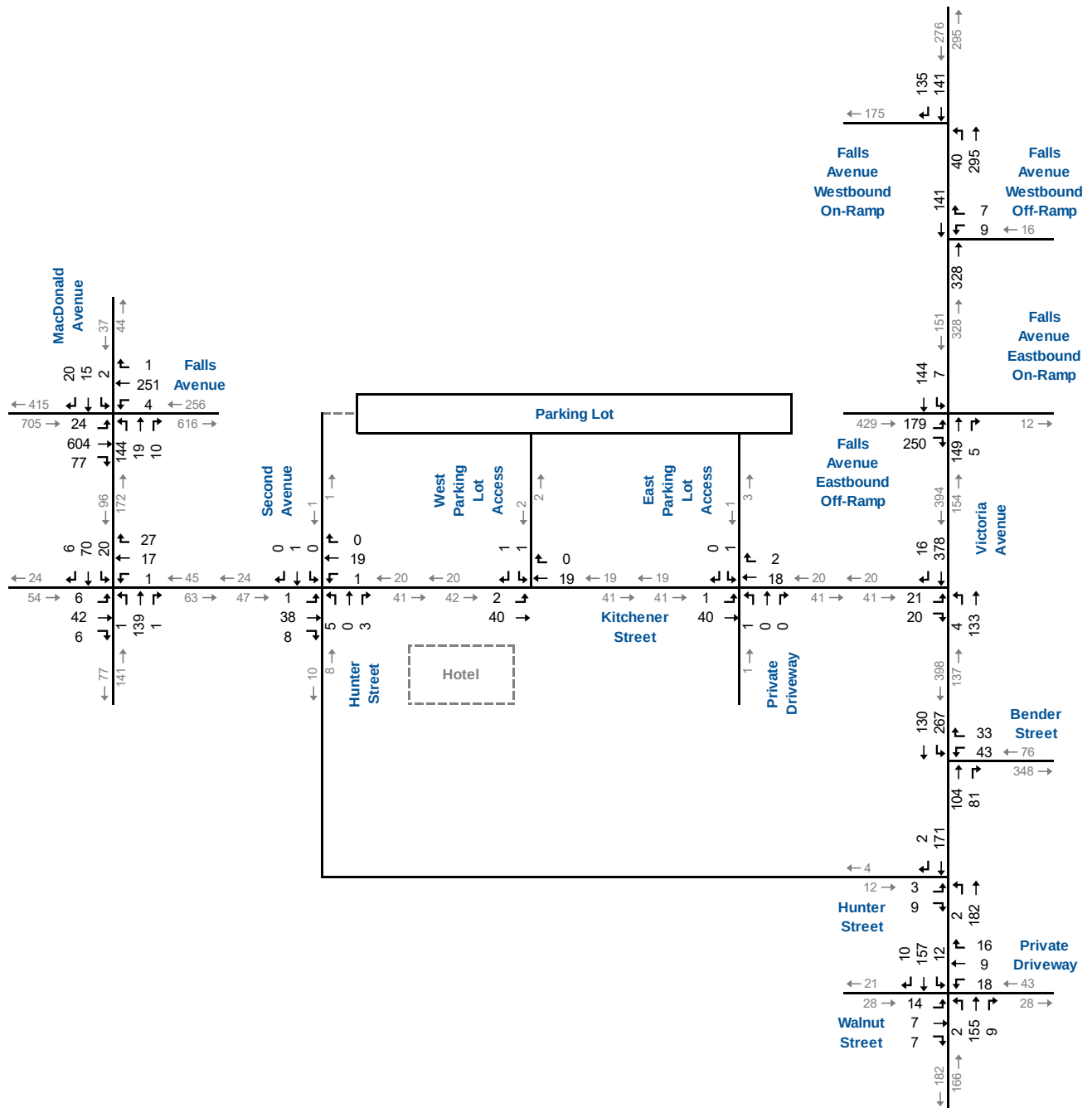
Figure 4.1, Figure 4.2, and Figure 4.3 illustrate the forecast opening year background traffic volumes without background developments. **Figure 4.4, Figure 4.5, and Figure 4.6** illustrate the forecast opening year total traffic volumes (background and site traffic) without background developments.

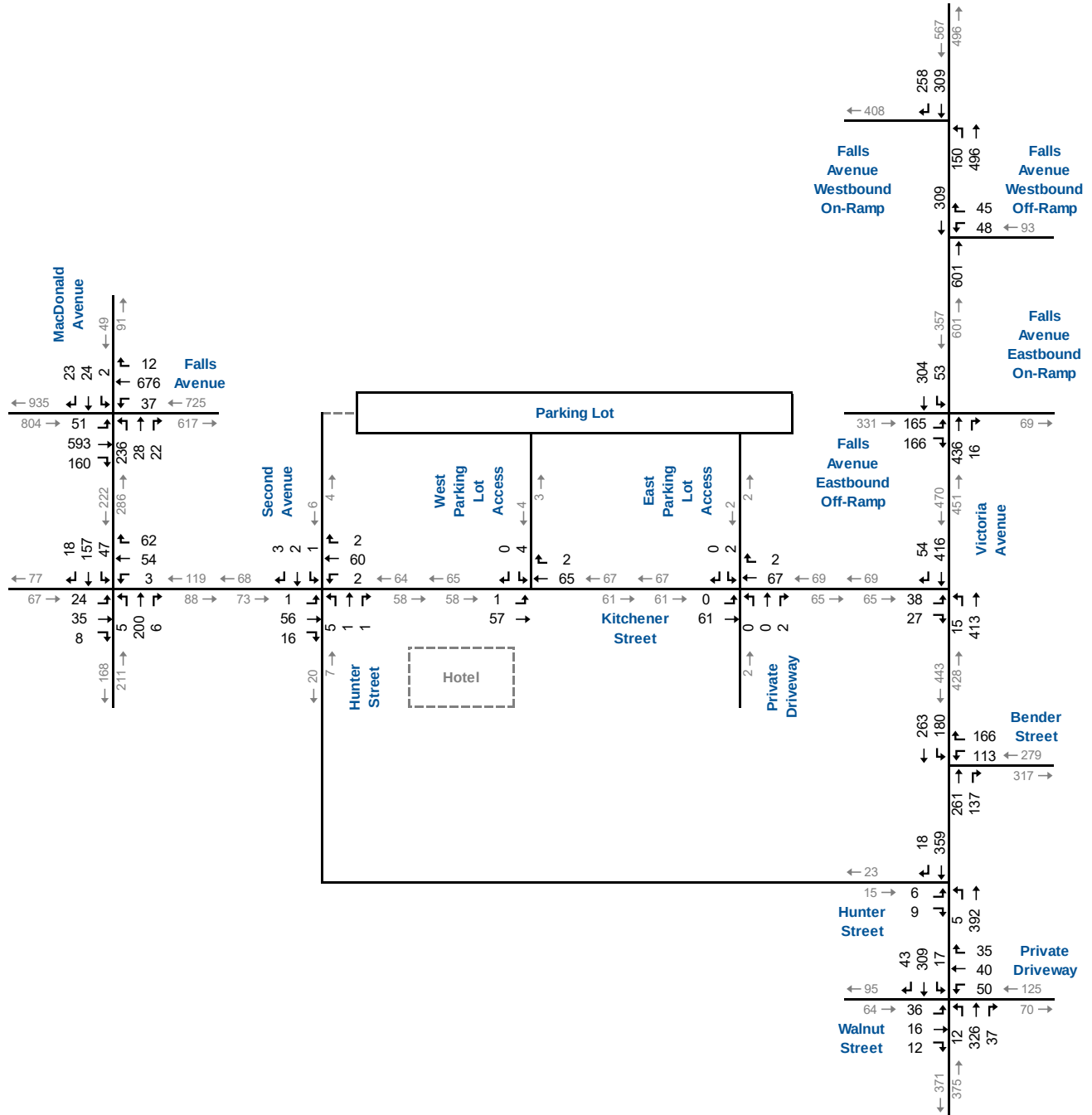
Figure 4.7, Figure 4.8, and Figure 4.9 illustrate the forecast five-year background traffic volumes without background developments. **Figure 4.10, Figure 4.11, and Figure 4.12** illustrate the forecast five-year total traffic volumes (background + site traffic) without background developments.

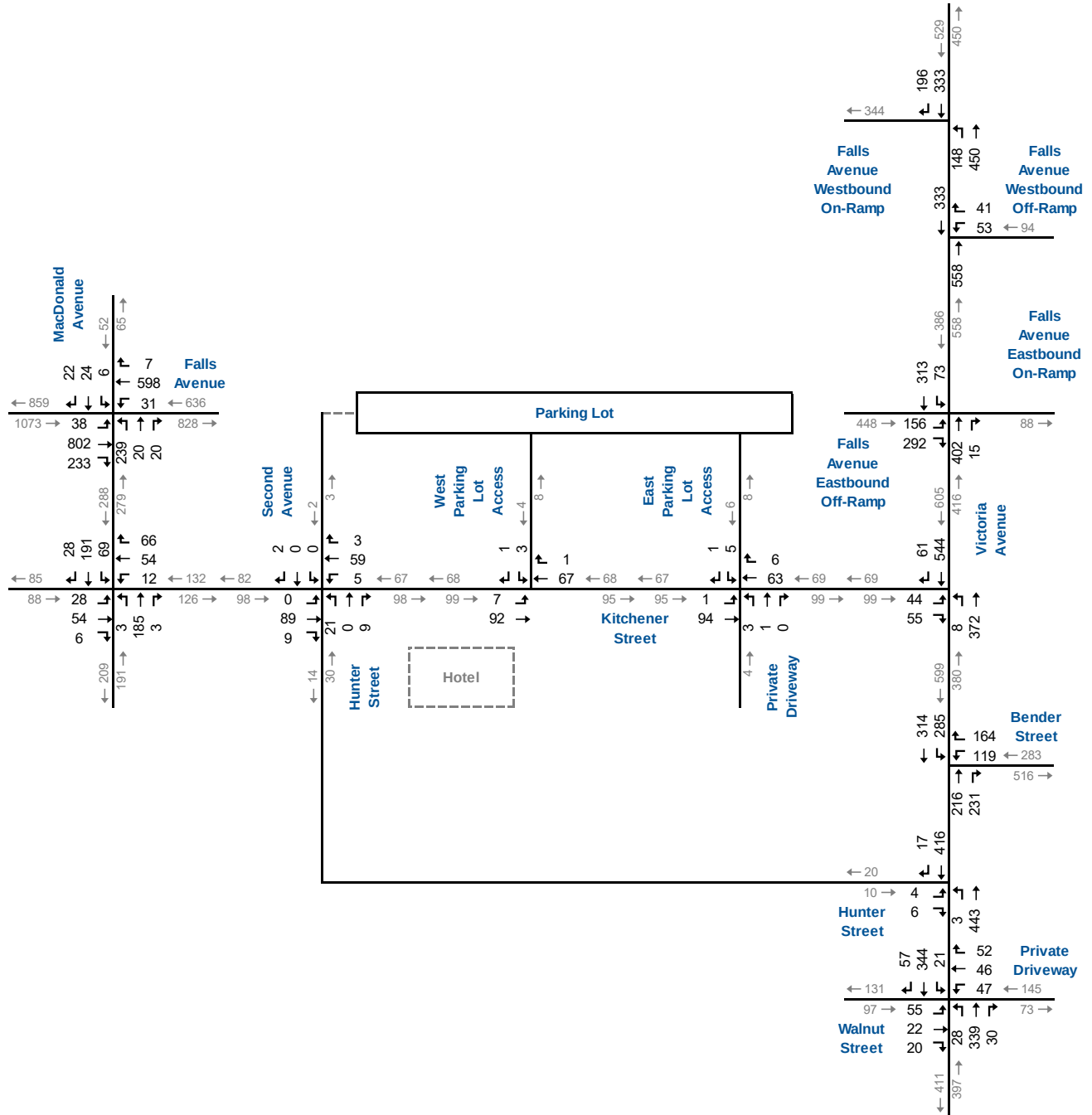
Figure 4.13, Figure 4.14, and Figure 4.15 illustrate the forecast opening year background traffic volumes with background developments. **Figure 4.16, Figure 4.17, and Figure 4.18** illustrate the forecast opening year total (background and site traffic) traffic volumes with background developments.

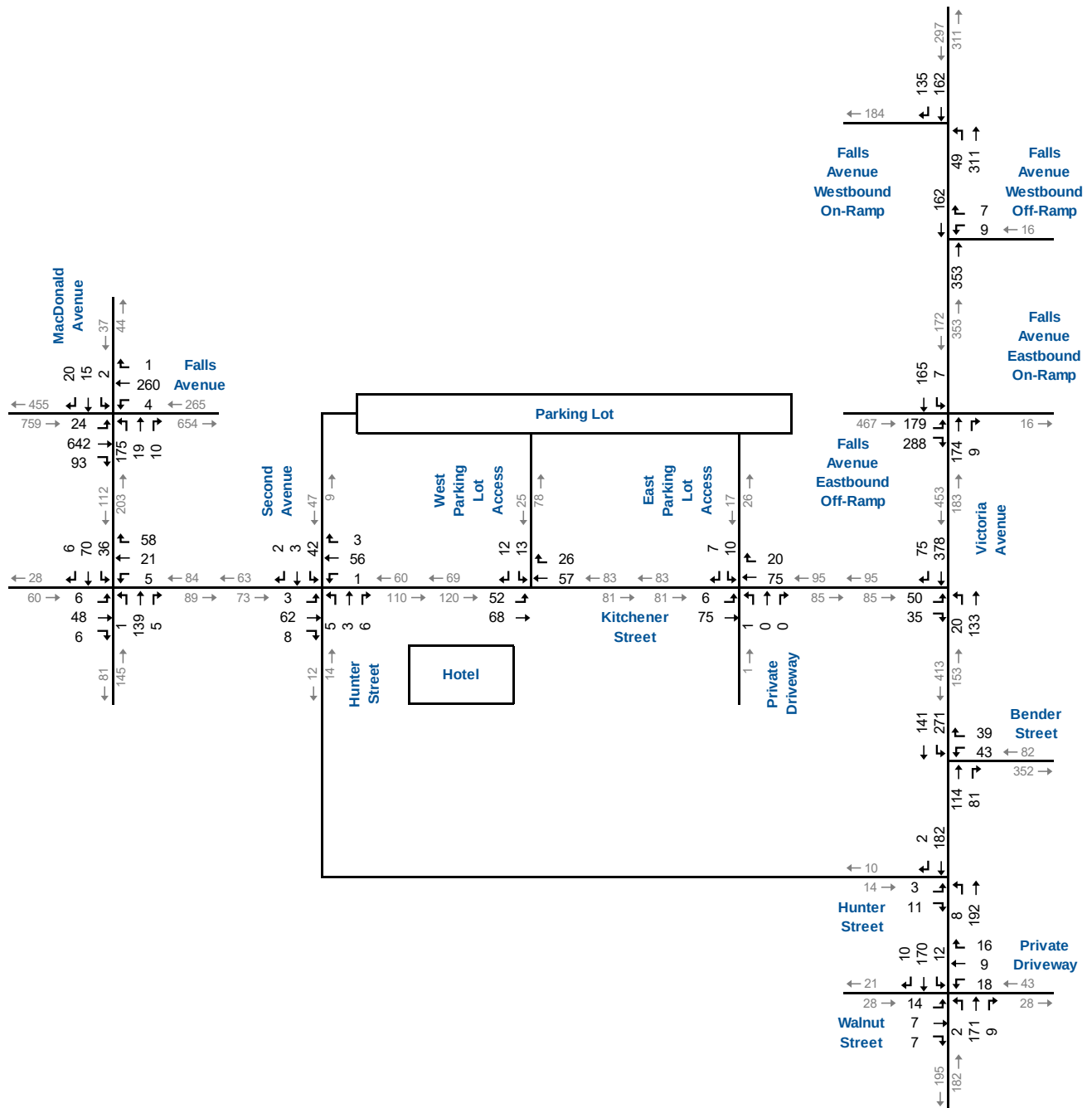
Figure 4.19, Figure 4.20, and Figure 4.21 illustrate the forecast five-year background traffic volumes with background developments. **Figure 4.22, Figure 4.23, and Figure 4.24** illustrate the forecast five-year total traffic volumes (background and site traffic) with background developments.

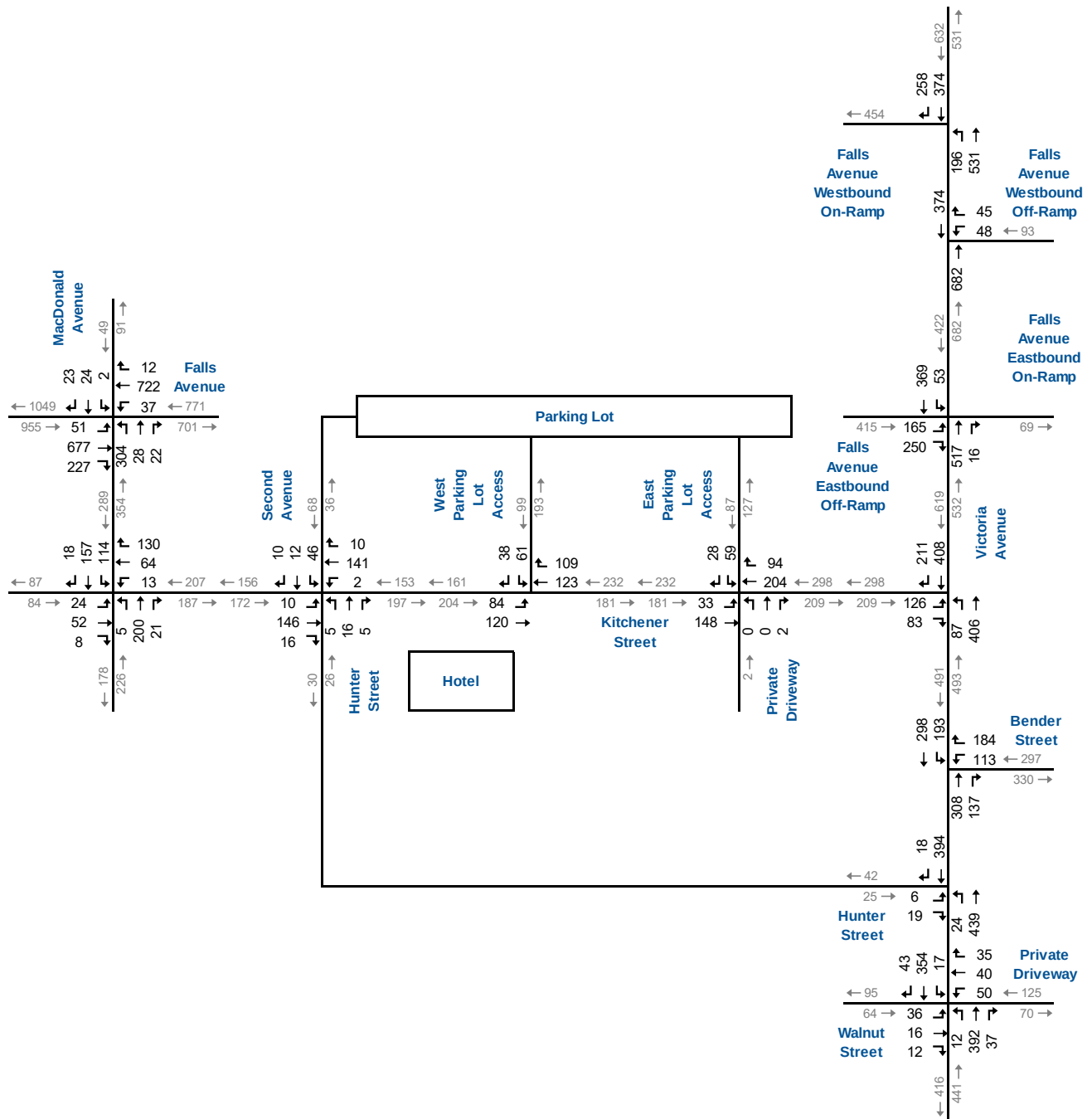








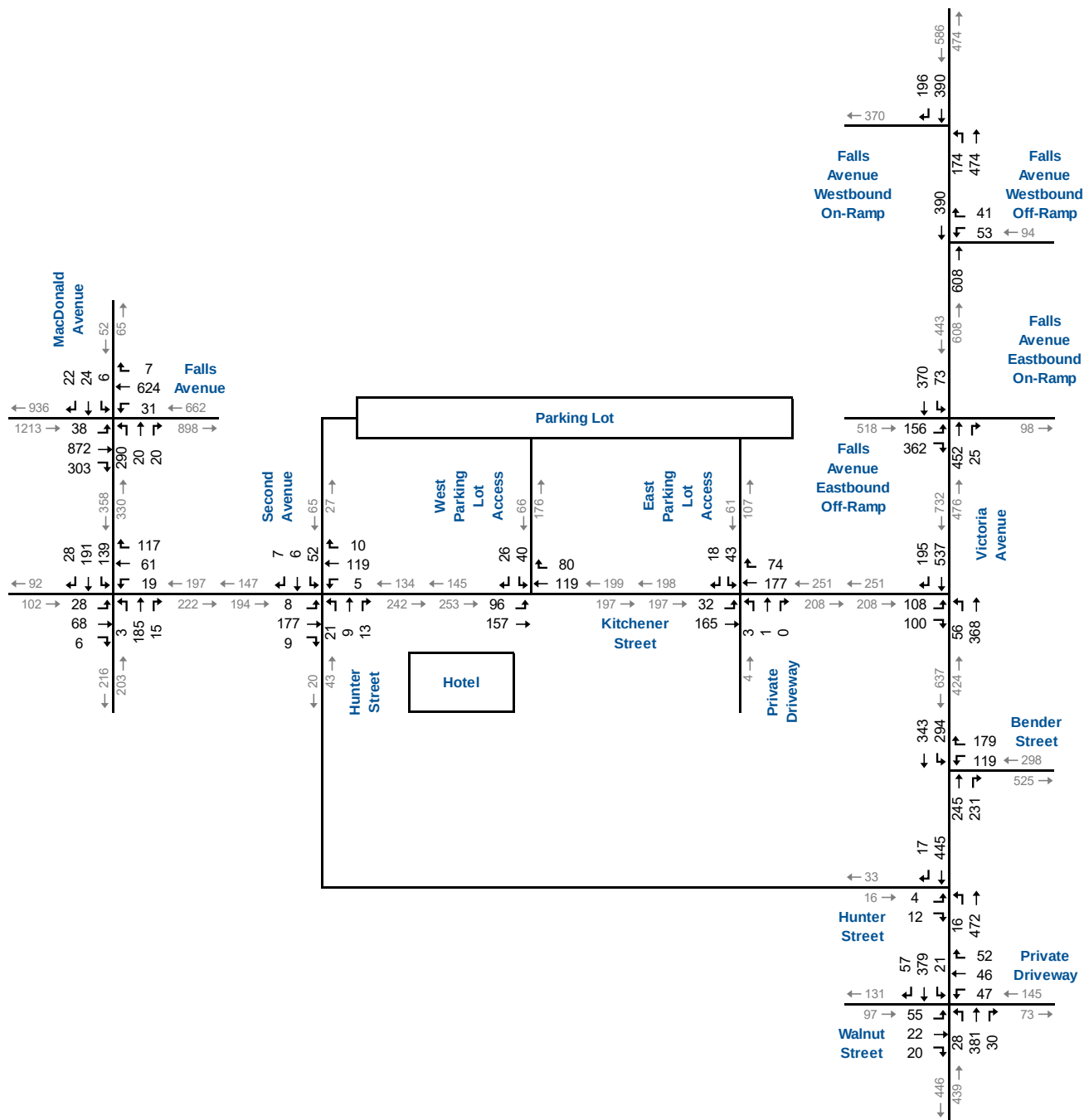


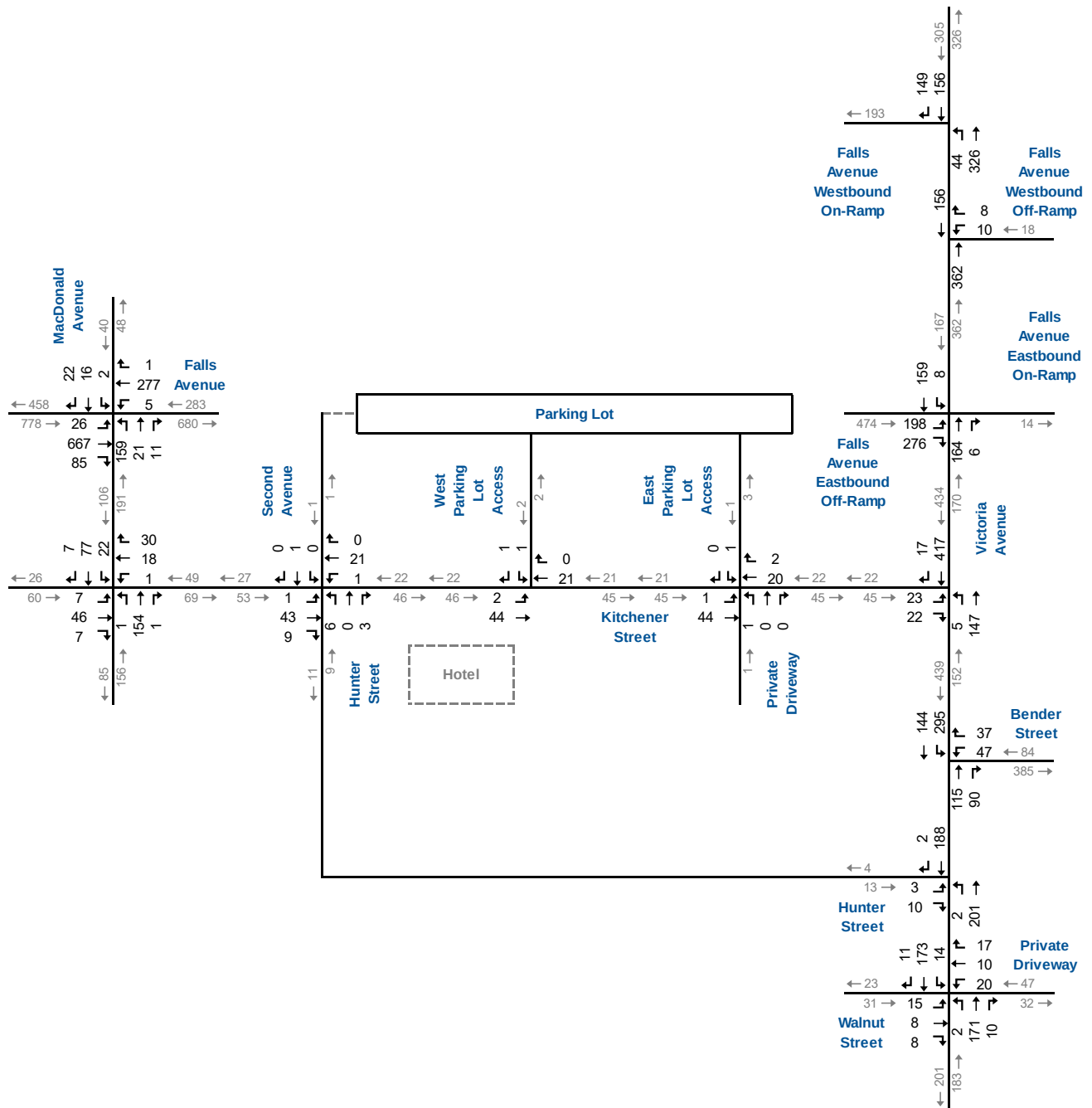


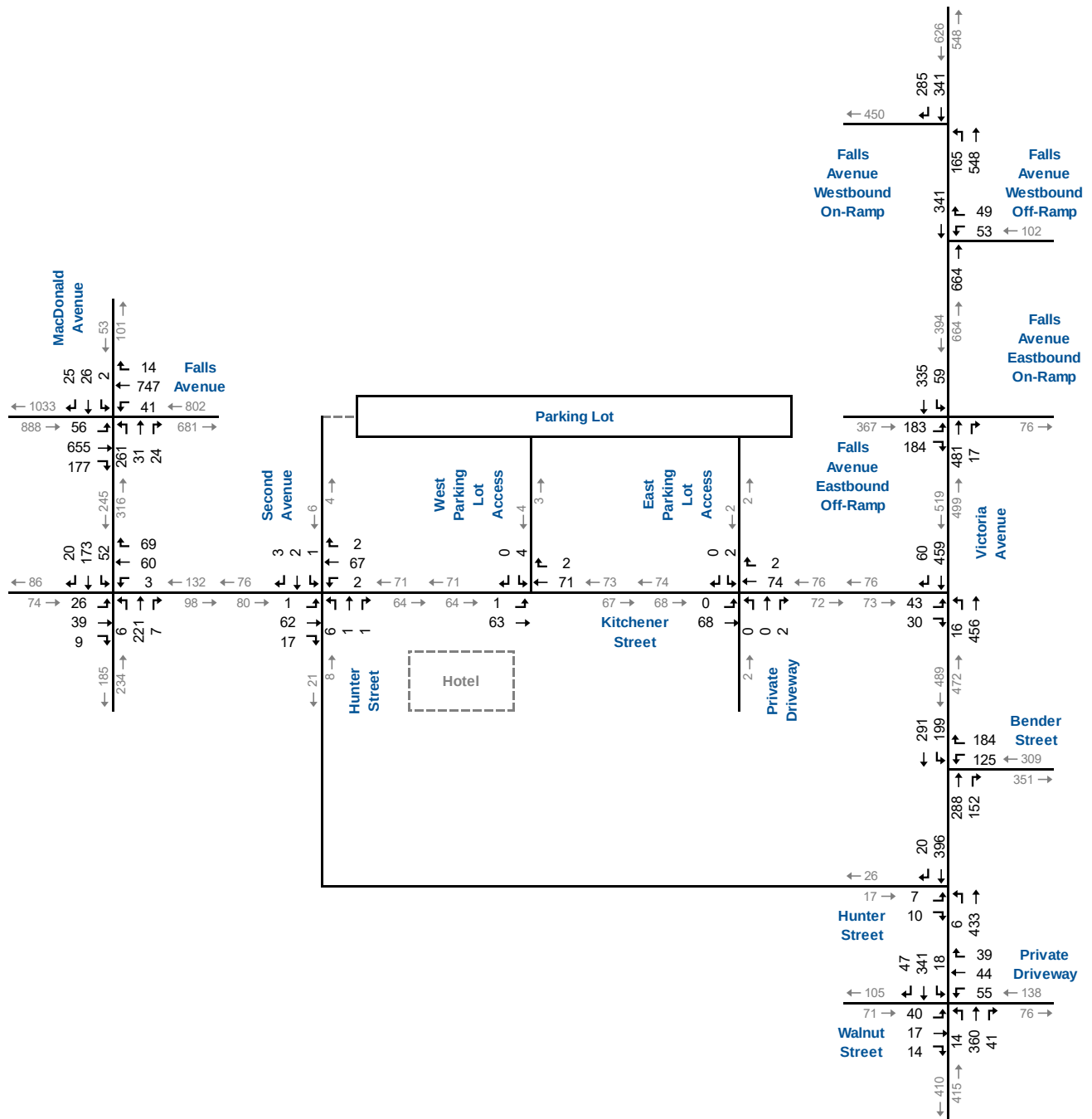
Opening Year Total Traffic Volumes Without Background Development (Weekday PM Peak Hour)

4873 and 4898 Kitchener Street, Niagara Falls TIS and PS
250550

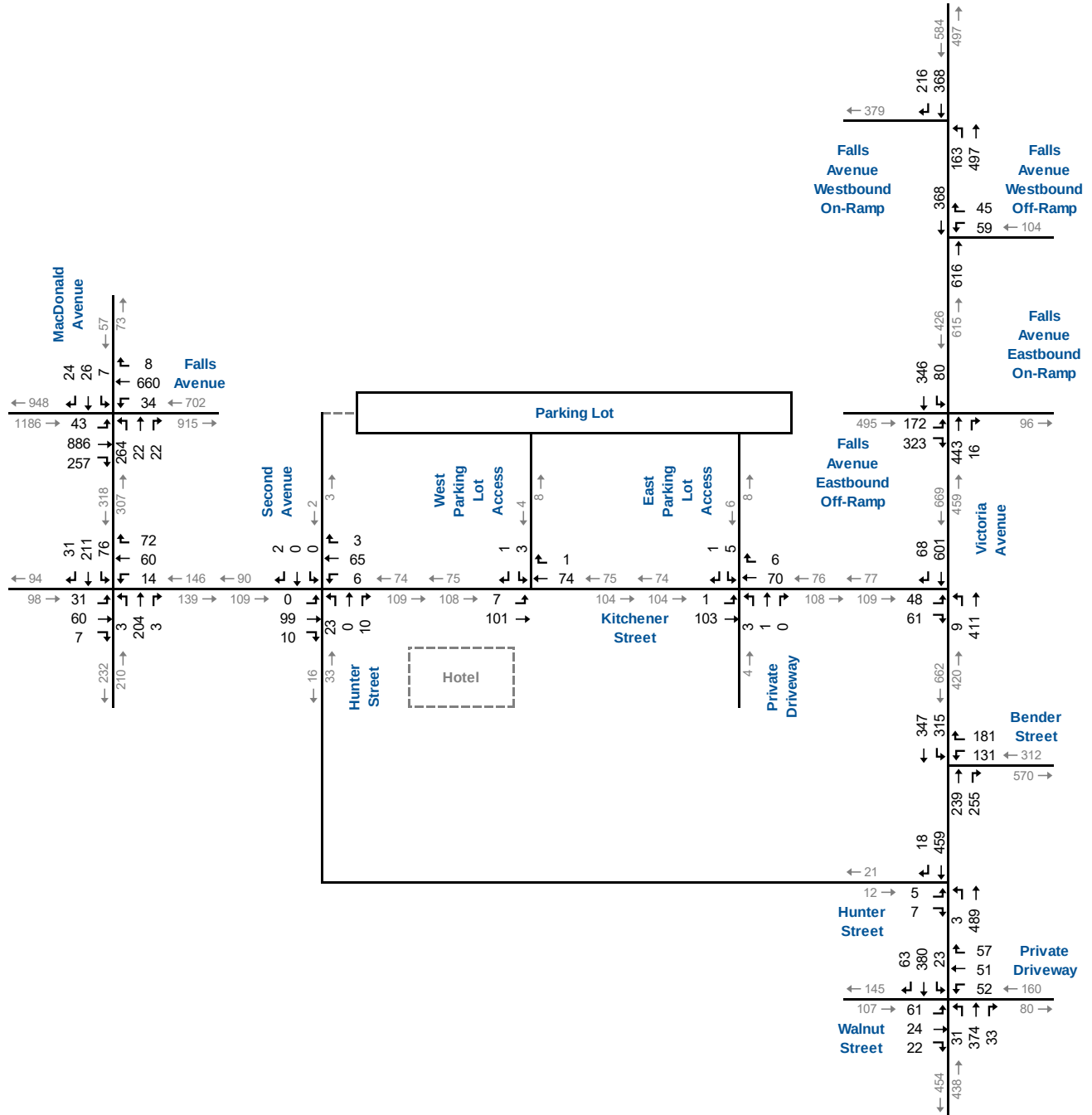
Figure 4.5







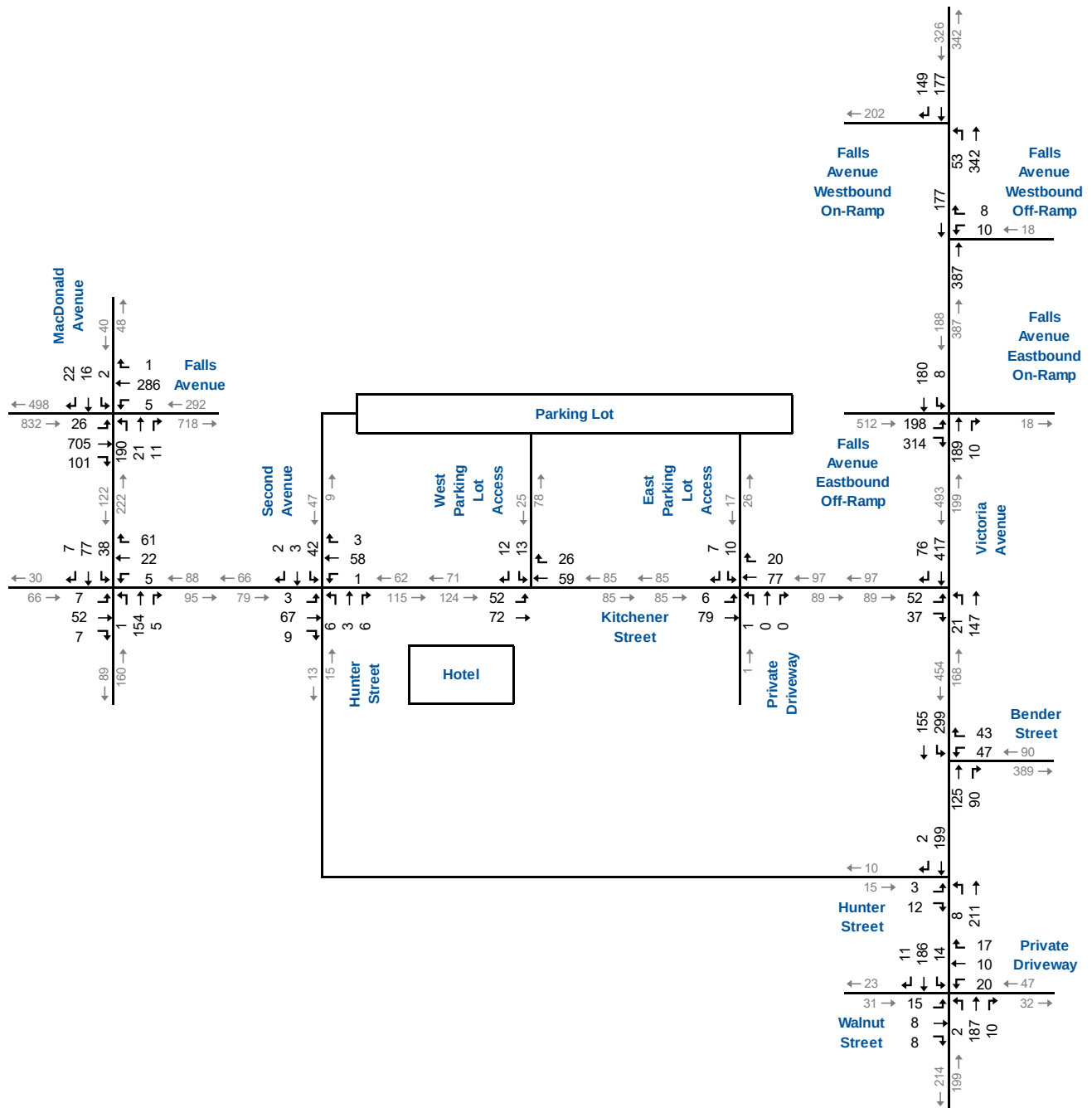
Five-Year Background Traffic Volumes Without Background Development (Weekday PM Peak Hour)



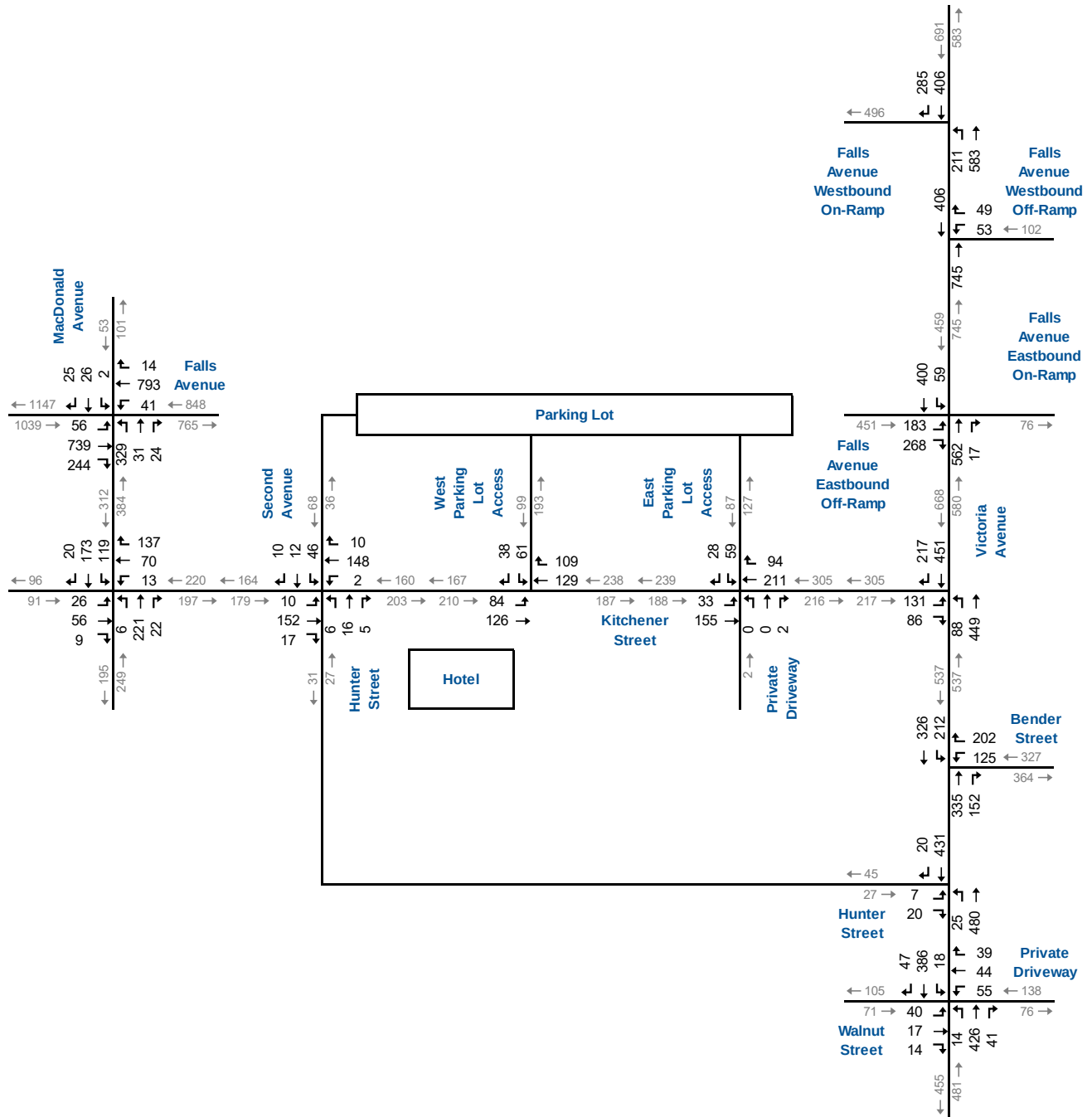
Five-Year Background Traffic Volumes Without Background Development (Saturday Peak Hour)

4873 and 4898 Kitchener Street, Niagara Falls TIS and PS
250550

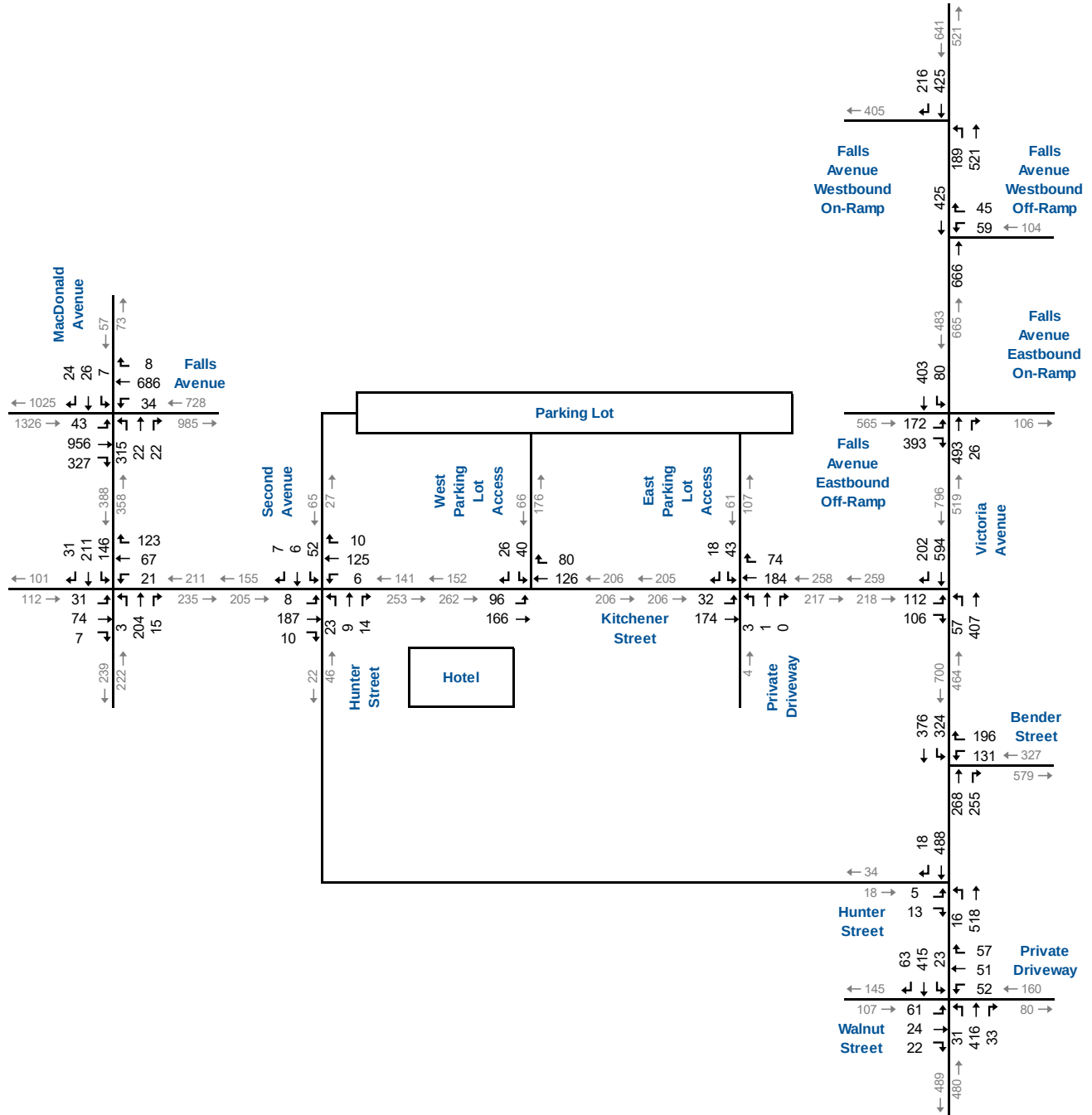
Figure 4.9



Five-Year Total Traffic Volumes Without Background Development (Weekday AM Peak Hour)



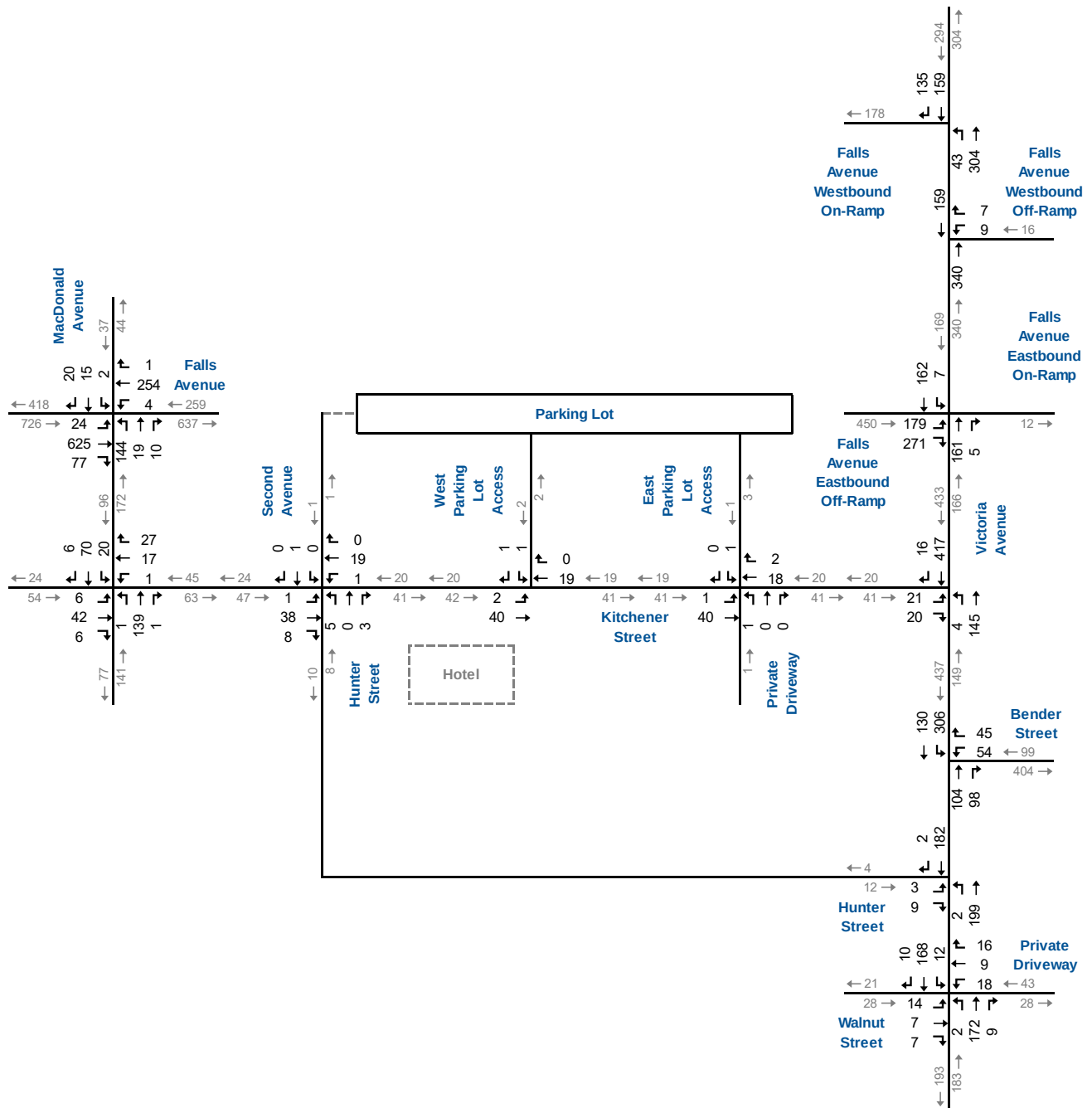
Five-Year Total Traffic Volumes Without Background Development (Weekday PM Peak Hour)



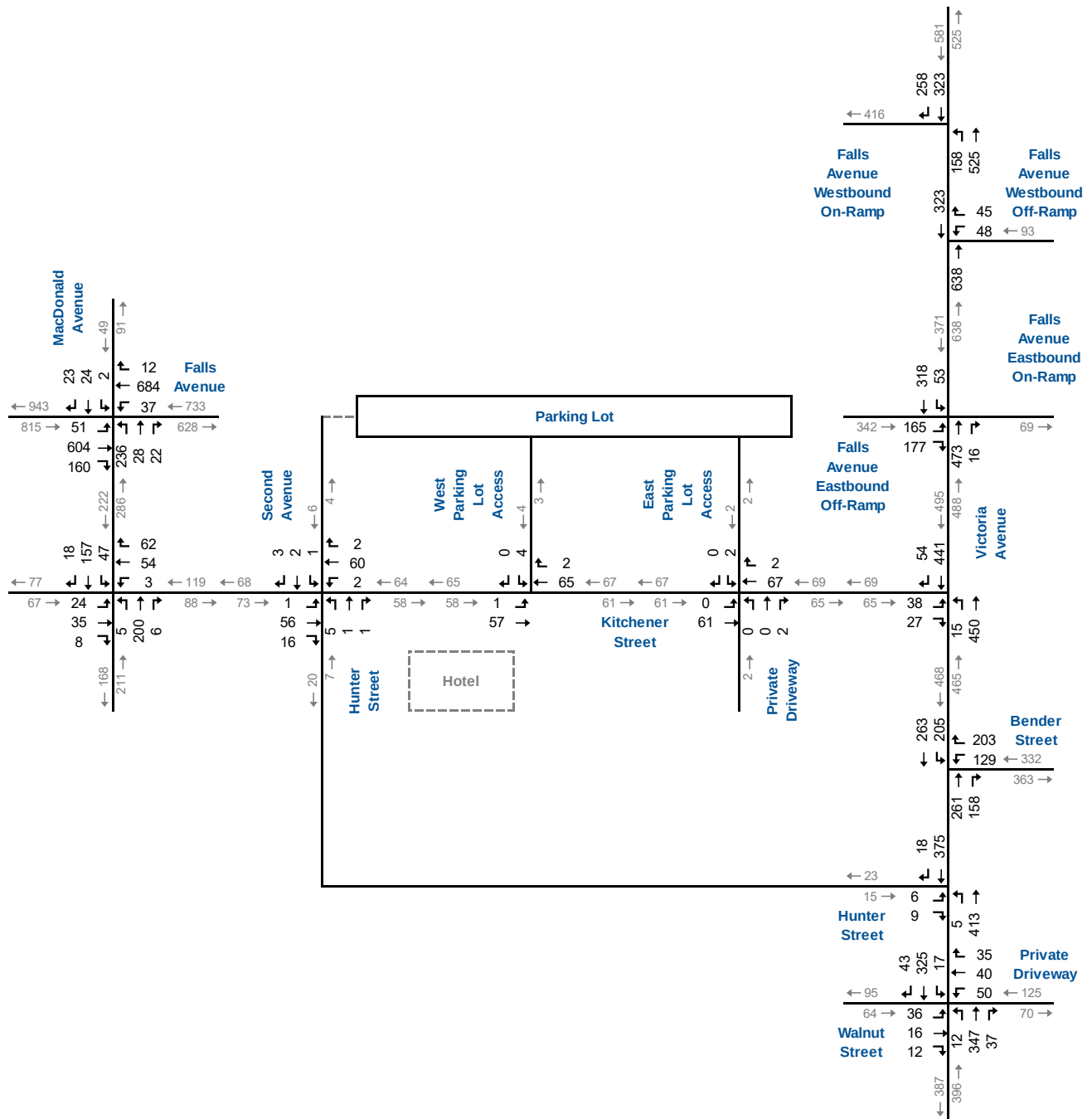
Five-Year Total Traffic Volumes Without Background Development (Saturday Peak Hour)

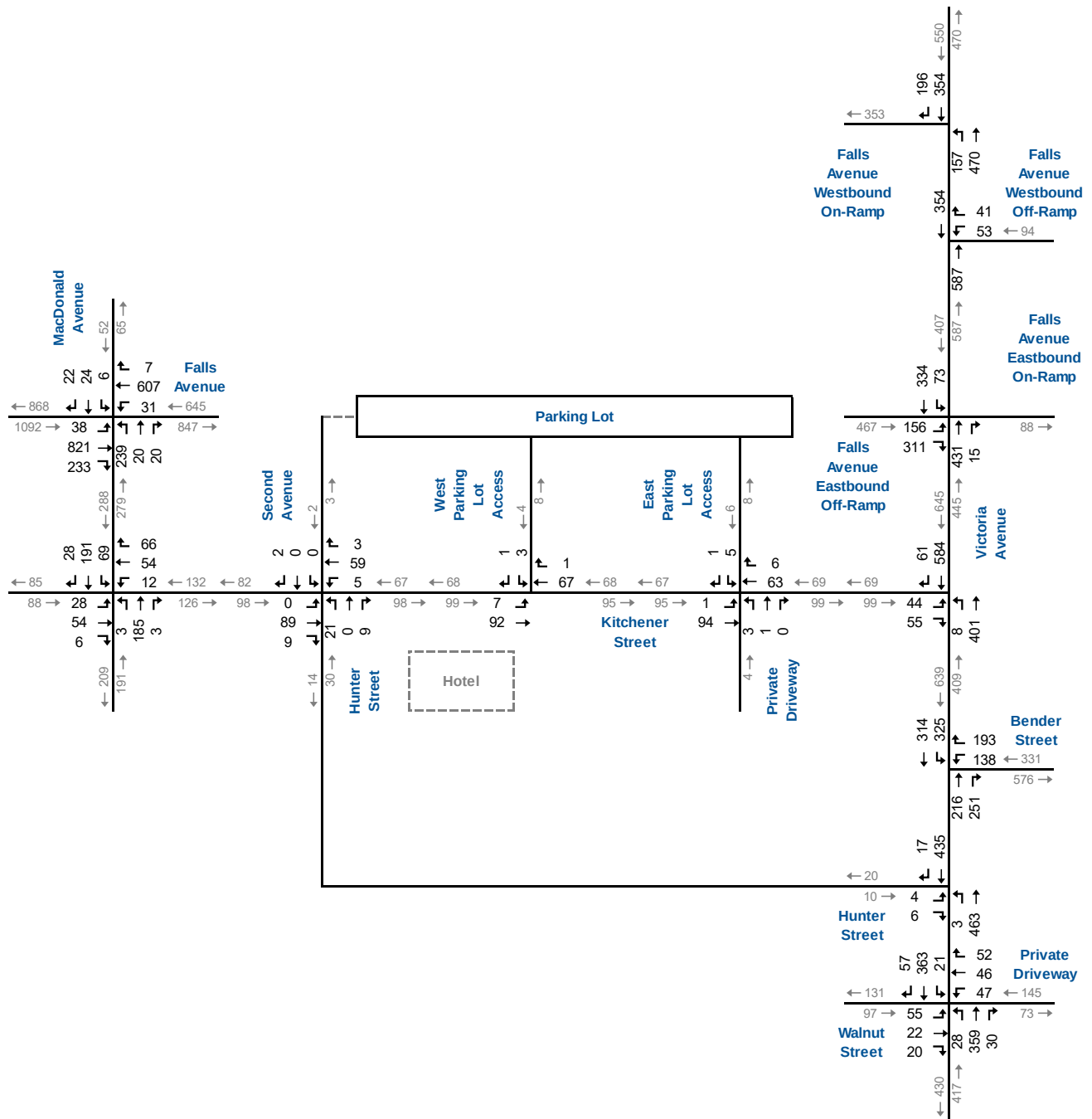
4873 and 4898 Kitchener Street, Niagara Falls TIS and PS 250550

Figure 4.12



Opening Year Background Traffic Volumes With Background Development (Weekday AM Peak Hour)

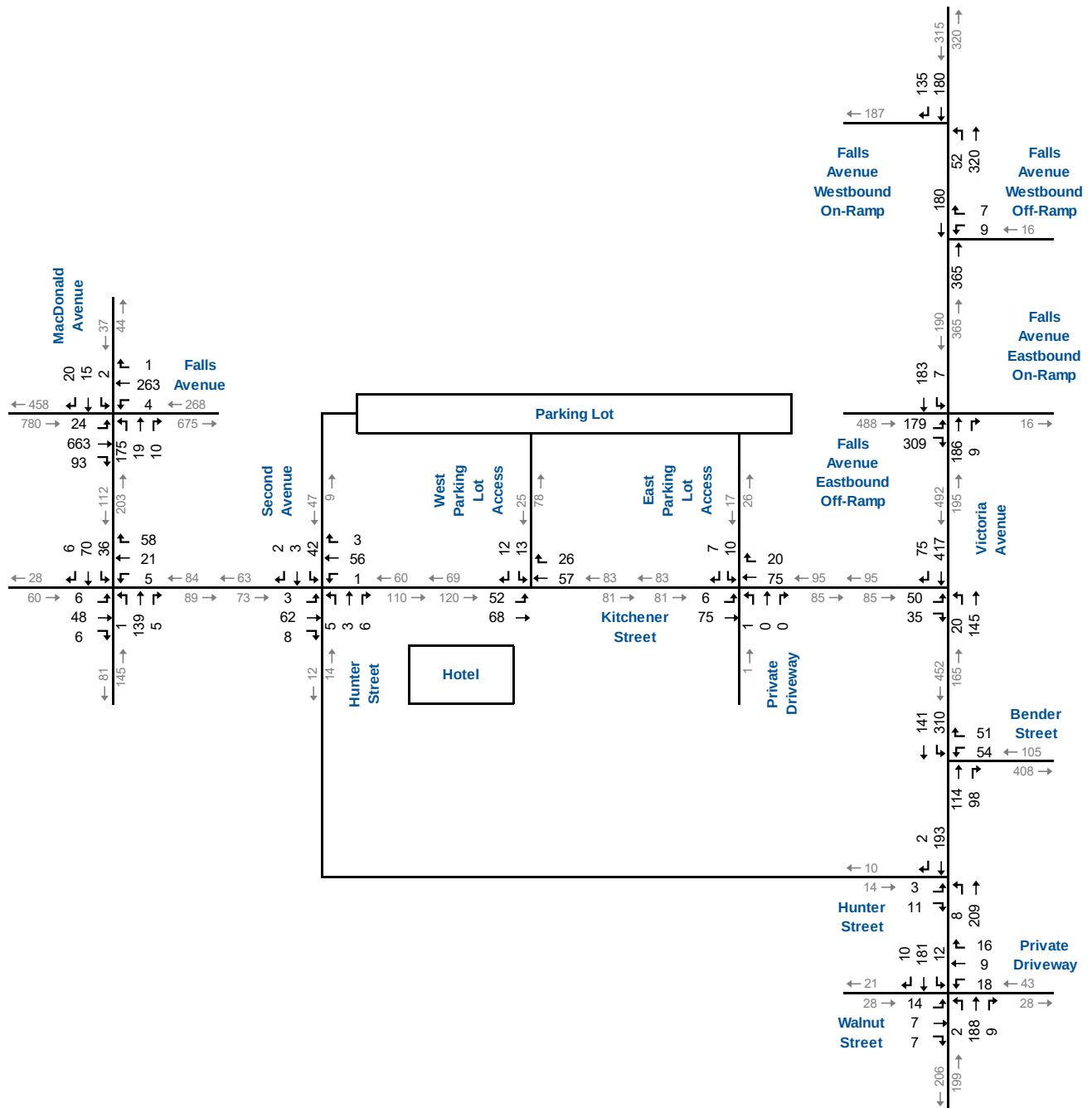


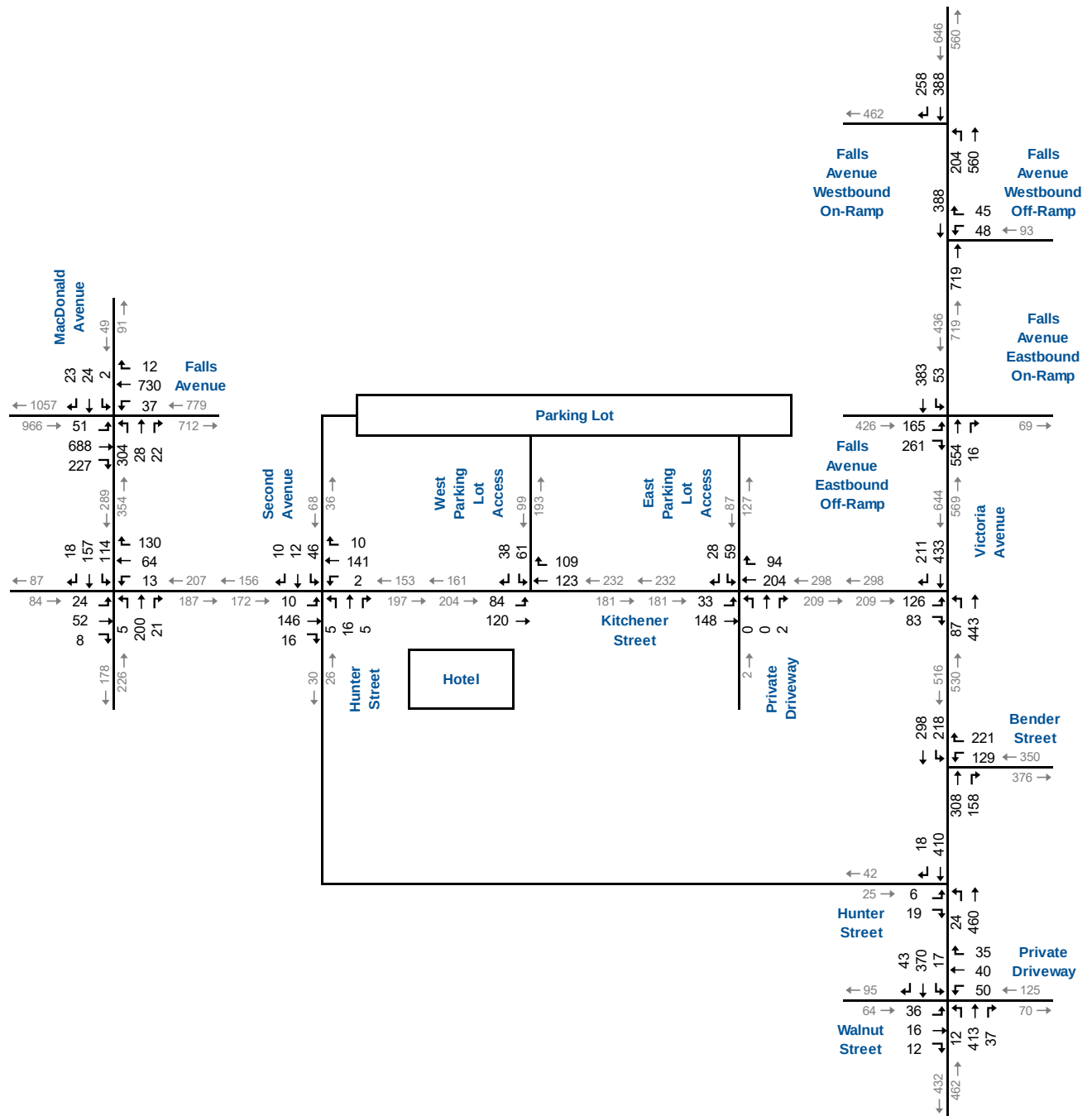


Opening Year Background Traffic Volumes With Background Development (Saturday Peak Hour)

4873 and 4898 Kitcheener Street, Niagara Falls TIS and PS 250550

Figure 4.15

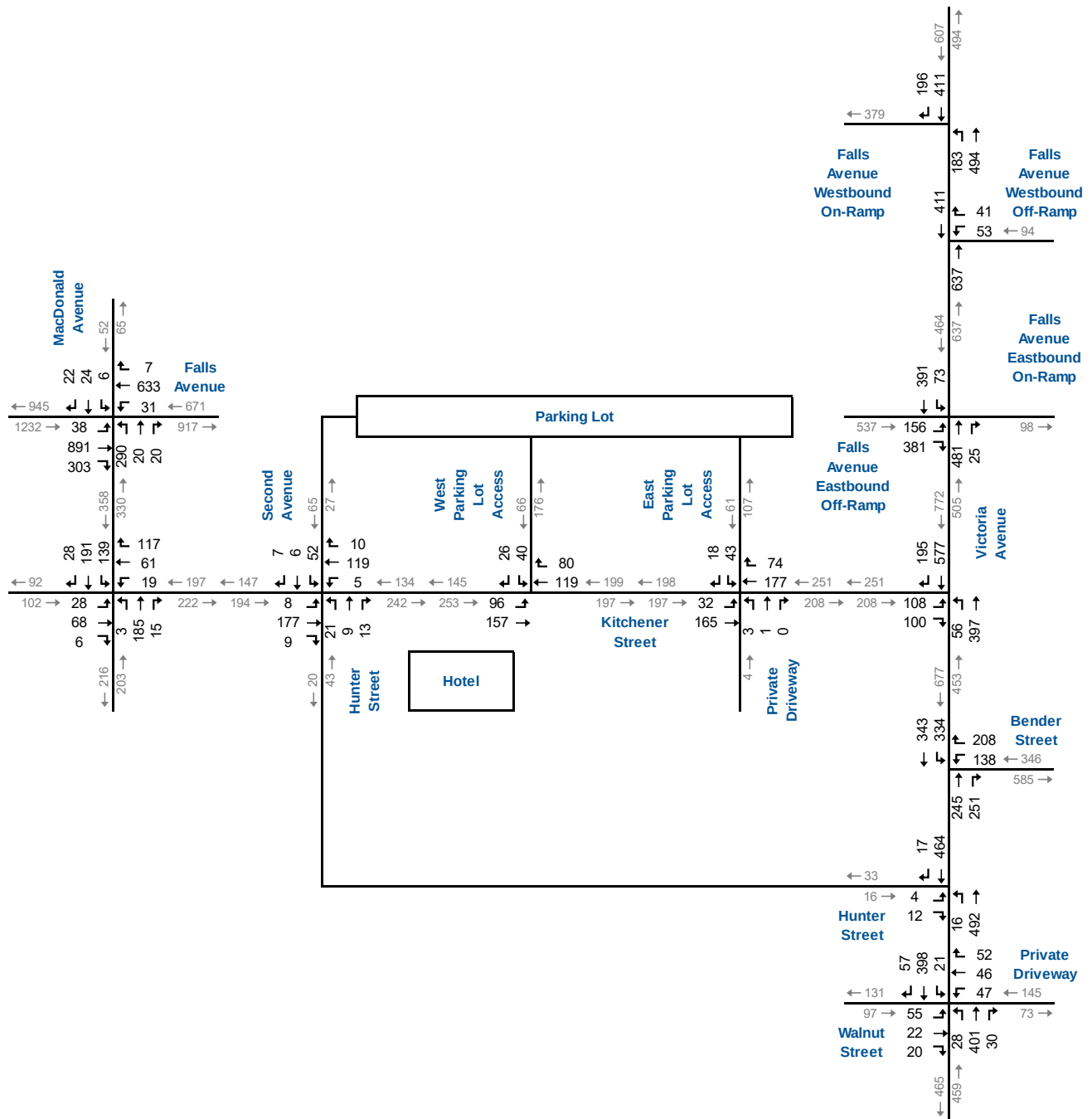


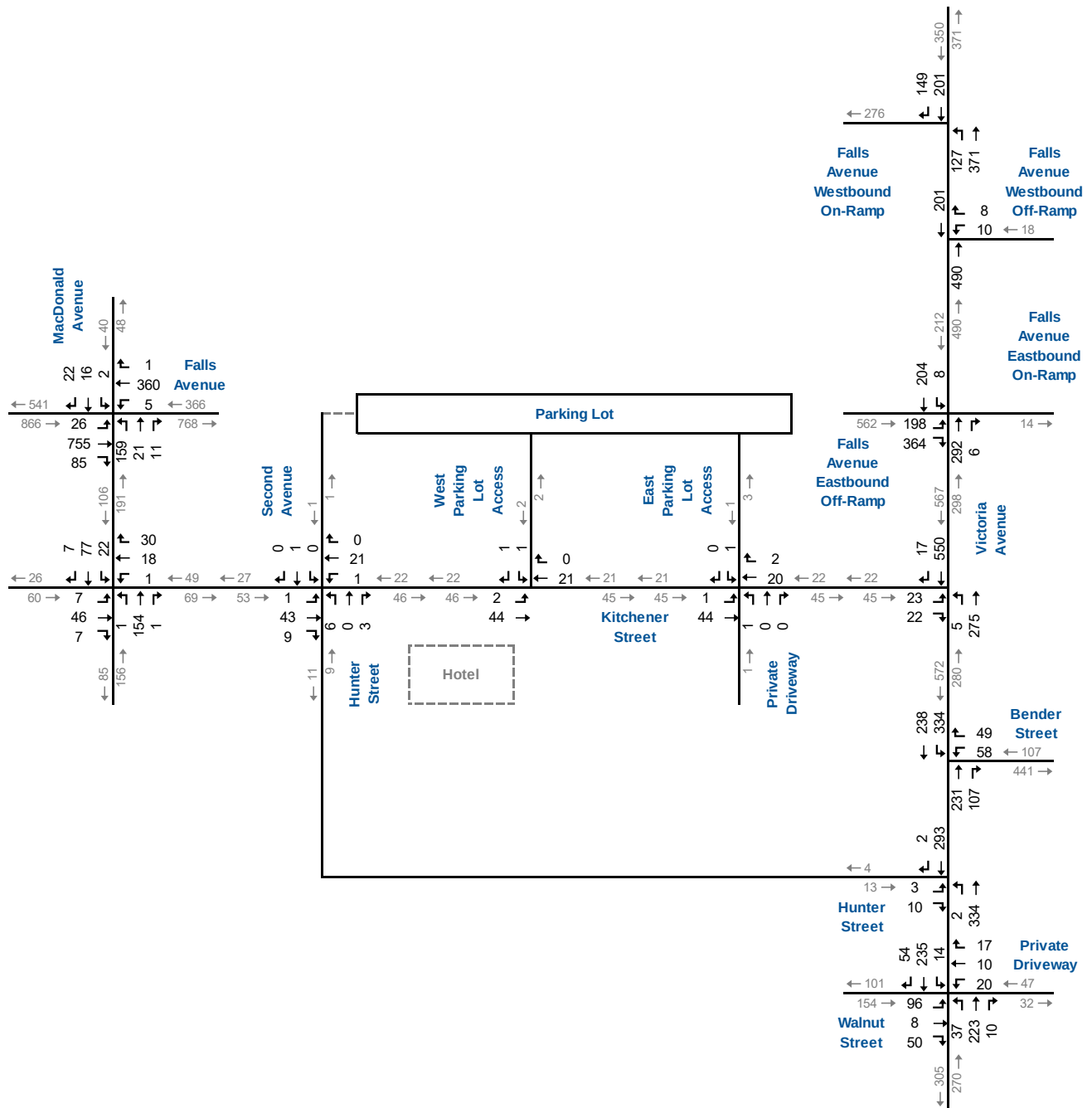


Opening Year Total Traffic Volumes With Background Development (Weekday PM Peak Hour)

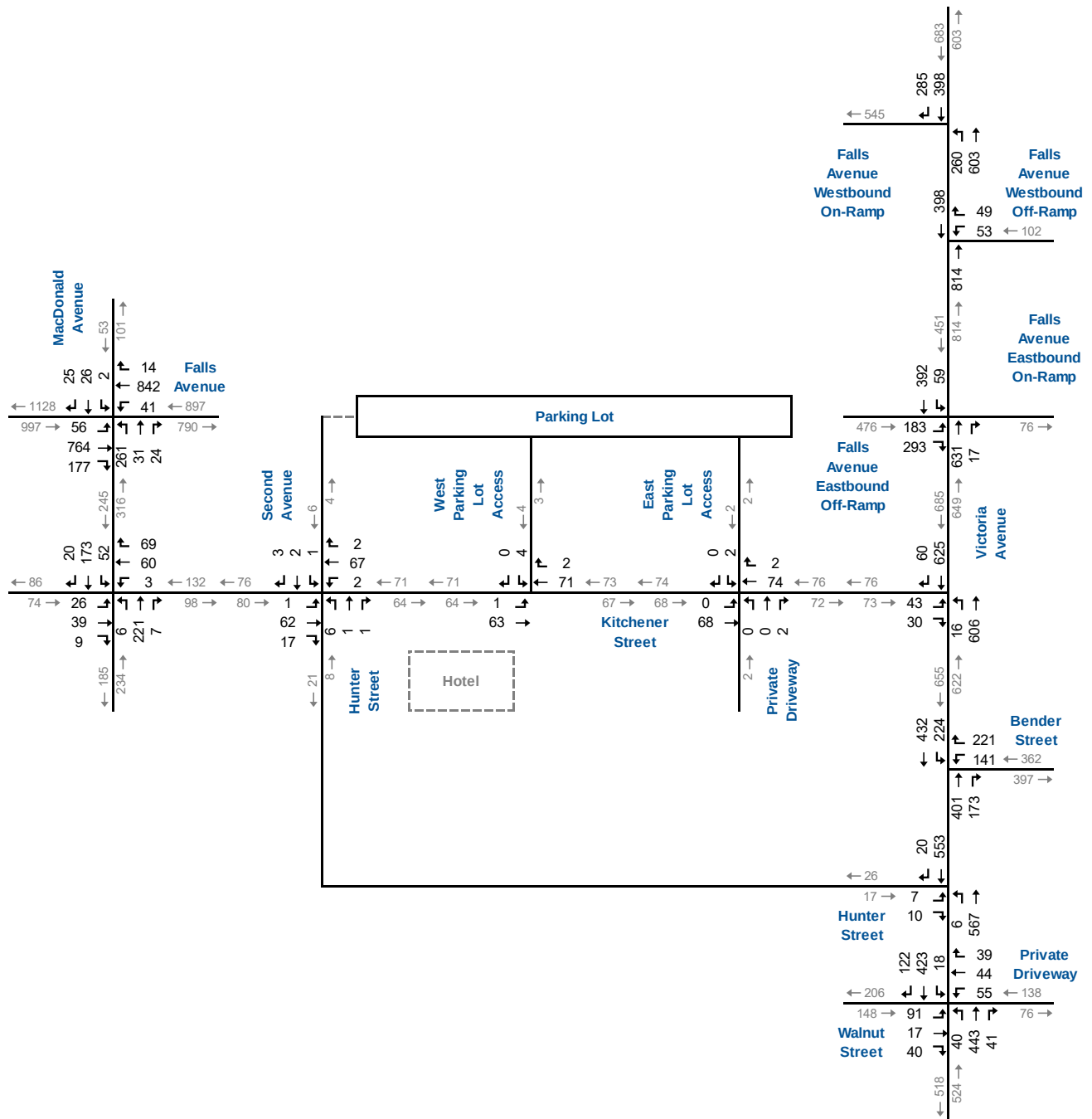
4873 and 4898 Kitchener Street, Niagara Falls TIS and PS
250550

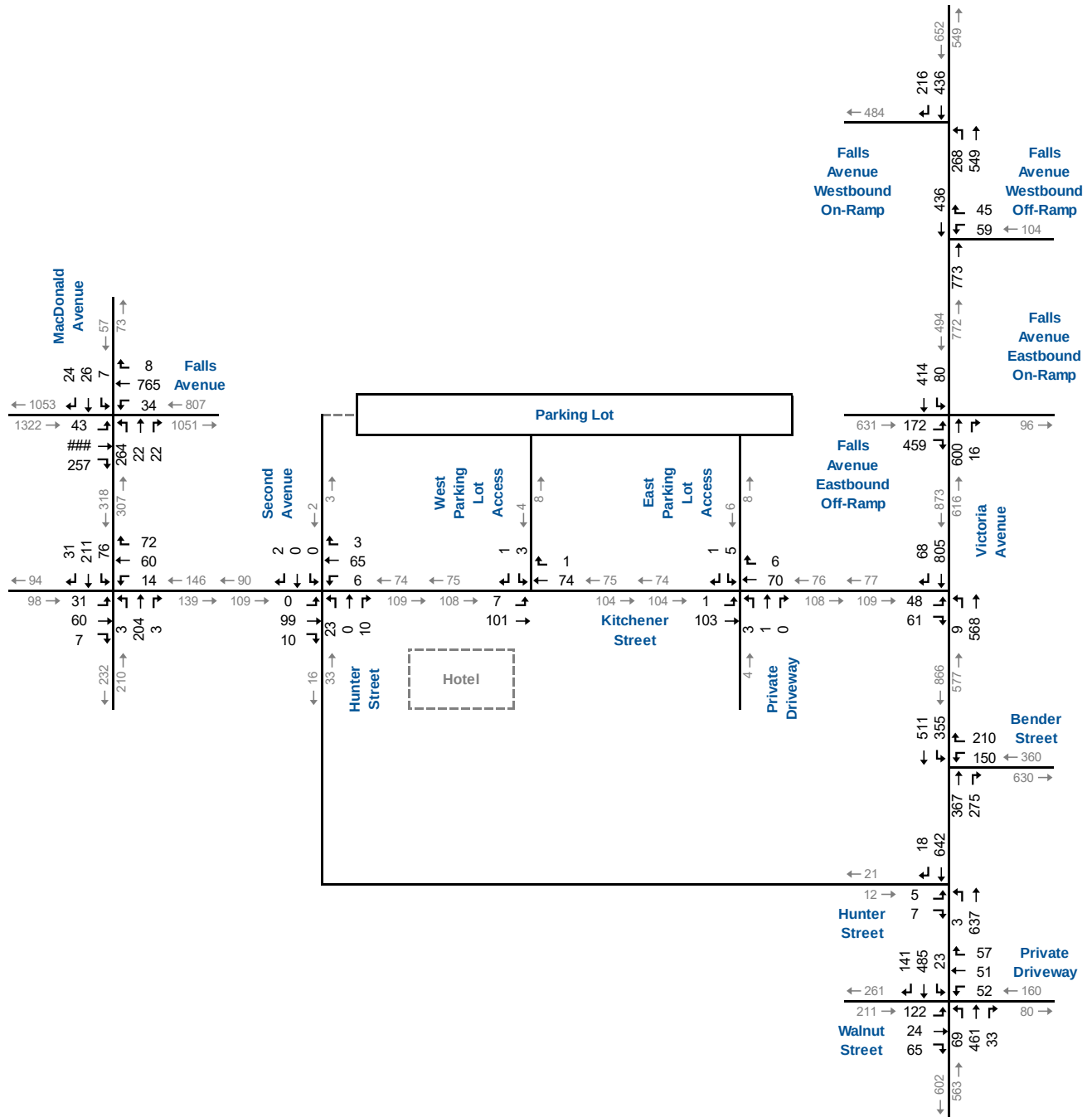
Figure 4.17



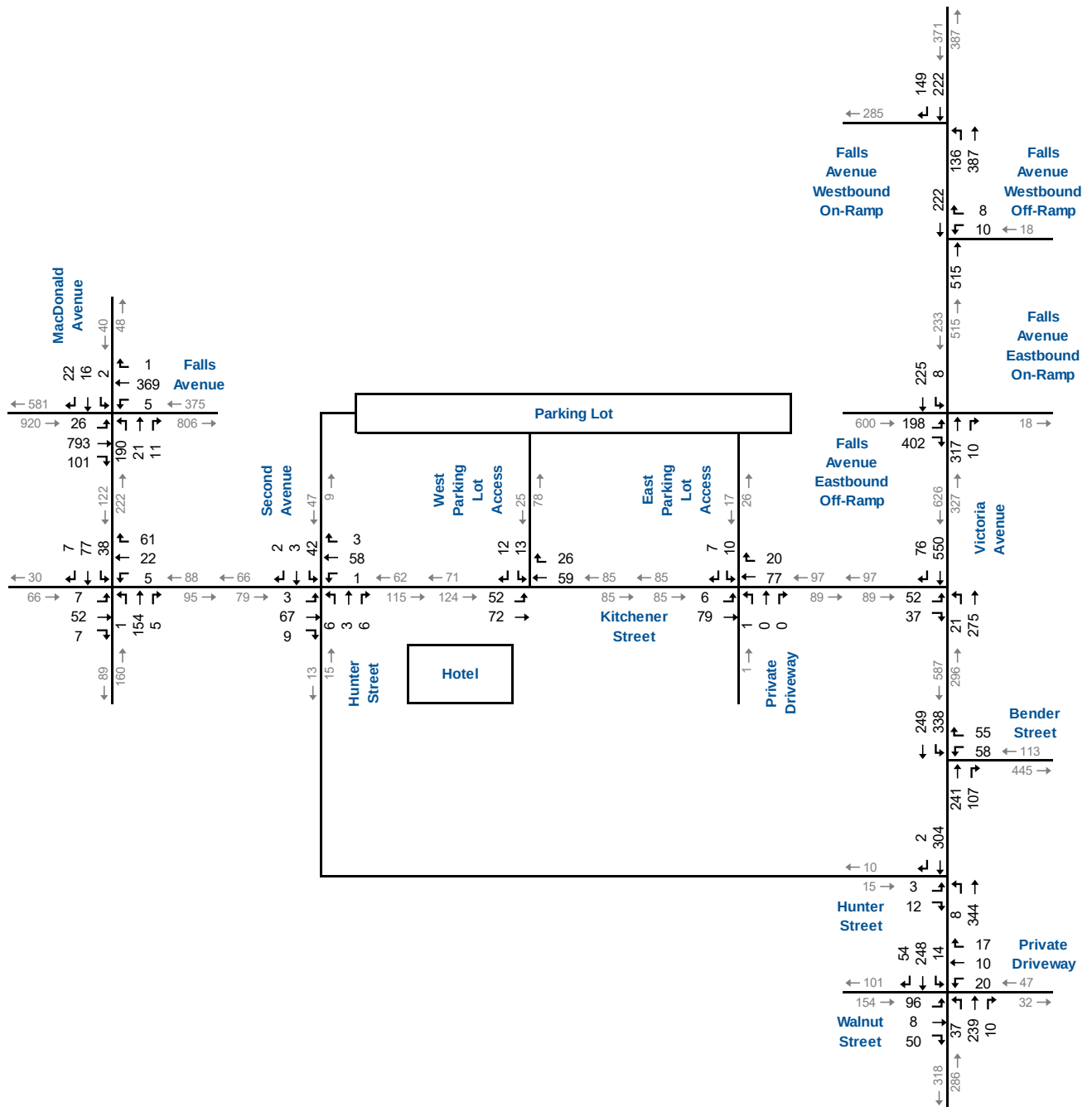


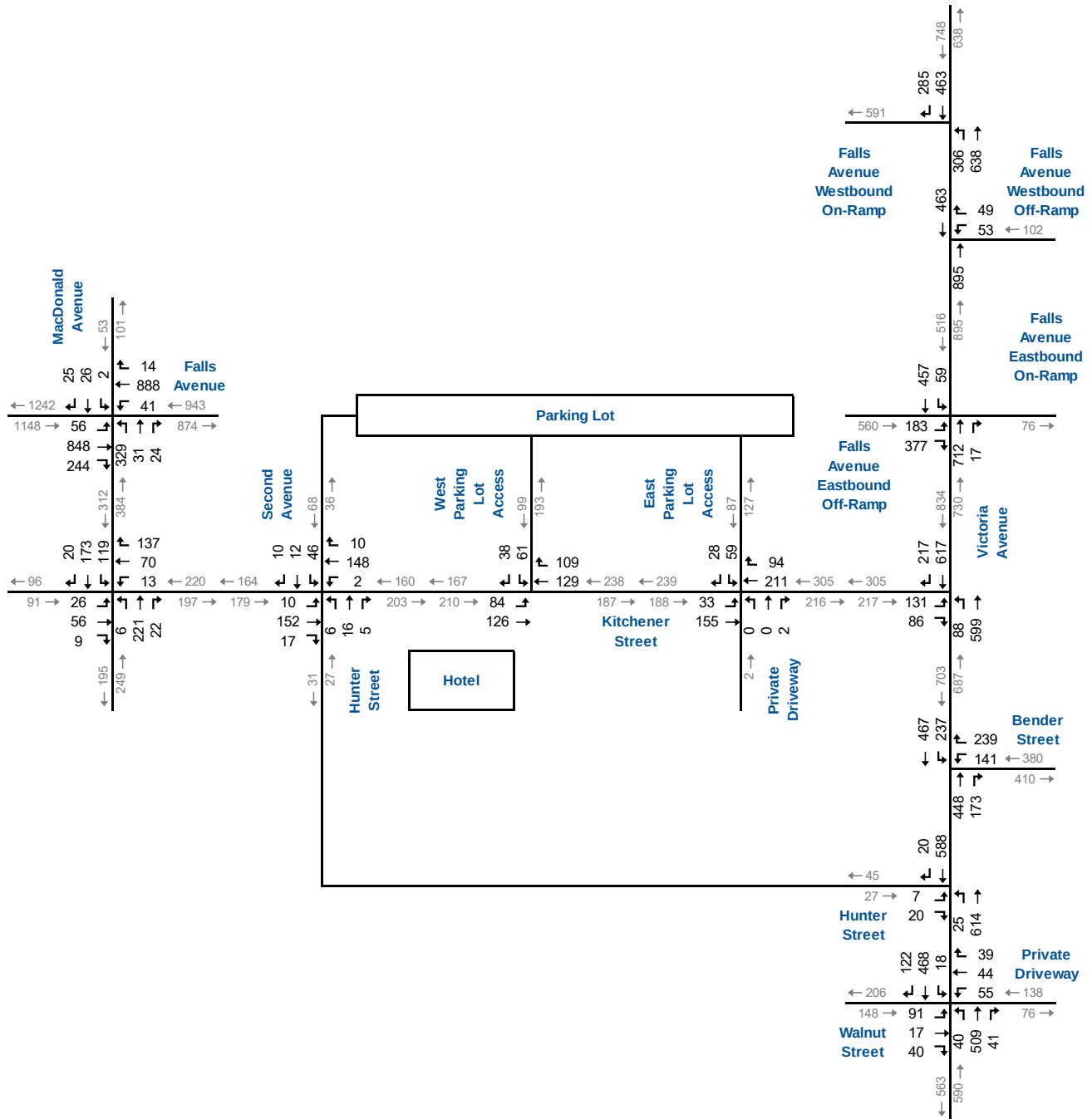
Five-Year Background Traffic Volumes With Background Development (Weekday AM Peak Hour)



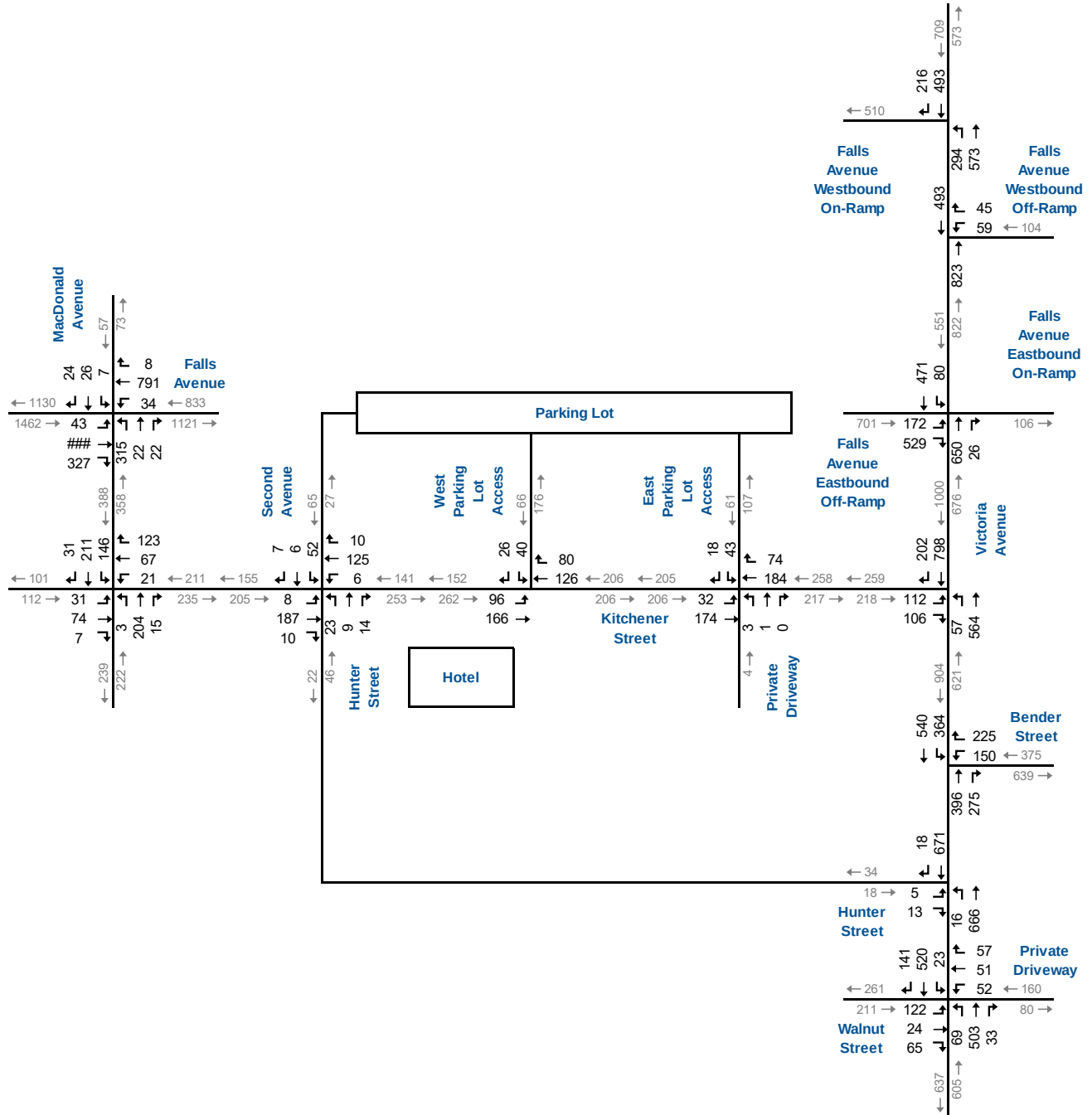


Five-Year Background Traffic Volumes With Background Development (Saturday Peak Hour)





Five-Year Total Traffic Volumes With Background Development (Weekday PM Peak Hour)



Five-Year Total Traffic Volumes With Background Development (Saturday Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

Figure 4.24

4.2 Opening Year without Background Development

4.2.1 Background Traffic Operations

Table 4.1, Table 4.2, and Table 4.3 summarize the opening year background traffic level of service conditions without any background developments.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 9 m during both the weekday PM and Saturday peak hours. The 50th percentile queue is contained by the current available storage. This movement becomes critical under base year conditions.
- ▶ Falls Avenue at MacDonald Avenue:
 - The eastbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue during the weekday AM peak hour does not block the adjacent left-turn lane. This movement becomes critical under base year conditions;
 - The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and
 - The northbound approach is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour. This movement becomes critical under base year conditions.

Appendix I contains the detailed Synchro reports.



TABLE 4.1: OPENING YEAR BACKGROUND OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 8 0.04 1	A 0 0.20 0		A 1		A 0 0.19 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					B 12 0.04 1		> > >	B 12		A 0 0.24 0		A 0		A 0 0.10 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	A 9 0.47 22		A 8 0.27 10	A 9				A 0		A 9 0.45 21	> > >	A 9	A 8 0.03 2	A 9 0.36 19		A 9	A 9 0.46
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	B 13 0.10 2		> > >	B 13					< < <	A 0 0.00 0		A 0		A 0 0.28 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 15 0.20 10 15 5		B 14 0.04 5 -	B 14		B 15 0.37 18 -	B 13 0.09 8 -	B 14	A 8 0.59 20 35 15	A 6 0.20 12 -		A 8	B 10 0.53
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 10 0.02 0		> > >	B 10					< < <	A 0 0.00 0		A 0		A 0 0.12 0	A 0 0.00 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 10 0.11 6	> > >	B 10	< < <	B 10 0.14 7	> > >	B 10	< < <	A 9 0.40 17	> > >	A 9	< < <	A 10 0.52 19	A 7 0.01 0	A 9	A 9 0.37
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 9 0.07 6 25 19	B 15 0.61 68 - -	> > > >	B 15	B 10 0.02 2 35 33	B 12 0.24 24 - -	> > > >	B 12	< < < <	C 21 0.63 44 -	> > > >	C 21	< < < <	B 15 0.07 8 -	> > > >	B 15	B 15 0.61
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.08 -	> > >	A 8	< < <	A 8 0.07 -	> > >	A 8	< < <	A 8 0.21 -	> > >	A 8	< < <	A 8 0.14 -	> > >	A 8	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 9 0.01 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 9 0.00 0	> > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.2: OPENING YEAR BACKGROUND OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.17 4	A 0 0.31 0		A 2		A 0 0.35 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 22 0.32 10		> > >	C 22		A 0 0.38 0		A 0		A 0 0.20 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 15 0.53 28		B 13 0.16 11	B 14				A 0		B 16 0.78 86	> > >	B 16	A 7 0.20 9	A 8 0.44 37		A 8	B 13 0.70
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 15 0.16 4		> > >	C 15					< < <	A 0 0.02 0		A 0		A 0 0.29 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 16 0.40 24 15 -9		B 15 0.16 13 -	B 15		B 15 0.56 41 - -	B 12 0.14 9 -	B 14	A 7 0.43 16 35 19	A 7 0.35 28 - -		A 7	B 12 0.48
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 12 0.03 1		> > >	B 12					< < <	A 0 0.00 0		A 0		A 0 0.22 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 14 0.25 13	> > >	B 14	< < <	B 14 0.42 22	> > >	B 14	< < <	B 13 0.68 54	> > >	B 13	< < <	B 15 0.72 53	A 7 0.05 3	B 14	B 14 0.61
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.27 11 25 14	C 24 0.74 84 - >	> > > >	C 23	B 14 0.22 8 35 27	C 22 0.68 77 - >	> > > >	C 22	< < < <	C 35 0.82 86 - >	> > > >	C 35	< < < <	B 16 0.08 10 - >	> > > >	B 16	C 24 0.75
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.10 -	> > >	A 9	< < <	A 9 0.17 -	> > >	A 9	< < <	A 10 0.29 -	> > >	A 10	< < <	A 10 0.31 -	> > >	A 10	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0 0	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.04 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.3: OPENING YEAR BACKGROUND OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.17 5	A 0 0.29 0		A 2		A 0 0.34 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 21 0.31 10		> > >	C 21		A 0 0.34 0		A 0		A 0 0.20 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 13 0.43 25		B 13 0.45 24	B 13				A 0		B 16 0.76 82	> > >	B 16	A 8 0.27 14	A 9 0.48 43		A 9	B 13 0.64
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 22 0.34 11		> > >	C 22					< < <	A 0 0.01 0		A 0		A 0 0.38 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.43 24 15 -9		B 16 0.17 13 -	B 17		B 16 0.52 36 -	B 14 0.24 14 -	B 15	A 9 0.58 26 35 9	A 7 0.39 33 -		A 8	B 12 0.58
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 16 0.03 1		> > >	C 16					< < <	A 0 0.00 0		A 0		A 0 0.25 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 15 0.37 18	> > >	B 15	< < <	B 16 0.45 23	> > >	B 16	< < <	B 14 0.71 62	> > >	B 14	< < <	B 17 0.76 72	A 7 0.07 5	B 16	B 15 0.65
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 12 0.14 8 25 17	C 27 0.85 131 -	> > > >	C 26	B 14 0.21 7 35 28	B 17 0.49 60 -	> > > >	B 17	< < < <	D 47 0.87 83 -	> > > >	D 47	< < < <	B 19 0.09 11 -	> > > >	B 19	C 26 0.83
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.14 -	> > >	A 9	< < <	A 9 0.19 -	> > >	A 9	< < <	A 10 0.27 -	> > >	A 10	< < <	B 11 0.40 -	> > >	B 11	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 1 0.00 0	> > >	A 1	< < <	A 10 0.05 1	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 1 0.00 0		A 1		A 0 0.05 0	> > >	A 0					A 10 0.00 0		> > >	A 10	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	A 10 0.00 0	> > >	A 10	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.2.2 Total Traffic Operations

Table 4.4, Table 4.5, and Table 4.6 summarize the opening year total traffic level of service conditions without any background developments.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp:
 - The westbound approach is forecast to operate at LOS D during the weekday PM and Saturday peak hours.
- ▶ Victoria Avenue at Kitchener Street:
 - The eastbound approach is forecast to operate at LOS E and F during the weekday PM and Saturday peak hours, respectively.
- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 10 m during both the weekday PM and Saturday peak hours. The 50th percentile queue is contained by the current available storage. This movement becomes critical under base year conditions; and
 - The southbound through movement is forecast to have a 95th percentile queue length that blocks the southbound left-turn movement during the Saturday peak hour. The 50th percentile queue does not block the adjacent left-turn lane.
- ▶ Falls Avenue at MacDonald Avenue:
 - The eastbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the weekday PM and Saturday peak hours. The 95th percentile queue length also blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions;
 - The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and



- The northbound approach is forecast to operate at LOS E and have a v/c ratio exceeding 0.85 during the weekday PM and Saturday peak hours. This movement becomes critical under base year conditions.

All approaches along Kitchener Street connecting to the proposed parking area for the site are forecast to operate at LOS A or B, with low v/c ratios (not exceeding 0.20) and minimal delays (less than 15 seconds) during the weekday AM, weekday PM, and Saturday peak hours.

Appendix J contains the detailed Synchro reports.



TABLE 4.4: OPENING YEAR TOTAL OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall	
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 8 0.05 1	A 0 0.21 0		A 1		A 0 0.20 0	> > >	A 0		
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					B 13 0.04 1		> > >	B 13		A 0 0.25 0		A 0		A 0 0.12 0		A 0		
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	A 10 0.47 24		A 9 0.31 11	A 9				A 0		A 10 0.51 25	> > >	A 10	A 8 0.03 2	A 9 0.40 22		A 9	A 9 0.49	
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 16 0.23 7		> > >	C 16					< < <	A 2 0.03 1		A 2		A 0 0.32 0	> > >	A 0		
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 15 0.20 10 15 5		B 14 0.04 6 -	B 15		B 15 0.39 20 -	B 13 0.09 8 -	B 14	A 8 0.60 20 35 15	A 6 0.21 13 -		A 8	B 10 0.54	
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 10 0.02 0		> > >	B 10					< < <	A 0 0.00 0		A 0		A 0 0.13 0	A 0 0.00 0	A 0		
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 11 0.11 6	> > >	B 11	< < <	B 11 0.14 8	> > >	B 11	< < <	A 9 0.44 19	> > >	A 9	< < <	A 10 0.54 21	A 7 0.01 0	A 10	A 10 0.38	
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 10 0.07 6 25 19	B 16 0.65 81 -	> > >	B 16	B 11 0.02 2 35 33	B 13 0.24 27 -	> > >	B 13	< < <	C 26 0.71 53 -	> > >	C 26	< < <	B 16 0.06 8 -	> > >	B 16	B 17 0.67	
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.10 -	> > >	A 8	< < <	A 8 0.13 -	> > >	A 8	< < <	A 9 0.22 -	> > >	A 9	< < <	A 8 0.17 -	> > >	A 8		
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0.02 0	> > >	A 10	< < <	B 10 0.08 2	> > >	B 10		
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.05 1		A 4		A 0 0.07 0	> > >	A 0						B 11 0.05 1		> > >	B 11	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 1 0.00 0		A 1		A 0 0.08 0	> > >	A 0	< < <	B 10 0.00 0	> > >	B 10	< < <	A 10 0.03 1	> > >	A 10		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.5: OPENING YEAR TOTAL OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 10 0.23 7	A 0 0.33 0		A 3		A 0 0.39 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					D 30 0.41 14		> > >	D 30		A 0 0.43 0		A 0		A 0 0.24 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 19 0.56 35		B 17 0.25 16	B 18				A 0		B 18 0.83 116	> > >	B 18	A 7 0.22 10	A 8 0.48 48		A 8	B 15 0.75
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	E 36 0.68 35		> > >	E 36					< < <	A 3 0.11 3		A 3		A 0 0.39 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 19 0.43 25 15 -10		B 17 0.18 14 -	B 18		B 18 0.64 52 -	B 12 0.14 10 -	B 16	A 7 0.43 18 35 17	A 7 0.37 32 -		A 7	B 13 0.53
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 13 0.05 1		> > >	B 13					< < <	A 1 0.03 1		A 1		A 0 0.24 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 15 0.26 13	> > >	B 15	< < <	B 16 0.43 22	> > >	B 16	< < <	B 15 0.75 81	> > >	B 15	< < <	B 17 0.77 74	A 7 0.05 3	B 16	B 15 0.65
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 16 0.28 11 25 14	C 34 0.87 120 -	> > > >	C 33	B 18 0.29 8 35 27	C 27 0.73 84 -	> > > >	C 27	< < < <	E 61 0.96 118 -	> > > >	E 61	< < < <	B 17 0.07 10 -	> > > >	B 17	D 35 0.89
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 10 0.14 -	> > >	A 10	< < <	B 10 0.31 -	> > >	B 10	< < <	B 11 0.35 -	> > >	B 11	< < <	B 12 0.44 -	> > >	B 12	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.05 1	> > >	B 12	< < <	B 12 0.14 4	> > >	B 12	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.07 2		A 4		A 0 0.15 0	> > >	A 0					B 13 0.20 5		> > >	B 13	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.20 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	B 14 0.20 5	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.6: OPENING YEAR TOTAL OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 10 0.21 6	A 0 0.31 0		A 3		A 0 0.38 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					D 26 0.37 12		> > >	D 26		A 0 0.37 0		A 0		A 0 0.24 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 14 0.38 25		C 23 0.74 57	C 20				A 0		C 23 0.85 100	> > >	C 23	A 9 0.32 15	B 11 0.55 53		B 11	B 18 0.80
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	F 74 0.88 56		> > >	F 74					< < <	A 3 0.09 2		A 3		A 0 0.46 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.44 25 15 -10		B 17 0.19 14 -	B 17		B 16 0.55 40 -	B 14 0.24 13 -	B 15	A 9 0.60 27 35 8	A 7 0.41 36 -		A 8	B 12 0.60
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 16 0.05 1		> > >	C 16					< < <	A 1 0.02 0		A 1		A 0 0.26 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 16 0.39 18	> > >	B 16	< < <	B 17 0.46 23	> > >	B 17	< < <	B 15 0.74 83	> > >	B 15	< < <	B 18 0.79 82	A 7 0.07 5	B 17	B 16 0.68
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.15 8 25 17	D 40 0.94 162 - -	> > > > >	D 39	B 18 0.28 7 35 28	C 20 0.50 64 - -	> > > > >	C 20	< < < < <	E 67 0.96 118 - -	> > > > >	E 67	< < < < <	C 21 0.09 12 - -	> > > > >	C 21	D 37 0.92
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	B 10 0.17 -	> > >	B 10	< < <	B 11 0.31 -	> > >	B 11	< < <	B 11 0.32 -	> > >	B 11	< < <	B 14 0.54 -	> > >	B 14	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.09 2	> > >	B 12	< < <	B 13 0.15 4	> > >	B 13	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.09 2		A 4		A 0 0.14 0	> > >	A 0					B 14 0.16 4		> > >	B 14	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.17 0	> > >	A 0	< < <	B 14 0.00 0	> > >	B 14	< < <	B 14 0.15 4	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.3 Five-Year Horizon without Background Development

4.3.1 Background Traffic Operations

Table 4.7, Table 4.8, and Table 4.9 summarize the five-year background traffic level of service conditions without any background developments.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp:
 - The westbound approach is forecast to operate at LOS D during the weekday PM and Saturday peak hours. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Kitchener Street:
 - The eastbound approach is forecast to operate at LOS D during the Saturday peak hour. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 12 and 13 m during the weekday PM and Saturday peak hours, respectively. The 50th percentile queue is contained by the current available storage. This movement becomes critical under base year conditions; and
 - The southbound through movement is forecast to have a 95th percentile queue length that blocks the southbound left-turn movement during the Saturday peak hour. The 50th percentile queue does not block the adjacent left-turn lane. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Falls Avenue at MacDonald Avenue:
 - The eastbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour. The 95th percentile queue length also blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions;



- The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and
- The northbound approach is forecast to operate at LOS E during the Saturday peak hour and a v/c ratio exceeding 0.85 during the weekday PM and Saturday peak hours. This movement becomes critical under base year conditions.

Appendix K contains the detailed Synchro reports.



TABLE 4.7: FIVE-YEAR BACKGROUND OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 8 0.04 1	A 0 0.22 0		A 1		A 0 0.21 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					B 13 0.05 1		> > >	B 13		A 0 0.26 0		A 0		A 0 0.11 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	A 10 0.51 26		A 9 0.30 11	A 9				A 0		A 10 0.49 24	> > >	A 10	A 8 0.03 2	A 9 0.39 22		A 9	A 9 0.50
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	B 14 0.12 3		> > >	B 14					< < <	A 0 0.00 0		A 0		A 0 0.30 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 15 0.22 11 15 4		B 14 0.04 6 -	B 15		B 15 0.40 20 -	B 13 0.10 8 -	B 14	A 10 0.65 23 35 12	A 6 0.22 13 -		A 8	B 11 0.59
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 10 0.02 0		> > >	B 10					< < <	A 0 0.00 0		A 0		A 0 0.13 0	A 0 0.00 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 11 0.12 6	> > >	B 11	< < <	B 11 0.16 8	> > >	B 11	< < <	A 9 0.43 19	> > >	A 9	< < <	B 10 0.56 22	A 7 0.02 0	B 10	A 10 0.40
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 10 0.08 6 25 19	B 16 0.65 82 -	> > > >	B 16	B 11 0.03 2 35 33	B 12 0.25 28 -	> > >	B 12	< < <	C 25 0.68 49 -	> > >	C 25	< < <	B 16 0.07 9 -	> > >	B 16	B 16 0.66
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.10 -	> > >	A 8	< < <	A 8 0.07 -	> > >	A 8	< < <	A 9 0.23 -	> > >	A 9	< < <	A 8 0.16 -	> > >	A 8	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 9 0.01 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 9 0.00 0	> > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.8: FIVE-YEAR BACKGROUND OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.19 5	A 0 0.34 0		A 2		A 0 0.39 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					D 28 0.41 14		> > >	D 28		A 0 0.42 0		A 0		A 0 0.22 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 18 0.57 38		B 15 0.18 13	B 16				A 0		B 19 0.82 108	> > >	B 19	A 7 0.24 11	A 8 0.46 45		A 8	B 15 0.74
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 16 0.20 5		> > >	C 16					< < <	A 0 0.02 0		A 0		A 0 0.32 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.46 27 15 -12		B 17 0.18 14 -	B 18		B 17 0.62 50 -	B 13 0.15 10 -	B 16	A 7 0.44 19 35 16	A 7 0.36 32 -		A 7	B 13 0.53
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 13 0.04 1		> > >	B 13					< < <	A 0 0.00 0		A 0		A 0 0.24 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 14 0.28 14	> > >	B 14	< < <	B 16 0.47 24	> > >	B 16	< < <	B 14 0.72 68	> > >	B 14	< < <	B 17 0.77 73	A 7 0.06 4	B 16	B 15 0.66
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 15 0.31 12 25 13	C 27 0.79 105 - -	> > > >	C 26	B 16 0.27 9 35 26	C 26 0.75 88 - -	> > > >	C 26	< < < <	D 46 0.89 100 -	> > > >	D 46	< < < <	B 17 0.08 10 -	> > > >	B 17	C 29 0.82
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.12 -	> > >	A 9	< < <	A 9 0.19 -	> > >	A 9	< < <	B 10 0.33 -	> > >	B 10	< < <	B 10 0.35 -	> > >	B 10	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0.01 0	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.9: FIVE-YEAR BACKGROUND OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.20 6	A 0 0.32 0		A 2		A 0 0.38 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					D 27 0.40 14		> > >	D 27		A 0 0.38 0		A 0		A 0 0.23 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 14 0.46 27		B 17 0.61 34	B 16				A 0		B 18 0.81 95	> > >	B 18	A 8 0.32 16	A 9 0.51 49		A 9	B 15 0.73
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	D 26 0.40 14		> > >	D 26					< < <	A 0 0.01 0		A 0		A 0 0.42 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.47 28 15 -13		B 17 0.19 14 -	B 17		B 17 0.55 40 - -	B 14 0.27 15 -	B 16	A 10 0.64 31 35 4	A 7 0.42 38 -		A 9	B 13 0.64
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 16 0.04 1		> > >	C 16					< < <	A 0 0.00 0		A 0		A 0 0.27 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 16 0.41 19	> > >	B 16	< < <	B 18 0.53 27	> > >	B 18	< < <	B 15 0.75 84	> > >	B 15	< < <	B 19 0.80 83	A 7 0.08 5	B 18	B 17 0.71
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 13 0.18 9 25 16	D 40 0.96 154 - >	> > > >	D 40	B 16 0.28 7 35 28	B 19 0.56 67 - >	> > > >	B 19	< < < <	E 56 0.92 96 - >	> > > >	E 56	< < < <	B 19 0.10 12 - >	> > > >	B 19	C 35 0.91
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 10 0.16 -	> > >	A 10	< < <	A 10 0.22 -	> > >	A 10	< < <	B 10 0.31 -	> > >	B 10	< < <	B 12 0.46 -	> > >	B 12	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 1 0.00 0	> > >	A 1	< < <	A 10 0.05 1	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0					A 10 0.00 0		> > >	A 10	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	B 10 0.00 0	> > >	B 10	< < <	B 10 0.00 0	> > >	B 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.3.2 Total Traffic Operations

Table 4.10, Table 4.11, and Table 4.12 summarize the five-year total traffic level of service conditions without any background developments.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp:
 - The westbound approach is forecast to operate at LOS E during the weekday PM and Saturday peak hours. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Falls Avenue Eastbound On/Off-Ramp:
 - The northbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the weekday PM peak hour.
- ▶ Victoria Avenue at Kitchener Street:
 - The eastbound approach is forecast to operate at LOS E and F during the weekday PM and Saturday peak hours, respectively. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 12 and 13 m during the weekday PM and Saturday peak hours, respectively. The 50th percentile queue is contained by the current available storage. This movement becomes critical under base year conditions; and
 - The southbound through movement is forecast to have a 95th percentile queue length that blocks the southbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue does not block the adjacent left-turn lane. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Falls Avenue at MacDonald Avenue:
 - The eastbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the weekday PM and



Saturday peak hours. The 95th percentile queue length also blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions;

- The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and
- The northbound approach is forecast to operate at LOS E with a v/c ratio exceeding 0.85 during the weekday PM peak hour and operate at LOS F with a v/c ratio of 1.00 during the Saturday peak hour. This movement becomes critical under base year conditions.

All approaches along Kitchener Street connecting to the proposed parking area for the site are forecast to operate at LOS A or B, with low v/c ratios (not exceeding 0.20) and minimal delays (less than 15 seconds) during the weekday AM, weekday PM, and Saturday peak hours.

Appendix L contains the detailed Synchro reports.



TABLE 4.10: FIVE-YEAR TOTAL OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall	
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 8 0.05 1	A 0 0.23 0		A 1		A 0 0.22 0	> > >	A 0		
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					B 13 0.05 1		> > >	B 13		A 0 0.28 0		A 0		A 0 0.13 0		A 0		
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 10 0.51 28		A 9 0.34 12	A 10				A 0		B 10 0.55 29	> > >	B 10	A 8 0.03 2	A 9 0.42 25		A 9	A 10 0.53	
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 17 0.26 8		> > >	C 17					< < <	A 1 0.03 1		A 1		A 0 0.34 0	> > >	A 0		
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 15 0.22 11 15 4		B 15 0.05 6 -	B 15		B 15 0.42 22 -	B 13 0.10 8 -	B 14	A 10 0.66 23 35 12	A 6 0.23 14 -		A 8	B 11 0.59	
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 10 0.03 1		> > >	B 10					< < <	A 0 0.00 0		A 0		A 0 0.14 0	A 0 0.00 0	A 0		
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 11 0.12 6	> > >	B 11	< < <	B 11 0.16 8	> > >	B 11	< < <	A 9 0.47 21	> > >	A 9	< < <	B 11 0.58 24	A 7 0.02 0	B 10	A 10 0.42	
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 10 0.08 7 25 18	B 18 0.69 92 -	> > >	B 17	B 11 0.03 2 35 33	B 13 0.26 30 -	> > >	B 13	< < <	C 32 0.77 59 -	> > >	C 32	< < <	B 16 0.07 8 -	> > >	B 16	B 19 0.72	
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.11 -	> > >	A 8	< < <	A 8 0.13 -	> > >	A 8	< < <	A 9 0.25 -	> > >	A 9	< < <	A 9 0.19 -	> > >	A 9		
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0.02 1	> > >	A 10	< < <	B 10 0.08 2	> > >	B 10		
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 3 0.05 1		A 3		A 0 0.07 0	> > >	A 0						B 11 0.05 1		> > >	B 11	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 1 0.00 0		A 1		A 0 0.08 0	> > >	A 0	< < <	B 10 0.00 0	> > >	B 10	< < <	A 10 0.03 1	> > >	A 10		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.11: FIVE-YEAR TOTAL OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 11 0.26 8	A 0 0.36 0		A 3		A 0 0.43 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					E 45 0.56 22		> > >	E 45		A 0 0.47 0		A 0		A 0 0.26 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	C 23 0.61 45		B 19 0.27 19	C 20				A 0		C 21 0.86 143	> > >	C 21	A 7 0.25 12	A 8 0.50 58		A 8	B 17 0.79
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	E 49 0.78 45		> > >	E 49					< < <	A 3 0.12 3		A 3		A 0 0.42 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 19 0.47 27 15 -12		B 18 0.20 15 -	B 18		B 18 0.67 58 -	B 12 0.15 10 -	B 16	A 8 0.50 20 35 15	A 7 0.40 36 -		A 7	B 13 0.58
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 13 0.06 1		> > >	B 13					< < <	A 1 0.03 1		A 1		A 0 0.26 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 16 0.29 14	> > >	B 16	< < <	B 17 0.49 24	> > >	B 17	< < <	B 17 0.79 96	> > >	B 17	< < <	B 19 0.80 86	A 7 0.06 4	B 18	B 17 0.70
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	C 21 0.36 14 25 11	D 49 0.95 156 -	> > > >	D 47	C 23 0.36 11 35 24	C 33 0.77 110 -	> > > >	C 33	< < < <	E 68 0.98 148 -	> > > >	E 68	< < < <	B 19 0.08 11 -	> > > >	B 19	D 45 0.93
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	B 10 0.16 -	> > >	B 10	< < <	B 11 0.35 -	> > >	B 11	< < <	B 12 0.39 -	> > >	B 12	< < <	B 13 0.49 -	> > >	B 13	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.06 1	> > >	B 12	< < <	B 12 0.14 4	> > >	B 12	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.07 2		A 4		A 0 0.16 0	> > >	A 0					B 13 0.20 6		> > >	B 13	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.20 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	B 14 0.20 6	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.12: FIVE-YEAR TOTAL OPERATIONS WITHOUT BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q								B 11 0.25 7	A 0 0.34 0		A 3		A 0 0.41 0	> > >	A 0		
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					E 36 0.49 18		> > >	E 36		A 0 0.41 0		A 0		A 0 0.26 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 17 0.41 36		C 30 0.78 76	C 26				A 0		C 25 0.85 128	> > >	C 25	B 10 0.37 19	B 12 0.56 68		B 12	C 21 0.82
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	F 115 1.03 74		> > >	F 115					< < <	A 3 0.10 2		A 3		A 0 0.50 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 19 0.48 28 15 -13		B 17 0.20 15 -	B 18		B 18 0.59 46 -	B 14 0.27 15 -	B 16	B 10 0.66 32 35 3	A 8 0.45 42 -		A 9	B 13 0.66
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 17 0.06 1		> > >	C 17					< < <	A 1 0.02 0		A 1		A 0 0.29 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 17 0.42 19	> > >	B 17	< < <	B 19 0.55 27	> > >	B 19	< < <	B 17 0.78 97	> > >	B 17	< < <	C 21 0.83 93	A 7 0.08 5	B 20	B 18 0.74
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 16 0.18 10 25 15	D 54 0.99 210 -	> > > >	D 53	C 24 0.38 8 35 27	C 25 0.54 81 -	> > > >	C 25	< < < <	F 85 1.00 150 -	> > > >	F 85	< < < <	C 24 0.09 14 -	> > > >	C 24	D 48 0.98
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	B 11 0.20 -	> > >	B 11	< < <	B 12 0.34 -	> > >	B 12	< < <	B 12 0.36 -	> > >	B 12	< < <	C 16 0.61 -	> > >	C 16	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.10 2	> > >	B 12	< < <	B 13 0.15 4	> > >	B 13	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.09 2		A 4		A 0 0.15 0	> > >	A 0					B 14 0.17 4		> > >	B 14	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.18 0	> > >	A 0	< < <	B 14 0.00 0	> > >	B 14	< < <	B 14 0.15 4	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

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AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.4 Opening Year with Background Development

4.4.1 Background Traffic Operations

Table 4.13, Table 4.14, and Table 4.15 summarize the opening year background traffic level of service conditions with background development traffic.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 13 m during both the weekday PM and Saturday peak hours, respectively. The 50th percentile queue is contained by the current available storage. This movement becomes critical under base year conditions.
- ▶ Falls Avenue at MacDonald Avenue:
 - The eastbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour. The 95th percentile queue length also blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions;
 - The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and
 - The northbound approach is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour. This movement becomes critical under base year conditions.

Appendix M contains the detailed Synchro reports.



TABLE 4.13: OPENING YEAR BACKGROUND OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 8 0.04 1	A 0 0.21 0		A 1		A 0 0.20 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					B 12 0.04 1		> > >	B 12		A 0 0.24 0		A 0		A 0 0.11 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	A 9 0.47 23		A 9 0.29 10	A 9				A 0		A 10 0.48 23	> > >	A 10	A 8 0.03 2	A 9 0.40 21		A 9	A 9 0.48
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	B 14 0.11 3		> > >	B 14					< < <	A 0 0.00 0		A 0		A 0 0.30 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 15 0.24 12 15 3		B 14 0.05 6 -	B 15		B 15 0.37 19 -	B 14 0.11 8 -	B 14	B 10 0.68 24 35 11	A 6 0.19 12 -		A 9	B 11 0.61
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 10 0.02 0		> > >	B 10					< < <	A 0 0.00 0		A 0		A 0 0.13 0	A 0 0.00 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 10 0.11 6	> > >	B 10	< < <	B 11 0.14 7	> > >	B 11	< < <	A 9 0.44 19	> > >	A 9	< < <	A 10 0.54 21	A 7 0.01 0	A 10	A 10 0.38
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 9 0.07 6 25 19	B 15 0.62 70 -	> > >	B 15	B 10 0.02 2 35 33	B 12 0.24 24 -	> > >	B 12	< < <	C 22 0.63 45 -	> > >	C 22	< < <	B 15 0.07 8 -	> > >	B 15	B 15 0.62
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.08 -	> > >	A 8	< < <	A 8 0.07 -	> > >	A 8	< < <	A 8 0.21 -	> > >	A 8	< < <	A 8 0.14 -	> > >	A 8	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 9 0.01 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 9 0.00 0	> > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.14: OPENING YEAR BACKGROUND OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.18 5	A 0 0.33 0		A 2		A 0 0.36 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 24 0.35 11		> > >	C 24		A 0 0.40 0		A 0		A 0 0.20 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 17 0.53 35		B 15 0.18 13	B 16				A 0		B 17 0.81 101	> > >	B 17	A 7 0.21 10	A 8 0.44 40		A 8	B 14 0.72
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 16 0.17 5		> > >	C 16					< < <	A 0 0.02 0		A 0		A 0 0.31 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.47 28 15 -13		B 17 0.20 15 -	B 17		B 17 0.58 45 -	B 13 0.16 11 -	B 16	A 7 0.44 20 35 15	A 7 0.33 29 -		A 7	B 13 0.51
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 12 0.03 1		> > >	B 12					< < <	A 0 0.00 0		A 0		A 0 0.23 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 14 0.25 13	> > >	B 14	< < <	B 15 0.42 22	> > >	B 15	< < <	B 13 0.70 59	> > >	B 13	< < <	B 16 0.74 60	A 7 0.05 3	B 15	B 14 0.63
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.27 11 25 14	C 24 0.75 85 - -	> > > >	C 23	B 14 0.22 8 35 27	C 22 0.68 78 - -	> > > >	C 22	< < < <	C 35 0.82 86 -	> > > >	C 35	< < < <	B 16 0.08 10 -	> > > >	B 16	C 24 0.76
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.10 -	> > >	A 9	< < <	A 9 0.17 -	> > >	A 9	< < <	A 10 0.29 -	> > >	A 10	< < <	A 10 0.31 -	> > >	A 10	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0 0	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.04 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.15: OPENING YEAR BACKGROUND OPERATIONS WITH BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 10 0.19 5	A 0 0.30 0		A 2		A 0 0.36 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 23 0.34 11		> > >	C 23		A 0 0.36 0		A 0		A 0 0.22 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 13 0.43 25		B 15 0.56 30	B 15				A 0		B 17 0.79 91	> > >	B 17	A 8 0.29 14	A 9 0.50 47		A 9	B 14 0.70
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 25 0.37 12		> > >	C 25					< < <	A 0 0.01 0		A 0		A 0 0.40 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.48 28 15 -13		B 16 0.20 14 -	B 17		B 16 0.51 36 -	B 14 0.26 14 -	B 15	B 11 0.68 34 35 1	A 7 0.39 35 -		A 9	B 13 0.67
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 16 0.03 1		> > >	C 16					< < <	A 0 0.00 0		A 0		A 0 0.26 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 16 0.38 18	> > >	B 16	< < <	B 16 0.45 23	> > >	B 16	< < <	B 14 0.72 77	> > >	B 14	< < <	B 18 0.78 77	A 7 0.07 5	B 16	B 16 0.67
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 12 0.14 8 25 17	C 28 0.86 135 - -	> > > > >	C 27	B 14 0.22 7 35 28	B 17 0.50 61 - -	> > > > >	B 17	< < < < <	D 47 0.87 83 - -	> > > > >	D 47	< < < < <	B 19 0.09 11 - -	> > > > >	B 19	C 27 0.83
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.14 -	> > >	A 9	< < <	A 9 0.19 -	> > >	A 9	< < <	A 10 0.27 -	> > >	A 10	< < <	B 11 0.40 -	> > >	B 11	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 1 0.00 0	> > >	A 1	< < <	A 10 0.05 1	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 1 0.00 0		A 1		A 0 0.05 0	> > >	A 0					A 10 0.00 0		> > >	A 10	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	A 10 0.00 0	> > >	A 10	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.4.2 Total Traffic Operations

Table 4.16, Table 4.17, and Table 4.18 summarize the opening year total traffic level of service conditions with background development traffic.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp:
 - The westbound approach is forecast to operate at LOS E and D during the weekday PM and Saturday peak hours, respectively. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Kitchener Street:
 - The eastbound approach is forecast to operate at LOS E and F during the weekday PM and Saturday peak hours, respectively. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 13 and 14 m during the weekday PM and Saturday peak hours, respectively. The 50th percentile queue is contained by the current available storage. This movement becomes critical under base year conditions;
 - The westbound right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue does not block the adjacent left-turn lane; and
 - The southbound through movement is forecast to have a 95th percentile queue length that blocks the southbound left-turn movement during the Saturday peak hour. The 50th percentile queue does not block the adjacent left-turn lane. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Falls Avenue at MacDonald Avenue:
 - The eastbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the weekday PM and



Saturday peak hours. The 95th percentile queue length also blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions;

- The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and
- The northbound approach is forecast to operate at LOS E with a v/c ratio exceeding 0.85 during the weekday PM and Saturday peak hours. This movement becomes critical under base year conditions.

All approaches along Kitchener Street connecting to the proposed parking area for the site are forecast to operate at LOS B, with low v/c ratios (not exceeding 0.20) and minimal delays (less than 15 seconds) during the weekday AM, weekday PM, and Saturday peak hours.

Appendix N contains the detailed Synchro reports.



TABLE 4.16: OPENING YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall	
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach		
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 8 0.05 1	A 0 0.22 0		A 1		A 0 0.22 0	> > >	A 0		
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					B 13 0.04 1		> > >	B 13		A 0 0.26 0		A 0		A 0 0.13 0		A 0		
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	A 10 0.47 24		A 9 0.33 12	A 9				A 0		B 10 0.54 28	> > >	B 10	A 8 0.03 2	A 9 0.43 24		A 9	A 10 0.51	
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 17 0.25 7		> > >	C 17					< < <	A 1 0.03 1		A 1		A 0 0.34 0	> > >	A 0		
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 15 0.25 12 15 3		B 14 0.06 7 -	B 15		B 15 0.39 20 -	B 14 0.11 8 -	B 14	B 11 0.68 25 35 10	A 6 0.21 13 -		A 9	B 11 0.62	
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 10 0.02 1		> > >	B 10					< < <	A 0 0.00 0		A 0		A 0 0.14 0	A 0 0.00 0	A 0		
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 11 0.11 6	> > >	B 11	< < <	B 11 0.14 8	> > >	B 11	< < <	A 9 0.47 21	> > >	A 9	< < <	B 10 0.56 22	A 7 0.01 0	B 10	A 10 0.40	
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 10 0.07 6 25 19	B 16 0.66 84 -	> > >	B 16	B 11 0.02 2 35 33	B 13 0.24 27 -	> > >	B 13	< < <	C 27 0.71 53 -	> > >	C 27	< < <	B 16 0.06 8 -	> > >	B 16	B 17 0.67	
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.10 -	> > >	A 8	< < <	A 8 0.13 -	> > >	A 8	< < <	A 9 0.22 -	> > >	A 9	< < <	A 8 0.17 -	> > >	A 8		
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0.02 0	> > >	A 10	< < <	B 10 0.08 2	> > >	B 10		
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.05 1		A 4		A 0 0.07 0	> > >	A 0						B 11 0.05 1		> > >	B 11	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 1 0.00 0		A 1		A 0 0.08 0	> > >	A 0	< < <	B 10 0.00 0	> > >	B 10	< < <	A 10 0.03 1	> > >	A 10		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.17: OPENING YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 10 0.25 7	A 0 0.35 0		A 3		A 0 0.40 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					E 35 0.46 17		> > >	E 35		A 0 0.45 0		A 0		A 0 0.25 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	C 21 0.57 41		B 18 0.26 19	B 20				A 0		B 19 0.85 136	> > >	B 19	A 7 0.22 10	A 8 0.48 53		A 8	B 16 0.77
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	E 44 0.73 40		> > >	E 44					< < <	A 3 0.12 3		A 3		A 0 0.40 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 19 0.48 28 15 -13		B 18 0.22 16 -	B 18		B 18 0.64 54 -	B 13 0.16 11 -	B 16	A 8 0.49 21 35 14	A 7 0.37 33 -		A 7	B 13 0.56
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 13 0.05 1		> > >	B 13					< < <	A 1 0.03 1		A 1		A 0 0.25 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 15 0.27 13	> > >	B 15	< < <	B 16 0.44 22	> > >	B 16	< < <	B 16 0.77 87	> > >	B 16	< < <	B 18 0.78 79	A 7 0.05 3	B 17	B 16 0.67
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 16 0.28 11 25 14	C 34 0.88 122 - >	> > > >	C 33	B 18 0.29 8 35 27	C 27 0.74 85 - >	> > > >	C 27	< < < <	E 63 0.97 118 - >	> > > >	E 63	< < < <	B 17 0.08 10 - >	> > > >	B 17	D 36 0.90
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 10 0.14 -	> > >	A 10	< < <	B 10 0.31 -	> > >	B 10	< < <	B 11 0.35 -	> > >	B 11	< < <	B 12 0.44 -	> > >	B 12	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.05 1	> > >	B 12	< < <	B 12 0.14 4	> > >	B 12	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.07 2		A 4		A 0 0.15 0	> > >	A 0					B 13 0.20 5		> > >	B 13	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.20 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	B 14 0.20 5	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.18: OPENING YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 10 0.23 7	A 0 0.32 0		A 3		A 0 0.39 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					D 30 0.41 14		> > >	D 30		A 0 0.39 0		A 0		A 0 0.25 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 15 0.39 30		C 26 0.75 66	C 23				A 0		C 23 0.85 111	> > >	C 23	A 9 0.32 15	B 11 0.55 58		B 11	B 19 0.81
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	F 100 0.98 66		> > >	F 100					< < <	A 3 0.09 2		A 3		A 0 0.48 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 19 0.49 29 15 -14		B 17 0.22 16 -	B 18		B 17 0.56 42 -	B 15 0.26 14 -	B 16	B 11 0.68 34 35 1	A 7 0.41 39 -		A 9	B 13 0.67
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 16 0.05 1		> > >	C 16					< < <	A 1 0.02 0		A 1		A 0 0.28 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 17 0.40 18	> > >	B 17	< < <	B 17 0.48 23	> > >	B 17	< < <	B 15 0.75 89	> > >	B 15	< < <	B 19 0.81 87	A 7 0.07 5	B 17	B 16 0.70
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.15 8 25 17	D 42 0.95 165 -	> > > >	D 41	B 18 0.29 7 35 28	C 20 0.51 64 -	> > > >	C 20	< < < <	E 68 0.96 119 -	> > > >	E 68	< < < <	C 21 0.09 12 -	> > > >	C 21	D 39 0.93
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	B 10 0.17 -	> > >	B 10	< < <	B 11 0.31 -	> > >	B 11	< < <	B 11 0.32 -	> > >	B 11	< < <	B 14 0.54 -	> > >	B 14	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.09 2	> > >	B 12	< < <	B 13 0.15 4	> > >	B 13	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.09 2		A 4		A 0 0.14 0	> > >	A 0					B 14 0.16 4		> > >	B 14	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.17 0	> > >	A 0	< < <	B 14 0.00 0	> > >	B 14	< < <	B 14 0.15 4	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.5 Five-Year Horizon with Background Development

4.5.1 Background Traffic Operations

Table 4.19, Table 4.20, and Table 4.21 summarize the five-year background traffic level of service conditions with background development traffic.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp:
 - The westbound approach is forecast to operate at LOS F during the weekday PM and Saturday peak hours. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Falls Avenue Eastbound On/Off-Ramp:
 - The eastbound right-turn is forecast to operate at LOS E with a v/c ratio exceeding 0.85 during the Saturday peak hour; and
 - The northbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the weekday PM and Saturday peak hours. This movement becomes critical under five-year total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Kitchener Street:
 - The eastbound approach is forecast to operate at LOS D and E during the weekday PM and Saturday peak hours, respectively. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 1, 15, and 16 m during the weekday AM, weekday PM, and Saturday peak hours, respectively. The 50th percentile queue is contained by the current available storage. This movement becomes critical under base year conditions;
 - The westbound right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue does not block the adjacent



left-turn lane. This movement becomes critical under opening total traffic conditions with background development traffic included;

- The southbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 35 m storage length by 21 m during the Saturday peak hour. The 50th percentile queue is contained by the current available storage; and
 - The southbound through movement is forecast to have a 95th percentile queue length that blocks the southbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue does not block the adjacent left-turn lane. This movement becomes critical under opening total traffic conditions without any background development traffic.
- Victoria Avenue at Walnut Street:
- The eastbound approach is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour;
 - The northbound approach is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour; and
 - The southbound left-turn/through movement is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour.
- Falls Avenue at MacDonald Avenue:
- The eastbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour. The 95th percentile queue length also blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions;
 - The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and
 - The northbound approach is forecast to operate at LOS E during the Saturday peak hour and have a v/c ratio exceeding 0.85 during the weekday PM and Saturday peak



hours. This movement becomes critical under base year conditions.

Appendix O contains the detailed Synchro reports.



TABLE 4.19: FIVE-YEAR BACKGROUND OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									A 9 0.13 3	A 0 0.25 0		A 2		A 0 0.24 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 15 0.06 1		> > >	C 15		A 0 0.35 0		A 0		A 0 0.14 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 12 0.52 32		B 11 0.39 14	B 11				A 0		B 15 0.71 53	> > >	B 15	A 8 0.03 3	A 9 0.41 31		A 9	B 12 0.63
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 16 0.14 4		> > >	C 16					< < <	A 0 0.00 0		A 0		A 0 0.40 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.29 16 15 -1		B 17 0.05 7 -	B 18		B 17 0.61 40 -	B 13 0.12 8 -	B 16	B 11 0.72 28 35 7	A 6 0.32 23 -		A 9	B 12 0.66
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 11 0.03 1		> > >	B 11					< < <	A 0 0.00 0		A 0		A 0 0.21 0	A 0 0.00 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 16 0.58 28	> > >	B 16	< < <	B 12 0.14 9	> > >	B 12	< < <	B 14 0.65 43	> > >	B 14	< < <	B 15 0.68 41	A 8 0.08 6	B 14	B 14 0.64
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 9 0.08 6 25 19	B 16 0.69 95 -	> > > >	B 16	B 10 0.03 2 35 33	B 12 0.31 36 -	> > >	B 12	< < <	C 28 0.71 49 -	> > >	C 28	< < <	B 17 0.07 9 -	> > >	B 17	B 17 0.69
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.10 -	> > >	A 8	< < <	A 8 0.07 -	> > >	A 8	< < <	A 9 0.23 -	> > >	A 9	< < <	A 8 0.16 -	> > >	A 8	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 9 0.01 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.02 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 9 0.00 0	> > >	A 9	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.20: FIVE-YEAR BACKGROUND OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 11 0.32 10	A 0 0.37 0		A 3		A 0 0.42 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					F 64 0.68 29		> > >	F 64		A 0 0.51 0		A 0		A 0 0.25 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	C 29 0.67 52		C 23 0.29 23	C 26				A 0		C 23 0.89 175	> > >	C 23	A 7 0.26 12	A 8 0.45 55		A 8	B 19 0.83
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	D 25 0.31 9		> > >	D 25					< < <	A 1 0.02 0		A 1		A 0 0.43 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					C 21 0.52 30 15 -15		B 19 0.22 16 -	B 20		C 20 0.73 72 -	B 12 0.17 11 -	B 18	A 9 0.58 23 35 12	A 8 0.52 55 -		A 8	B 14 0.64
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 14 0.04 1		> > >	B 14					< < <	A 0 0.00 0		A 0		A 0 0.34 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	C 24 0.63 38	> > >	C 24	< < <	C 20 0.52 30	> > >	C 20	< < <	B 20 0.83 113	> > >	B 20	< < <	B 19 0.81 98	A 7 0.16 7	B 16	B 19 0.77
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 15 0.33 11 25 14	C 30 0.85 123 - -	> > > > >	C 29	B 16 0.30 9 35 26	C 28 0.80 99 - -	> > > > >	C 27	< < < < <	D 55 0.93 104 - -	> > > > >	D 55	< < < < <	B 18 0.09 11 - -	> > > > >	B 18	C 32 0.86
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 9 0.12 -	> > >	A 9	< < <	A 9 0.19 -	> > >	A 9	< < <	B 10 0.33 -	> > >	B 10	< < <	B 10 0.35 -	> > >	B 10	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0.01 0	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0	A 0 0.05 0	> > >		A 0					A 9 0.00 0		> > >	A 9	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0	A 0 0.05 0	> > >		A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	A 10 0.00 0	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



TABLE 4.21: FIVE-YEAR BACKGROUND OPERATIONS WITH BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 12 0.35 12	A 0 0.35 0		A 4		A 0 0.42 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					F 64 0.67 29		> > >	F 64		A 0 0.47 0		A 0		A 0 0.27 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	C 21 0.38 39		E 57 0.93 110	D 48				A 0		D 45 0.96 175	> > >	D 45	B 14 0.47 23	B 15 0.54 75		B 15	D 37 0.95
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	E 42 0.55 22		> > >	E 42					< < <	A 0 0.02 0		A 0		A 0 0.55 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					C 22 0.55 31 15 -16		B 19 0.22 16 -	C 20		C 22 0.72 68 -	B 14 0.29 16 -	B 19	B 18 0.80 56 35 -21	A 9 0.59 69 -		B 13	B 16 0.78
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 19 0.04 1		> > >	C 19					< < <	A 0 0.00 0		A 0		A 0 0.38 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	D 53 0.87 69	> > >	D 53	< < <	C 26 0.55 40	> > >	C 26	< < <	C 33 0.92 141	> > >	C 33	< < <	C 26 0.86 123	A 9 0.21 8	C 22	C 30 0.90
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.19 8 25 17	D 45 0.98 181 - -	> > > >	D 44	B 18 0.32 7 35 28	C 20 0.58 79 - -	> > > >	C 20	< < < <	E 68 0.95 111 -	> > > >	E 68	< < < <	C 22 0.10 13 - -	> > > >	C 22	D 39 0.94
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 10 0.16 -	> > >	A 10	< < <	A 10 0.22 -	> > >	A 10	< < <	B 10 0.31 -	> > >	B 10	< < <	B 12 0.46 -	> > >	B 12	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 1 0.00 0	> > >	A 1	< < <	A 10 0.05 1	> > >	A 10	< < <	A 9 0.00 0	> > >	A 9	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0					A 10 0.00 0		> > >	A 10	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0		A 0		A 0 0.05 0	> > >	A 0	< < <	B 10 0.00 0	> > >	B 10	< < <	B 10 0.00 0	> > >	B 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.5.2 Total Traffic Operations

Table 4.22, Table 4.23, and Table 4.24 summarize the five-year total traffic level of service conditions with background development traffic.

All study area intersections are forecast to operate at acceptable levels of service during the weekday AM, weekday PM, and Saturday peak hours with the following critical movements noted:

- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp:
 - The westbound approach is forecast to operate at LOS F during the weekday PM and Saturday peak hours. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Falls Avenue Eastbound On/Off-Ramp:
 - The eastbound right-turn is forecast to operate at LOS F with a v/c ratio exceeding 1.00 during the Saturday peak hour. This becomes critical under five-year background traffic conditions with background development traffic included; and
 - The northbound through/right-turn movement is forecast to have a v/c ratio exceeding 0.85 during the weekday PM peak hour and operate at LOS F with a v/c ratio exceeding 1.00 during the Saturday peak hour. This movement becomes critical under five-year total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Kitchener Street:
 - The eastbound approach is forecast to operate at LOS F during the weekday PM and Saturday peak hours. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Bender Street:
 - The westbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 15 m storage length by 1, 15, and 21 m during the weekday AM, weekday PM, and Saturday peak hours, respectively. The 50th percentile queue is contained by the current available storage during the weekday AM and weekday PM peak hours only. This movement becomes critical under base year conditions;
 - The westbound right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue does not block the adjacent



left-turn lane. This movement becomes critical under opening total traffic conditions with background development traffic included;

- The southbound left-turn movement is forecast to have a 95th percentile queue length that exceeds its 35 m storage length by 19 m during the Saturday peak hour. The 50th percentile queue is contained by the current available storage. This becomes critical under five-year background traffic conditions with background development traffic included; and
 - The southbound through movement is forecast to have a 95th percentile queue length that blocks the southbound left-turn movement during the weekday PM and Saturday peak hours. The 50th percentile queue does not block the adjacent left-turn lane. This movement becomes critical under opening total traffic conditions without any background development traffic.
- ▶ Victoria Avenue at Walnut Street:
- The eastbound approach is forecast to operate at LOS E with a v/c ratio exceeding 0.85 during the Saturday peak hour. This becomes critical under five-year background traffic conditions with background development traffic included;
 - The northbound approach is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour. This becomes critical under five-year background traffic conditions with background development traffic included; and
 - The southbound left-turn/through movement is forecast to have a v/c ratio exceeding 0.85 during the Saturday peak hour. This becomes critical under five-year background traffic conditions with background development traffic included.
- ▶ Falls Avenue at MacDonald Avenue:
- The eastbound through/right-turn movement is forecast to operate with at LOS E a v/c ratio exceeding 0.85 during the weekday PM and Saturday peak hours. The 95th percentile queue length also blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions;



- The westbound through/right-turn movement is forecast to have a 95th percentile queue length that blocks the eastbound left-turn movement during the weekday AM, weekday PM, and Saturday peak hours. The 50th percentile queue during the weekday PM and Saturday peak hours also blocks the adjacent left-turn lane. This movement becomes critical under base year conditions; and
- The northbound approach is forecast to operate at LOS F with a v/c ratio exceeding 1.00 during the weekday PM and Saturday peak hours. This movement becomes critical under base year conditions.

It is noted that all approaches along Kitchener Street connecting to the proposed parking area for the site are forecast to operate at LOS B, with low v/c ratios (not exceeding 0.20) and minimal delays (less than 15 seconds) during the weekday AM, weekday PM, and Saturday peak hours.

Appendix P contains the detailed Synchro reports.



**TABLE 4.22: FIVE-YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT
(WEEKDAY AM PEAK HOUR)**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday AM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q								A 9 0.14 4	A 0 0.26 0		A 2		A 0 0.25 0	> > >	A 0		
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					C 16 0.06 2		> > >	C 16		A 0 0.37 0		A 0		A 0 0.16 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	B 13 0.53 32		B 14 0.58 28	B 13				A 0		B 16 0.74 69	> > >	B 16	A 8 0.03 3	A 10 0.43 35	A 9	B 13 0.67	
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	C 20 0.31 10		> > >	C 20					< < <	A 1 0.03 1		A 1		A 0 0.44 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.29 16 15 -1		B 17 0.06 8 -	B 18		B 18 0.62 42 -	B 13 0.12 8 -	B 16	B 12 0.73 29 35 6	A 6 0.34 24 -		A 9	B 12 0.67
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 11 0.03 1		> > >	B 11					< < <	A 0 0.00 0		A 0		A 0 0.21 0	A 0 0.00 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	B 17 0.59 28	> > >	B 17	< < <	B 12 0.14 9	> > >	B 12	< < <	B 14 0.67 46	> > >	B 14	< < <	B 15 0.69 44	A 8 0.08 6	B 14	B 14 0.65
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	A 10 0.08 6 25 19	B 18 0.73 114 -	> > >	B 18	B 11 0.03 2 35 33	B 13 0.32 37 -	> > >	B 13	< < <	D 36 0.80 60 -	> > >	D 36	< < <	B 18 0.07 9 -	> > >	B 18	B 19 0.75
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	A 8 0.11 -	> > >	A 8	< < <	A 8 0.13 -	> > >	A 8	< < <	A 9 0.25 -	> > >	A 9	< < <	A 9 0.19 -	> > >	A 9	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	A 10 0.02 1	> > >	A 10	< < <	B 10 0.08 2	> > >	B 10	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 3 0.05 1		A 3		A 0 0.07 0	> > >	A 0					B 11 0.05 1		> > >	B 11	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 1 0.00 0		A 1		A 0 0.08 0	> > >	A 0	< < <	B 10 0.00 0	> > >	B 10	< < <	A 10 0.03 1	> > >	A 10	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



**TABLE 4.23: FIVE-YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT
(WEEKDAY PM PEAK HOUR)**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q									B 12 0.40 15	A 0 0.40 0		A 4		A 0 0.46 0	> > >	A 0	
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					F 194 1.09 52		> > >	F 194		A 0 0.57 0		A 0		A 0 0.29 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	D 38 0.72 52		D 44 0.76 70	D 42				A 0		C 30 0.93 210	> > >	C 30	A 6 0.28 12	A 8 0.49 67		A 7	C 27 0.89
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	F 230 1.32 100		> > >	F 230					< < <	A 4 0.14 4		A 4		A 0 0.52 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					C 22 0.54 30 15 -15		B 20 0.24 16 -	C 21		C 22 0.78 95 -	B 12 0.18 11 -	B 19	B 11 0.65 27 35 8	A 8 0.54 62 -		A 9	B 15 0.69
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 15 0.07 2		> > >	B 15					< < <	A 1 0.03 1		A 1		A 0 0.36 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	C 33 0.69 46	> > >	C 33	< < <	C 26 0.58 36	> > >	C 26	< < <	C 21 0.85 138	> > >	C 21	< < <	B 19 0.81 115	A 7 0.16 7	B 16	C 21 0.81
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	C 22 0.39 14 25 11	E 56 0.98 188 - -	> > > > >	D 54	C 25 0.41 11 35 24	C 35 0.80 131 - -	> > > > >	C 34	< < < < <	F 83 1.01 162 - -	> > > > >	F 83	< < < < <	C 22 0.08 13 - -	> > > > >	C 22	D 51 0.97
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	B 10 0.16 -	> > >	B 10	< < <	B 11 0.35 -	> > >	B 11	< < <	B 12 0.39 -	> > >	B 12	< < <	B 13 0.49 -	> > >	B 13	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.06 1	> > >	B 12	< < <	B 12 0.14 4	> > >	B 12	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.07 2		A 4		A 0 0.16 0	> > >	A 0					B 13 0.20 6		> > >	B 13	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.20 0	> > >	A 0	< < <	A 9 0.00 0	> > >	A 9	< < <	B 14 0.20 6	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



**TABLE 4.24: FIVE-YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT
(SATURDAY PEAK HOUR)**

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Westbound On-Ramp	TWSC	LOS Delay V/C Q								B 13 0.41 15	A 0 0.37 0		A 4		A 0 0.46 0	> > >	A 0		
	Victoria Avenue & Westbound Off-Ramp	TWSC	LOS Delay V/C Q					F 124 0.90 42		> > >	F 124		A 0 0.50 0		A 0		A 0 0.30 0		A 0	
	Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp	TCS	LOS Delay V/C Q	C 23 0.33 44		F 116 1.12 171	F 93				A 0		F 88 1.08 239	> > >	F 88	C 29 0.65 40	C 22 0.63 110		C 23	E 71 1.10
	Victoria Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	F 275 1.42 109		> > >	F 275					< < <	A 4 0.13 3		A 4		A 0 0.63 0	> > >	A 0	
	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					C 26 0.58 36 15 -21		C 22 0.24 19 -	C 24		C 24 0.75 85 -	B 16 0.30 18 -	C 21	B 16 0.78 54 35 -19	A 9 0.58 76 -		B 12	B 17 0.77
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 20 0.07 2		> > >	C 20					< < <	A 1 0.03 1		A 1		A 0 0.40 0	A 0 0.01 0	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < <	E 69 0.92 71	> > >	E 69	< < <	C 28 0.58 43	> > >	C 28	< < <	D 41 0.96 156	> > >	D 41	< < <	C 28 0.89 134	A 8 0.22 7	C 24	D 36 0.95
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 15 0.19 10 25 15	E 69 1.05 240 - -	> > > > >	E 68	C 24 0.39 8 35 27	C 24 0.59 92 - -	> > > > >	C 24	< < < < <	F 103 1.06 155 - -	> > > > >	F 103	< < < < <	C 26 0.10 15 - -	> > > > >	C 26	E 58 1.03
	MacDonald Avenue & Kitchener Street	AWSC	LOS Delay D. Util Q	< < <	B 11 0.20 -	> > >	B 11	< < <	B 12 0.34 -	> > >	B 12	< < <	B 12 0.36 -	> > >	B 12	< < <	C 16 0.61 -	> > >	C 16	
	Hunter Street/Second Avenue & Kitchener Street	TWSC	LOS Delay V/C Q	< < <	A 0 0.00 0	> > >	A 0	< < <	A 0 0.00 0	> > >	A 0	< < <	B 12 0.10 2	> > >	B 12	< < <	B 13 0.15 4	> > >	B 13	
	Kitchener Street & West Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 4 0.09 2		A 4		A 0 0.15 0	> > >	A 0					B 14 0.17 4		> > >	B 14	
	Kitchener Street & East Parking Lot Access	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1		A 2		A 0 0.18 0	> > >	A 0	< < <	B 14 0.00 0	> > >	B 14	< < <	B 14 0.15 4	> > >	B 14	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

D. Util - Degrees of Utilization

</> - Shared Movement



4.6 Operations Summary

Without Background Development

Traffic conditions on the surrounding road network are generally expected to operate well under the opening year horizon and five-years post build-out. While the study area intersections as a whole perform acceptably, a few specific turning movements experience heavier congestion and longer queues during peak times. These issues mostly relate to limited storage lane lengths or high traffic volume demand on certain approaches.

The driveways serving the site operate efficiently with minimal delay. Overall, the road network can accommodate expected traffic volumes without significant operational concerns.

With Background Developments

Traffic operations remain acceptable across the network when background development traffic is included. Most intersections function well overall, but several specific turning movements experience heavier congestion, longer delays, and queue spillback during peak hours. These issues occur mainly where turn-lane storage is limited or where high demand already exists.

The driveways serving the site operate efficiently with minimal delay. Overall, the road network can accommodate expected traffic volumes without significant operational concerns.



5 Remedial Measures

5.1 Traffic Control Signal Warrant

Under future traffic conditions, the intersections of Victoria Avenue at Kitchener Street and Victoria Avenue at the Westbound Off-Ramp for Falls Avenue are forecast to operate with poor side street operations. The intersections have been assessed using the Ontario Traffic Manual (OTM) Book 12 – Justification 7¹³ procedures to determine if a traffic control signal is warranted.

Table 5.1 summarizes the findings of the warrant analysis under five-year total traffic conditions with background development traffic included. The assessment indicates that a traffic control signal is unlikely to be installed (not warranted) at the intersections of Victoria Avenue at Kitchener Street and Victoria Avenue at the Westbound Off-Ramp for Falls Avenue. No changes to the existing form of traffic control is recommended. **Appendix Q** contains the warrant analysis.

TABLE 5.1: SIGNAL WARRANT SUMMARY

Intersection	Justification				Warranted
	1A	1B	2A	2B	
Victoria Avenue at Kitchener Street	96%	30%	85%	66%	Unlikely
Victoria Avenue at Falls Avenue Westbound Off-Ramp	77%	12%	73%	23%	Unlikely

5.2 Pedestrian Crossover (PXO) Warrant

The proposed pedestrian crossing over Kitchener Street between the garage and the main building has been reviewed to determine a treatment type to help facilitate safe crossings. The review is based on guidance published in Ontario Traffic Manual (OTM) Book 15 – Pedestrian Crossing Treatments.¹⁴

Based on the two-lane cross-section of Kitchener Street along with a speed limit of 50 km/h and the forecast 2033 8-hour vehicle traffic volume of 2,115 and a 4-hour vehicle traffic volume of 1,284, a Level 2

¹³ Ontario Ministry of Transportation, *Ontario Traffic Manual Book 12: Traffic Signals*, (Toronto: King's Printer for Ontario, 2024).

¹⁴ Ontario Ministry of Transportation, *Ontario Traffic Manual Book 15: Pedestrian Crossing Treatments*, (Toronto: Queen's Printer for Ontario, 2016).



Type D pedestrian crossover is warranted and recommended to be installed.

To provide a traffic calming feature along Kitchener Street and better assist pedestrians crossing between the hotel's main entrance and the parking garage, it is also recommended that the PXO be designed as a raised crossing.

5.3 Sensitivity Analysis

Under future traffic conditions, the following intersections listed below are noted to operate with at least one critical movement such as poor levels of service, high v/c ratios, and/or excessive queuing:

- ▶ Victoria Avenue at Falls Avenue Westbound Off-Ramp;
- ▶ Victoria Avenue at Falls Avenue Eastbound On/Off-Ramp;
- ▶ Victoria Avenue at Kitchener Street;
- ▶ Victoria Avenue at Bender Street;
- ▶ Victoria Avenue at Walnut Street; and
- ▶ Falls Avenue at MacDonald Avenue.

With the proposed development located in the tourist area of Niagara Falls, there is likely limited right-of-way available to accommodate geometric road improvements intended to increase capacity. Instead, most improvements in this area would be typically expected to focus on enhancing the pedestrian environment.

The following road improvements suggested below can likely be accommodated within the existing pavement width:

- ▶ Extend the southbound left-turn lane storage length at the intersection of Victoria Avenue and Bender Street from 35 m to 50 m. This appears to be a line painting exercise to provide for additional storage capacity for the turning movement;
- ▶ Modify the lane configuration on the southbound approach at the intersection of Victoria Avenue and Walnut Street to provide an exclusive left-turn lane and a shared through right-turn lane. This appears to be a line painting exercise to indicate to southbound through moving traffic to now travel in the right-most lane through the intersection.;
- ▶ Remove the exclusive southbound right-turn lane at the intersection of Victoria Avenue and Hunter Street and have through and right-turn movements on the southbound approach operate as shared. This only requires line painting, and the



modification would better accommodate a modified southbound approach at the intersection of Victoria Avenue and Walnut Street. The modified southbound approach at the intersection of Victoria Avenue and Hunter Street will keep southbound through traffic as far to the right as possible rather than switching from the left lane to the right lane when approaching the intersection of Victoria Avenue and Walnut Street; and

- ▶ Add an exclusive 15 m northbound right-turn lane at the intersection of Falls Avenue and MacDonald Avenue. The leftmost northbound lane would operate as a shared left-turn/through movement. This appears to be a line painting exercise as the northbound approach is wide enough to accommodate an auxiliary turn lane. The modified northbound approach will also provide an opportunity for northbound right-turn vehicles to move around traffic intending to turn left off of MacDonald Avenue onto Falls Avenue.

It is also noted that there is room to accommodate turn lane extensions for the eastbound left-turn and westbound left-turn lanes at the intersection of Falls Avenue and MacDonald Avenue. However, to extend both turn lanes, it would require the road authorities to cut into the existing centre median along Falls Avenue. Since the eastbound left-turn and westbound left-turn movements at the intersection of Falls Avenue and MacDonald Avenue don't operate poorly and are only blocked by the adjacent through movement queue lengths, it is not recommended to implement the left-turn lane extensions.

Table 5.2, Table 5.3, and Table 5.4 summarize the five-year total traffic level of service conditions with background development traffic included and the suggested road improvements listed above.

Appendix R contains the detailed Synchro reports.

With the implementation of the suggested road improvements described above. All critical movements previously forecasted at the intersections of Victoria Avenue at Bender Street, Victoria Avenue at Walnut Street, and Falls Avenue at MacDonald Avenue remain unresolved. The suggested road improvements are not expected to offer a significant benefit to intersection operation.

With the suggested capacity reduction at the intersection of Victoria Avenue and Hunter Street, which involves removing the exclusive southbound right-turn lane, no traffic operational issues are noted during the weekday AM, weekday PM, or Saturday peak hours. The exclusive southbound right-turn lane can remain in place at the intersection of Victoria Avenue and Hunter Street since road improvements are no longer recommended at the intersection of Victoria Avenue and Walnut Street.



With the tested remedial measures not fully resolving forecast critical movements, which are expected to occur with or without the development of the subject site, the existing lane configurations and traffic control should remain (no modifications).

The forecast capacity issues could be addressed by widening roadway cross-sections to add through lanes or auxiliary turn lanes. However, in several locations, physical constraints such as buildings located close to the roadway limit opportunities for expansion. More importantly, widening the roadway to address vehicle capacity would reduce the space available for active transportation, particularly the pedestrian realm. The City's Official Plan identifies pedestrian comfort and mobility in the tourist area as a key objective rather than designing for an automobile centric environment that puts travel by automobile first.



TABLE 5.2: IMPROVED FIVE-YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY AM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday AM Peak Hour	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					B 18 0.29 16 15 -1		B 17 0.06 8 - -	B 18		B 18 0.62 42 - -	B 13 0.12 8 - -	B 16	B 12 0.73 29 50 21	A 6 0.34 24 - -		A 9	B 12 0.67
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 11 0.03 1		> > > >	B 11					< < < <	A 0 0.00 0		A 0		A 0 0.21 0	> > > >	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < < <	B 17 0.59 27	> > > >	B 17	< < < <	B 12 0.14 9	> > > >	B 12	< < < <	B 14 0.68 48	> > > >	B 14	A 8 0.04 4	B 16 0.71 50	> > > >	B 15	B 15 0.66
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 11 0.08 6 25 19	C 22 0.77 115 - -	> > > >	C 21	B 13 0.04 2 35 33	B 15 0.33 38 - -	> > > >	B 15	< < < <	D 41 0.83 71 - -	B 16 0.01 0 15 15	D 40	< < < <	B 17 0.06 9 - -	> > > >	B 17	C 22 0.79

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

</> - Shared Movement



TABLE 5.3: IMPROVED FIVE-YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT (WEEKDAY PM PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Weekday PM Peak Hour	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					C 22 0.55 30 15 -15		B 20 0.24 16 -	C 21		C 22 0.78 95 -	B 12 0.17 11 -	B 19	B 11 0.65 28 50 22	A 8 0.55 62 -		A 9	B 16 0.69
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	B 15 0.07 2		> > > >	B 15					< < < <	A 1 0.03 1		A 1		A 0 0.37 0	> > > >	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < < <	D 40 0.74 54	> > > >	D 40	< < < <	C 30 0.60 45	> > > >	C 30	< < < <	B 19 0.82 124	> > > >	B 19	A 6 0.06 4	C 23 0.87 152	> > > >	C 23	C 24 0.83
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	C 26 0.47 15 25 10	F 92 1.09 203 - -	> > > >	F 89	C 28 0.43 12 35 23	D 45 0.89 150 - -	> > > >	D 44	< < < <	F 98 1.07 159 -	B 18 0.02 1 15 14	F 93	< < < <	B 19 0.07 12 - -	> > > >	B 19	E 71 1.05

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

</> - Shared Movement



TABLE 5.4: IMPROVED FIVE-YEAR TOTAL OPERATIONS WITH BACKGROUND DEVELOPMENT (SATURDAY PEAK HOUR)

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
Saturday Peak Hour	Victoria Avenue & Bender Street	TCS	LOS Delay V/C Q Stor. Avail.					C 26 0.59 37 15 -22		C 22 0.24 19 - -	C 24		C 25 0.75 85 - -	B 16 0.30 18 - -	C 21	B 16 0.78 54 50 -4	A 9 0.58 76 - -		B 12	B 17 0.77
	Victoria Avenue & Hunter Street	TWSC	LOS Delay V/C Q	C 20 0.07 2		> > > >	C 20					< < < <	A 1 0.03 1		A 1		A 0 0.41 0	> > > >	A 0	
	Victoria Avenue & Walnut Street	TCS	LOS Delay V/C Q	< < < <	F 96 1.01 73	> > > >	F 96	< < < <	C 33 0.64 46	> > > >	C 33	< < < <	E 60 1.03 166	> > > >	E 60	A 7 0.08 4	D 42 0.97 167	> > > >	D 40	D 54 1.02
	MacDonald Avenue & Falls Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 18 0.21 10 25 15	F 106 1.14 254 - -	> > > >	F 103	C 28 0.39 9 35 26	C 28 0.65 100 - -	> > > >	C 28	< < < <	F 122 1.12 150 - -	C 22 0.02 0 15 15	F 116	< < < <	C 23 0.09 14 - -	> > > >	C 23	E 80 1.10

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

</> - Shared Movement



6 Parking Study

6.1 Proposed Parking Supply

The parking supply for the development is proposed as:

- ▶ 38 off-street outdoor parking spaces (inclusive of 4 valet parking spaces);
- ▶ 447 off-street garage parking spaces (inclusive of 95 municipal parking spaces); and
- ▶ 5 on-street valet parking spaces provided along the south side of Kitchener Street directly east of Hunter Street.

Without the municipal parking supply (95 spaces) and the valet parking supply (9 spaces), the site's parking supply is 386 spaces. With the off-street valet spaces included the supply is 390 spaces.

6.2 Zoning Requirements

The proposed development is subject to City of Niagara Falls Zoning By-law (ZBL) 79-200.¹⁵ The subject site is within Schedule D and the following parking rates apply:

- ▶ Hotel: For every 1.25 rooms, 1 parking spot is required (330 spaces);
- ▶ Commercial: For every 60 m² of commercial space, 1 parking spot is required (18 spaces); and
- ▶ Place of Entertainment (Music Hall): For every fifth seat provided, 1 parking spot is required (100 spaces).

¹⁵ City of Niagara Falls Zoning By-law 79-200, Section 4 – General Provisions, Table 1.1.



Table 6.1 summarizes the site's zoning by-law calculations.

TABLE 6.1: ZONING BY-LAW PARKING CALCULATIONS

Land Use	Calculation	Proposed Supply	Delta
Hotel	330 spaces	268 spaces	-62 spaces
Commercial	18 spaces	18 spaces	Meets Zoning
Place of Entertainment	100 spaces	100 spaces	Meets Zoning
Total	448 spaces	386 spaces	-62 spaces

Based on zoning requirements, the development requires 448 parking spaces. With a proposed parking supply of 386 spaces (less the municipal and valet parking supply), this represents a deficit of 62 spaces. The restaurant, cafe, and event space within the hotel building do not require any parking as they are considered an ancillary use.

6.3 Forecast Parking Demand

6.3.1 ITE Parking Generation

The Institute of Transportation Engineers (ITE) Parking Generation Manual (6th Edition)¹⁶ provides data on surveys across the USA and Canada of peak parking demand for different land uses.

The parking demand for the subject site has been estimated using parking rates for LUC 310 (Hotel).

Table 6.2 summarizes the ITE forecast parking generation. The hotel is forecast to generate a parking demand of 268 spaces. With a proposed supply of 268 spaces for the hotel, this represents neither a deficit nor surplus.

¹⁶ The Institute of Transportation Engineers Parking Generation Manual 6th ed., (Washington, DC: ITE, 2023).



TABLE 6.2: ITE PARKING DEMAND

LUC/ Size	Day of Week	Forecast Demand	
		Average Rate	Generation
310	Monday to Friday	0.64	264 spaces
412 Rooms	Saturday	0.65	268 spaces
Total Maximum ITE Parking Demand			268 spaces

6.3.2 Shared Parking Analysis

The parking demand estimates in **Table 6.2** indicate a peak parking demand less than the proposed supply; however, they assume the peak parking demand for each land use occurs at the same time. Given the various land uses proposed on the site, it is feasible that the timing of peak parking demands may support a shared parking supply.

Shared parking is a form of parking management that can allow parking spaces to be shared by more than one user group. As indicated by the time of day distributions for peak parking noted in the ITE parking generation data, there could be opportunities to share parking spaces between the hotel, commercial (retail), and music hall components of the development without exceeding the long-term parking supply of 386 spaces.

With no available ITE parking generation data for the music hall component of the development, it is assumed that the parking occupancy rate is 100% from 5 PM to 12 AM on weekdays and from 3 PM to 12 AM on Saturday to account for pre and post event conditions for events that occur later in the afternoon or evening.



Table 6.3 summarizes the shared parking demand profile between the proposed hotel, commercial, and music hall components of the development (also illustrated in **Figure 6.1**, **Figure 6.2**, and **Figure 6.3**). The shared parking analysis assumes the forecast parking demand for each development component as the value at a parking occupancy rate of 100%.

Based on the time of day distributions for the parking occupancy rates, the peak parking demand is forecast to be 360 spaces occurring from 11 PM to 12 AM on a weekday.

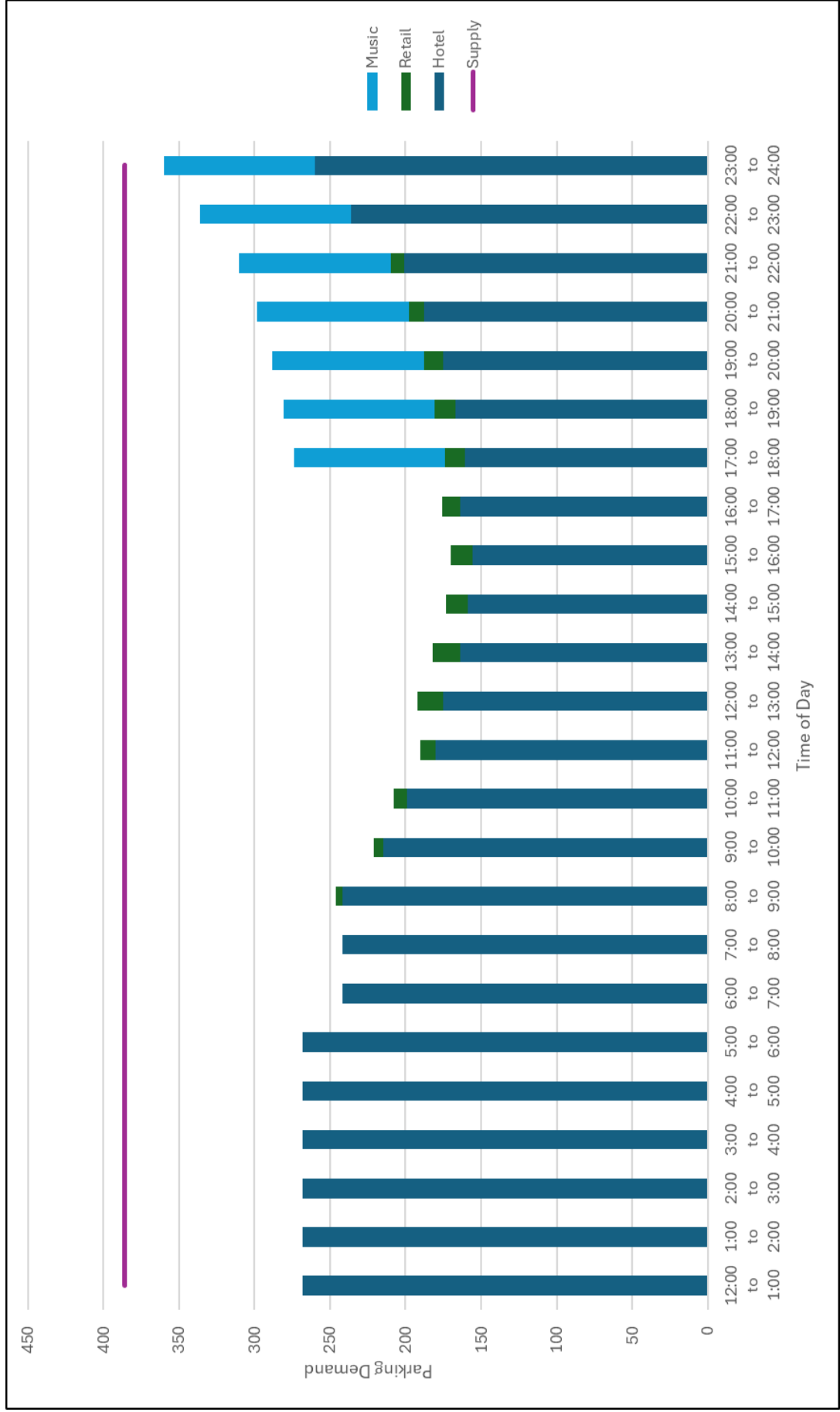
With a proposed parking supply of 386 spaces for the development, the shared parking analysis forecasts a surplus of 26 spaces without the 95 spaces allocated to the municipal parking supply. With the municipal parking supply, there is a forecast surplus of 121 spaces. **Appendix S** contains the ITE parking data.



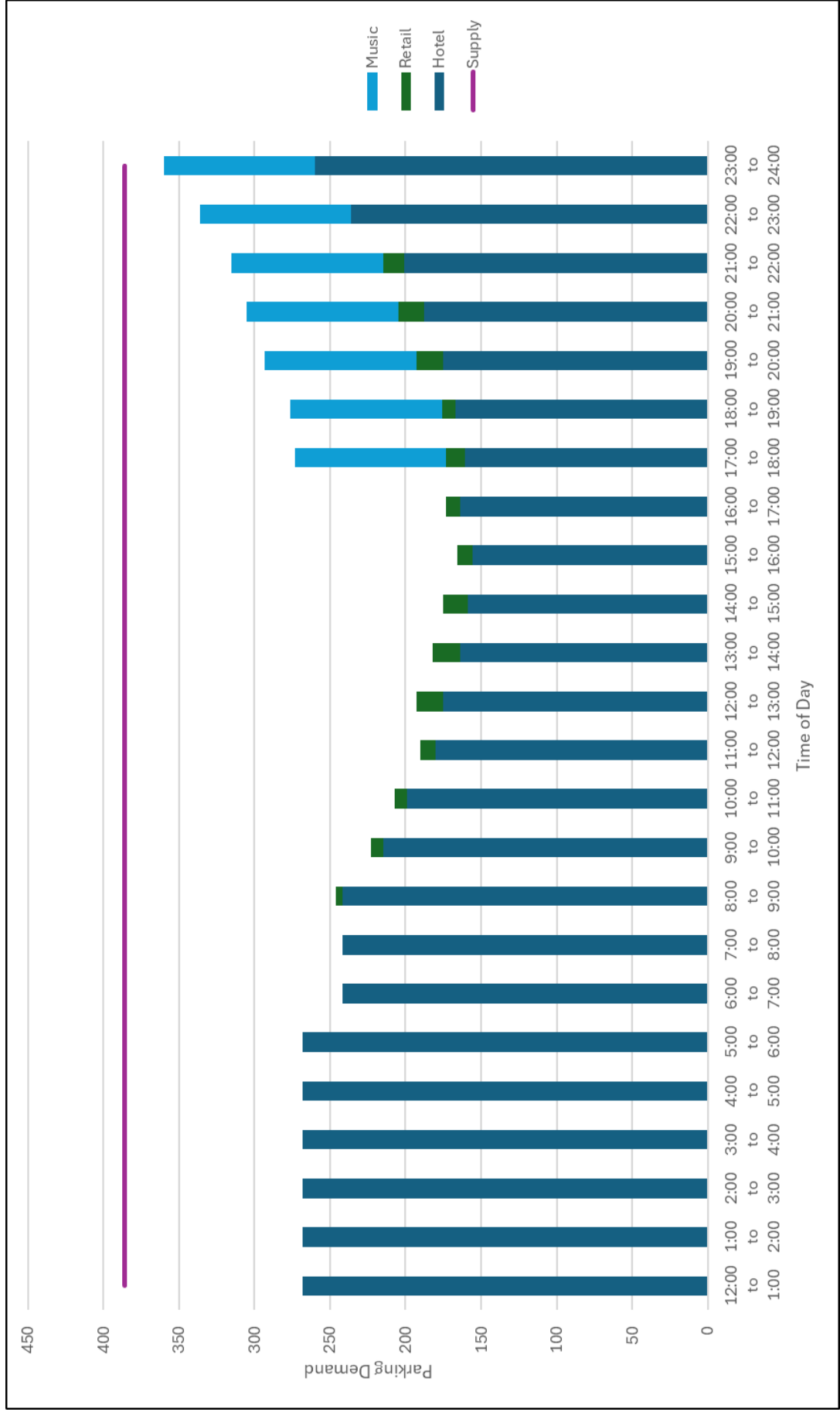
TABLE 6.3: SHARED PARKING DEMAND

Time	Forecast Parking Demand		
	Monday to Thursday	Friday Only	Saturday Only
12:00 to 1:00	268	268	268
1:00 to 2:00	268	268	268
2:00 to 3:00	268	268	268
3:00 to 4:00	268	268	268
4:00 to 5:00	268	268	268
5:00 to 6:00	268	268	268
6:00 to 7:00	242	242	215
7:00 to 8:00	242	242	218
8:00 to 9:00	246	246	215
9:00 to 10:00	221	223	219
10:00 to 11:00	208	207	198
11:00 to 12:00	190	190	187
12:00 to 13:00	192	193	180
13:00 to 14:00	182	182	171
14:00 to 15:00	173	175	147
15:00 to 16:00	170	166	249
16:00 to 17:00	176	173	260
17:00 to 18:00	274	273	271
18:00 to 19:00	281	276	290
19:00 to 20:00	288	293	317
20:00 to 21:00	298	305	317
21:00 to 22:00	310	315	320
22:00 to 23:00	336	336	334
23:00 to 24:00	360	360	355

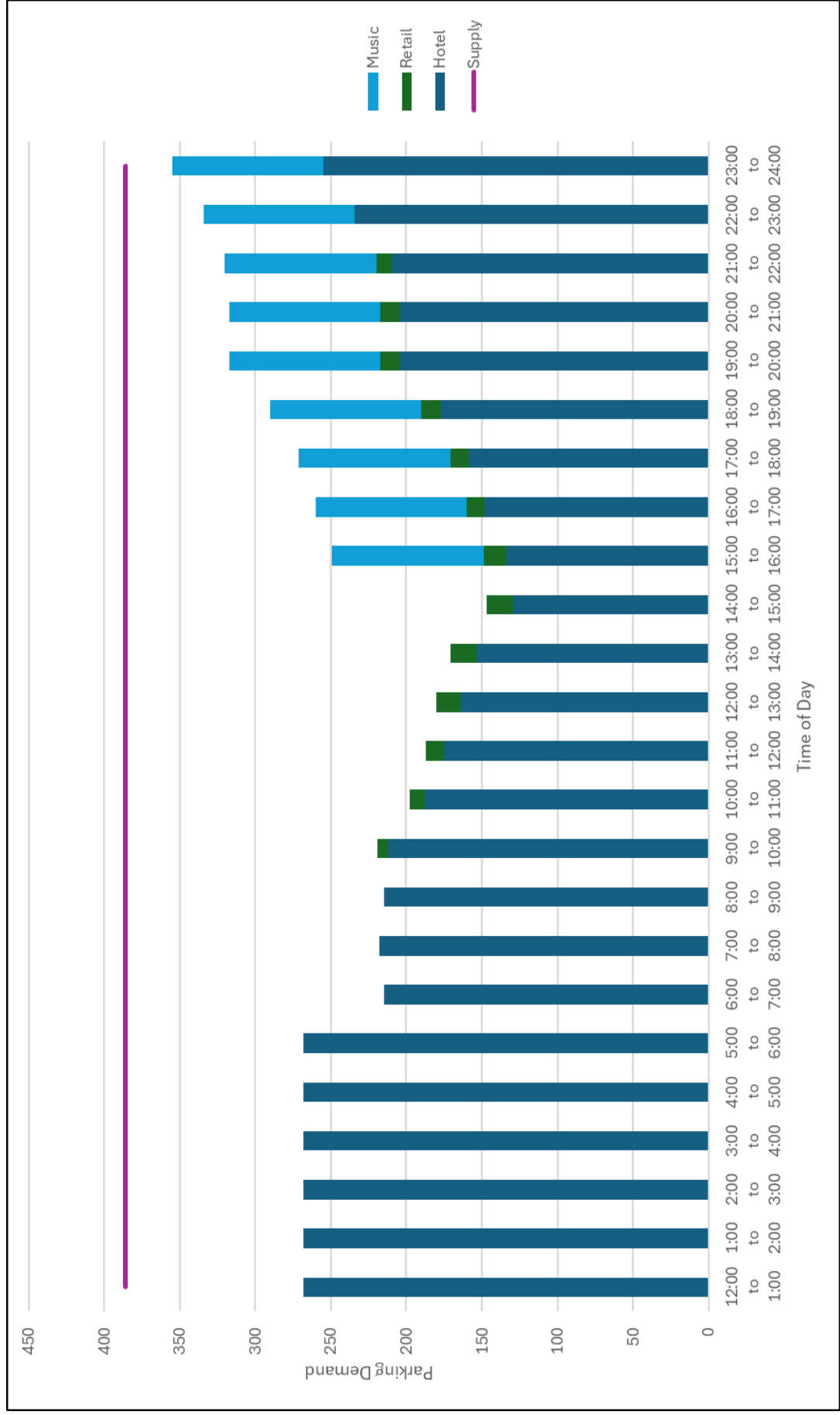




Shared Parking Profile (Monday to Thursday)



Shared Parking Profile (Friday Only)



Shared Parking Profile (Saturday Only)

Figure 6.3

7 Conclusions and Recommendations

7.1 Conclusions

Based on the investigations carried out, it is concluded that:

- ▶ **Base Year Traffic Conditions:** The study area intersections are currently operating within acceptable levels of service.

The intersections at Victoria Avenue and Bender Street and Falls Avenue and MacDonald Avenue experience some localized queuing during peak periods. At Victoria and Bender, westbound left-turn queues occasionally exceed available storage. At Falls and MacDonald, peak-hour queues in the eastbound and westbound through and right-turn lanes sometimes block the adjacent left-turn lane, and the northbound approach is moderately constrained on Saturdays. Overall, these issues are isolated to specific movements and peak periods.
- ▶ **Site Trip Generation:** The site is forecast to generate approximately 192 weekday AM peak hour, 559 weekday PM peak hour, and 449 Saturday peak hour net external trips.
- ▶ **Site Circulation Review:** The hotel loading zones can accommodate MSU and LSU design vehicles, and the two loading areas operate independently, which allows simultaneous loading activity without conflict. MSUs are limited to the north loading zone, while LSUs can use either location.

Exit movements for the HSU design vehicle from the parking structure loading zone requires coordination with valet staff. Minor design refinements that increase the exit radius could reduce or eliminate this requirement.

Internal circulation within the parking structure is functional and follows typical structured parking design conventions. Low travel speeds and normal driver attentiveness are expected, and regular users will adapt to the environment over time.
- ▶ **On-Site Valet Operations:** The forecast maximum 95th percentile queue for the valet service is 10 vehicles. The current site plan proposes 9 valet parking spaces therefore, one additional parking space on-site should be designated as valet parking.
- ▶ **Opening Year Background Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to existing traffic conditions with no additional critical movements



noted during the weekday AM, weekday PM, and Saturday peak hours.

- ▶ **Opening Year Total Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening year background traffic conditions (without background developments).

The study intersections are expected to experience some localized constraints during peak periods. The westbound off-ramp at Victoria Avenue is forecast to operate at LOS D during the weekday PM and Saturday peaks. At Victoria Avenue and Kitchener Street, the eastbound approach is expected to operate at LOS E and F during the same periods. At Victoria Avenue and Bender Street, southbound through queues may occasionally block the adjacent left-turn lane during the Saturday peak hour, although typical queues remain contained.

- ▶ **Five-Year Background Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening year traffic conditions (without background developments) with no additional critical movements noted during the weekday AM, weekday PM, and Saturday peak hours.

- ▶ **Five-Year Total Traffic Conditions (without Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to five-year background traffic conditions (without background developments).

At the Victoria Avenue and Falls Avenue eastbound on and off-ramp, the northbound through and right-turn movement is forecast to operate with a v/c ratio above 0.85 during the weekday PM peak hour, indicating moderate congestion during this period.

- ▶ **Opening Year Background Traffic Conditions (with Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening and five-year traffic conditions (without background developments) with no additional critical movements noted during the weekday AM, weekday PM, and Saturday peak hours.
- ▶ **Opening Year Total Traffic Conditions (with Background Developments):** The study area intersections are forecast to



operate at acceptable levels of service similar to opening year background traffic conditions (with background developments).

At Victoria Avenue and Bender Street, westbound right-turn queues are forecast to occasionally block the eastbound left-turn lane during the weekday PM and Saturday peak hours, although typical queues remain contained.

- ▶ **Five-Year Background Traffic Conditions (with Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to opening year traffic conditions (with background developments).

At the Victoria Avenue and Falls Avenue eastbound on and off-ramp, the eastbound right-turn movement is forecast to operate at LOS E with a v/c ratio above 0.85 during the Saturday peak hour. At Victoria Avenue and Bender Street, the southbound left-turn queue is expected to exceed the available 35 m storage by about 21 m during the Saturday peak hour, although typical queues remain contained. At Victoria Avenue and Walnut Street, the eastbound, northbound, and southbound movements are all forecast to operate with v/c ratios above 0.85 during the Saturday peak hour, indicating moderate peak-period congestion across multiple approaches.

- ▶ **Five-Year Total Traffic Conditions (with Background Developments):** The study area intersections are forecast to operate at acceptable levels of service similar to five-year background traffic conditions (with background developments) with no additional critical movements noted during the weekday AM, weekday PM, and Saturday peak hours.
- ▶ **Traffic Control Signal Warrant:** A traffic control signal is unlikely to be installed (not warranted) at the intersections of Victoria Avenue at Kitchener Street and Victoria Avenue at the Westbound Off-Ramp for Falls Avenue. Therefore, the installation of a traffic control signal at both intersections is not recommended.
- ▶ **Pedestrian Crossover (PXO) Warrant:** A Type D Level 2 pedestrian crossover should be considered for the proposed midblock crossing over Kitchener Street connecting the hotel building and parking garage.
- ▶ **Road Improvements:** Several road improvement options were reviewed to address localized peak-period constraints, all of which appear to be possible through line painting without widening the roadway. These included extending the southbound left-turn storage at Victoria Avenue and Bender Street, adjusting the southbound lane configuration at Victoria



Avenue and Walnut Street, converting the southbound right-turn lane to a shared lane at Victoria Avenue and Hunter Street, and adding a short northbound right-turn lane at Falls Avenue and MacDonald Avenue.

A sensitivity analysis under five-year total traffic conditions, including background growth, determined that these measures would not fully resolve the forecast critical movements, and operational constraints would remain.

The forecast capacity constraints are expected to occur regardless of the proposed development. Widening the roadway to address vehicle capacity would reduce the space available for active transportation, particularly the pedestrian realm. Pedestrian comfort and mobility in the tourist area is a key objective within the City's Official Plan.

- ▶ **Zoning By-law Parking Requirements:** The City of Niagara Falls Zoning By-law mandates a total parking supply of 448 spaces.

With a proposed parking supply of 386 spaces (excluding valet and municipal parking spaces), this represents a deficit of 62 spaces.

- ▶ **Forecast Parking Demand:** Based on shared parking analysis between the various development components, the maximum shared parking demand is forecast to be 360 spaces. With a proposed parking supply of 386 spaces, this represents a surplus of 26 spaces. The 95 spaces allocated to the municipal parking supply can be used by persons visiting the subject site or the surrounding area. With the municipal parking spaces included, there is a forecast parking surplus of 121 spaces.

7.2 Recommendations

Based on the findings of this study, it recommended that:

- ▶ Signage and warning lights be installed at the loading zones to alert users when the areas are in active use;
- ▶ Valet parking be increased to 10 spaces; and
- ▶ A Level 2 Type D Level pedestrian crossover be installed at the proposed midblock crossing over Kitchener Street connecting the hotel building and parking garage.



Appendix A

Pre-Study Material



From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: August 20, 2025 11:23 AM
To: Andrew Orr
Cc: Scott Catton; Biba, Philippe; John Grubich
Subject: RE: 250550 (4873 and 4898 Kitchener Street, Niagara Falls) TIS

Hello Andrew

Thank you for including the Region on this circulation, the Region did not require a TIS therefore we have no comments on the terms of reference. If you require Regional traffic data a request can be made through the Region's website. [Traffic Data Request Application Forms - Niagara Region, Ontario](#)

Thank you

Susan M. Dunsmore, P.Eng.
ACTING DIRECTOR, INFRASTRUCTURE PLANNING & DEVELOPMENT ENGINEERING
Niagara Region, 1815 Sir Isaac Brock Way, Thorold, ON, L2V 4T7

P : (905) 980 - 6000 ext. 3661
W : www.niagararegion.ca
E : susan.dunsmore@niagararegion.ca



From: Andrew Orr <aorr@ptsl.com>
Sent: Wednesday, August 13, 2025 12:50 PM
To: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>; John Grubich <jgrubich@niagarafalls.ca>
Cc: Scott Catton <scatton@ptsl.com>
Subject: 250550 (4873 and 4898 Kitchener Street, Niagara Falls) TIS

**Niagara Region Security
Warning:**

This is an external email, use caution when opening attachments or clicking links

Hello Susan and John,

Paradigm has been retained to conduct a Traffic Impact Study (TIS) for a proposed development located at 4873 and 4898 Kitchener Street in the City of Niagara Falls.

The development concept proposes a conversion of the existing place of worship at 4898 Kitchener Street into a 50-storey hotel with 407 rooms, along with music studios, performing venues, offices, and restaurants. At 4873 Kitchener Street (currently Municipal Parking Lot 18B), the site will be rezoned to accommodate a 498-space parking garage to serve the hotel site while maintaining some municipal parking.

Vehicle access to the hotel valet parking area is proposed via a private one-way road connecting Hunter Street and Kitchener Street. Vehicle access to the hotel loading zone is proposed via a private circular driveway to Hunter Street. Vehicle access to the parking garage is proposed via two driveways connecting to Kitchener Street (preliminary concept attached).

We'd like to prepare our report based on the following scope, subject to your comments:

PROPOSED TERMS OF REFERENCE

Study Area Intersections:

- Kitchener Street at Victoria Avenue;
- Kitchener Street at Hunter Street/2nd Avenue;
- Kitchener Street at McDonald Avenue;
- Victoria Avenue at Hunter Street;
- Victoria Avenue at Bender Street (signalized);
- Victoria Avenue at Falls Avenue Eastbound Ramp (signalized);
- Victoria Avenue at Falls Avenue Westbound Off-Ramp;
- Victoria Avenue at Falls Avenue Westbound On-Ramp;
- Falls Avenue at McDonald Avenue (signalized);
- The proposed site driveways

Analysis Periods:

- Weekday AM peak hour;
- Weekday PM peak hour; and
- Saturday mid-day peak hour.

Existing Data:

- TMCs collected by Paradigm in August 2025.

Horizon Year

- Existing Conditions; and
- Opening year of the full build-out (2028); and
- Five years post full build-out (2033).

Analysis

- Synchro 12, HCM 2000 analysis.
- Queuing assessment for the hotel's pick-up/drop-off areas.
- AutoTURN analysis for vehicles accessing the site.

Background Traffic

- Background traffic annual growth rate. **Please confirm**
- Any nearby background developments to include in the study. **Please confirm**

Road Improvements

- **Please confirm**

Trip Generation

- ITE Trip Generation Data 11th Edition (for the hotel related land uses); and
- First principles approach for the musical performance related land uses.

Site Traffic Distribution

- Existing Traffic Patterns.

Report

- Report documenting the study methodologies, findings, conclusions, and recommendations.

Best Regards,

Andrew Orr, M.A.Sc., EIT

Transportation Consultant, Associate
(He/Him)



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From: John Grubich <jgrubich@niagarafalls.ca>
Sent: August 13, 2025 3:08 PM
To: Andrew Orr
Cc: Scott Catton; Wilson, Josh
Subject: RE: [EXTERNAL]-250550 (4873 and 4898 Kitchener Street, Niagara Falls) TIS

Andrew;

Thank you for providing your terms of reference for this proposed development. City Transportation comments are embedded in your e-mail. Feel free to contact me if you have any questions.

John Grubich, C.E.T. | Traffic Planning Supervisor | Municipal Works - Transportation Services | City of Niagara Falls
4343 Morrison Street, Niagara Falls, ON L2E 6Z9 | (905) 356-7521 ext 5214 | jgrubich@niagarafalls.ca

From: Andrew Orr <aorr@ptsl.com>
Sent: Wednesday, August 13, 2025 12:50 PM
To: Dunsmore, Susan <susan.dunsmore@niagararegion.ca>; John Grubich <jgrubich@niagarafalls.ca>
Cc: Scott Catton <scatton@ptsl.com>
Subject: [EXTERNAL]-250550 (4873 and 4898 Kitchener Street, Niagara Falls) TIS

Hello Susan and John,

Paradigm has been retained to conduct a Traffic Impact Study (TIS) for a proposed development located at 4873 and 4898 Kitchener Street in the City of Niagara Falls.

The development concept proposes a conversion of the existing place of worship at 4898 Kitchener Street into a 50-storey hotel with 407 rooms, along with music studios, performing venues, offices, and restaurants. At 4873 Kitchener Street (currently Municipal Parking Lot 18B), the site will be rezoned to accommodate a 498-space parking garage to serve the hotel site while maintaining some municipal parking.

Vehicle access to the hotel valet parking area is proposed via a private one-way road connecting Hunter Street and Kitchener Street. Vehicle access to the hotel loading zone is proposed via a private circular driveway to Hunter Street. Vehicle access to the parking garage is proposed via two driveways connecting to Kitchener Street (preliminary concept attached).

We'd like to prepare our report based on the following scope, subject to your comments:

PROPOSED TERMS OF REFERENCE

Study Area Intersections:

- Kitchener Street at Victoria Avenue;
- Kitchener Street at Hunter Street/2nd Avenue;
- Kitchener Street at McDonald Avenue;
- Victoria Avenue at Hunter Street;
- Victoria Avenue at Bender Street (signalized);

- Victoria Avenue at Falls Avenue Eastbound Ramp (signalized);
- Victoria Avenue at Falls Avenue Westbound Off-Ramp;
- Victoria Avenue at Falls Avenue Westbound On-Ramp;
- Falls Avenue at McDonald Avenue (signalized);
- The proposed site driveways
- **Victoria Avenue & Walnut Street (Signalized) - add**

Analysis Periods: **OK**

- Weekday AM peak hour;
- Weekday PM peak hour; and
- Saturday mid-day peak hour.

Existing Data: **OK**

- TMCs collected by Paradigm in August 2025.

Horizon Year **OK**

- Existing Conditions; and
- Opening year of the full build-out (2028); and
- Five years post full build-out (2033).

Analysis **OK**

- Synchro 12, HCM 2000 analysis.
- Queuing assessment for the hotel's pick-up/drop-off areas.
- AutoTURN analysis for vehicles accessing the site.

Background Traffic

- Background traffic annual growth rate. **Please confirm Please use 2% annual growth rate**
- Any nearby background developments to include in the study. **Please confirm City Council has approved the following developments that are to be included in the background conditions:**
 - **Ice Hotel, 4709-4745 Bender Street -> <https://niagarafalls.ca/city-hall/planning/current-planning-applications/139-4709-4725-4745-bender-st-5655-ontario-av-air-rights-over-a-portion-of-ontario-av-lands-on-the-sw-corner-of-palmer-av-bender-st.pda>**
 - **Hotel/Condo, 5631 Victoria Avenue: Paradigm prepared the TIS for this proposal**
 - **One set of analyses should be done where only the subject development is included considering that some approved projects do not proceed forward to construction, and the second analysis including the 2 aforementioned approved developments**

Road Improvements

- **Please confirm There are no planned road improvements that impact the study area.**

Trip Generation **OK**

- ITE Trip Generation Data 11th Edition (for the hotel related land uses); and
- First principles approach for the musical performance related land uses.
- **Include a separate trip diagram for valet trips**

Site Traffic Distribution

- Existing Traffic Patterns.
- **Use TTS data as well**

Report

- Report documenting the study methodologies, findings, conclusions, and recommendations.

Other:

City Staff provided the following comments at the pre-consultation meeting that should be addressed in the TIS:

A 407-room hotel requires 325.6 parking spaces at a rate of 1 parking space for every 1.25 rooms, and that the place of entertainment requires 1 parking space for every 5 persons that can be lawfully accommodated therein at any one time, but there is not enough information provided on the occupancy to determine the parking requirement. Please advise if the parking requirement for the project is not met. City Staff may require a parking study to be done.

The traffic impact study is to identify the required traffic control and ideal location for pedestrians crossing Kitchener Street from the parking garage to the hotel site.

The registration area is quite small for guests and servicing vehicles, and Staff has a concern that it will fill up with vehicles quickly causing others to have to wait or unload from the road. The traffic consultant will be required to calculate and determine if the space is suitable to accommodate peak arrival rates. All hotel-related activities are to be carried out on the hotel site.

All garbage and servicing must be undertaken on the development lands. Plan to show the required loading zones, each being a minimum 3m x 9m in size. Truck drivers must enter the site in a forward direction, accomplish all movements on-site, and then leave the site in a forward direction. Servicing vehicles should not severely impact guests. A cursory assessment is requested in the traffic report.

As Kitchener Street is a collector road, whereas Hunter Street is classified as a local road, the main vehicular entrance for hotel guests & servicing vehicles should be from Kitchener Street opposed to Hunter Street as shown on the plans.

There are two driveways proposed from Hunter Street to the main hotel receiving area, presumably the eastern driveway will be an entrance and the other an exit, with another two driveways, from Hunter Street to Kitchener Street, closer to the intersection for valets. The driveway appears to go through the required 5m x 5m daylight triangle. Valet service should be done in the main registration area.

Best Regards,

Andrew Orr, M.A.Sc., EIT

Transportation Consultant, Associate
(He/Him)



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Appendix B

Traffic Data and Signal Timing Plans





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway East
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Driveway Northbound						Driveway East Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	6	0	0	0	6	0	5	1	0	0	6	0	0	0	0	0	0	1	0	0	0	0	1	13
7:15 AM	0	7	0	0	0	7	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	8
7:30 AM	0	8	0	0	0	8	0	5	0	0	0	5	1	0	0	0	0	1	0	0	0	0	5	0	14
7:45 AM	0	6	0	0	0	6	0	6	0	0	0	6	0	0	0	0	0	0	0	0	0	0	1	0	12
Hourly Total	0	27	0	0	0	27	0	17	1	0	0	18	1	0	0	0	0	1	1	0	0	0	6	1	47
8:00 AM	1	5	0	0	0	6	0	3	0	0	0	3	1	0	0	0	0	1	0	0	0	0	2	0	10
8:15 AM	0	9	0	0	0	9	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	11
8:30 AM	0	8	1	0	0	9	0	5	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	14
8:45 AM	0	13	0	0	0	13	0	5	1	0	0	6	0	0	0	0	0	0	1	0	0	0	0	1	20
Hourly Total	1	35	1	0	0	37	0	14	2	0	2	16	1	0	0	0	0	1	1	0	0	0	3	1	55
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	13	0	0	0	13	0	5	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	18
11:15 AM	0	12	0	0	0	12	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	19
11:30 AM	0	16	0	0	0	16	0	9	0	0	2	9	0	0	0	0	0	0	1	0	0	0	0	1	26
11:45 AM	0	12	0	0	0	12	0	12	0	0	1	12	0	0	1	0	0	1	0	0	0	0	0	0	25
Hourly Total	0	53	0	0	0	53	0	33	0	0	3	33	0	0	1	0	0	1	1	0	0	0	1	1	88
12:00 PM	0	15	0	0	1	15	0	4	1	0	0	5	0	1	0	0	0	1	1	0	0	0	0	1	22
12:15 PM	0	16	0	0	0	16	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	23
12:30 PM	0	21	0	0	0	21	0	10	1	0	0	11	0	1	0	0	0	1	1	0	0	0	0	1	34
12:45 PM	1	12	0	0	0	13	0	10	0	0	0	10	0	1	0	0	0	1	0	0	0	0	0	0	24
Hourly Total	1	64	0	0	1	65	0	31	2	0	0	33	0	3	0	0	0	3	2	0	0	0	0	2	103
1:00 PM	0	7	0	0	2	7	0	11	0	0	0	11	0	0	0	0	0	0	1	0	0	0	0	1	19
1:15 PM	0	11	0	0	2	11	0	5	4	0	0	9	0	0	0	0	0	0	3	0	2	0	2	5	25
1:30 PM	0	9	0	0	0	9	0	7	1	0	1	8	0	0	1	0	0	1	0	0	2	0	2	2	20
1:45 PM	0	16	0	0	0	16	0	12	0	0	0	12	0	0	0	0	0	0	1	0	0	0	0	1	29
Hourly Total	0	43	0	0	4	43	0	35	5	0	1	40	0	0	1	0	0	1	5	0	4	0	4	9	93
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	16	0	0	2	16	0	6	0	0	2	6	0	1	0	0	0	1	0	0	0	0	1	0	23
3:15 PM	0	10	0	0	5	10	0	11	1	0	0	12	0	1	1	0	0	2	0	0	0	0	2	0	24
3:30 PM	0	17	0	0	2	17	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	24
3:45 PM	0	12	0	0	0	12	0	8	0	1	0	9	0	0	0	0	0	0	0	0	0	0	1	0	21
Hourly Total	0	55	0	0	9	55	0	32	1	1	2	34	0	2	1	0	0	3	0	0	0	0	5	0	92
4:00 PM	0	9	0	0	2	9	0	5	0	0	1	5	1	0	1	0	0	2	0	0	0	0	0	0	16
4:15 PM	0	12	0	0	2	12	1	12	1	0	0	14	0	0	0	0	0	0	2	1	0	0	0	3	29
4:30 PM	0	12	0	0	0	12	0	16	1	0	3	17	0	0	0	0	0	0	1	0	0	0	4	1	30

4:45 PM	0	20	0	0	0	20	0	14	1	0	0	15	0	0	1	0	0	1	0	0	0	0	1	0	36
Hourly Total	0	53	0	0	4	53	1	47	3	0	4	51	1	0	2	0	0	3	3	1	0	0	5	4	111
5:00 PM	0	11	0	0	1	11	0	16	0	0	0	16	0	0	1	0	0	1	1	0	0	0	2	1	29
5:15 PM	0	14	0	0	0	14	0	17	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	31
5:30 PM	0	12	0	1	3	13	0	13	1	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	27
5:45 PM	0	10	0	1	2	11	0	7	0	0	0	7	0	0	0	0	0	0	0	0	1	0	5	1	19
Hourly Total	0	47	0	2	6	49	0	53	1	0	0	54	0	0	1	0	0	1	1	0	1	0	7	2	106
Grand Total	2	377	1	2	24	382	1	262	15	1	12	279	3	5	6	0	0	14	14	1	5	0	31	20	695
Approach %	0.5	98.7	0.3	0.5	-	-	0.4	93.9	5.4	0.4	-	-	21.4	35.7	42.9	0.0	-	-	70.0	5.0	25.0	0.0	-	-	-
Total %	0.3	54.2	0.1	0.3	-	55.0	0.1	37.7	2.2	0.1	-	40.1	0.4	0.7	0.9	0.0	-	2.0	2.0	0.1	0.7	0.0	-	2.9	-
Motorcycles	0	2	0	0	-	2	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	4
% Motorcycles	0.0	0.5	0.0	0.0	-	0.5	0.0	0.8	0.0	0.0	-	0.7	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.6
Cars & Light Goods	1	363	0	2	-	366	0	248	15	1	-	264	3	0	4	0	-	7	14	0	4	0	-	18	655
% Cars & Light Goods	50.0	96.3	0.0	100.0	-	95.8	0.0	94.7	100.0	100.0	-	94.6	100.0	0.0	66.7	-	-	50.0	100.0	0.0	80.0	-	-	90.0	94.2
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.3	0.0	0.0	-	0.3	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Single-Unit Trucks	1	1	0	0	-	2	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	5
% Single-Unit Trucks	50.0	0.3	0.0	0.0	-	0.5	0.0	1.1	0.0	0.0	-	1.1	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.7
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.4	0.0	0.0	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	10	1	0	-	11	1	8	0	0	-	9	0	5	2	0	-	7	0	1	1	0	-	2	29
% Bicycles on Road	0.0	2.7	100.0	0.0	-	2.9	100.0	3.1	0.0	0.0	-	3.2	0.0	100.0	33.3	-	-	50.0	0.0	100.0	20.0	-	-	10.0	4.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	8.3	-	-	-	-	-	-	-	-	-	-	-	19.4	-	-
Pedestrians	-	-	-	-	24	-	-	-	-	-	11	-	-	-	-	-	0	-	-	-	-	-	25	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	91.7	-	-	-	-	-	-	-	-	-	-	-	80.6	-	-

Turning Movement Data Plot

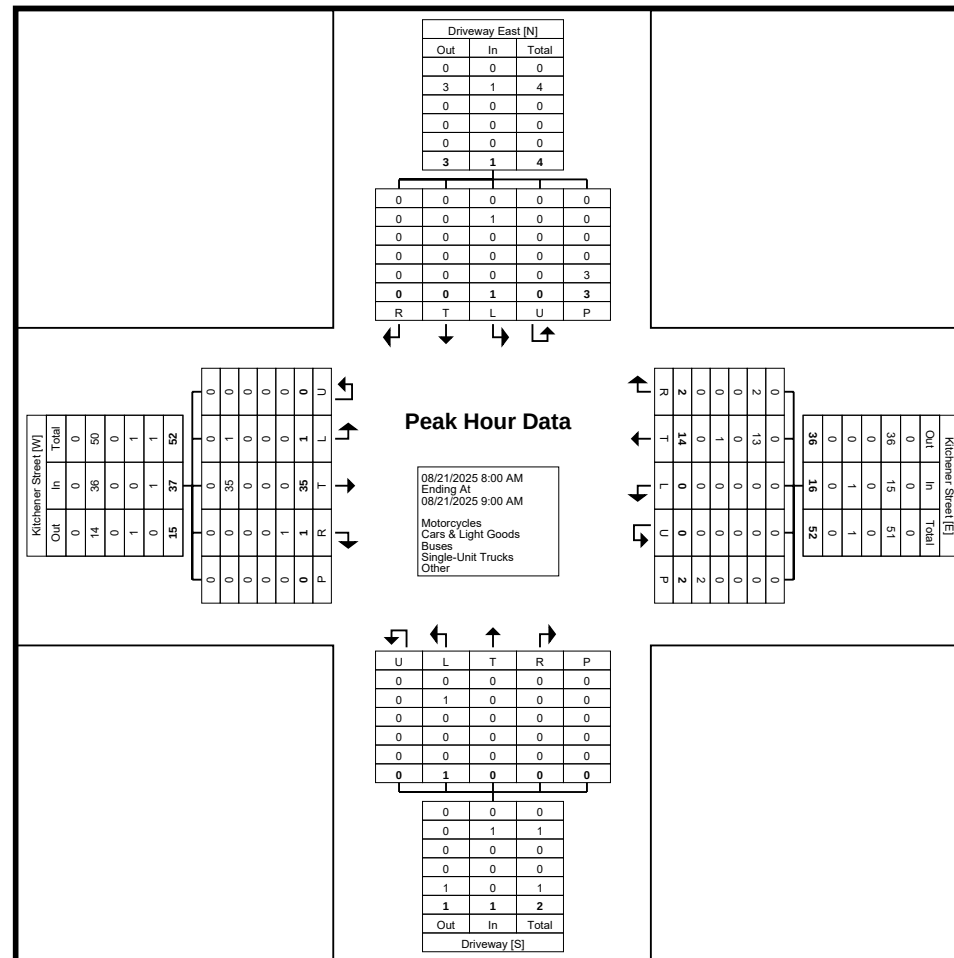
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Driveway Northbound						Driveway East Southbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
8:00 AM	1	5	0	0	0	6	0	3	0	0	0	3	1	0	0	0	0	1	0	0	0	0	2	0	10	
8:15 AM	0	9	0	0	0	9	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	11	
8:30 AM	0	8	1	0	0	9	0	5	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	14	
8:45 AM	0	13	0	0	0	13	0	5	1	0	0	6	0	0	0	0	0	0	1	0	0	0	0	1	20	
Total	1	35	1	0	0	37	0	14	2	0	2	16	1	0	0	0	0	1	1	0	0	0	3	1	55	
Approach %	2.7	94.6	2.7	0.0	-	-	0.0	87.5	12.5	0.0	-	-	100.0	0.0	0.0	0.0	0.0	-	-	100.0	0.0	0.0	0.0	-	-	-
Total %	1.8	63.6	1.8	0.0	-	67.3	0.0	25.5	3.6	0.0	-	29.1	1.8	0.0	0.0	0.0	-	1.8	1.8	0.0	0.0	0.0	-	1.8	-	
PHF	0.250	0.673	0.250	0.000	-	0.712	0.000	0.700	0.500	0.000	-	0.667	0.250	0.000	0.000	0.000	-	0.250	0.250	0.000	0.000	0.000	-	0.250	0.688	
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Motorcycles	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Cars & Light Goods	1	35	0	0	-	36	0	13	2	0	-	15	1	0	0	0	-	1	1	0	0	0	-	1	53	
% Cars & Light Goods	100.0	100.0	0.0	-	-	97.3	-	92.9	100.0	-	-	93.8	100.0	-	-	-	-	100.0	100.0	-	-	-	-	100.0	96.4	
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Buses	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1	
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	-	7.1	0.0	-	-	6.3	0.0	-	-	-	-	0.0	0.0	-	-	-	-	0.0	1.8	
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Bicycles on Road	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	
% Bicycles on Road	0.0	0.0	100.0	-	-	2.7	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	-	-	-	-	0.0	1.8	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	33.3	-	-	
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	2	-	-	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	66.7	-	-	



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway East
Site Code: 250550
Start Date: 08/21/2025
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)

Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Driveway Northbound						Driveway East Southbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
11:45 AM	0	12	0	0	0	12	0	12	0	0	1	12	0	0	1	0	0	1	0	0	0	0	0	0	25	
12:00 PM	0	15	0	0	1	15	0	4	1	0	0	5	0	1	0	0	0	1	1	0	0	0	0	1	22	
12:15 PM	0	16	0	0	0	16	0	7	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	23	
12:30 PM	0	21	0	0	0	21	0	10	1	0	0	11	0	1	0	0	0	1	1	0	0	0	0	1	34	
Total	0	64	0	0	1	64	0	33	2	0	1	35	0	2	1	0	0	3	2	0	0	0	0	2	104	
Approach %	0.0	100.0	0.0	0.0	-	-	0.0	94.3	5.7	0.0	-	-	0.0	66.7	33.3	0.0	-	-	100.0	0.0	0.0	0.0	0.0	-	-	-
Total %	0.0	61.5	0.0	0.0	-	61.5	0.0	31.7	1.9	0.0	-	33.7	0.0	1.9	1.0	0.0	-	2.9	1.9	0.0	0.0	0.0	-	1.9	-	
PHF	0.000	0.762	0.000	0.000	-	0.762	0.000	0.688	0.500	0.000	-	0.729	0.000	0.500	0.250	0.000	-	0.750	0.500	0.000	0.000	0.000	-	0.500	0.765	
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Motorcycles	-	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Cars & Light Goods	0	60	0	0	-	60	0	32	2	0	-	34	0	0	0	0	-	0	2	0	0	0	-	2	96	
% Cars & Light Goods	-	93.8	-	-	-	93.8	-	97.0	100.0	-	-	97.1	-	0.0	0.0	-	-	0.0	100.0	-	-	-	-	100.0	92.3	
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1	
% Buses	-	1.6	-	-	-	1.6	-	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	1.0	
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Single-Unit Trucks	-	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Articulated Trucks	-	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Bicycles on Road	0	3	0	0	-	3	0	1	0	0	-	1	0	2	1	0	-	3	0	0	0	0	-	0	7	
% Bicycles on Road	-	4.7	-	-	-	4.7	-	3.0	0.0	-	-	2.9	-	100.0	100.0	-	-	100.0	0.0	-	-	-	-	0.0	6.7	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Turning Movement Peak Hour Data Plot (11:45 AM)

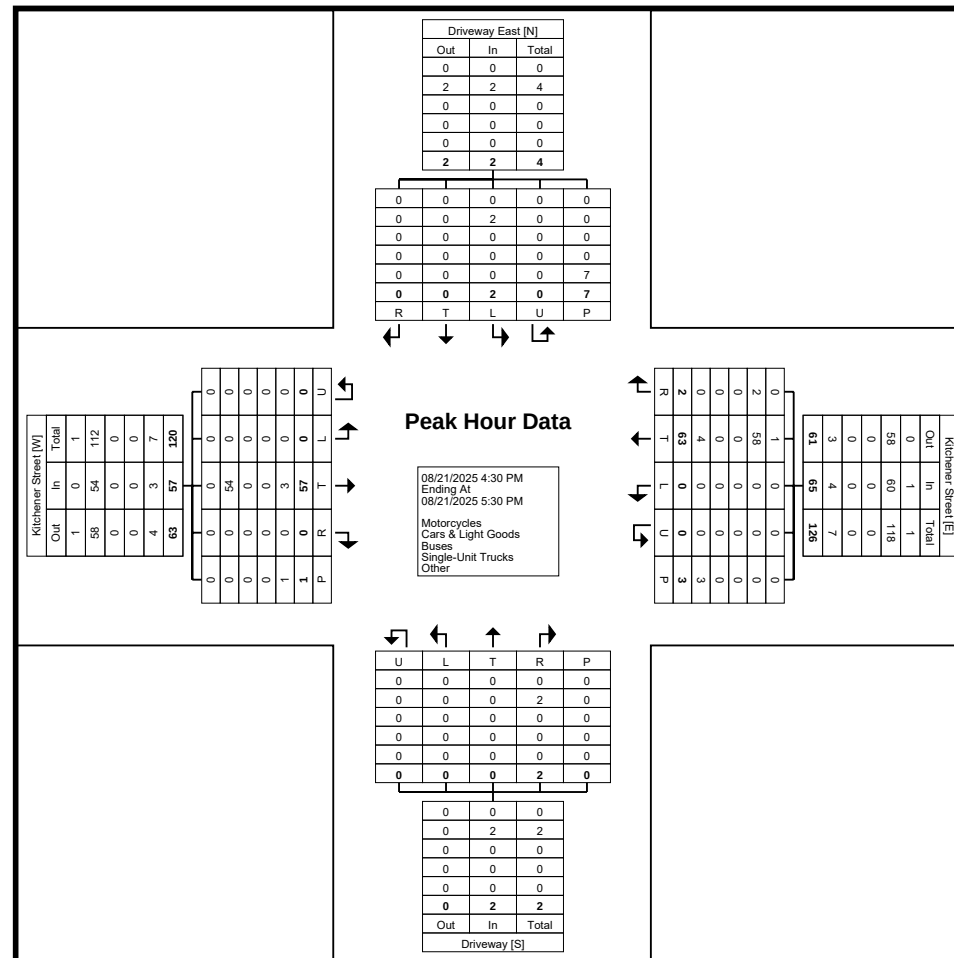
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Driveway Northbound						Driveway East Southbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
4:30 PM	0	12	0	0	0	12	0	16	1	0	3	17	0	0	0	0	0	0	1	0	0	0	4	1	30	
4:45 PM	0	20	0	0	0	20	0	14	1	0	0	15	0	0	1	0	0	1	0	0	0	0	1	0	36	
5:00 PM	0	11	0	0	1	11	0	16	0	0	0	16	0	0	1	0	0	1	1	0	0	0	2	1	29	
5:15 PM	0	14	0	0	0	14	0	17	0	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	31	
Total	0	57	0	0	1	57	0	63	2	0	3	65	0	0	2	0	0	2	2	0	0	0	7	2	126	
Approach %	0.0	100.0	0.0	0.0	-	-	0.0	96.9	3.1	0.0	-	-	0.0	0.0	100.0	0.0	-	-	100.0	0.0	0.0	0.0	0.0	-	-	-
Total %	0.0	45.2	0.0	0.0	-	45.2	0.0	50.0	1.6	0.0	-	51.6	0.0	0.0	1.6	0.0	-	1.6	1.6	0.0	0.0	0.0	-	1.6	-	
PHF	0.000	0.713	0.000	0.000	-	0.713	0.000	0.926	0.500	0.000	-	0.956	0.000	0.000	0.500	0.000	-	0.500	0.500	0.000	0.000	0.000	-	0.500	0.875	
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1	
% Motorcycles	-	0.0	-	-	-	0.0	-	1.6	0.0	-	-	1.5	-	-	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.8	
Cars & Light Goods	0	54	0	0	-	54	0	58	2	0	-	60	0	0	2	0	-	2	2	0	0	0	-	2	118	
% Cars & Light Goods	-	94.7	-	-	-	94.7	-	92.1	100.0	-	-	92.3	-	-	100.0	-	-	100.0	100.0	-	-	-	-	100.0	93.7	
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Buses	-	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Single-Unit Trucks	-	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Articulated Trucks	-	0.0	-	-	-	0.0	-	0.0	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0	-	-	-	-	0.0	0.0	
Bicycles on Road	0	3	0	0	-	3	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	7	
% Bicycles on Road	-	5.3	-	-	-	5.3	-	6.3	0.0	-	-	6.2	-	-	0.0	-	-	0.0	0.0	-	-	-	-	0.0	5.6	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-	
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	33.3	-	-	-	-	-	-	-	-	-	-	-	14.3	-	-	
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	6	-	-	
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	66.7	-	-	-	-	-	-	-	-	-	-	-	85.7	-	-	



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway East
Site Code: 250550
Start Date: 08/21/2025
Page No: 9



Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound					Kitchener Street Westbound					Driveway East Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
7:00 AM	0	5	0	0	5	4	0	0	1	4	1	0	0	0	1	10
7:15 AM	0	7	0	0	7	4	0	0	0	4	0	1	0	0	1	12
7:30 AM	0	9	0	1	9	5	0	0	0	5	0	0	0	2	0	14
7:45 AM	0	5	0	1	5	4	0	0	0	4	1	0	0	1	1	10
Hourly Total	0	26	0	2	26	17	0	0	1	17	2	1	0	3	3	46
8:00 AM	0	7	0	0	7	5	0	0	0	5	0	1	0	1	1	13
8:15 AM	0	8	0	0	8	0	0	0	0	0	1	0	0	1	1	9
8:30 AM	0	9	0	0	9	7	0	0	0	7	0	0	0	0	0	16
8:45 AM	2	13	0	2	15	5	0	0	0	5	0	0	0	2	0	20
Hourly Total	2	37	0	2	39	17	0	0	0	17	1	1	0	4	2	58
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	11	0	0	11	5	0	0	0	5	0	0	0	1	0	16
11:15 AM	2	13	0	1	15	8	0	0	0	8	0	0	0	1	0	23
11:30 AM	0	18	0	0	18	8	1	0	0	9	0	0	0	0	0	27
11:45 AM	2	12	0	3	14	12	0	0	0	12	0	1	0	0	1	27
Hourly Total	4	54	0	4	58	33	1	0	0	34	0	1	0	2	1	93
12:00 PM	0	13	0	0	13	4	0	0	0	4	0	0	0	0	0	17
12:15 PM	0	16	0	0	16	8	0	0	0	8	0	0	0	1	0	24
12:30 PM	0	20	0	0	20	10	1	0	0	11	0	1	0	0	1	32
12:45 PM	1	14	0	0	15	8	0	0	0	8	0	1	0	0	1	24
Hourly Total	1	63	0	0	64	30	1	0	0	31	0	2	0	1	2	97
1:00 PM	0	8	0	0	8	12	0	0	0	12	0	1	0	0	1	21
1:15 PM	1	9	0	5	10	6	0	1	3	7	0	1	0	5	1	18
1:30 PM	0	7	0	2	7	9	0	0	0	9	0	0	0	2	0	16
1:45 PM	0	17	0	0	17	14	0	0	0	14	1	0	0	1	1	32
Hourly Total	1	41	0	7	42	41	0	1	3	42	1	2	0	8	3	87
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	12	0	2	12	6	0	0	1	6	2	1	0	1	3	21
3:15 PM	0	13	0	2	13	10	0	0	3	10	0	0	0	3	0	23
3:30 PM	1	15	0	0	16	7	1	0	0	8	0	0	0	5	0	24
3:45 PM	0	10	0	0	10	7	0	0	0	7	1	0	0	1	1	18
Hourly Total	1	50	0	4	51	30	1	0	4	31	3	1	0	10	4	86
4:00 PM	0	8	0	0	8	6	0	0	0	6	0	0	0	0	0	14
4:15 PM	0	15	0	2	15	15	0	0	0	15	0	0	0	0	0	30
4:30 PM	1	10	0	0	11	18	0	0	0	18	1	0	0	2	1	30
4:45 PM	0	17	0	0	17	11	1	0	0	12	2	0	0	2	2	31

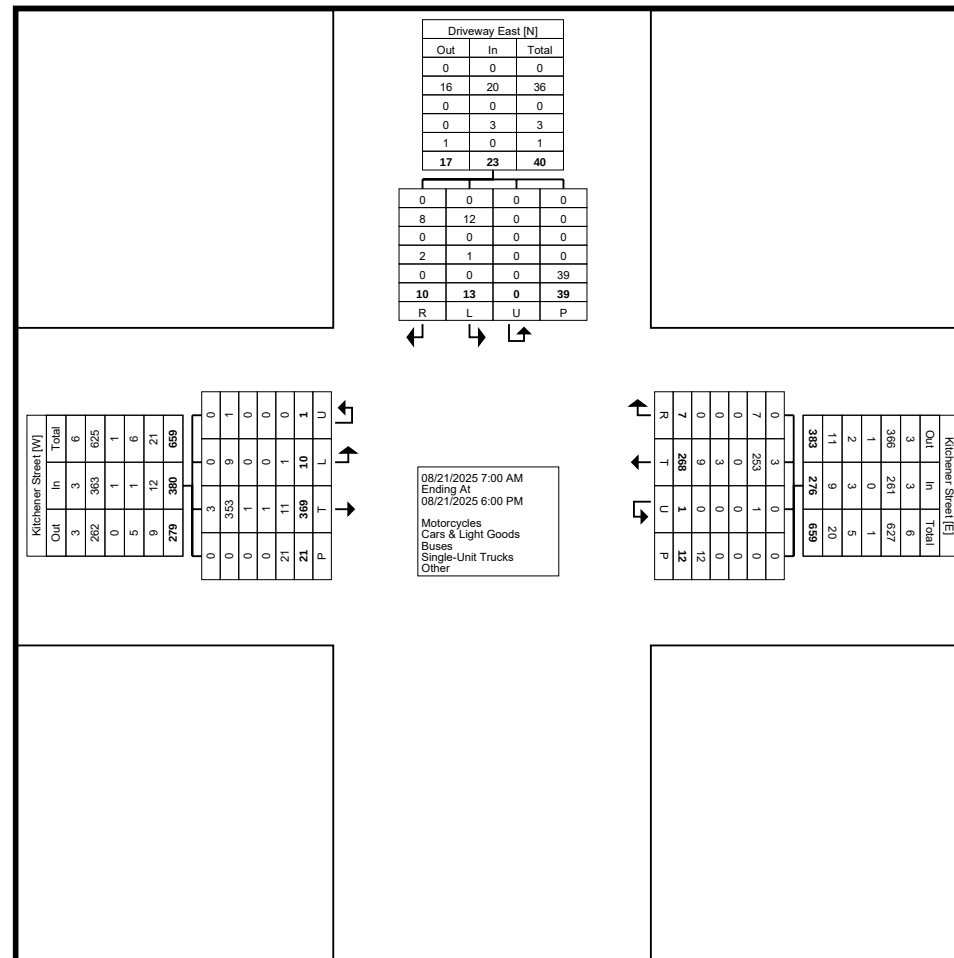
Hourly Total	1	50	0	2	51	50	1	0	0	51	3	0	0	4	3	105
5:00 PM	0	11	0	0	11	14	0	0	0	14	1	0	0	1	1	26
5:15 PM	0	16	0	0	16	17	1	0	0	18	0	0	0	0	0	34
5:30 PM	0	8	0	0	8	10	2	0	4	12	2	2	0	3	4	24
5:45 PM	0	13	1	0	14	9	0	0	0	9	0	0	0	3	0	23
Hourly Total	0	48	1	0	49	50	3	0	4	53	3	2	0	7	5	107
Grand Total	10	369	1	21	380	268	7	1	12	276	13	10	0	39	23	679
Approach %	2.6	97.1	0.3	-	-	97.1	2.5	0.4	-	-	56.5	43.5	0.0	-	-	-
Total %	1.5	54.3	0.1	-	56.0	39.5	1.0	0.1	-	40.6	1.9	1.5	0.0	-	3.4	-
Motorcycles	0	3	0	-	3	3	0	0	-	3	0	0	0	-	0	6
% Motorcycles	0.0	0.8	0.0	-	0.8	1.1	0.0	0.0	-	1.1	0.0	0.0	-	-	0.0	0.9
Cars & Light Goods	9	353	1	-	363	253	7	1	-	261	12	8	0	-	20	644
% Cars & Light Goods	90.0	95.7	100.0	-	95.5	94.4	100.0	100.0	-	94.6	92.3	80.0	-	-	87.0	94.8
Buses	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Buses	0.0	0.3	0.0	-	0.3	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	0.0	0.1
Single-Unit Trucks	0	1	0	-	1	3	0	0	-	3	1	2	0	-	3	7
% Single-Unit Trucks	0.0	0.3	0.0	-	0.3	1.1	0.0	0.0	-	1.1	7.7	20.0	-	-	13.0	1.0
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	0.0	0.4	0.0	0.0	-	0.4	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	1	11	0	-	12	8	0	0	-	8	0	0	0	-	0	20
% Bicycles on Road	10.0	3.0	0.0	-	3.2	3.0	0.0	0.0	-	2.9	0.0	0.0	-	-	0.0	2.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	7	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	17.9	-	-
Pedestrians	-	-	-	21	-	-	-	-	12	-	-	-	-	32	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	82.1	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West
Site Code: 250550
Start Date: 08/21/2025
Page No: 3



Turning Movement Data Plot

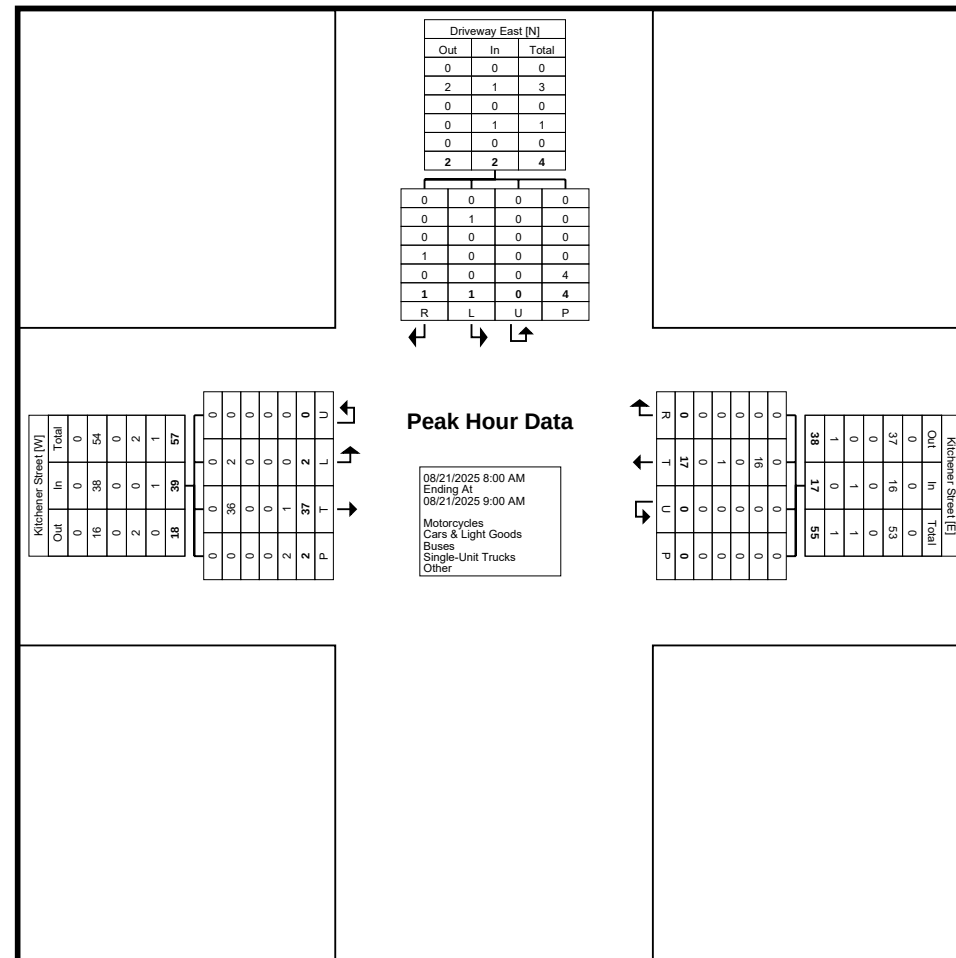
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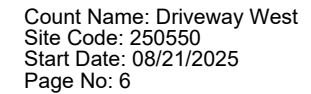
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West
Site Code: 250550
Start Date: 08/21/2025
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)

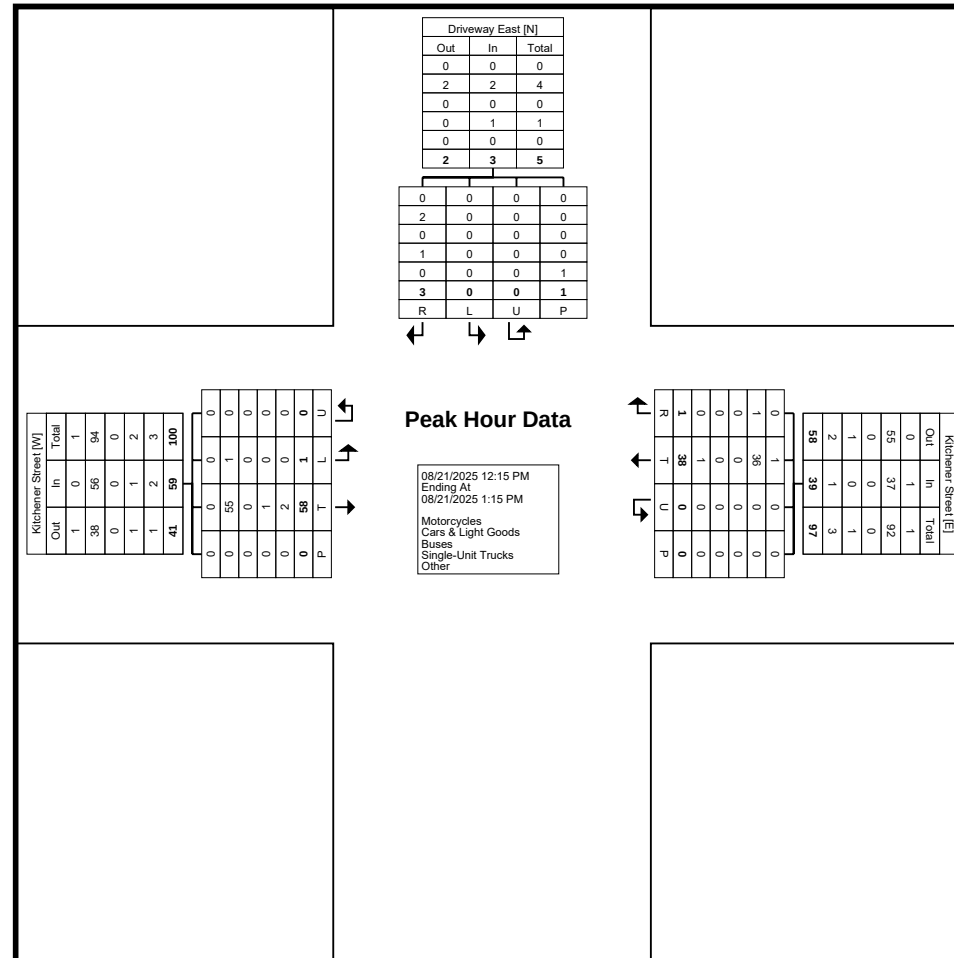




Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West
Site Code: 250550
Start Date: 08/21/2025
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)

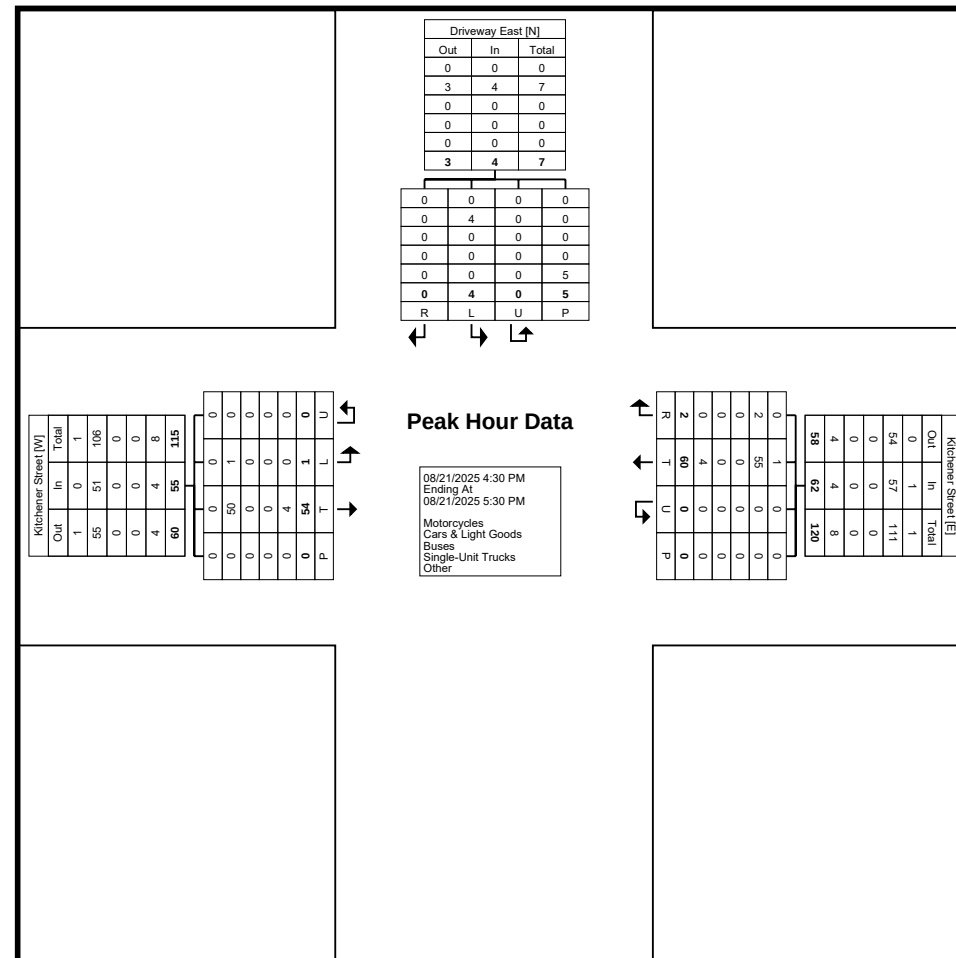
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West
Site Code: 250550
Start Date: 08/21/2025
Page No: 9



Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Falls Avenue & MacDonald
Avenue
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Falls Avenue Eastbound						Falls Avenue Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	3	70	5	0	0	78	1	44	0	0	1	45	21	3	1	0	0	25	0	1	1	0	1	2	150
7:15 AM	4	84	10	0	2	98	0	35	0	0	0	35	6	1	0	0	0	7	1	1	2	0	0	4	144
7:30 AM	6	104	3	0	2	113	0	35	1	0	0	36	7	1	0	0	0	8	1	3	7	0	0	11	168
7:45 AM	6	132	14	0	1	152	1	54	2	0	0	57	14	1	1	0	0	16	4	8	5	0	0	17	242
Hourly Total	19	390	32	0	5	441	2	168	3	0	1	173	48	6	2	0	0	56	6	13	15	0	1	34	704
8:00 AM	3	117	13	0	2	133	1	61	1	0	1	63	17	2	0	0	0	19	1	3	3	0	1	7	222
8:15 AM	8	176	13	0	2	197	1	55	0	0	2	56	10	2	2	0	0	14	0	1	5	0	0	6	273
8:30 AM	6	131	22	0	5	159	0	53	0	2	2	55	13	3	0	0	0	16	0	1	8	0	0	9	239
8:45 AM	5	146	21	1	3	173	0	67	0	0	0	67	12	0	2	0	0	14	1	8	3	0	0	12	266
Hourly Total	22	570	69	1	12	662	2	236	1	2	5	241	52	7	4	0	0	63	2	13	19	0	1	34	1000
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	2	138	21	1	0	162	2	98	3	1	0	104	23	3	3	0	1	29	0	6	2	0	0	8	303
11:15 AM	4	138	31	1	1	174	3	89	0	4	2	96	28	1	4	0	0	33	3	3	5	0	0	11	314
11:30 AM	5	142	37	1	1	185	0	114	1	2	1	117	25	4	2	0	0	31	1	2	3	0	0	6	339
11:45 AM	4	137	38	0	0	179	4	112	0	1	0	117	26	5	4	0	0	35	2	6	5	0	0	13	344
Hourly Total	15	555	127	3	2	700	9	413	4	8	3	434	102	13	13	0	1	128	6	17	15	0	0	38	1300
12:00 PM	2	131	32	1	1	166	5	91	2	0	1	98	31	1	1	0	0	33	0	1	3	0	0	4	301
12:15 PM	4	145	25	0	0	174	3	131	1	2	2	137	22	4	1	0	0	27	1	2	5	0	0	8	346
12:30 PM	4	137	22	0	3	163	6	115	1	1	1	123	29	3	5	0	0	37	0	2	6	0	0	8	331
12:45 PM	5	178	20	1	1	204	1	101	0	4	1	106	33	3	2	0	0	38	1	4	5	0	0	10	358
Hourly Total	15	591	99	2	5	707	15	438	4	7	5	464	115	11	9	0	0	135	2	9	19	0	0	30	1336
1:00 PM	3	130	21	1	3	155	4	107	0	1	1	112	33	4	5	0	0	42	0	1	3	0	0	4	313
1:15 PM	4	153	29	1	2	187	2	116	0	0	0	118	34	1	4	0	0	39	1	3	2	0	0	6	350
1:30 PM	7	156	30	0	1	193	4	103	3	1	3	111	16	1	9	0	0	26	0	3	2	0	1	5	335
1:45 PM	2	172	39	1	3	214	5	99	2	1	3	107	33	5	6	0	2	44	0	4	6	0	4	10	375
Hourly Total	16	611	119	3	9	749	15	425	5	3	7	448	116	11	24	0	2	151	1	11	13	0	5	25	1373
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	13	134	23	4	1	174	2	120	2	1	1	125	48	1	5	0	0	54	0	3	7	0	0	10	363
3:15 PM	7	130	31	0	0	168	7	123	0	0	3	130	40	5	6	0	0	51	1	2	5	0	1	8	357
3:30 PM	9	136	24	0	1	169	10	142	1	0	4	153	51	5	2	0	0	58	4	5	6	0	2	15	395
3:45 PM	10	147	27	2	2	186	1	148	2	0	0	151	34	8	2	0	0	44	1	8	3	0	0	12	393
Hourly Total	39	547	105	6	4	697	20	533	5	1	8	559	173	19	15	0	0	207	6	18	21	0	3	45	1508
4:00 PM	13	134	19	0	3	166	1	163	2	0	0	166	46	8	2	0	0	56	0	3	5	0	0	8	396
4:15 PM	15	130	29	0	1	174	1	144	3	1	0	149	55	5	7	0	0	67	1	5	5	0	0	11	401
4:30 PM	20	139	42	2	3	203	7	191	2	1	3	201	50	2	5	0	0	57	1	6	5	0	0	12	473

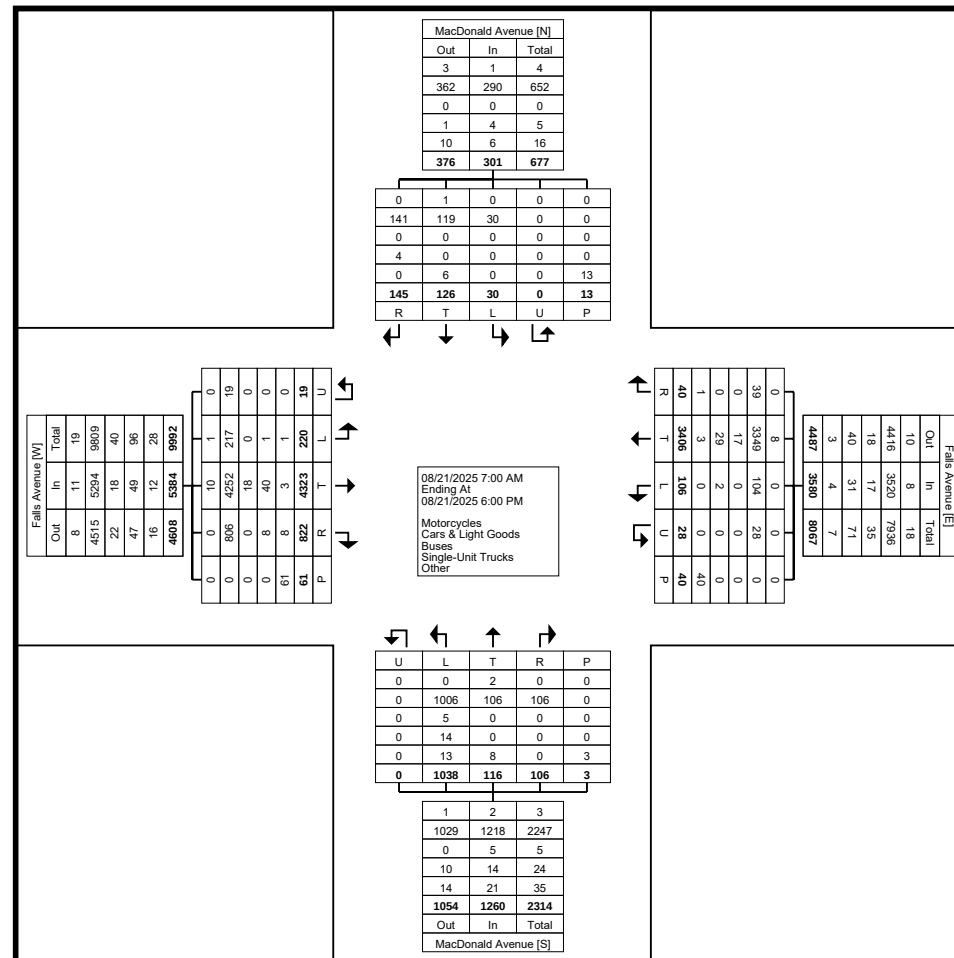
4:45 PM	8	150	37	0	3	195	4	120	2	0	3	126	56	11	8	0	0	75	0	12	3	0	2	15	411
Hourly Total	56	553	127	2	10	738	13	618	9	2	6	642	207	26	22	0	0	255	2	26	18	0	2	46	1681
5:00 PM	8	129	34	1	3	172	4	185	6	3	1	198	66	10	3	0	0	79	1	2	7	0	0	10	459
5:15 PM	8	141	38	1	1	188	15	141	2	1	3	159	48	3	5	0	0	56	0	3	7	0	0	10	413
5:30 PM	15	109	32	0	4	156	10	138	1	0	1	149	44	5	6	0	0	55	0	6	5	0	1	11	371
5:45 PM	7	127	40	0	6	174	1	111	0	1	0	113	67	5	3	0	0	75	4	8	6	0	0	18	380
Hourly Total	38	506	144	2	14	690	30	575	9	5	5	619	225	23	17	0	0	265	5	19	25	0	1	49	1623
Grand Total	220	4323	822	19	61	5384	106	3406	40	28	40	3580	1038	116	106	0	3	1260	30	126	145	0	13	301	10525
Approach %	4.1	80.3	15.3	0.4	-	-	3.0	95.1	1.1	0.8	-	-	82.4	9.2	8.4	0.0	-	-	10.0	41.9	48.2	0.0	-	-	-
Total %	2.1	41.1	7.8	0.2	-	51.2	1.0	32.4	0.4	0.3	-	34.0	9.9	1.1	1.0	0.0	-	12.0	0.3	1.2	1.4	0.0	-	2.9	-
Motorcycles	1	10	0	0	-	11	0	8	0	0	-	8	0	2	0	0	-	2	0	1	0	0	-	1	22
% Motorcycles	0.5	0.2	0.0	0.0	-	0.2	0.0	0.2	0.0	0.0	-	0.2	0.0	1.7	0.0	-	-	0.2	0.0	0.8	0.0	-	-	0.3	0.2
Cars & Light Goods	217	4252	806	19	-	5294	104	3349	39	28	-	3520	1006	106	106	0	-	1218	30	119	141	0	-	290	10322
% Cars & Light Goods	98.6	98.4	98.1	100.0	-	98.3	98.1	98.3	97.5	100.0	-	98.3	96.9	91.4	100.0	-	-	96.7	100.0	94.4	97.2	-	-	96.3	98.1
Buses	0	18	0	0	-	18	0	17	0	0	-	17	5	0	0	0	-	5	0	0	0	0	-	0	40
% Buses	0.0	0.4	0.0	0.0	-	0.3	0.0	0.5	0.0	0.0	-	0.5	0.5	0.0	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.4
Single-Unit Trucks	1	40	8	0	-	49	2	29	0	0	-	31	14	0	0	0	-	14	0	0	4	0	-	4	98
% Single-Unit Trucks	0.5	0.9	1.0	0.0	-	0.9	1.9	0.9	0.0	0.0	-	0.9	1.3	0.0	0.0	-	-	1.1	0.0	0.0	2.8	-	-	1.3	0.9
Articulated Trucks	1	3	8	0	-	12	0	3	0	0	-	3	13	0	0	0	-	13	0	0	0	0	-	0	28
% Articulated Trucks	0.5	0.1	1.0	0.0	-	0.2	0.0	0.1	0.0	0.0	-	0.1	1.3	0.0	0.0	-	-	1.0	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	8	0	0	-	8	0	6	0	0	-	6	15
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	2.5	0.0	-	0.0	0.0	6.9	0.0	-	-	0.6	0.0	4.8	0.0	-	-	2.0	0.1
Bicycles on Crosswalk	-	-	-	-	11	-	-	-	-	-	6	-	-	-	-	-	0	-	-	-	-	-	6	-	-
% Bicycles on Crosswalk	-	-	-	-	18.0	-	-	-	-	-	15.0	-	-	-	-	-	0.0	-	-	-	-	-	46.2	-	-
Pedestrians	-	-	-	-	50	-	-	-	-	-	34	-	-	-	-	-	3	-	-	-	-	-	7	-	-
% Pedestrians	-	-	-	-	82.0	-	-	-	-	-	85.0	-	-	-	-	-	100.0	-	-	-	-	-	53.8	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Falls Avenue & MacDonald
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Count Name: Falls Avenue & MacDonald
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Site Code: 250550
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Turning Movement Peak Hour Data (8:00 AM)

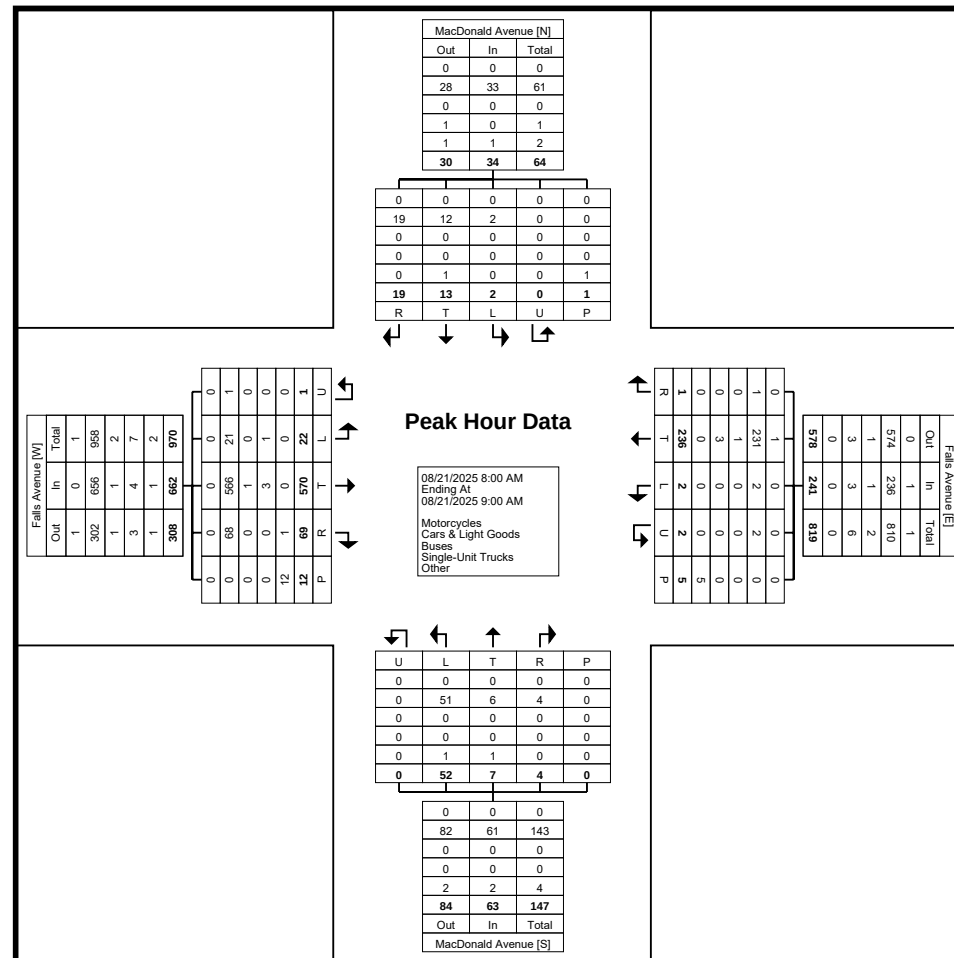
Start Time	Falls Avenue Eastbound						Falls Avenue Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	3	117	13	0	2	133	1	61	1	0	1	63	17	2	0	0	0	19	1	3	3	0	1	7	222
8:15 AM	8	176	13	0	2	197	1	55	0	0	2	56	10	2	2	0	0	14	0	1	5	0	0	6	273
8:30 AM	6	131	22	0	5	159	0	53	0	2	2	55	13	3	0	0	0	16	0	1	8	0	0	9	239
8:45 AM	5	146	21	1	3	173	0	67	0	0	0	67	12	0	2	0	0	14	1	8	3	0	0	12	266
Total	22	570	69	1	12	662	2	236	1	2	5	241	52	7	4	0	0	63	2	13	19	0	1	34	1000
Approach %	3.3	86.1	10.4	0.2	-	-	0.8	97.9	0.4	0.8	-	-	82.5	11.1	6.3	0.0	-	-	5.9	38.2	55.9	0.0	-	-	-
Total %	2.2	57.0	6.9	0.1	-	66.2	0.2	23.6	0.1	0.2	-	24.1	5.2	0.7	0.4	0.0	-	6.3	0.2	1.3	1.9	0.0	-	3.4	-
PHF	0.688	0.810	0.784	0.250	-	0.840	0.500	0.881	0.250	0.250	-	0.899	0.765	0.583	0.500	0.000	-	0.829	0.500	0.406	0.594	0.000	-	0.708	0.916
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.4	0.0	0.0	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Cars & Light Goods	21	566	68	1	-	656	2	231	1	2	-	236	51	6	4	0	-	61	2	12	19	0	-	33	986
% Cars & Light Goods	95.5	99.3	98.6	100.0	-	99.1	100.0	97.9	100.0	100.0	-	97.9	98.1	85.7	100.0	-	-	96.8	100.0	92.3	100.0	-	-	97.1	98.6
Buses	0	1	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	2
% Buses	0.0	0.2	0.0	0.0	-	0.2	0.0	0.4	0.0	0.0	-	0.4	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	1	3	0	0	-	4	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	7
% Single-Unit Trucks	4.5	0.5	0.0	0.0	-	0.6	0.0	1.3	0.0	0.0	-	1.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.7
Articulated Trucks	0	0	1	0	-	1	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	1.4	0.0	-	0.2	0.0	0.0	0.0	0.0	-	0.0	1.9	0.0	0.0	-	-	1.6	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	2
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	14.3	0.0	-	-	1.6	0.0	7.7	0.0	-	-	2.9	0.2
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	33.3	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	66.7	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Falls Avenue & MacDonald
Avenue
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Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Falls Avenue & MacDonald
Avenue
Site Code: 250550
Start Date: 08/21/2025
Page No: 6

Turning Movement Peak Hour Data (1:00 PM)

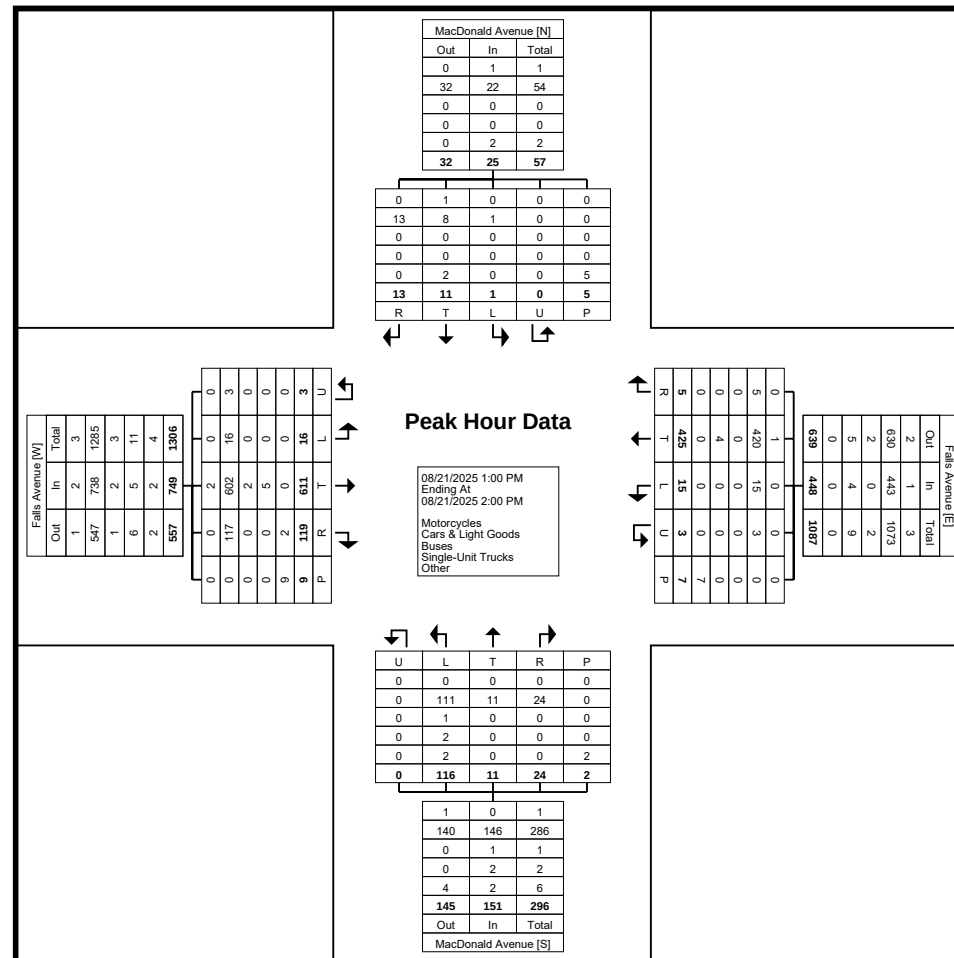
Start Time	Falls Avenue Eastbound						Falls Avenue Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
1:00 PM	3	130	21	1	3	155	4	107	0	1	1	112	33	4	5	0	0	42	0	1	3	0	0	4	313
1:15 PM	4	153	29	1	2	187	2	116	0	0	0	118	34	1	4	0	0	39	1	3	2	0	0	6	350
1:30 PM	7	156	30	0	1	193	4	103	3	1	3	111	16	1	9	0	0	26	0	3	2	0	1	5	335
1:45 PM	2	172	39	1	3	214	5	99	2	1	3	107	33	5	6	0	2	44	0	4	6	0	4	10	375
Total	16	611	119	3	9	749	15	425	5	3	7	448	116	11	24	0	2	151	1	11	13	0	5	25	1373
Approach %	2.1	81.6	15.9	0.4	-	-	3.3	94.9	1.1	0.7	-	-	76.8	7.3	15.9	0.0	-	-	4.0	44.0	52.0	0.0	-	-	-
Total %	1.2	44.5	8.7	0.2	-	54.6	1.1	31.0	0.4	0.2	-	32.6	8.4	0.8	1.7	0.0	-	11.0	0.1	0.8	0.9	0.0	-	1.8	-
PHF	0.571	0.888	0.763	0.750	-	0.875	0.750	0.916	0.417	0.750	-	0.949	0.853	0.550	0.667	0.000	-	0.858	0.250	0.688	0.542	0.000	-	0.625	0.915
Motorcycles	0	2	0	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	4
% Motorcycles	0.0	0.3	0.0	0.0	-	0.3	0.0	0.2	0.0	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	9.1	0.0	-	-	4.0	0.3
Cars & Light Goods	16	602	117	3	-	738	15	420	5	3	-	443	111	11	24	0	-	146	1	8	13	0	-	22	1349
% Cars & Light Goods	100.0	98.5	98.3	100.0	-	98.5	100.0	98.8	100.0	100.0	-	98.9	95.7	100.0	100.0	-	-	96.7	100.0	72.7	100.0	-	-	88.0	98.3
Buses	0	2	0	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	3
% Buses	0.0	0.3	0.0	0.0	-	0.3	0.0	0.0	0.0	0.0	-	0.0	0.9	0.0	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	5	0	0	-	5	0	4	0	0	-	4	2	0	0	0	-	2	0	0	0	0	-	0	11
% Single-Unit Trucks	0.0	0.8	0.0	0.0	-	0.7	0.0	0.9	0.0	0.0	-	0.9	1.7	0.0	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	0.8
Articulated Trucks	0	0	2	0	-	2	0	0	0	0	-	0	2	0	0	0	-	2	0	0	0	0	-	0	4
% Articulated Trucks	0.0	0.0	1.7	0.0	-	0.3	0.0	0.0	0.0	0.0	-	0.0	1.7	0.0	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	2
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	18.2	0.0	-	-	8.0	0.1
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	11.1	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	40.0	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	88.9	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	60.0	-	-



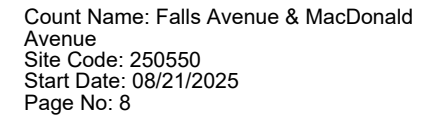
Paradigm Transportation Solutions Limited
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Count Name: Falls Avenue & MacDonald
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Turning Movement Peak Hour Data Plot (1:00 PM)



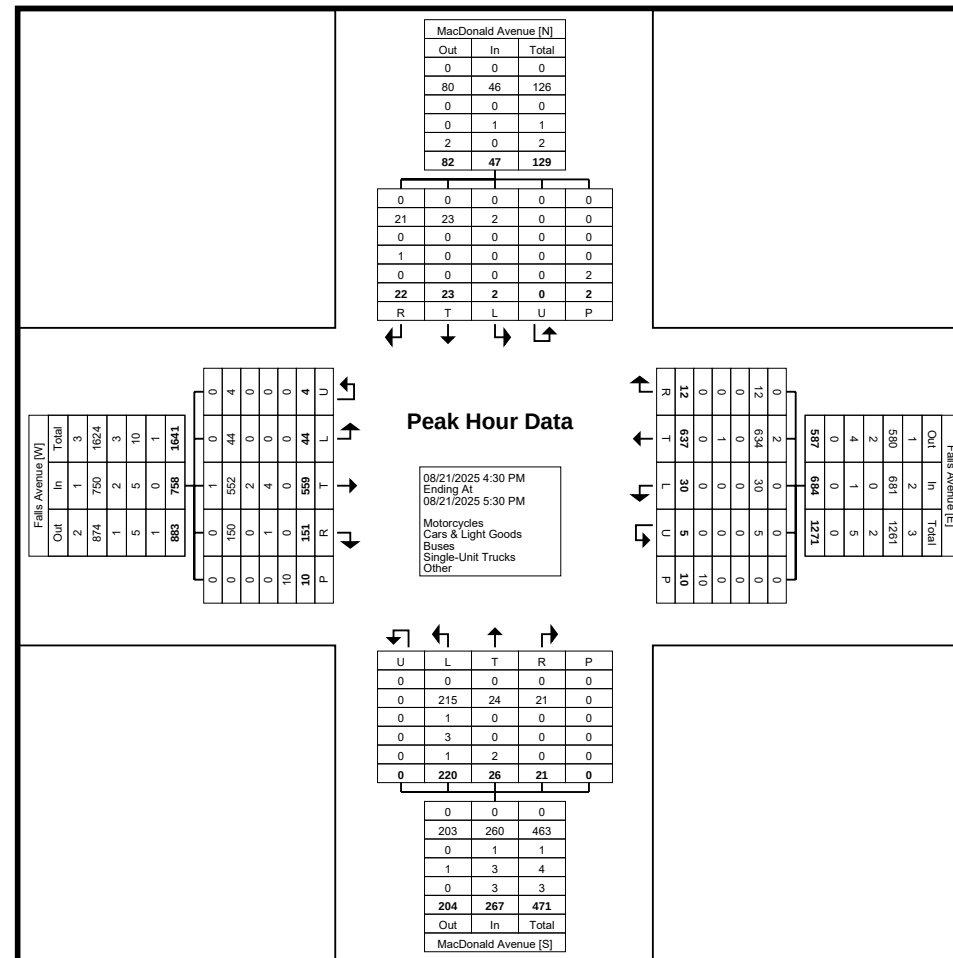
Start Time	Falls Avenue Eastbound						Falls Avenue Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	20	139	42	2	3	203	7	191	2	1	3	201	50	2	5	0	0	57	1	6	5	0	0	12	473
4:45 PM	8	150	37	0	3	195	4	120	2	0	3	126	56	11	8	0	0	75	0	12	3	0	2	15	411
5:00 PM	8	129	34	1	3	172	4	185	6	3	1	198	66	10	3	0	0	79	1	2	7	0	0	10	459
5:15 PM	8	141	38	1	1	188	15	141	2	1	3	159	48	3	5	0	0	56	0	3	7	0	0	10	413
Total	44	559	151	4	10	758	30	637	12	5	10	684	220	26	21	0	0	267	2	23	22	0	2	47	1756
Approach %	5.8	73.7	19.9	0.5	-	-	4.4	93.1	1.8	0.7	-	-	82.4	9.7	7.9	0.0	-	-	4.3	48.9	46.8	0.0	-	-	-
Total %	2.5	31.8	8.6	0.2	-	43.2	1.7	36.3	0.7	0.3	-	39.0	12.5	1.5	1.2	0.0	-	15.2	0.1	1.3	1.3	0.0	-	2.7	-
PHF	0.550	0.932	0.899	0.500	-	0.933	0.500	0.834	0.500	0.417	-	0.851	0.833	0.591	0.656	0.000	-	0.845	0.500	0.479	0.786	0.000	-	0.783	0.928
Motorcycles	0	1	0	0	-	1	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	3
% Motorcycles	0.0	0.2	0.0	0.0	-	0.1	0.0	0.3	0.0	0.0	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Cars & Light Goods	44	552	150	4	-	750	30	634	12	5	-	681	215	24	21	0	-	260	2	23	21	0	-	46	1737
% Cars & Light Goods	100.0	98.7	99.3	100.0	-	98.9	100.0	99.5	100.0	100.0	-	99.6	97.7	92.3	100.0	-	-	97.4	100.0	100.0	95.5	-	-	97.9	98.9
Buses	0	2	0	0	-	2	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	3
% Buses	0.0	0.4	0.0	0.0	-	0.3	0.0	0.0	0.0	0.0	-	0.0	0.5	0.0	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	4	1	0	-	5	0	1	0	0	-	1	3	0	0	0	-	3	0	0	1	0	-	1	10
% Single-Unit Trucks	0.0	0.7	0.7	0.0	-	0.7	0.0	0.2	0.0	0.0	-	0.1	1.4	0.0	0.0	-	-	1.1	0.0	0.0	4.5	-	-	2.1	0.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.5	0.0	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	2
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	7.7	0.0	-	-	0.7	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	2	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@ptsil.com

Count Name: Falls Avenue & MacDonald
Avenue
Site Code: 250550
Start Date: 08/21/2025
Page No: 9



Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Hunter Street Northbound						2nd Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	5	0	0	0	5	0	4	0	0	2	4	1	0	0	0	0	1	0	0	1	0	0	1	11
7:15 AM	0	7	2	0	0	9	0	5	0	0	0	5	0	0	0	0	0	0	1	0	0	0	0	1	15
7:30 AM	0	9	1	0	0	10	1	3	0	0	0	4	2	0	0	0	6	2	0	0	0	0	1	0	16
7:45 AM	0	5	0	0	0	5	0	5	0	0	3	5	0	0	0	0	2	0	0	1	0	0	0	1	11
Hourly Total	0	26	3	0	0	29	1	17	0	0	5	18	3	0	0	0	8	3	1	1	1	0	1	3	53
8:00 AM	0	7	3	0	0	10	0	6	0	0	0	6	1	0	0	0	4	1	0	0	0	0	3	0	17
8:15 AM	0	10	1	0	0	11	0	1	0	0	0	1	4	0	0	0	1	4	0	0	0	0	0	0	16
8:30 AM	0	5	2	0	0	7	1	6	0	0	0	7	0	0	2	0	1	2	0	0	0	0	0	0	16
8:45 AM	1	14	2	0	0	17	0	5	0	0	2	5	0	0	1	0	0	1	0	1	0	0	0	1	24
Hourly Total	1	36	8	0	0	45	1	18	0	0	2	19	5	0	3	0	6	8	0	1	0	0	3	1	73
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	8	0	0	3	8	1	4	0	0	1	5	1	0	2	0	0	3	0	0	0	0	0	0	16
11:15 AM	1	15	1	0	0	17	2	6	0	0	2	8	2	0	1	0	1	3	0	0	0	0	3	0	28
11:30 AM	0	17	0	0	0	17	0	8	0	0	0	8	0	0	0	0	0	0	0	0	0	0	3	0	25
11:45 AM	0	12	2	0	0	14	0	13	0	0	0	13	0	0	1	0	0	1	1	0	1	0	1	2	30
Hourly Total	1	52	3	0	3	56	3	31	0	0	3	34	3	0	4	0	1	7	1	0	1	0	7	2	99
12:00 PM	2	17	1	0	0	20	0	3	1	0	2	4	0	0	0	0	2	0	0	1	0	0	3	1	25
12:15 PM	2	16	1	0	0	19	0	7	1	0	0	8	0	0	0	0	0	0	0	0	0	0	1	0	27
12:30 PM	0	17	0	0	0	17	1	10	0	0	0	11	2	0	3	0	0	5	0	0	1	0	0	1	34
12:45 PM	0	15	1	0	0	16	1	8	0	0	0	9	2	0	0	0	0	2	0	0	0	0	2	0	27
Hourly Total	4	65	3	0	0	72	2	28	2	0	2	32	4	0	3	0	2	7	0	1	1	0	6	2	113
1:00 PM	0	7	3	0	0	10	1	13	0	0	0	14	2	0	1	0	0	3	0	0	0	0	0	0	27
1:15 PM	0	8	1	0	0	9	1	6	0	0	6	7	3	0	2	0	2	5	0	0	0	0	0	0	21
1:30 PM	0	6	0	0	2	6	2	7	0	0	1	9	1	0	1	0	0	2	1	0	0	0	2	1	18
1:45 PM	0	17	1	0	0	18	1	13	0	0	0	14	1	0	0	0	2	1	0	0	2	0	1	2	35
Hourly Total	0	38	5	0	2	43	5	39	0	0	7	44	7	0	4	0	4	11	1	0	2	0	3	3	101
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	12	4	0	0	16	0	7	0	0	0	7	1	0	0	0	2	1	0	0	1	0	1	1	25
3:15 PM	1	12	4	0	0	17	0	10	0	0	0	10	2	0	1	0	0	3	0	0	1	0	0	1	31
3:30 PM	0	16	2	0	0	18	1	6	0	0	0	7	1	0	0	0	0	1	0	0	0	0	5	0	26
3:45 PM	0	10	1	0	0	11	0	7	0	0	0	7	2	0	0	0	0	2	0	0	0	0	1	0	20
Hourly Total	1	50	11	0	0	62	1	30	0	0	0	31	6	0	1	0	2	7	0	0	2	0	7	2	102
4:00 PM	0	6	2	0	1	8	0	6	0	0	0	6	4	0	3	1	0	8	0	0	0	0	1	0	22
4:15 PM	0	15	2	0	0	17	1	14	0	0	0	15	5	0	0	0	0	5	0	0	0	0	1	0	37
4:30 PM	1	11	0	0	0	12	0	18	0	0	0	18	2	0	0	0	0	2	0	0	0	0	0	0	32

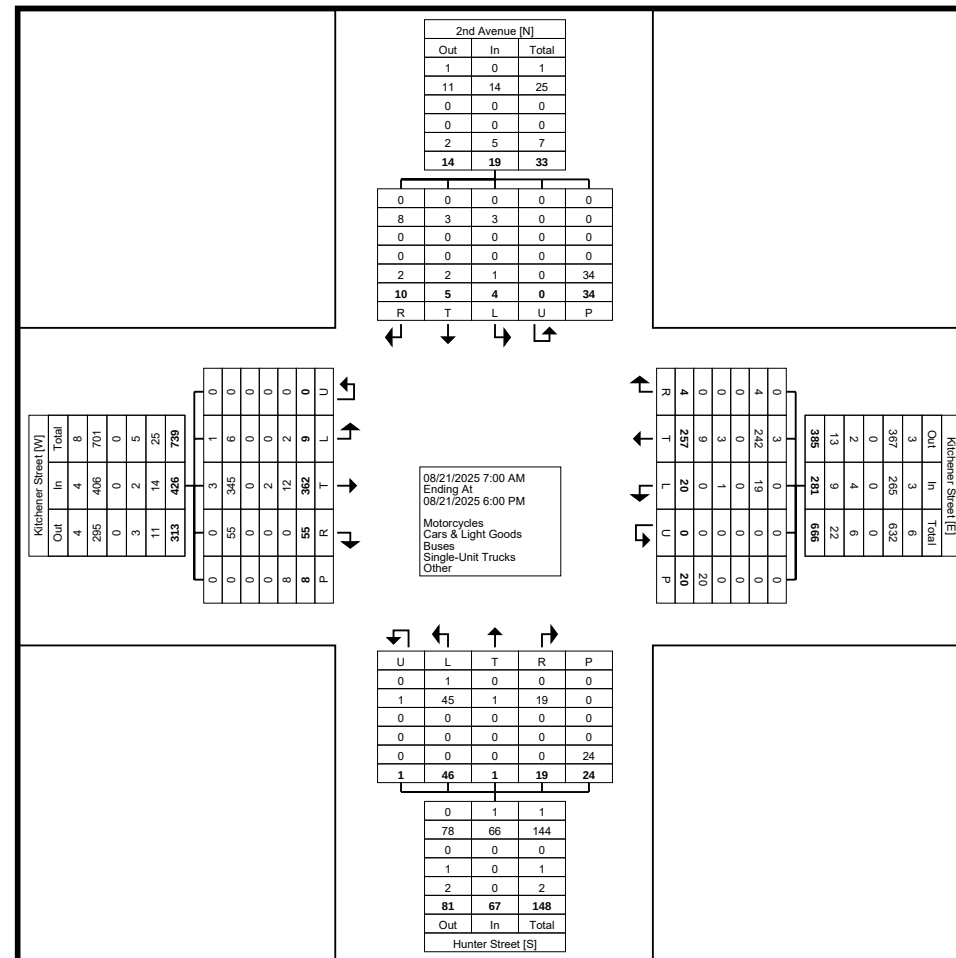
4:45 PM	0	15	4	0	0	19	0	8	1	0	1	9	0	0	1	0	0	1	0	0	0	1	0	29	
Hourly Total	1	47	8	0	1	56	1	46	1	0	1	48	11	0	4	1	0	16	0	0	0	0	3	0	120
5:00 PM	0	10	2	0	0	12	1	14	1	0	0	16	0	0	0	0	0	0	0	1	0	0	1	29	
5:15 PM	0	16	3	0	0	19	0	17	0	0	0	17	1	0	0	0	1	1	0	1	1	0	0	2	39
5:30 PM	1	8	6	0	2	15	1	11	0	0	0	12	4	1	0	0	0	5	1	0	2	0	0	3	35
5:45 PM	0	14	3	0	0	17	4	6	0	0	0	10	2	0	0	0	0	2	0	0	0	0	3	0	29
Hourly Total	1	48	14	0	2	63	6	48	1	0	0	55	7	1	0	0	1	8	1	2	3	0	4	6	132
Grand Total	9	362	55	0	8	426	20	257	4	0	20	281	46	1	19	1	24	67	4	5	10	0	34	19	793
Approach %	2.1	85.0	12.9	0.0	-	-	7.1	91.5	1.4	0.0	-	-	68.7	1.5	28.4	1.5	-	-	21.1	26.3	52.6	0.0	-	-	-
Total %	1.1	45.6	6.9	0.0	-	53.7	2.5	32.4	0.5	0.0	-	35.4	5.8	0.1	2.4	0.1	-	8.4	0.5	0.6	1.3	0.0	-	2.4	-
Motorcycles	1	3	0	0	-	4	0	3	0	0	-	3	1	0	0	0	-	1	0	0	0	0	-	0	8
% Motorcycles	11.1	0.8	0.0	-	-	0.9	0.0	1.2	0.0	-	-	1.1	2.2	0.0	0.0	0.0	-	1.5	0.0	0.0	0.0	-	-	0.0	1.0
Cars & Light Goods	6	345	55	0	-	406	19	242	4	0	-	265	45	1	19	1	-	66	3	3	8	0	-	14	751
% Cars & Light Goods	66.7	95.3	100.0	-	-	95.3	95.0	94.2	100.0	-	-	94.3	97.8	100.0	100.0	100.0	-	98.5	75.0	60.0	80.0	-	-	73.7	94.7
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	2	0	0	-	2	1	3	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	6
% Single-Unit Trucks	0.0	0.6	0.0	-	-	0.5	5.0	1.2	0.0	-	-	1.4	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.8
Articulated Trucks	1	0	0	0	-	1	0	1	0	0	-	1	0	0	0	0	-	0	0	0	2	0	-	2	4
% Articulated Trucks	11.1	0.0	0.0	-	-	0.2	0.0	0.4	0.0	-	-	0.4	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	20.0	-	-	10.5	0.5
Bicycles on Road	1	12	0	0	-	13	0	8	0	0	-	8	0	0	0	0	-	0	1	2	0	0	-	3	24
% Bicycles on Road	11.1	3.3	0.0	-	-	3.1	0.0	3.1	0.0	-	-	2.8	0.0	0.0	0.0	0.0	-	0.0	25.0	40.0	0.0	-	-	15.8	3.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	7	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	4.2	-	-	-	-	-	20.6	-	-
Pedestrians	-	-	-	-	8	-	-	-	-	-	20	-	-	-	-	-	23	-	-	-	-	-	27	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	95.8	-	-	-	-	-	79.4	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

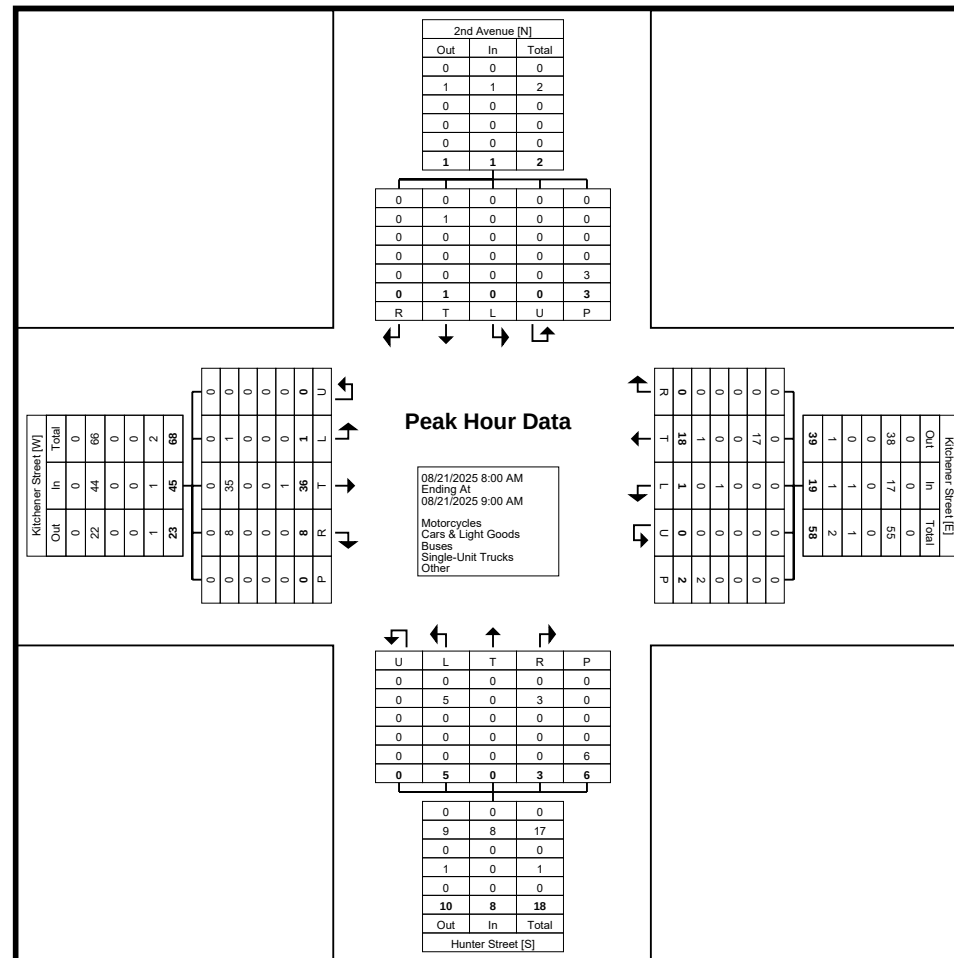
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Hunter Street Northbound						2nd Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	0	7	3	0	0	10	0	6	0	0	0	6	1	0	0	0	4	1	0	0	0	0	3	0	17
8:15 AM	0	10	1	0	0	11	0	1	0	0	0	1	4	0	0	0	1	4	0	0	0	0	0	0	16
8:30 AM	0	5	2	0	0	7	1	6	0	0	0	7	0	0	2	0	1	2	0	0	0	0	0	0	16
8:45 AM	1	14	2	0	0	17	0	5	0	0	2	5	0	0	1	0	0	1	0	1	0	0	0	1	24
Total	1	36	8	0	0	45	1	18	0	0	2	19	5	0	3	0	6	8	0	1	0	0	3	1	73
Approach %	2.2	80.0	17.8	0.0	-	-	5.3	94.7	0.0	0.0	-	-	62.5	0.0	37.5	0.0	-	-	0.0	100.0	0.0	0.0	-	-	-
Total %	1.4	49.3	11.0	0.0	-	61.6	1.4	24.7	0.0	0.0	-	26.0	6.8	0.0	4.1	0.0	-	11.0	0.0	1.4	0.0	0.0	-	1.4	-
PHF	0.250	0.643	0.667	0.000	-	0.662	0.250	0.750	0.000	0.000	-	0.679	0.313	0.000	0.375	0.000	-	0.500	0.000	0.250	0.000	0.000	-	0.250	0.760
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0
Cars & Light Goods	1	35	8	0	-	44	0	17	0	0	-	17	5	0	3	0	-	8	0	1	0	0	-	1	70
% Cars & Light Goods	100.0	97.2	100.0	-	-	97.8	0.0	94.4	-	-	-	89.5	100.0	-	100.0	-	-	100.0	-	100.0	-	-	-	100.0	95.9
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	-	0.0	-	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	100.0	0.0	-	-	-	5.3	0.0	-	0.0	-	-	0.0	-	0.0	-	-	-	0.0	1.4
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	5.6	-	-	-	5.3	0.0	-	0.0	-	-	0.0	-	0.0	-	-	-	0.0	1.4
Bicycles on Road	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Bicycles on Road	0.0	2.8	0.0	-	-	2.2	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	-	0.0	-	-	-	0.0	1.4
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	16.7	-	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	83.3	-	-	-	-	-	66.7	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 6

Turning Movement Peak Hour Data (11:45 AM)

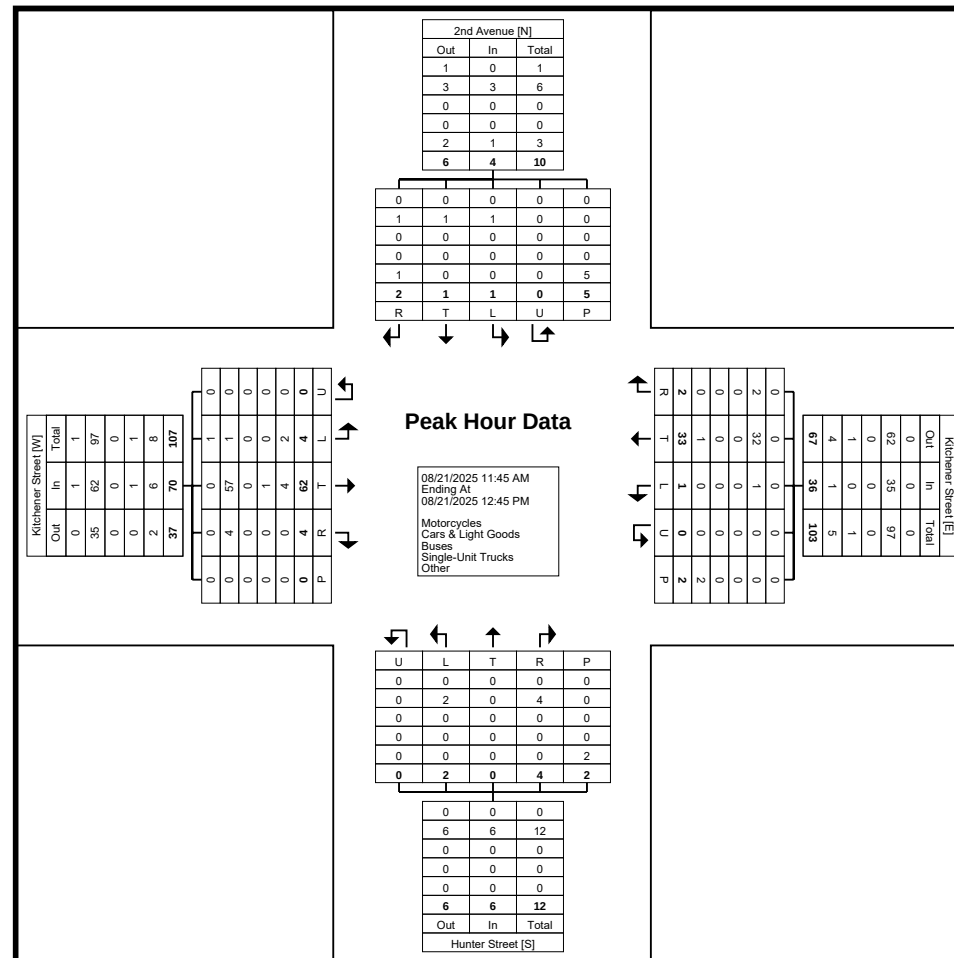
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Hunter Street Northbound						2nd Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	0	12	2	0	0	14	0	13	0	0	0	13	0	0	1	0	0	1	1	0	1	0	1	2	30
12:00 PM	2	17	1	0	0	20	0	3	1	0	2	4	0	0	0	0	2	0	0	1	0	0	3	1	25
12:15 PM	2	16	1	0	0	19	0	7	1	0	0	8	0	0	0	0	0	0	0	0	0	0	1	0	27
12:30 PM	0	17	0	0	0	17	1	10	0	0	0	11	2	0	3	0	0	5	0	0	1	0	0	1	34
Total	4	62	4	0	0	70	1	33	2	0	2	36	2	0	4	0	2	6	1	1	2	0	5	4	116
Approach %	5.7	88.6	5.7	0.0	-	-	2.8	91.7	5.6	0.0	-	-	33.3	0.0	66.7	0.0	-	-	25.0	25.0	50.0	0.0	-	-	-
Total %	3.4	53.4	3.4	0.0	-	60.3	0.9	28.4	1.7	0.0	-	31.0	1.7	0.0	3.4	0.0	-	5.2	0.9	0.9	1.7	0.0	-	3.4	-
PHF	0.500	0.912	0.500	0.000	-	0.875	0.250	0.635	0.500	0.000	-	0.692	0.250	0.000	0.333	0.000	-	0.300	0.250	0.250	0.500	0.000	-	0.500	0.853
Motorcycles	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	25.0	0.0	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.9
Cars & Light Goods	1	57	4	0	-	62	1	32	2	0	-	35	2	0	4	0	-	6	1	1	1	0	-	3	106
% Cars & Light Goods	25.0	91.9	100.0	-	-	88.6	100.0	97.0	100.0	-	-	97.2	100.0	-	100.0	-	-	100.0	100.0	100.0	50.0	-	-	75.0	91.4
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	1.6	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.9
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	2
% Articulated Trucks	25.0	0.0	0.0	-	-	1.4	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	50.0	-	-	25.0	1.7
Bicycles on Road	1	4	0	0	-	5	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	6
% Bicycles on Road	25.0	6.5	0.0	-	-	7.1	0.0	3.0	0.0	-	-	2.8	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	5.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	40.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	60.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 8

Turning Movement Peak Hour Data (4:45 PM)

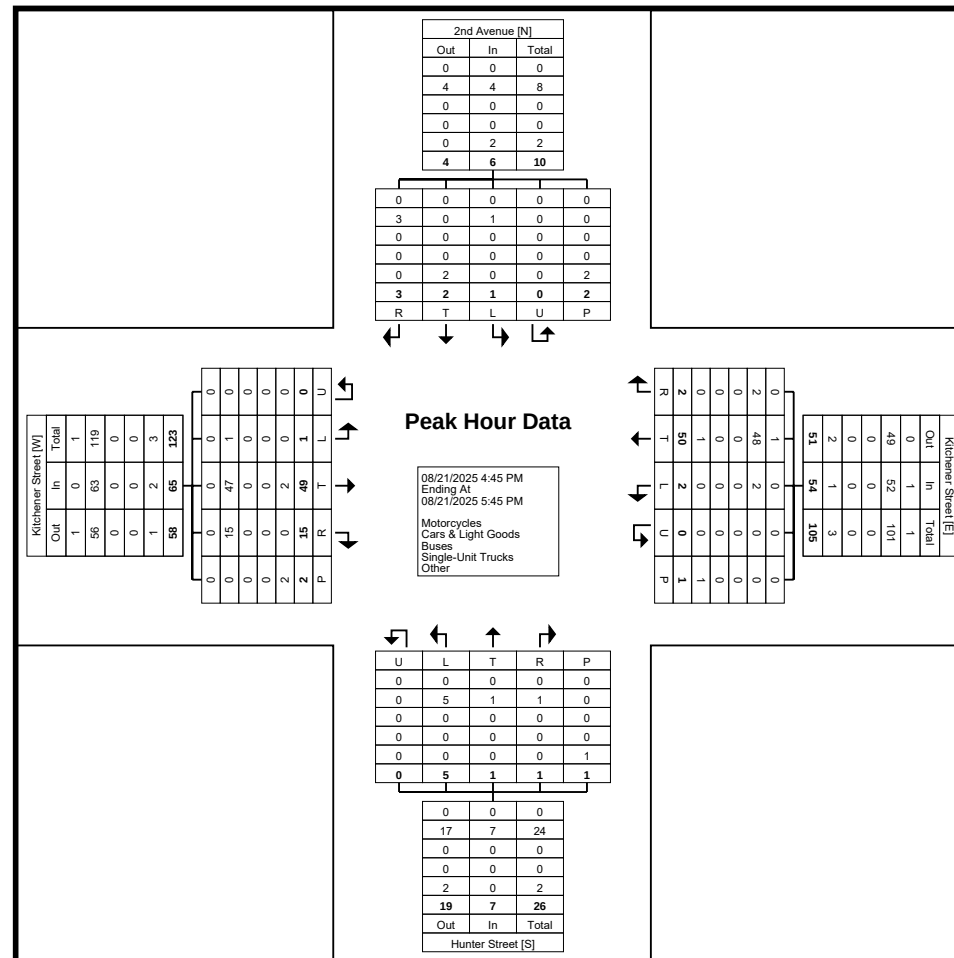
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Hunter Street Northbound						2nd Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	0	15	4	0	0	19	0	8	1	0	1	9	0	0	1	0	0	1	0	0	0	0	1	0	29
5:00 PM	0	10	2	0	0	12	1	14	1	0	0	16	0	0	0	0	0	0	0	1	0	0	1	1	29
5:15 PM	0	16	3	0	0	19	0	17	0	0	0	17	1	0	0	0	1	1	0	1	1	0	0	2	39
5:30 PM	1	8	6	0	2	15	1	11	0	0	0	12	4	1	0	0	0	5	1	0	2	0	0	3	35
Total	1	49	15	0	2	65	2	50	2	0	1	54	5	1	1	0	1	7	1	2	3	0	2	6	132
Approach %	1.5	75.4	23.1	0.0	-	-	3.7	92.6	3.7	0.0	-	-	71.4	14.3	14.3	0.0	-	-	16.7	33.3	50.0	0.0	-	-	-
Total %	0.8	37.1	11.4	0.0	-	49.2	1.5	37.9	1.5	0.0	-	40.9	3.8	0.8	0.8	0.0	-	5.3	0.8	1.5	2.3	0.0	-	4.5	-
PHF	0.250	0.766	0.625	0.000	-	0.855	0.500	0.735	0.500	0.000	-	0.794	0.313	0.250	0.250	0.000	-	0.350	0.250	0.500	0.375	0.000	-	0.500	0.846
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	2.0	0.0	-	-	1.9	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.8
Cars & Light Goods	1	47	15	0	-	63	2	48	2	0	-	52	5	1	1	0	-	7	1	0	3	0	-	4	126
% Cars & Light Goods	100.0	95.9	100.0	-	-	96.9	100.0	96.0	100.0	-	-	96.3	100.0	100.0	100.0	-	-	100.0	100.0	0.0	100.0	-	-	66.7	95.5
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	2	0	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	0	2	0	0	-	2	5
% Bicycles on Road	0.0	4.1	0.0	-	-	3.1	0.0	2.0	0.0	-	-	1.9	0.0	0.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	33.3	3.8
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & MacDonald Avenue
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	3	3	1	0	0	7	2	2	2	0	1	6	0	21	0	0	1	21	1	3	1	0	0	5	39
7:15 AM	1	7	1	0	1	9	0	3	2	0	0	5	0	3	0	0	0	3	4	7	0	0	1	11	28
7:30 AM	0	7	0	0	1	7	0	6	4	0	0	10	0	4	0	0	1	4	0	6	0	0	0	6	27
7:45 AM	1	5	1	0	1	7	0	3	5	0	0	8	0	12	0	0	0	12	3	11	6	0	0	20	47
Hourly Total	5	22	3	0	3	30	2	14	13	0	1	29	0	40	0	0	2	40	8	27	7	0	1	42	141
8:00 AM	2	9	0	0	1	11	0	3	4	0	1	7	1	13	0	0	0	14	6	13	2	0	0	21	53
8:15 AM	2	7	5	0	9	14	1	1	7	0	2	9	0	3	0	0	0	3	4	9	2	0	2	15	41
8:30 AM	0	7	1	0	2	8	0	7	7	0	2	14	0	9	1	0	0	10	5	20	0	0	0	25	57
8:45 AM	2	16	0	0	2	18	0	5	7	0	0	12	0	6	0	0	1	6	4	24	2	0	0	30	66
Hourly Total	6	39	6	0	14	51	1	16	25	0	5	42	1	31	1	0	1	33	19	66	6	0	2	91	217
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	3	6	1	0	1	10	0	3	8	0	0	11	0	23	0	0	0	23	6	21	4	0	0	31	75
11:15 AM	5	10	2	0	2	17	0	3	10	0	2	13	1	17	1	0	0	19	7	28	1	0	2	36	85
11:30 AM	3	13	0	0	3	16	0	6	7	0	0	13	0	23	0	0	1	23	8	30	4	0	1	42	94
11:45 AM	3	7	0	0	1	10	0	15	7	0	0	22	2	30	0	0	0	32	8	36	1	0	0	45	109
Hourly Total	14	36	3	0	7	53	0	27	32	0	2	59	3	93	1	0	1	97	29	115	10	0	3	154	363
12:00 PM	2	9	4	0	0	15	0	5	7	0	0	12	0	21	1	0	0	22	5	31	3	0	3	39	88
12:15 PM	3	14	4	0	0	21	0	6	12	0	0	18	1	14	2	0	1	17	5	22	3	0	0	30	86
12:30 PM	5	13	1	0	4	19	0	8	5	0	0	13	2	25	1	0	1	28	8	19	3	0	0	30	90
12:45 PM	5	8	1	0	0	14	1	4	10	0	1	15	2	24	1	0	0	27	3	20	2	0	0	25	81
Hourly Total	15	44	10	0	4	69	1	23	34	0	1	58	5	84	5	0	2	94	21	92	11	0	3	124	345
1:00 PM	6	9	3	0	1	18	0	9	14	0	2	23	1	22	1	0	0	24	2	25	0	0	1	27	92
1:15 PM	1	6	2	0	2	9	0	5	11	0	0	16	0	28	2	0	1	30	6	27	2	0	0	35	90
1:30 PM	6	3	1	0	0	10	0	5	3	0	3	8	1	19	0	0	0	20	3	29	5	0	1	37	75
1:45 PM	5	11	3	0	3	19	0	9	10	0	2	19	1	30	0	0	1	31	10	35	5	0	0	50	119
Hourly Total	18	29	9	0	6	56	0	28	38	0	7	66	3	99	3	0	2	105	21	116	12	0	2	149	376
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	2	8	1	0	1	11	0	10	11	0	0	21	2	44	1	0	0	47	9	19	0	0	1	28	107
3:15 PM	5	8	0	0	1	13	1	12	18	0	3	31	2	31	1	0	2	34	6	31	5	0	0	42	120
3:30 PM	3	8	1	0	1	12	2	6	19	0	4	27	1	39	1	0	0	41	10	25	4	0	2	39	119
3:45 PM	5	4	1	0	1	10	2	6	16	0	0	24	0	25	2	0	0	27	11	19	5	0	0	35	96
Hourly Total	15	28	3	0	4	46	5	34	64	0	7	103	5	139	5	0	2	149	36	94	14	0	3	144	442
4:00 PM	4	4	3	0	2	11	1	8	17	0	0	26	1	35	1	0	1	37	9	11	3	0	1	23	97
4:15 PM	3	9	3	0	4	15	2	12	15	0	1	29	2	47	1	0	4	50	8	22	5	0	1	35	129
4:30 PM	6	7	1	0	6	14	1	16	12	0	1	29	1	40	2	0	0	43	11	40	5	0	1	56	142

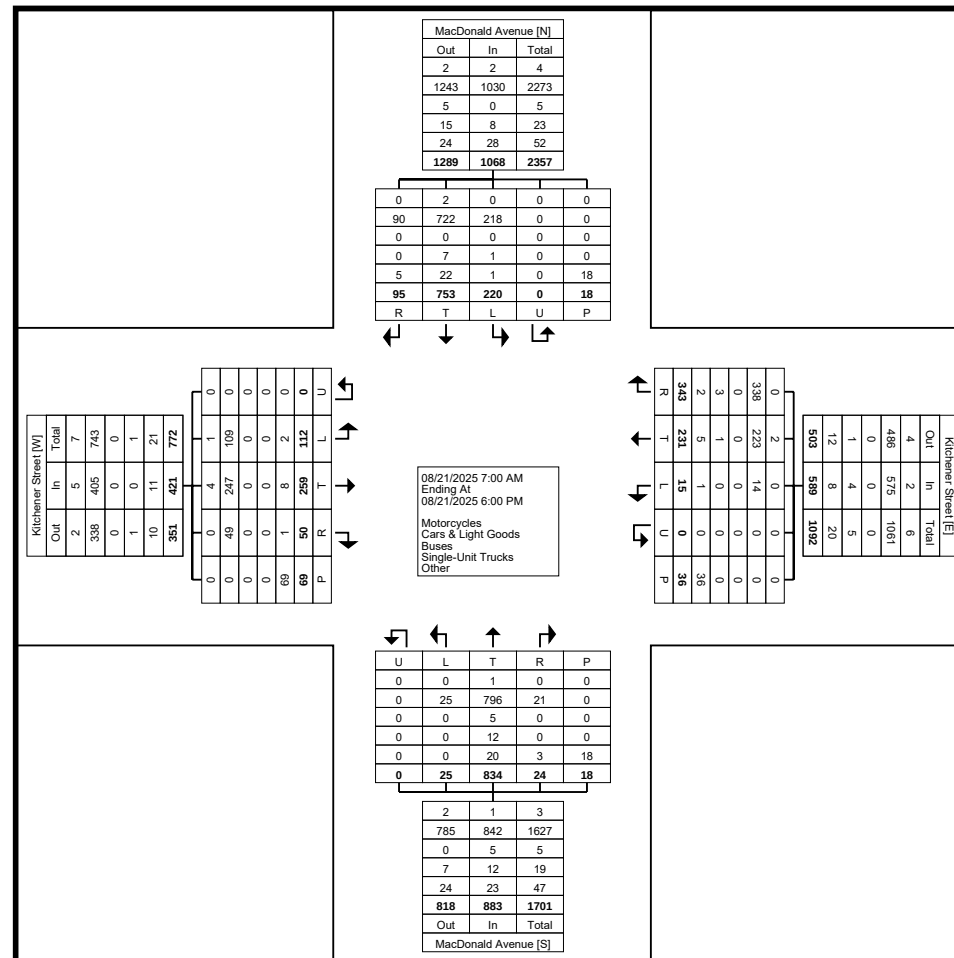
4:45 PM	5	12	3	0	3	20	0	9	14	0	4	23	1	55	2	0	0	58	12	40	2	0	0	54	155
Hourly Total	18	32	10	0	15	60	4	45	58	0	6	107	5	177	6	0	5	188	40	113	15	0	3	168	523
5:00 PM	6	6	3	0	4	15	1	13	18	0	1	32	1	55	1	0	0	57	10	28	3	0	0	41	145
5:15 PM	6	8	1	0	1	15	1	13	15	0	3	29	2	38	1	0	1	41	11	38	7	0	0	56	141
5:30 PM	6	1	1	0	6	8	0	11	20	0	1	31	0	34	1	0	0	35	14	28	6	0	0	48	122
5:45 PM	3	14	1	0	5	18	0	7	26	0	2	33	0	44	0	0	2	44	11	36	4	0	1	51	146
Hourly Total	21	29	6	0	16	56	2	44	79	0	7	125	3	171	3	0	3	177	46	130	20	0	1	196	554
Grand Total	112	259	50	0	69	421	15	231	343	0	36	589	25	834	24	0	18	883	220	753	95	0	18	1068	2961
Approach %	26.6	61.5	11.9	0.0	-	-	2.5	39.2	58.2	0.0	-	-	2.8	94.5	2.7	0.0	-	-	20.6	70.5	8.9	0.0	-	-	-
Total %	3.8	8.7	1.7	0.0	-	14.2	0.5	7.8	11.6	0.0	-	19.9	0.8	28.2	0.8	0.0	-	29.8	7.4	25.4	3.2	0.0	-	36.1	-
Motorcycles	1	4	0	0	-	5	0	2	0	0	-	2	0	1	0	0	-	1	0	2	0	0	-	2	10
% Motorcycles	0.9	1.5	0.0	-	-	1.2	0.0	0.9	0.0	-	-	0.3	0.0	0.1	0.0	-	-	0.1	0.0	0.3	0.0	-	-	0.2	0.3
Cars & Light Goods	109	247	49	0	-	405	14	223	338	0	-	575	25	796	21	0	-	842	218	722	90	0	-	1030	2852
% Cars & Light Goods	97.3	95.4	98.0	-	-	96.2	93.3	96.5	98.5	-	-	97.6	100.0	95.4	87.5	-	-	95.4	99.1	95.9	94.7	-	-	96.4	96.3
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	5	0	0	-	5	0	0	0	0	-	0	5
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.6	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	0	0	0	-	0	0	1	3	0	-	4	0	12	0	0	-	12	1	7	0	0	-	8	24
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.4	0.9	-	-	0.7	0.0	1.4	0.0	-	-	1.4	0.5	0.9	0.0	-	-	0.7	0.8
Articulated Trucks	0	1	0	0	-	1	1	2	0	0	-	3	0	11	0	0	-	11	0	10	0	0	-	10	25
% Articulated Trucks	0.0	0.4	0.0	-	-	0.2	6.7	0.9	0.0	-	-	0.5	0.0	1.3	0.0	-	-	1.2	0.0	1.3	0.0	-	-	0.9	0.8
Bicycles on Road	2	7	1	0	-	10	0	3	2	0	-	5	0	9	3	0	-	12	1	12	5	0	-	18	45
% Bicycles on Road	1.8	2.7	2.0	-	-	2.4	0.0	1.3	0.6	-	-	0.8	0.0	1.1	12.5	-	-	1.4	0.5	1.6	5.3	-	-	1.7	1.5
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	4.3	-	-	-	-	-	11.1	-	-	-	-	-	0.0	-	-	-	-	-	22.2	-	-
Pedestrians	-	-	-	-	66	-	-	-	-	-	32	-	-	-	-	-	18	-	-	-	-	-	14	-	-
% Pedestrians	-	-	-	-	95.7	-	-	-	-	-	88.9	-	-	-	-	-	100.0	-	-	-	-	-	77.8	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Kitchener Street & MacDonald
Avenue
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & MacDonald Avenue
Site Code: 250550
Start Date: 08/21/2025
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

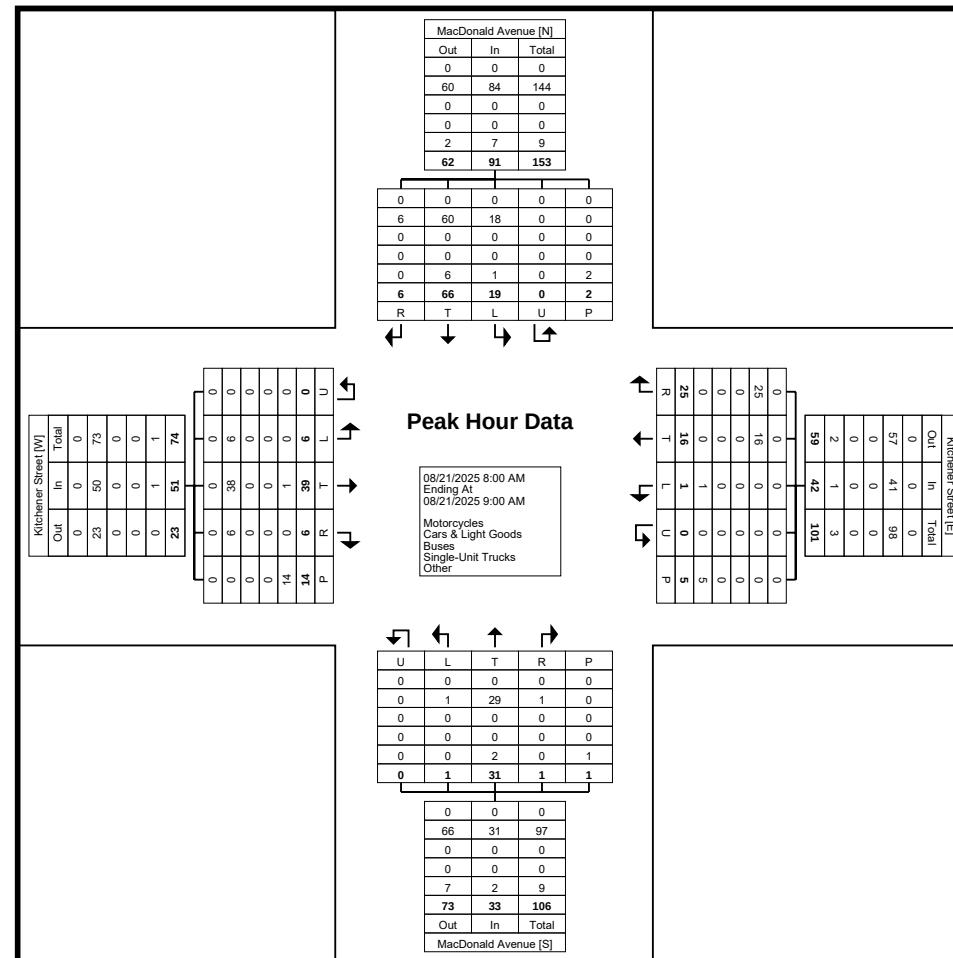
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	2	9	0	0	1	11	0	3	4	0	1	7	1	13	0	0	0	14	6	13	2	0	0	21	53
8:15 AM	2	7	5	0	9	14	1	1	7	0	2	9	0	3	0	0	0	3	4	9	2	0	2	15	41
8:30 AM	0	7	1	0	2	8	0	7	7	0	2	14	0	9	1	0	0	10	5	20	0	0	0	25	57
8:45 AM	2	16	0	0	2	18	0	5	7	0	0	12	0	6	0	0	1	6	4	24	2	0	0	30	66
Total	6	39	6	0	14	51	1	16	25	0	5	42	1	31	1	0	1	33	19	66	6	0	2	91	217
Approach %	11.8	76.5	11.8	0.0	-	-	2.4	38.1	59.5	0.0	-	-	3.0	93.9	3.0	0.0	-	-	20.9	72.5	6.6	0.0	-	-	-
Total %	2.8	18.0	2.8	0.0	-	23.5	0.5	7.4	11.5	0.0	-	19.4	0.5	14.3	0.5	0.0	-	15.2	8.8	30.4	2.8	0.0	-	41.9	-
PHF	0.750	0.609	0.300	0.000	-	0.708	0.250	0.571	0.893	0.000	-	0.750	0.250	0.596	0.250	0.000	-	0.589	0.792	0.688	0.750	0.000	-	0.758	0.822
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	6	38	6	0	-	50	0	16	25	0	-	41	1	29	1	0	-	31	18	60	6	0	-	84	206
% Cars & Light Goods	100.0	97.4	100.0	-	-	98.0	0.0	100.0	100.0	-	-	97.6	100.0	93.5	100.0	-	-	93.9	94.7	90.9	100.0	-	-	92.3	94.9
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	1	0	0	-	1	1	0	0	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	4
% Articulated Trucks	0.0	2.6	0.0	-	-	2.0	100.0	0.0	0.0	-	-	2.4	0.0	3.2	0.0	-	-	3.0	0.0	1.5	0.0	-	-	1.1	1.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1	5	0	0	-	6	7
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	3.2	0.0	-	-	3.0	5.3	7.6	0.0	-	-	6.6	3.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	14	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Kitchener Street & MacDonald
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Kitchener Street & MacDonald Avenue
Site Code: 250550
Start Date: 08/21/2025
Page No: 6

Turning Movement Peak Hour Data (11:30 AM)

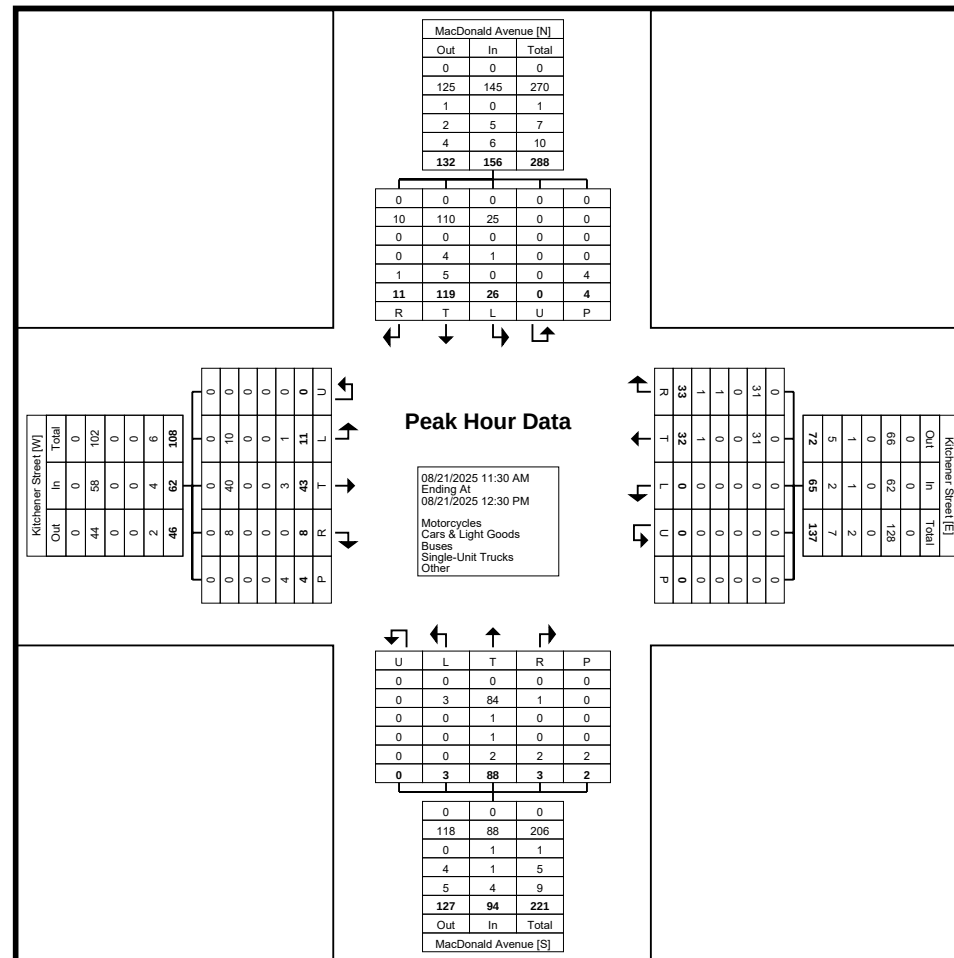
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:30 AM	3	13	0	0	3	16	0	6	7	0	0	13	0	23	0	0	1	23	8	30	4	0	1	42	94
11:45 AM	3	7	0	0	1	10	0	15	7	0	0	22	2	30	0	0	0	32	8	36	1	0	0	45	109
12:00 PM	2	9	4	0	0	15	0	5	7	0	0	12	0	21	1	0	0	22	5	31	3	0	3	39	88
12:15 PM	3	14	4	0	0	21	0	6	12	0	0	18	1	14	2	0	1	17	5	22	3	0	0	30	86
Total	11	43	8	0	4	62	0	32	33	0	0	65	3	88	3	0	2	94	26	119	11	0	4	156	377
Approach %	17.7	69.4	12.9	0.0	-	-	0.0	49.2	50.8	0.0	-	-	3.2	93.6	3.2	0.0	-	-	16.7	76.3	7.1	0.0	-	-	-
Total %	2.9	11.4	2.1	0.0	-	16.4	0.0	8.5	8.8	0.0	-	17.2	0.8	23.3	0.8	0.0	-	24.9	6.9	31.6	2.9	0.0	-	41.4	-
PHF	0.917	0.768	0.500	0.000	-	0.738	0.000	0.533	0.688	0.000	-	0.739	0.375	0.733	0.375	0.000	-	0.734	0.813	0.826	0.688	0.000	-	0.867	0.865
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	10	40	8	0	-	58	0	31	31	0	-	62	3	84	1	0	-	88	25	110	10	0	-	145	353
% Cars & Light Goods	90.9	93.0	100.0	-	-	93.5	-	96.9	93.9	-	-	95.4	100.0	95.5	33.3	-	-	93.6	96.2	92.4	90.9	-	-	92.9	93.6
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.1	0.0	0.0	0.0	-	-	0.0	0.3
Single-Unit Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	1	4	0	0	-	5	7
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	-	0.0	3.0	-	-	1.5	0.0	1.1	0.0	-	-	1.1	3.8	3.4	0.0	-	-	3.2	1.9
Articulated Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	2	0	0	-	2	0	3	0	0	-	3	6
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	-	3.1	0.0	-	-	1.5	0.0	2.3	0.0	-	-	2.1	0.0	2.5	0.0	-	-	1.9	1.6
Bicycles on Road	1	3	0	0	-	4	0	0	1	0	-	1	0	0	2	0	-	2	0	2	1	0	-	3	10
% Bicycles on Road	9.1	7.0	0.0	-	-	6.5	-	0.0	3.0	-	-	1.5	0.0	0.0	66.7	-	-	2.1	0.0	1.7	9.1	-	-	1.9	2.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	25.0	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	75.0	-	-



Paradigm Transportation Solutions Limited
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Count Name: Kitchener Street & MacDonald
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Count Name: Kitchener Street & MacDonald Avenue
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Peak Hour Data (4:30 PM)

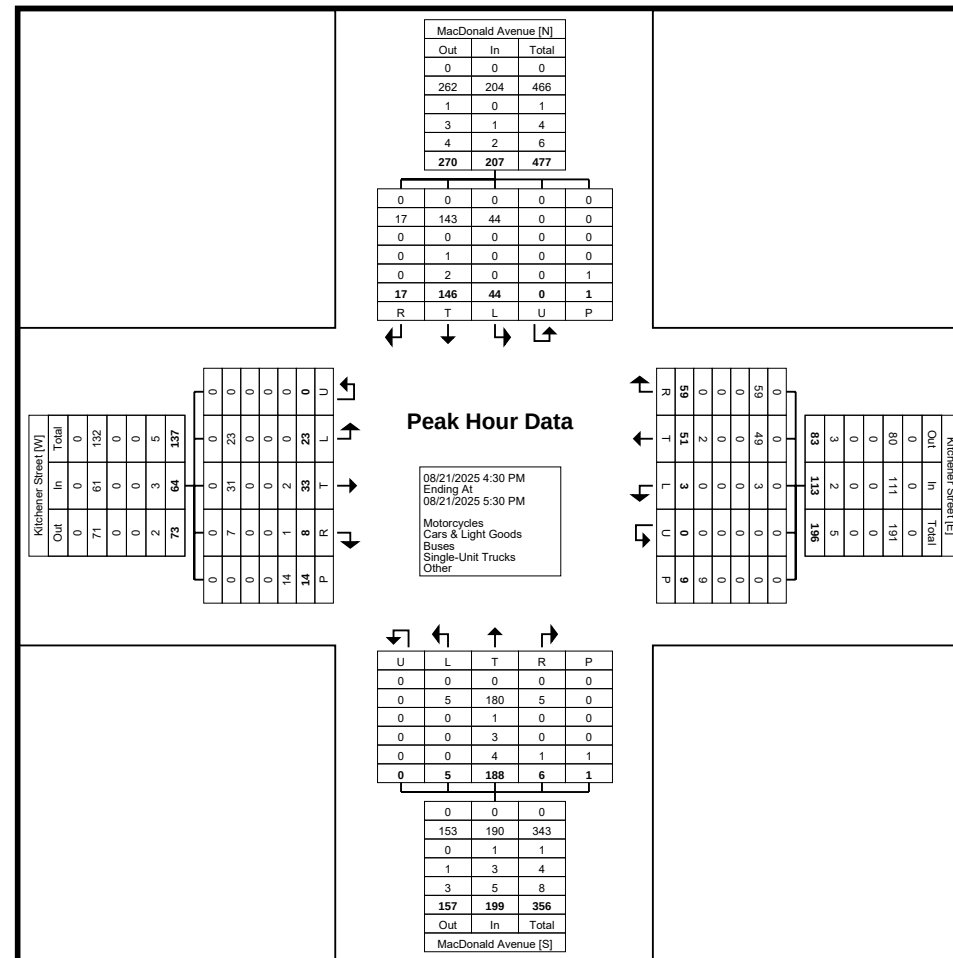
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:30 PM	6	7	1	0	6	14	1	16	12	0	1	29	1	40	2	0	0	43	11	40	5	0	1	56	142
4:45 PM	5	12	3	0	3	20	0	9	14	0	4	23	1	55	2	0	0	58	12	40	2	0	0	54	155
5:00 PM	6	6	3	0	4	15	1	13	18	0	1	32	1	55	1	0	0	57	10	28	3	0	0	41	145
5:15 PM	6	8	1	0	1	15	1	13	15	0	3	29	2	38	1	0	1	41	11	38	7	0	0	56	141
Total	23	33	8	0	14	64	3	51	59	0	9	113	5	188	6	0	1	199	44	146	17	0	1	207	583
Approach %	35.9	51.6	12.5	0.0	-	-	2.7	45.1	52.2	0.0	-	-	2.5	94.5	3.0	0.0	-	-	21.3	70.5	8.2	0.0	-	-	-
Total %	3.9	5.7	1.4	0.0	-	11.0	0.5	8.7	10.1	0.0	-	19.4	0.9	32.2	1.0	0.0	-	34.1	7.5	25.0	2.9	0.0	-	35.5	-
PHF	0.958	0.688	0.667	0.000	-	0.800	0.750	0.797	0.819	0.000	-	0.883	0.625	0.855	0.750	0.000	-	0.858	0.917	0.913	0.607	0.000	-	0.924	0.940
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	23	31	7	0	-	61	3	49	59	0	-	111	5	180	5	0	-	190	44	143	17	0	-	204	566
% Cars & Light Goods	100.0	93.9	87.5	-	-	95.3	100.0	96.1	100.0	-	-	98.2	100.0	95.7	83.3	-	-	95.5	100.0	97.9	100.0	-	-	98.6	97.1
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.2
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	1	0	0	-	1	4
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.6	0.0	-	-	1.5	0.0	0.7	0.0	-	-	0.5	0.7
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.5	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	2	1	0	-	3	0	2	0	0	-	2	0	3	1	0	-	4	0	2	0	0	-	2	11
% Bicycles on Road	0.0	6.1	12.5	-	-	4.7	0.0	3.9	0.0	-	-	1.8	0.0	1.6	16.7	-	-	2.0	0.0	1.4	0.0	-	-	1.0	1.9
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	7.1	-	-	-	-	-	22.2	-	-	-	-	-	0.0	-	-	-	-	-	100.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	7	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	92.9	-	-	-	-	-	77.8	-	-	-	-	-	100.0	-	-	-	-	-	0.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Kitchener Street & MacDonald
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Turning Movement Peak Hour Data Plot (4:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Bender Street
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Data

Start Time	Bender Street Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:00 AM	3	4	0	0	7	9	6	0	1	15	21	17	0	2	38	60
7:15 AM	1	6	0	3	7	15	15	0	0	30	28	14	0	0	42	79
7:30 AM	5	2	0	2	7	25	11	0	0	36	36	20	0	0	56	99
7:45 AM	7	8	0	1	15	16	8	0	0	24	46	27	0	2	73	112
Hourly Total	16	20	0	6	36	65	40	0	1	105	131	78	0	4	209	350
8:00 AM	11	6	0	4	17	17	22	0	0	39	47	21	0	0	68	124
8:15 AM	8	6	0	3	14	23	11	0	2	34	73	23	0	3	96	144
8:30 AM	13	7	0	4	20	33	22	0	1	55	56	35	0	3	91	166
8:45 AM	8	12	0	4	20	24	21	0	1	45	69	40	0	2	109	174
Hourly Total	40	31	0	15	71	97	76	0	4	173	245	119	0	8	364	608
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	21	18	0	11	39	34	42	0	8	76	37	54	0	1	91	206
11:15 AM	18	24	0	5	42	38	34	0	6	72	39	41	0	1	80	194
11:30 AM	20	25	0	17	45	33	45	0	5	78	50	63	0	11	113	236
11:45 AM	18	24	0	15	42	54	42	0	4	96	53	68	0	2	121	259
Hourly Total	77	91	0	48	168	159	163	0	23	322	179	226	0	15	405	895
12:00 PM	17	16	0	4	33	40	30	0	7	70	29	53	1	1	83	186
12:15 PM	20	20	0	4	40	39	30	0	4	69	40	50	0	2	90	199
12:30 PM	15	21	0	4	36	50	35	0	0	85	53	73	0	9	126	247
12:45 PM	19	22	0	21	41	37	40	0	7	77	58	66	0	15	124	242
Hourly Total	71	79	0	33	150	166	135	0	18	301	180	242	1	27	423	874
1:00 PM	19	20	0	19	39	48	30	0	7	78	43	49	0	3	92	209
1:15 PM	13	22	0	23	35	37	42	0	7	79	41	62	0	3	103	217
1:30 PM	14	19	0	9	33	58	26	0	13	84	40	65	1	7	106	223
1:45 PM	16	21	0	22	37	46	39	0	8	85	55	67	1	1	123	245
Hourly Total	62	82	0	73	144	189	137	0	35	326	179	243	2	14	424	894
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	20	38	0	16	58	66	34	0	11	100	35	44	0	7	79	237
3:15 PM	13	35	0	24	48	65	44	1	10	110	46	71	0	1	117	275
3:30 PM	20	47	0	9	67	67	29	0	1	96	42	59	0	4	101	264
3:45 PM	19	25	0	13	44	40	44	0	2	84	38	61	0	3	99	227
Hourly Total	72	145	0	62	217	238	151	1	24	390	161	235	0	15	396	1003
4:00 PM	15	39	0	5	54	63	40	0	9	103	28	58	0	14	86	243
4:15 PM	28	33	0	21	61	63	36	0	8	99	49	56	0	4	105	265
4:30 PM	36	45	0	14	81	53	24	0	3	77	46	68	0	1	114	272
4:45 PM	18	32	0	8	50	53	32	0	6	85	35	64	0	1	99	234

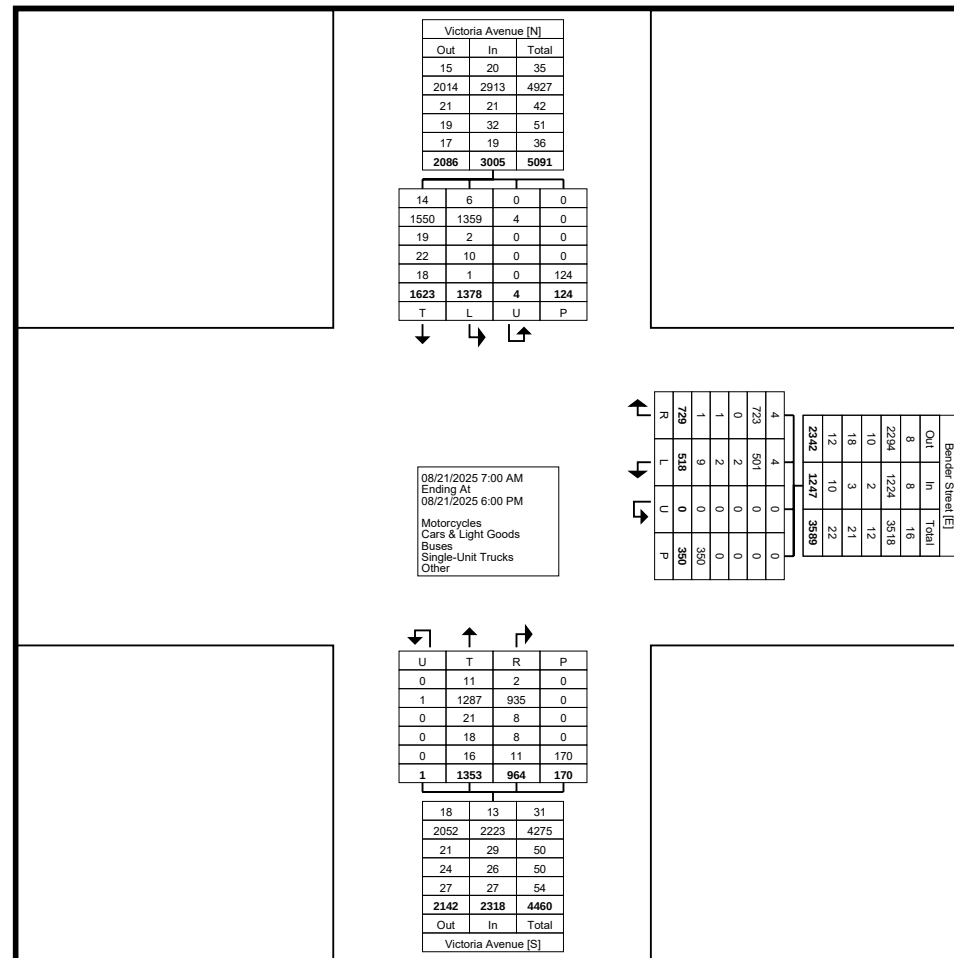
Hourly Total	97	149	0	48	246	232	132	0	26	364	158	246	0	20	404	1014
5:00 PM	25	47	0	21	72	62	33	0	12	95	40	59	0	5	99	266
5:15 PM	16	37	0	6	53	56	32	0	26	88	38	55	1	0	94	235
5:30 PM	18	29	0	18	47	38	33	0	1	71	32	63	0	10	95	213
5:45 PM	24	19	0	20	43	51	32	0	0	83	35	57	0	6	92	218
Hourly Total	83	132	0	65	215	207	130	0	39	337	145	234	1	21	380	932
Grand Total	518	729	0	350	1247	1353	964	1	170	2318	1378	1623	4	124	3005	6570
Approach %	41.5	58.5	0.0	-	-	58.4	41.6	0.0	-	-	45.9	54.0	0.1	-	-	-
Total %	7.9	11.1	0.0	-	19.0	20.6	14.7	0.0	-	35.3	21.0	24.7	0.1	-	45.7	-
Motorcycles	4	4	0	-	8	11	2	0	-	13	6	14	0	-	20	41
% Motorcycles	0.8	0.5	-	-	0.6	0.8	0.2	0.0	-	0.6	0.4	0.9	0.0	-	0.7	0.6
Cars & Light Goods	501	723	0	-	1224	1287	935	1	-	2223	1359	1550	4	-	2913	6360
% Cars & Light Goods	96.7	99.2	-	-	98.2	95.1	97.0	100.0	-	95.9	98.6	95.5	100.0	-	96.9	96.8
Buses	2	0	0	-	2	21	8	0	-	29	2	19	0	-	21	52
% Buses	0.4	0.0	-	-	0.2	1.6	0.8	0.0	-	1.3	0.1	1.2	0.0	-	0.7	0.8
Single-Unit Trucks	2	1	0	-	3	18	8	0	-	26	10	22	0	-	32	61
% Single-Unit Trucks	0.4	0.1	-	-	0.2	1.3	0.8	0.0	-	1.1	0.7	1.4	0.0	-	1.1	0.9
Articulated Trucks	1	0	0	-	1	2	4	0	-	6	0	4	0	-	4	11
% Articulated Trucks	0.2	0.0	-	-	0.1	0.1	0.4	0.0	-	0.3	0.0	0.2	0.0	-	0.1	0.2
Bicycles on Road	8	1	0	-	9	14	7	0	-	21	1	14	0	-	15	45
% Bicycles on Road	1.5	0.1	-	-	0.7	1.0	0.7	0.0	-	0.9	0.1	0.9	0.0	-	0.5	0.7
Bicycles on Crosswalk	-	-	-	14	-	-	-	-	2	-	-	-	-	8	-	-
% Bicycles on Crosswalk	-	-	-	4.0	-	-	-	-	1.2	-	-	-	-	6.5	-	-
Pedestrians	-	-	-	336	-	-	-	-	168	-	-	-	-	116	-	-
% Pedestrians	-	-	-	96.0	-	-	-	-	98.8	-	-	-	-	93.5	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Bender Street
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Bender Street
Site Code: 250550
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Turning Movement Peak Hour Data (8:00 AM)

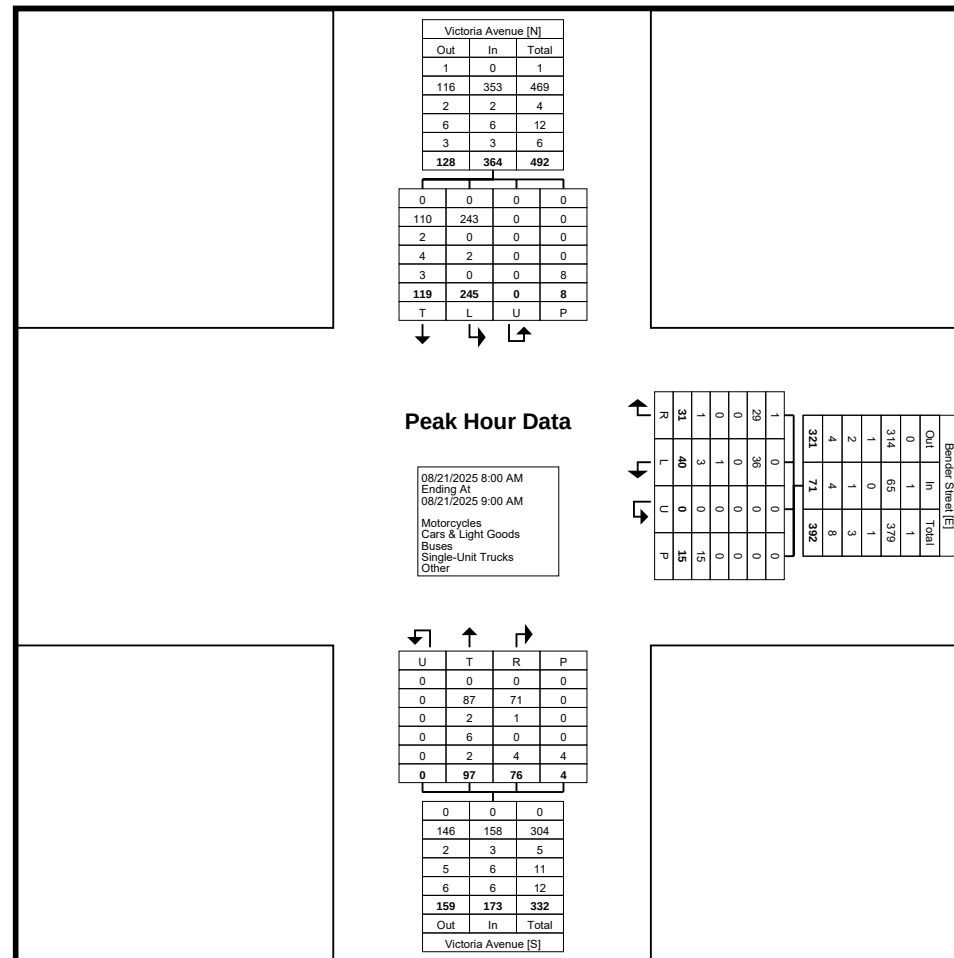
Start Time	Bender Street Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
8:00 AM	11	6	0	4	17	17	22	0	0	39	47	21	0	0	68	124
8:15 AM	8	6	0	3	14	23	11	0	2	34	73	23	0	3	96	144
8:30 AM	13	7	0	4	20	33	22	0	1	55	56	35	0	3	91	166
8:45 AM	8	12	0	4	20	24	21	0	1	45	69	40	0	2	109	174
Total	40	31	0	15	71	97	76	0	4	173	245	119	0	8	364	608
Approach %	56.3	43.7	0.0	-	-	56.1	43.9	0.0	-	-	67.3	32.7	0.0	-	-	-
Total %	6.6	5.1	0.0	-	11.7	16.0	12.5	0.0	-	28.5	40.3	19.6	0.0	-	59.9	-
PHF	0.769	0.646	0.000	-	0.888	0.735	0.864	0.000	-	0.786	0.839	0.744	0.000	-	0.835	0.874
Motorcycles	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Motorcycles	0.0	3.2	-	-	1.4	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.2
Cars & Light Goods	36	29	0	-	65	87	71	0	-	158	243	110	0	-	353	576
% Cars & Light Goods	90.0	93.5	-	-	91.5	89.7	93.4	-	-	91.3	99.2	92.4	-	-	97.0	94.7
Buses	0	0	0	-	0	2	1	0	-	3	0	2	0	-	2	5
% Buses	0.0	0.0	-	-	0.0	2.1	1.3	-	-	1.7	0.0	1.7	-	-	0.5	0.8
Single-Unit Trucks	1	0	0	-	1	6	0	0	-	6	2	4	0	-	6	13
% Single-Unit Trucks	2.5	0.0	-	-	1.4	6.2	0.0	-	-	3.5	0.8	3.4	-	-	1.6	2.1
Articulated Trucks	1	0	0	-	1	1	3	0	-	4	0	1	0	-	1	6
% Articulated Trucks	2.5	0.0	-	-	1.4	1.0	3.9	-	-	2.3	0.0	0.8	-	-	0.3	1.0
Bicycles on Road	2	1	0	-	3	1	1	0	-	2	0	2	0	-	2	7
% Bicycles on Road	5.0	3.2	-	-	4.2	1.0	1.3	-	-	1.2	0.0	1.7	-	-	0.5	1.2
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	13.3	-	-	-	-	0.0	-	-	-	-	12.5	-	-
Pedestrians	-	-	-	13	-	-	-	-	4	-	-	-	-	7	-	-
% Pedestrians	-	-	-	86.7	-	-	-	-	100.0	-	-	-	-	87.5	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Bender Street
Site Code: 250550
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Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Bender Street
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Peak Hour Data (12:30 PM)

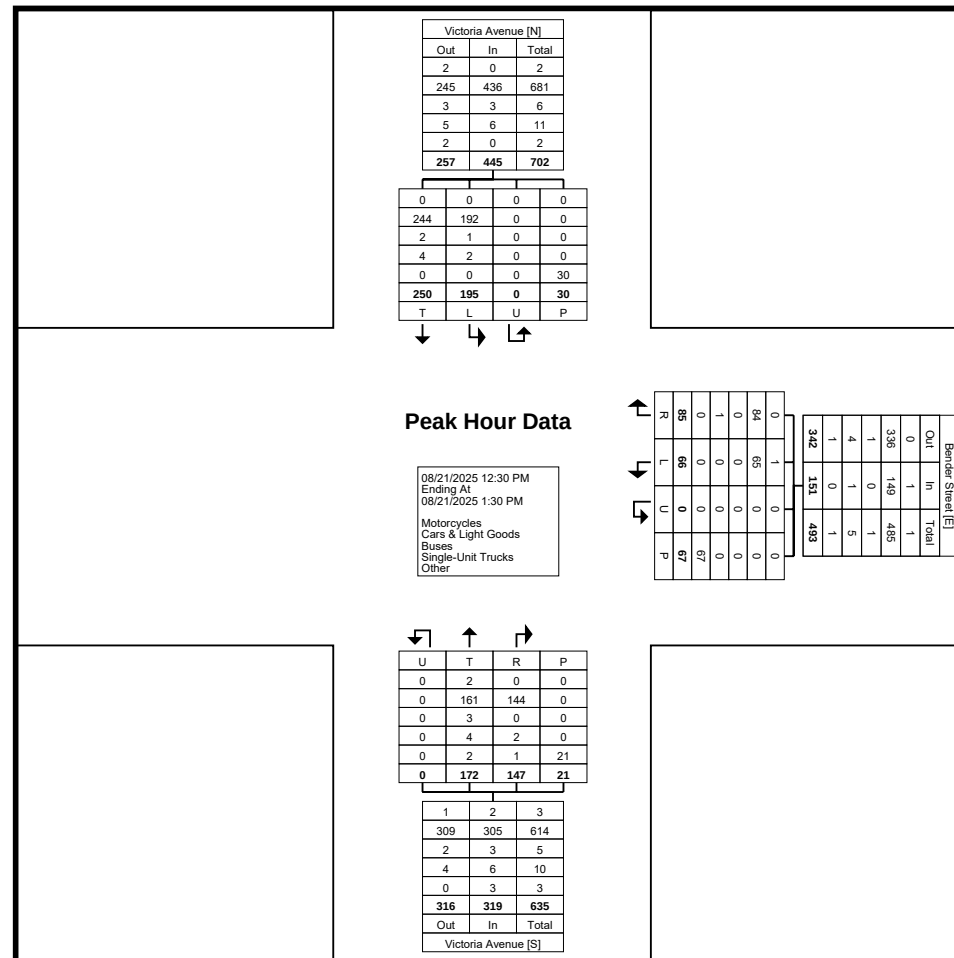
Start Time	Bender Street Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
12:30 PM	15	21	0	4	36	50	35	0	0	85	53	73	0	9	126	247
12:45 PM	19	22	0	21	41	37	40	0	7	77	58	66	0	15	124	242
1:00 PM	19	20	0	19	39	48	30	0	7	78	43	49	0	3	92	209
1:15 PM	13	22	0	23	35	37	42	0	7	79	41	62	0	3	103	217
Total	66	85	0	67	151	172	147	0	21	319	195	250	0	30	445	915
Approach %	43.7	56.3	0.0	-	-	53.9	46.1	0.0	-	-	43.8	56.2	0.0	-	-	-
Total %	7.2	9.3	0.0	-	16.5	18.8	16.1	0.0	-	34.9	21.3	27.3	0.0	-	48.6	-
PHF	0.868	0.966	0.000	-	0.921	0.860	0.875	0.000	-	0.938	0.841	0.856	0.000	-	0.883	0.926
Motorcycles	1	0	0	-	1	2	0	0	-	2	0	0	0	-	0	3
% Motorcycles	1.5	0.0	-	-	0.7	1.2	0.0	-	-	0.6	0.0	0.0	-	-	0.0	0.3
Cars & Light Goods	65	84	0	-	149	161	144	0	-	305	192	244	0	-	436	890
% Cars & Light Goods	98.5	98.8	-	-	98.7	93.6	98.0	-	-	95.6	98.5	97.6	-	-	98.0	97.3
Buses	0	0	0	-	0	3	0	0	-	3	1	2	0	-	3	6
% Buses	0.0	0.0	-	-	0.0	1.7	0.0	-	-	0.9	0.5	0.8	-	-	0.7	0.7
Single-Unit Trucks	0	1	0	-	1	4	2	0	-	6	2	4	0	-	6	13
% Single-Unit Trucks	0.0	1.2	-	-	0.7	2.3	1.4	-	-	1.9	1.0	1.6	-	-	1.3	1.4
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	2	1	0	-	3	0	0	0	-	0	3
% Bicycles on Road	0.0	0.0	-	-	0.0	1.2	0.7	-	-	0.9	0.0	0.0	-	-	0.0	0.3
Bicycles on Crosswalk	-	-	-	3	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	4.5	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	64	-	-	-	-	21	-	-	-	-	30	-	-
% Pedestrians	-	-	-	95.5	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Bender Street
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Bender Street
Site Code: 250550
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Turning Movement Peak Hour Data (4:15 PM)

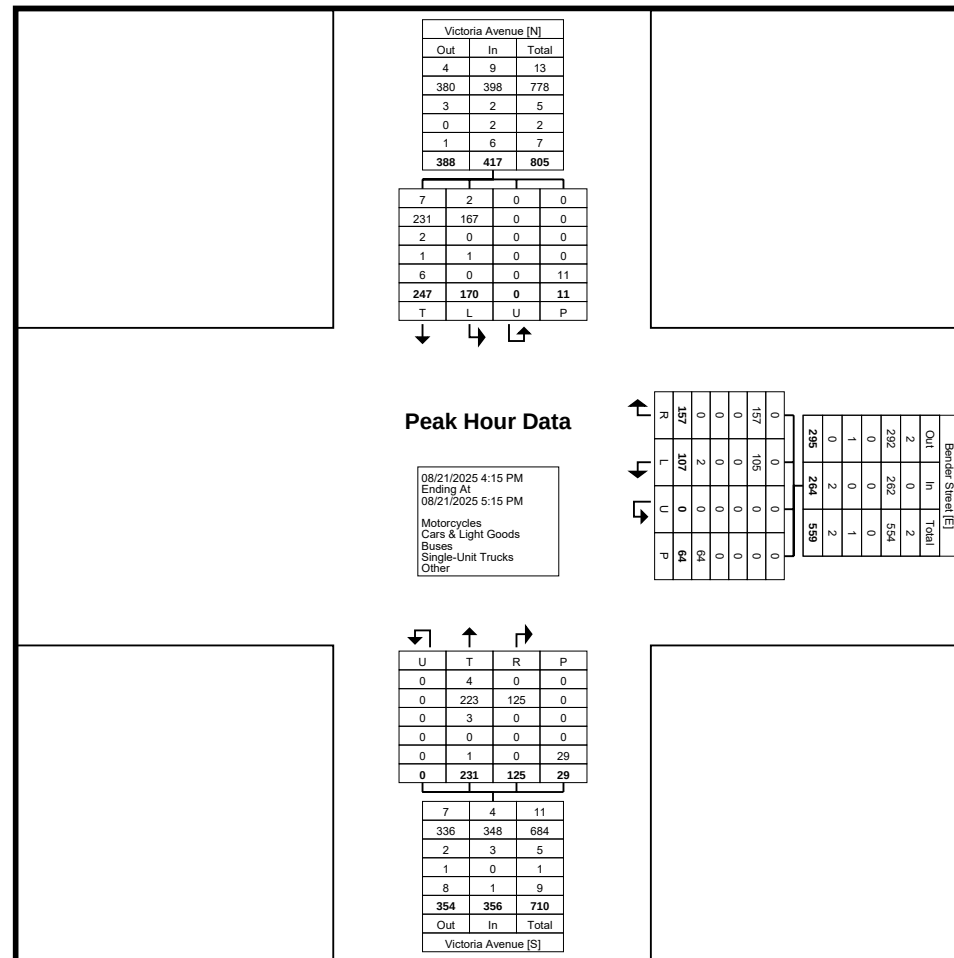
Start Time	Bender Street Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
4:15 PM	28	33	0	21	61	63	36	0	8	99	49	56	0	4	105	265
4:30 PM	36	45	0	14	81	53	24	0	3	77	46	68	0	1	114	272
4:45 PM	18	32	0	8	50	53	32	0	6	85	35	64	0	1	99	234
5:00 PM	25	47	0	21	72	62	33	0	12	95	40	59	0	5	99	266
Total	107	157	0	64	264	231	125	0	29	356	170	247	0	11	417	1037
Approach %	40.5	59.5	0.0	-	-	64.9	35.1	0.0	-	-	40.8	59.2	0.0	-	-	-
Total %	10.3	15.1	0.0	-	25.5	22.3	12.1	0.0	-	34.3	16.4	23.8	0.0	-	40.2	-
PHF	0.743	0.835	0.000	-	0.815	0.917	0.868	0.000	-	0.899	0.867	0.908	0.000	-	0.914	0.953
Motorcycles	0	0	0	-	0	4	0	0	-	4	2	7	0	-	9	13
% Motorcycles	0.0	0.0	-	-	0.0	1.7	0.0	-	-	1.1	1.2	2.8	-	-	2.2	1.3
Cars & Light Goods	105	157	0	-	262	223	125	0	-	348	167	231	0	-	398	1008
% Cars & Light Goods	98.1	100.0	-	-	99.2	96.5	100.0	-	-	97.8	98.2	93.5	-	-	95.4	97.2
Buses	0	0	0	-	0	3	0	0	-	3	0	2	0	-	2	5
% Buses	0.0	0.0	-	-	0.0	1.3	0.0	-	-	0.8	0.0	0.8	-	-	0.5	0.5
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	1	1	0	-	2	2
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.6	0.4	-	-	0.5	0.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	2	0	0	-	2	1	0	0	-	1	0	6	0	-	6	9
% Bicycles on Road	1.9	0.0	-	-	0.8	0.4	0.0	-	-	0.3	0.0	2.4	-	-	1.4	0.9
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	1.6	-	-	-	-	0.0	-	-	-	-	27.3	-	-
Pedestrians	-	-	-	63	-	-	-	-	29	-	-	-	-	8	-	-
% Pedestrians	-	-	-	98.4	-	-	-	-	100.0	-	-	-	-	72.7	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
EB Ramp
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Data

Start Time	Falls Avenue EB Ramp Eastbound						Falls Avenue EB Ramp Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	20	0	23	0	3	43	0	0	0	0	2	0	0	17	0	0	0	17	3	22	0	0	0	25	85
7:15 AM	22	0	28	0	3	50	0	0	0	0	3	0	0	25	0	0	0	25	3	14	0	0	0	17	92
7:30 AM	22	0	37	0	8	59	0	0	0	0	3	0	0	34	0	0	0	34	0	20	0	0	0	20	113
7:45 AM	49	0	48	0	3	97	0	0	0	0	2	0	0	27	0	0	0	27	4	34	0	0	0	38	162
Hourly Total	113	0	136	0	17	249	0	0	0	0	10	0	0	103	0	0	0	103	10	90	0	0	0	100	452
8:00 AM	38	0	47	0	2	85	0	0	0	0	2	0	0	26	0	0	0	26	0	23	0	0	0	23	134
8:15 AM	48	0	70	0	12	118	0	0	0	0	2	0	0	29	2	0	0	31	1	30	0	0	0	31	180
8:30 AM	34	0	58	0	9	92	0	0	0	0	7	0	0	41	2	0	1	43	3	36	0	0	0	39	174
8:45 AM	49	0	60	0	11	109	0	0	0	0	2	0	0	39	1	0	0	40	3	46	0	0	0	49	198
Hourly Total	169	0	235	0	34	404	0	0	0	0	13	0	0	135	5	0	1	140	7	135	0	0	0	142	686
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	30	1	38	0	18	69	0	0	0	0	6	0	0	61	1	0	1	62	8	56	0	0	0	64	195
11:15 AM	35	0	42	0	5	77	0	0	0	0	5	0	0	67	3	0	0	70	4	43	0	0	0	47	194
11:30 AM	29	1	53	0	12	83	0	0	0	0	8	0	0	61	4	0	0	65	3	66	0	1	0	70	218
11:45 AM	35	0	47	0	9	82	0	0	0	0	7	0	0	82	2	0	0	84	9	73	0	0	0	82	248
Hourly Total	129	2	180	0	44	311	0	0	0	0	26	0	0	271	10	0	1	281	24	238	0	1	0	263	855
12:00 PM	35	0	35	0	11	70	0	0	0	0	0	0	0	61	1	0	0	62	5	49	1	0	0	55	187
12:15 PM	35	1	40	0	11	76	0	0	0	0	1	0	0	68	1	0	0	69	11	51	1	0	0	63	208
12:30 PM	26	0	58	0	17	84	0	0	0	0	5	0	0	76	0	0	0	76	7	75	0	0	0	82	242
12:45 PM	50	0	66	0	15	116	0	0	0	0	12	0	0	69	4	0	0	73	10	67	0	0	0	77	266
Hourly Total	146	1	199	0	54	346	0	0	0	0	18	0	0	274	6	0	0	280	33	242	2	0	0	277	903
1:00 PM	33	1	44	0	12	78	0	0	0	0	7	0	0	68	0	0	0	68	9	60	0	0	0	69	215
1:15 PM	32	0	51	0	17	83	0	0	0	0	6	0	0	62	0	0	2	62	6	56	0	0	0	62	207
1:30 PM	42	1	41	0	16	84	0	0	0	0	4	0	0	71	1	0	2	72	9	69	1	0	0	79	235
1:45 PM	27	2	54	0	15	83	0	0	0	0	9	0	0	77	0	0	1	77	8	80	0	0	0	88	248
Hourly Total	134	4	190	0	60	328	0	0	0	0	26	0	0	278	1	0	5	279	32	265	1	0	0	298	905
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	42	0	32	0	10	74	0	0	0	0	12	0	0	108	6	0	0	114	14	53	0	0	0	67	255
3:15 PM	36	1	50	0	18	87	0	0	0	0	8	0	0	105	5	0	0	110	11	76	0	0	0	87	284
3:30 PM	37	0	33	0	14	70	0	0	0	0	9	0	0	118	4	0	0	122	12	69	0	0	0	81	273
3:45 PM	40	0	34	0	15	74	0	0	0	0	3	0	0	76	0	0	0	76	13	74	0	0	0	87	237
Hourly Total	155	1	149	0	57	305	0	0	0	0	32	0	0	407	15	0	0	422	50	272	0	0	0	322	1049
4:00 PM	35	0	39	0	16	74	0	0	0	0	11	0	0	107	2	0	1	109	6	55	0	0	0	61	244
4:15 PM	42	1	50	0	13	93	0	0	0	0	11	0	0	105	2	0	1	107	9	61	0	0	0	70	270
4:30 PM	33	0	46	0	12	79	0	0	0	0	8	0	0	98	2	0	0	100	6	77	0	0	0	83	262

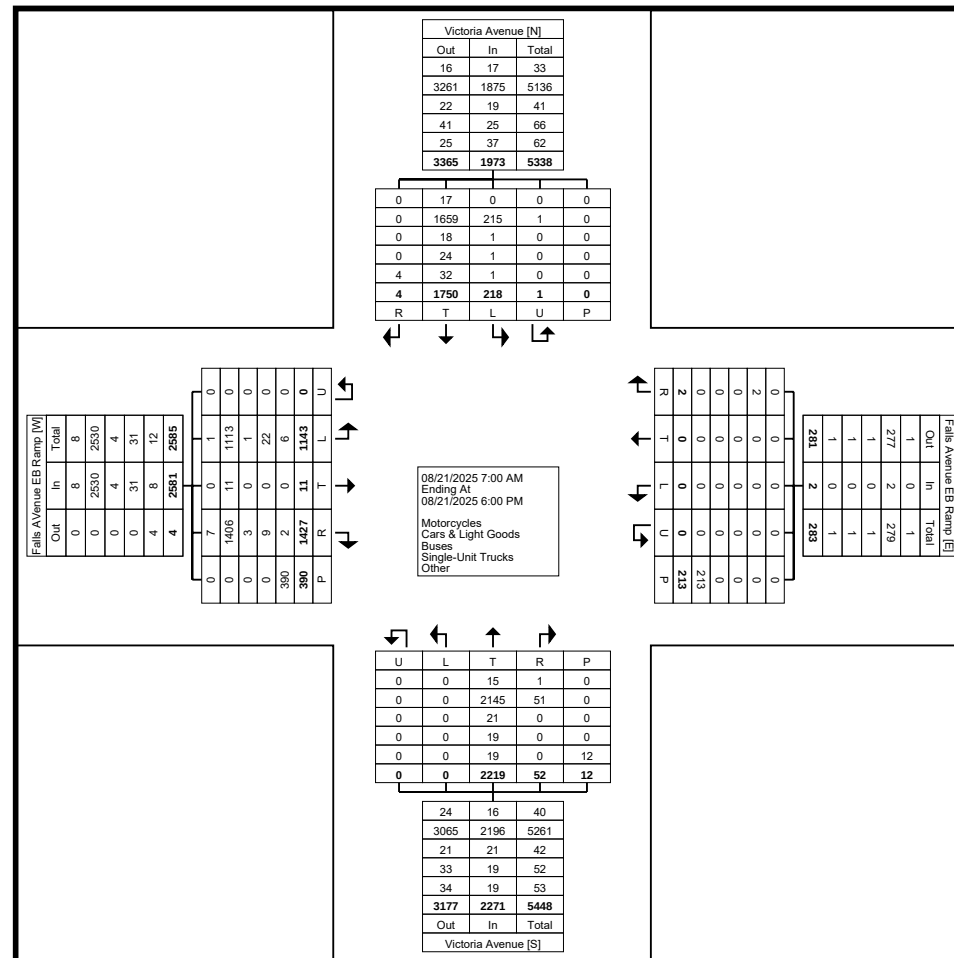
4:45 PM	40	0	46	0	27	86	0	0	2	0	14	2	0	84	3	0	2	87	9	55	0	0	0	64	239
Hourly Total	150	1	181	0	68	332	0	0	2	0	44	2	0	394	9	0	4	403	30	248	0	0	0	278	1015
5:00 PM	34	0	36	0	9	70	0	0	0	0	12	0	0	107	4	0	0	111	10	67	0	0	0	77	258
5:15 PM	47	1	39	0	20	87	0	0	0	0	5	0	0	105	2	0	0	107	8	67	0	0	0	75	269
5:30 PM	38	0	36	0	15	74	0	0	0	0	8	0	0	74	0	0	0	74	7	72	0	0	0	79	227
5:45 PM	28	1	46	0	12	75	0	0	0	0	19	0	0	71	0	0	1	71	7	54	1	0	0	62	208
Hourly Total	147	2	157	0	56	306	0	0	0	0	44	0	0	357	6	0	1	363	32	260	1	0	0	293	962
Grand Total	1143	11	1427	0	390	2581	0	0	2	0	213	2	0	2219	52	0	12	2271	218	1750	4	1	0	1973	6827
Approach %	44.3	0.4	55.3	0.0	-	-	0.0	0.0	100.0	0.0	-	-	0.0	97.7	2.3	0.0	-	-	11.0	88.7	0.2	0.1	-	-	-
Total %	16.7	0.2	20.9	0.0	-	37.8	0.0	0.0	0.0	0.0	-	0.0	0.0	32.5	0.8	0.0	-	33.3	3.2	25.6	0.1	0.0	-	28.9	-
Motorcycles	1	0	7	0	-	8	0	0	0	0	-	0	0	15	1	0	-	16	0	17	0	0	-	17	41
% Motorcycles	0.1	0.0	0.5	-	-	0.3	-	-	0.0	-	-	0.0	-	0.7	1.9	-	-	0.7	0.0	1.0	0.0	0.0	-	0.9	0.6
Cars & Light Goods	1113	11	1406	0	-	2530	0	0	2	0	-	2	0	2145	51	0	-	2196	215	1659	0	1	-	1875	6603
% Cars & Light Goods	97.4	100.0	98.5	-	-	98.0	-	-	100.0	-	-	100.0	-	96.7	98.1	-	-	96.7	98.6	94.8	0.0	100.0	-	95.0	96.7
Buses	1	0	3	0	-	4	0	0	0	0	-	0	0	21	0	0	-	21	1	18	0	0	-	19	44
% Buses	0.1	0.0	0.2	-	-	0.2	-	-	0.0	-	-	0.0	-	0.9	0.0	-	-	0.9	0.5	1.0	0.0	0.0	-	1.0	0.6
Single-Unit Trucks	22	0	9	0	-	31	0	0	0	0	-	0	0	19	0	0	-	19	1	24	0	0	-	25	75
% Single-Unit Trucks	1.9	0.0	0.6	-	-	1.2	-	-	0.0	-	-	0.0	-	0.9	0.0	-	-	0.8	0.5	1.4	0.0	0.0	-	1.3	1.1
Articulated Trucks	4	0	2	0	-	6	0	0	0	0	-	0	0	1	0	0	-	1	1	2	0	0	-	3	10
% Articulated Trucks	0.3	0.0	0.1	-	-	0.2	-	-	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.5	0.1	0.0	0.0	-	0.2	0.1
Bicycles on Road	2	0	0	0	-	2	0	0	0	0	-	0	0	18	0	0	-	18	0	30	4	0	-	34	54
% Bicycles on Road	0.2	0.0	0.0	-	-	0.1	-	-	0.0	-	-	0.0	-	0.8	0.0	-	-	0.8	0.0	1.7	100.0	0.0	-	1.7	0.8
Bicycles on Crosswalk	-	-	-	-	46	-	-	-	-	-	17	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	11.8	-	-	-	-	-	8.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	344	-	-	-	-	-	196	-	-	-	-	-	12	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	88.2	-	-	-	-	-	92.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
EB Ramp
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
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Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Falls Avenue
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Turning Movement Peak Hour Data (8:00 AM)

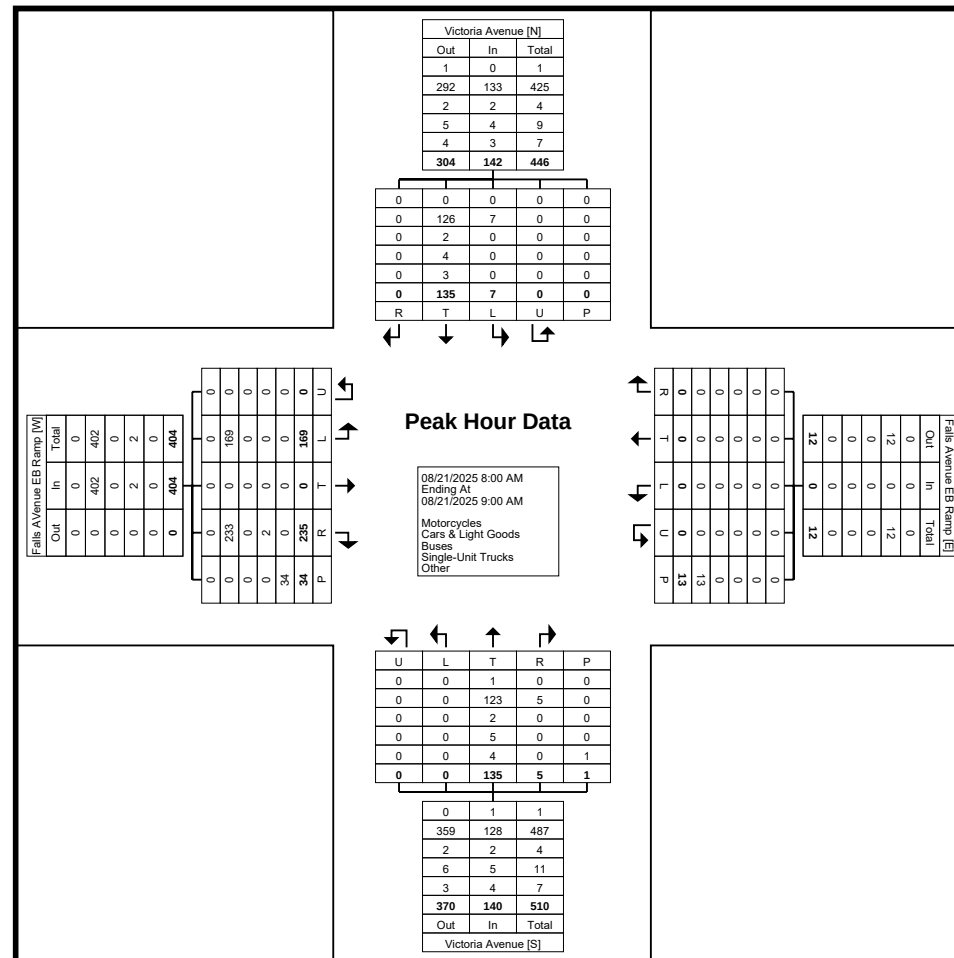
Start Time	Falls Avenue EB Ramp Eastbound						Falls Avenue EB Ramp Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	38	0	47	0	2	85	0	0	0	0	2	0	0	26	0	0	0	26	0	23	0	0	0	23	134
8:15 AM	48	0	70	0	12	118	0	0	0	0	2	0	0	29	2	0	0	31	1	30	0	0	0	31	180
8:30 AM	34	0	58	0	9	92	0	0	0	0	7	0	0	41	2	0	1	43	3	36	0	0	0	39	174
8:45 AM	49	0	60	0	11	109	0	0	0	0	2	0	0	39	1	0	0	40	3	46	0	0	0	49	198
Total	169	0	235	0	34	404	0	0	0	0	13	0	0	135	5	0	1	140	7	135	0	0	0	142	686
Approach %	41.8	0.0	58.2	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	96.4	3.6	0.0	-	-	4.9	95.1	0.0	0.0	-	-	-
Total %	24.6	0.0	34.3	0.0	-	58.9	0.0	0.0	0.0	0.0	-	0.0	0.0	19.7	0.7	0.0	-	20.4	1.0	19.7	0.0	0.0	-	20.7	-
PHF	0.862	0.000	0.839	0.000	-	0.856	0.000	0.000	0.000	0.000	-	0.000	0.000	0.823	0.625	0.000	-	0.814	0.583	0.734	0.000	0.000	-	0.724	0.866
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Motorcycles	0.0	-	0.0	-	-	0.0	-	-	-	-	-	-	-	0.7	0.0	-	-	0.7	0.0	0.0	-	-	-	0.0	0.1
Cars & Light Goods	169	0	233	0	-	402	0	0	0	0	-	0	0	123	5	0	-	128	7	126	0	0	-	133	663
% Cars & Light Goods	100.0	-	99.1	-	-	99.5	-	-	-	-	-	-	-	91.1	100.0	-	-	91.4	100.0	93.3	-	-	-	93.7	96.6
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	2	0	0	-	2	4
% Buses	0.0	-	0.0	-	-	0.0	-	-	-	-	-	-	-	1.5	0.0	-	-	1.4	0.0	1.5	-	-	-	1.4	0.6
Single-Unit Trucks	0	0	2	0	-	2	0	0	0	0	-	0	0	5	0	0	-	5	0	4	0	0	-	4	11
% Single-Unit Trucks	0.0	-	0.9	-	-	0.5	-	-	-	-	-	-	-	3.7	0.0	-	-	3.6	0.0	3.0	-	-	-	2.8	1.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	2
% Articulated Trucks	0.0	-	0.0	-	-	0.0	-	-	-	-	-	-	-	0.7	0.0	-	-	0.7	0.0	0.7	-	-	-	0.7	0.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	2	0	0	-	2	5
% Bicycles on Road	0.0	-	0.0	-	-	0.0	-	-	-	-	-	-	-	2.2	0.0	-	-	2.1	0.0	1.5	-	-	-	1.4	0.7
Bicycles on Crosswalk	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	14.7	-	-	-	-	-	7.7	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	29	-	-	-	-	-	12	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	85.3	-	-	-	-	-	92.3	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



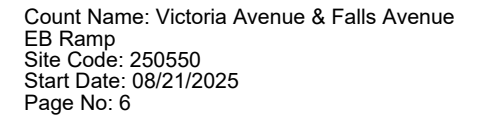
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Victoria Avenue & Falls Avenue
EB Ramp
Site Code: 250550
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Turning Movement Peak Hour Data Plot (8:00 AM)

[illegible]

Turning Movement Peak Hour Data Plot (12:15 PM)

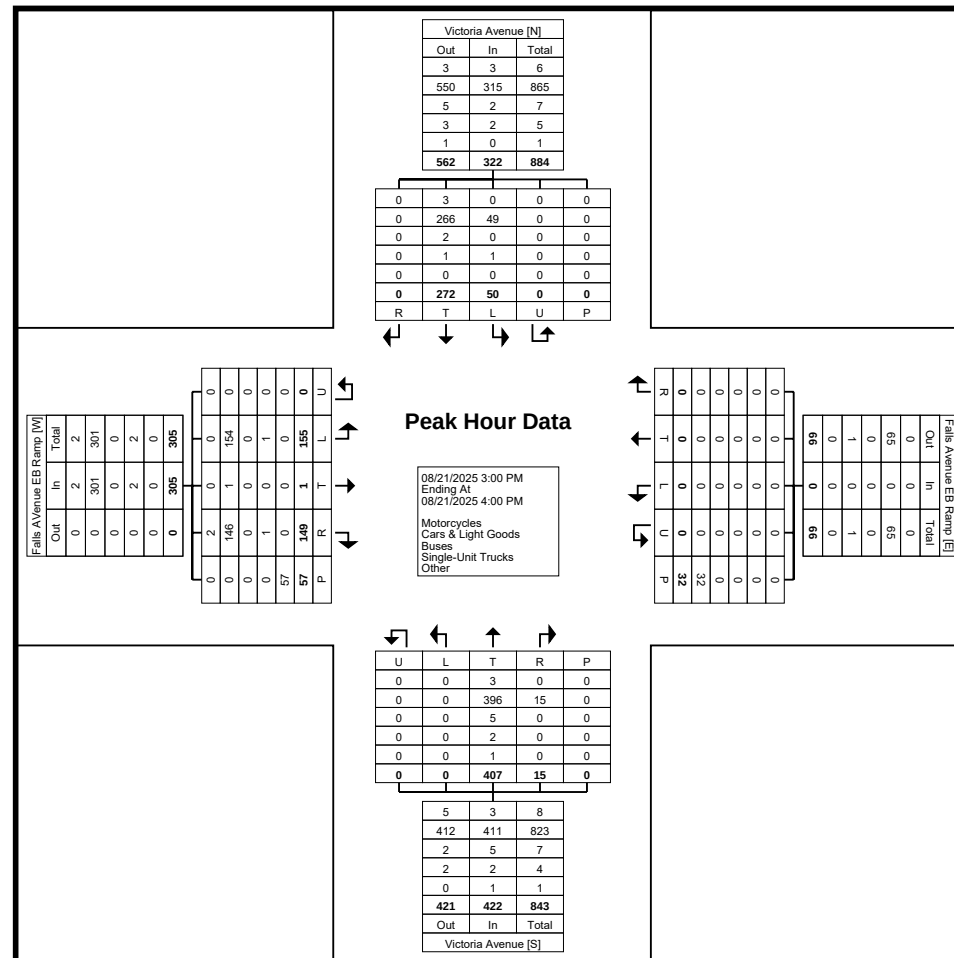
[illegible]



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Turning Movement Peak Hour Data Plot (3:00 PM)



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Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Data

Start Time	Falls Avenue WB Off Ramp Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:00 AM	0	2	0	0	2	37	0	0	0	37	0	23	0	0	23	62
7:15 AM	0	0	0	2	0	42	0	0	0	42	0	16	0	0	16	58
7:30 AM	2	0	0	4	2	59	0	0	0	59	0	17	0	0	17	78
7:45 AM	3	4	0	3	7	77	0	0	0	77	0	36	0	0	36	120
Hourly Total	5	6	0	9	11	215	0	0	0	215	0	92	0	0	92	318
8:00 AM	0	2	0	2	2	63	0	0	0	63	0	22	0	0	22	87
8:15 AM	2	2	0	1	4	78	0	0	0	78	0	31	0	1	31	113
8:30 AM	2	1	0	6	3	75	0	0	0	75	0	36	0	0	36	114
8:45 AM	5	2	0	1	7	88	0	0	0	88	0	44	0	1	44	139
Hourly Total	9	7	0	10	16	304	0	0	0	304	0	133	0	2	133	453
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	6	3	0	6	9	89	0	0	0	89	0	59	0	1	59	157
11:15 AM	5	3	0	5	8	106	0	0	0	106	0	42	0	0	42	156
11:30 AM	9	6	0	10	15	89	0	0	0	89	0	63	0	0	63	167
11:45 AM	11	7	0	3	18	121	0	0	0	121	0	72	0	0	72	211
Hourly Total	31	19	0	24	50	405	0	0	0	405	0	236	0	1	236	691
12:00 PM	6	5	0	0	11	97	0	0	0	97	0	51	0	1	51	159
12:15 PM	13	7	0	1	20	104	0	0	0	104	0	51	0	2	51	175
12:30 PM	12	8	0	4	20	102	0	0	0	102	0	69	1	0	70	192
12:45 PM	10	8	0	17	18	118	0	0	0	118	0	67	0	1	67	203
Hourly Total	41	28	0	22	69	421	0	0	0	421	0	238	1	4	239	729
1:00 PM	11	6	0	4	17	101	0	0	0	101	0	58	0	0	58	176
1:15 PM	13	7	0	9	20	94	0	0	0	94	0	52	0	0	52	166
1:30 PM	10	7	0	2	17	113	0	0	0	113	0	67	0	0	67	197
1:45 PM	5	8	0	10	13	104	0	0	0	104	0	84	0	0	84	201
Hourly Total	39	28	0	25	67	412	0	0	0	412	0	261	0	0	261	740
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	8	15	0	13	23	153	0	0	1	153	0	60	0	1	60	236
3:15 PM	9	11	0	10	20	139	0	0	0	139	0	77	0	1	77	236
3:30 PM	15	9	0	7	24	156	0	0	0	156	0	69	0	1	69	249
3:45 PM	13	7	0	3	20	119	0	0	0	119	0	70	0	0	70	209
Hourly Total	45	42	0	33	87	567	0	0	1	567	0	276	0	3	276	930
4:00 PM	7	9	0	11	16	142	0	0	0	142	0	54	0	0	54	212
4:15 PM	4	10	0	8	14	149	0	0	0	149	0	67	0	2	67	230
4:30 PM	13	4	0	8	17	131	0	0	0	131	0	70	0	0	70	218
4:45 PM	5	7	0	9	12	128	0	0	3	128	0	65	0	0	65	205

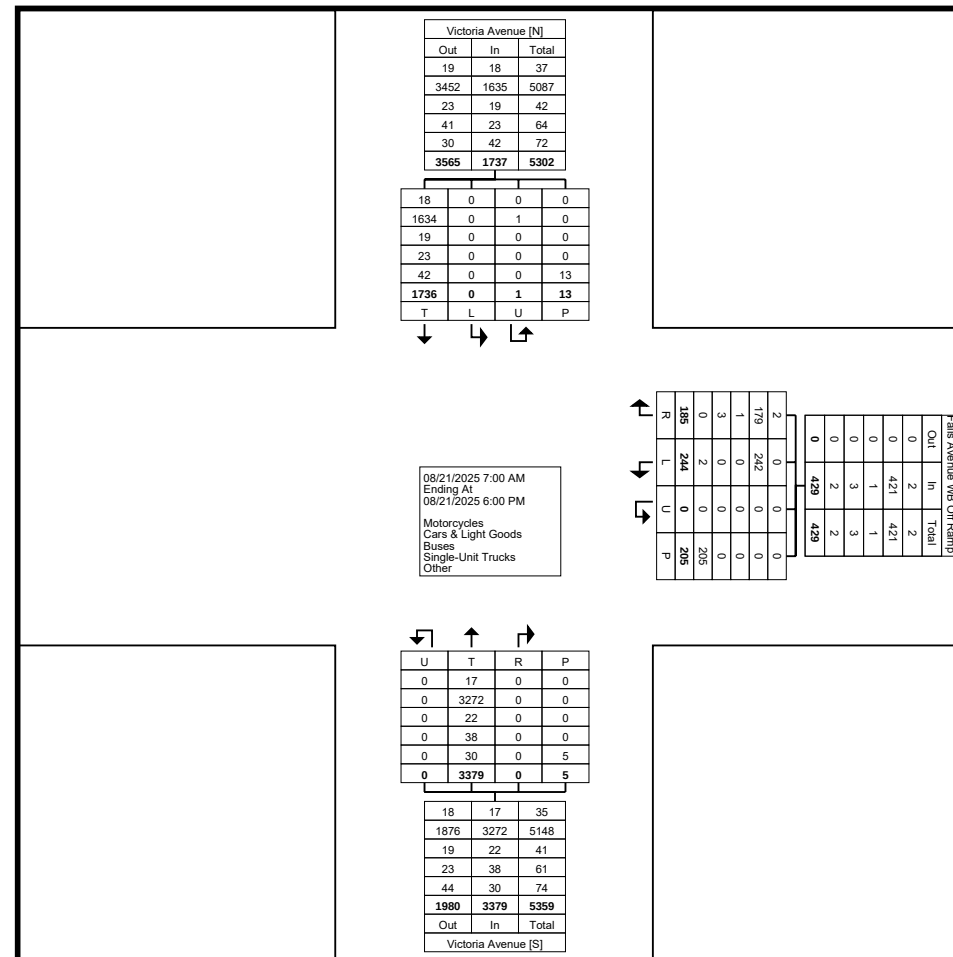
Hourly Total	29	30	0	36	59	550	0	0	3	550	0	256	0	2	256	865
5:00 PM	13	10	0	13	23	142	0	0	0	142	0	60	0	0	60	225
5:15 PM	15	5	0	6	20	149	0	0	0	149	0	63	0	0	63	232
5:30 PM	10	4	0	7	14	114	0	0	1	114	0	66	0	0	66	194
5:45 PM	7	6	0	20	13	100	0	0	0	100	0	55	0	1	55	168
Hourly Total	45	25	0	46	70	505	0	0	1	505	0	244	0	1	244	819
Grand Total	244	185	0	205	429	3379	0	0	5	3379	0	1736	1	13	1737	5545
Approach %	56.9	43.1	0.0	-	-	100.0	0.0	0.0	-	-	0.0	99.9	0.1	-	-	-
Total %	4.4	3.3	0.0	-	7.7	60.9	0.0	0.0	-	60.9	0.0	31.3	0.0	-	31.3	-
Motorcycles	0	2	0	-	2	17	0	0	-	17	0	18	0	-	18	37
% Motorcycles	0.0	1.1	-	-	0.5	0.5	-	-	-	0.5	-	1.0	0.0	-	1.0	0.7
Cars & Light Goods	242	179	0	-	421	3272	0	0	-	3272	0	1634	1	-	1635	5328
% Cars & Light Goods	99.2	96.8	-	-	98.1	96.8	-	-	-	96.8	-	94.1	100.0	-	94.1	96.1
Buses	0	1	0	-	1	22	0	0	-	22	0	19	0	-	19	42
% Buses	0.0	0.5	-	-	0.2	0.7	-	-	-	0.7	-	1.1	0.0	-	1.1	0.8
Single-Unit Trucks	0	3	0	-	3	38	0	0	-	38	0	23	0	-	23	64
% Single-Unit Trucks	0.0	1.6	-	-	0.7	1.1	-	-	-	1.1	-	1.3	0.0	-	1.3	1.2
Articulated Trucks	2	0	0	-	2	6	0	0	-	6	0	1	0	-	1	9
% Articulated Trucks	0.8	0.0	-	-	0.5	0.2	-	-	-	0.2	-	0.1	0.0	-	0.1	0.2
Bicycles on Road	0	0	0	-	0	24	0	0	-	24	0	41	0	-	41	65
% Bicycles on Road	0.0	0.0	-	-	0.0	0.7	-	-	-	0.7	-	2.4	0.0	-	2.4	1.2
Bicycles on Crosswalk	-	-	-	16	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	7.8	-	-	-	-	0.0	-	-	-	-	7.7	-	-
Pedestrians	-	-	-	189	-	-	-	-	5	-	-	-	-	12	-	-
% Pedestrians	-	-	-	92.2	-	-	-	-	100.0	-	-	-	-	92.3	-	-



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Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp
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Start Date: 08/21/2025
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Turning Movement Data Plot



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5A-150 Pinebush Rd

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Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Falls Avenue WB Off Ramp Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
8:00 AM	0	2	0	2	2	63	0	0	0	63	0	22	0	0	22	87
8:15 AM	2	2	0	1	4	78	0	0	0	78	0	31	0	1	31	113
8:30 AM	2	1	0	6	3	75	0	0	0	75	0	36	0	0	36	114
8:45 AM	5	2	0	1	7	88	0	0	0	88	0	44	0	1	44	139
Total	9	7	0	10	16	304	0	0	0	304	0	133	0	2	133	453
Approach %	56.3	43.8	0.0	-	-	100.0	0.0	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	2.0	1.5	0.0	-	3.5	67.1	0.0	0.0	-	67.1	0.0	29.4	0.0	-	29.4	-
PHF	0.450	0.875	0.000	-	0.571	0.864	0.000	0.000	-	0.864	0.000	0.756	0.000	-	0.756	0.815
Motorcycles	0	0	0	-	0	2	0	0	-	2	0	0	0	-	0	2
% Motorcycles	0.0	0.0	-	-	0.0	0.7	-	-	-	0.7	-	0.0	-	-	0.0	0.4
Cars & Light Goods	8	6	0	-	14	292	0	0	-	292	0	124	0	-	124	430
% Cars & Light Goods	88.9	85.7	-	-	87.5	96.1	-	-	-	96.1	-	93.2	-	-	93.2	94.9
Buses	0	1	0	-	1	2	0	0	-	2	0	2	0	-	2	5
% Buses	0.0	14.3	-	-	6.3	0.7	-	-	-	0.7	-	1.5	-	-	1.5	1.1
Single-Unit Trucks	0	0	0	-	0	5	0	0	-	5	0	4	0	-	4	9
% Single-Unit Trucks	0.0	0.0	-	-	0.0	1.6	-	-	-	1.6	-	3.0	-	-	3.0	2.0
Articulated Trucks	1	0	0	-	1	1	0	0	-	1	0	0	0	-	0	2
% Articulated Trucks	11.1	0.0	-	-	6.3	0.3	-	-	-	0.3	-	0.0	-	-	0.0	0.4
Bicycles on Road	0	0	0	-	0	2	0	0	-	2	0	3	0	-	3	5
% Bicycles on Road	0.0	0.0	-	-	0.0	0.7	-	-	-	0.7	-	2.3	-	-	2.3	1.1
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	10.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	9	-	-	-	-	0	-	-	-	-	2	-	-
% Pedestrians	-	-	-	90.0	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (8:00 AM)



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Count Name: Victoria Avenue & Falls Avenue
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Turning Movement Peak Hour Data (12:15 PM)

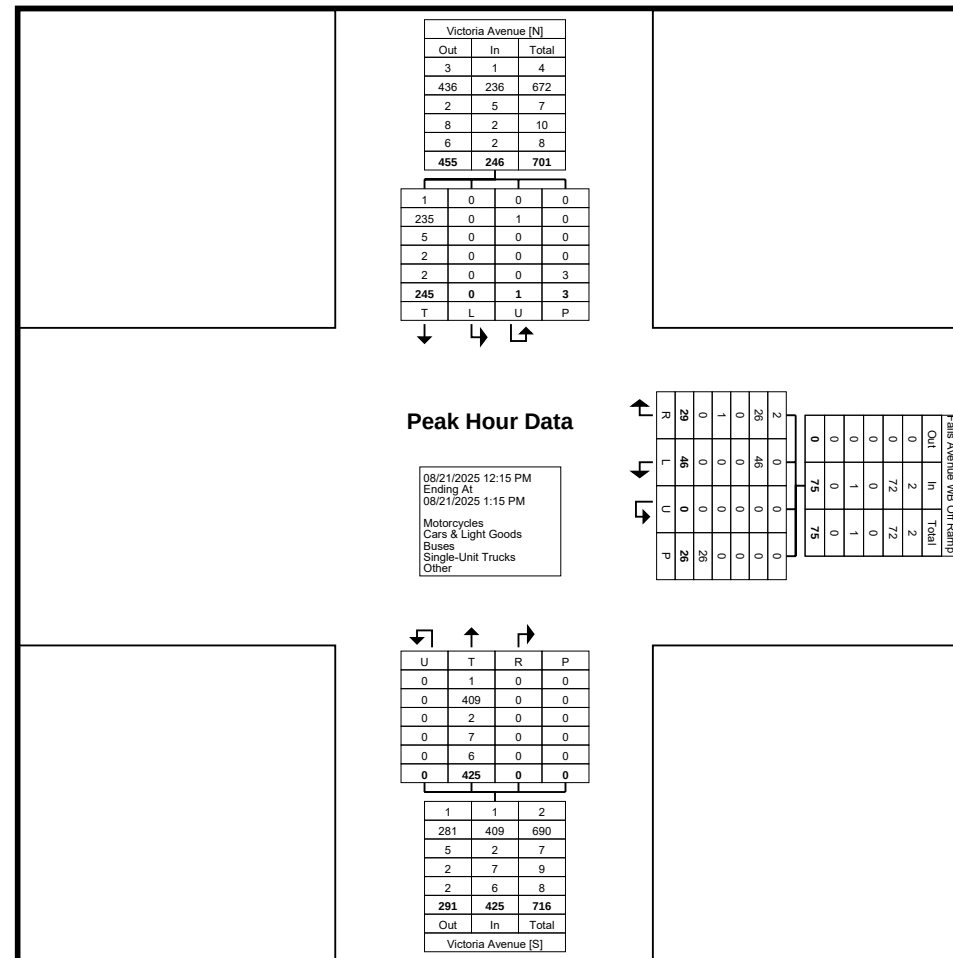
Start Time	Falls Avenue WB Off Ramp Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
12:15 PM	13	7	0	1	20	104	0	0	0	104	0	51	0	2	51	175
12:30 PM	12	8	0	4	20	102	0	0	0	102	0	69	1	0	70	192
12:45 PM	10	8	0	17	18	118	0	0	0	118	0	67	0	1	67	203
1:00 PM	11	6	0	4	17	101	0	0	0	101	0	58	0	0	58	176
Total	46	29	0	26	75	425	0	0	0	425	0	245	1	3	246	746
Approach %	61.3	38.7	0.0	-	-	100.0	0.0	0.0	-	-	0.0	99.6	0.4	-	-	-
Total %	6.2	3.9	0.0	-	10.1	57.0	0.0	0.0	-	57.0	0.0	32.8	0.1	-	33.0	-
PHF	0.885	0.906	0.000	-	0.938	0.900	0.000	0.000	-	0.900	0.000	0.888	0.250	-	0.879	0.919
Motorcycles	0	2	0	-	2	1	0	0	-	1	0	1	0	-	1	4
% Motorcycles	0.0	6.9	-	-	2.7	0.2	-	-	-	0.2	-	0.4	0.0	-	0.4	0.5
Cars & Light Goods	46	26	0	-	72	409	0	0	-	409	0	235	1	-	236	717
% Cars & Light Goods	100.0	89.7	-	-	96.0	96.2	-	-	-	96.2	-	95.9	100.0	-	95.9	96.1
Buses	0	0	0	-	0	2	0	0	-	2	0	5	0	-	5	7
% Buses	0.0	0.0	-	-	0.0	0.5	-	-	-	0.5	-	2.0	0.0	-	2.0	0.9
Single-Unit Trucks	0	1	0	-	1	7	0	0	-	7	0	2	0	-	2	10
% Single-Unit Trucks	0.0	3.4	-	-	1.3	1.6	-	-	-	1.6	-	0.8	0.0	-	0.8	1.3
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	-	-	-	0.2	-	0.0	0.0	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	5	0	0	-	5	0	2	0	-	2	7
% Bicycles on Road	0.0	0.0	-	-	0.0	1.2	-	-	-	1.2	-	0.8	0.0	-	0.8	0.9
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	7.7	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	24	-	-	-	-	0	-	-	-	-	3	-	-
% Pedestrians	-	-	-	92.3	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 7



Turning Movement Peak Hour Data Plot (12:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 8

Turning Movement Peak Hour Data (3:00 PM)

Start Time	Falls Avenue WB Off Ramp Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
3:00 PM	8	15	0	13	23	153	0	0	1	153	0	60	0	1	60	236
3:15 PM	9	11	0	10	20	139	0	0	0	139	0	77	0	1	77	236
3:30 PM	15	9	0	7	24	156	0	0	0	156	0	69	0	1	69	249
3:45 PM	13	7	0	3	20	119	0	0	0	119	0	70	0	0	70	209
Total	45	42	0	33	87	567	0	0	1	567	0	276	0	3	276	930
Approach %	51.7	48.3	0.0	-	-	100.0	0.0	0.0	-	-	0.0	100.0	0.0	-	-	-
Total %	4.8	4.5	0.0	-	9.4	61.0	0.0	0.0	-	61.0	0.0	29.7	0.0	-	29.7	-
PHF	0.750	0.700	0.000	-	0.906	0.909	0.000	0.000	-	0.909	0.000	0.896	0.000	-	0.896	0.934
Motorcycles	0	0	0	-	0	4	0	0	-	4	0	2	0	-	2	6
% Motorcycles	0.0	0.0	-	-	0.0	0.7	-	-	-	0.7	-	0.7	-	-	0.7	0.6
Cars & Light Goods	45	42	0	-	87	555	0	0	-	555	0	269	0	-	269	911
% Cars & Light Goods	100.0	100.0	-	-	100.0	97.9	-	-	-	97.9	-	97.5	-	-	97.5	98.0
Buses	0	0	0	-	0	5	0	0	-	5	0	3	0	-	3	8
% Buses	0.0	0.0	-	-	0.0	0.9	-	-	-	0.9	-	1.1	-	-	1.1	0.9
Single-Unit Trucks	0	0	0	-	0	2	0	0	-	2	0	1	0	-	1	3
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.4	-	-	-	0.4	-	0.4	-	-	0.4	0.3
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	-	-	-	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	1	0	-	1	2
% Bicycles on Road	0.0	0.0	-	-	0.0	0.2	-	-	-	0.2	-	0.4	-	-	0.4	0.2
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	6.1	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	31	-	-	-	-	1	-	-	-	-	3	-	-
% Pedestrians	-	-	-	93.9	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (3:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Falls Avenue WB On Ramp Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	2	0	5	34	0	0	39	23	20	0	0	43	82
7:15 AM	0	0	0	3	0	3	41	0	0	44	16	18	0	0	34	78
7:30 AM	0	0	0	5	0	1	56	0	0	57	19	23	0	0	42	99
7:45 AM	0	0	0	4	0	6	74	0	1	80	35	30	0	0	65	145
Hourly Total	0	0	0	14	0	15	205	0	1	220	93	91	0	0	184	404
8:00 AM	0	0	0	3	0	7	59	0	0	66	21	35	0	0	56	122
8:15 AM	0	0	0	10	0	11	68	0	0	79	31	28	0	0	59	138
8:30 AM	0	0	0	8	0	7	70	0	0	77	35	32	0	1	67	144
8:45 AM	0	0	0	8	0	12	78	0	0	90	44	32	0	0	76	166
Hourly Total	0	0	0	29	0	37	275	0	0	312	131	127	0	1	258	570
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	0	0	18	0	19	77	0	0	96	59	53	0	0	112	208
11:15 AM	0	0	0	5	0	17	91	0	0	108	42	29	0	0	71	179
11:30 AM	0	0	0	14	0	29	66	0	0	95	64	41	0	0	105	200
11:45 AM	0	0	0	9	0	18	110	0	0	128	71	43	0	0	114	242
Hourly Total	0	0	0	46	0	83	344	0	0	427	236	166	0	0	402	829
12:00 PM	0	0	0	7	0	14	90	0	2	104	51	38	0	0	89	193
12:15 PM	0	0	0	9	0	18	93	0	1	111	52	56	0	0	108	219
12:30 PM	0	0	0	13	0	25	87	0	0	112	69	49	0	0	118	230
12:45 PM	0	0	0	19	0	21	104	1	1	126	67	36	0	0	103	229
Hourly Total	0	0	0	48	0	78	374	1	4	453	239	179	0	0	418	871
1:00 PM	0	0	0	11	0	18	90	0	0	108	56	33	0	0	89	197
1:15 PM	0	2	0	16	2	26	74	0	2	100	48	46	0	0	94	196
1:30 PM	0	0	0	21	0	17	101	0	0	118	65	43	0	0	108	226
1:45 PM	0	1	0	14	1	19	88	0	1	107	81	38	0	0	119	227
Hourly Total	0	3	0	62	3	80	353	0	3	433	250	160	0	0	410	846
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	0	6	0	27	140	0	0	167	63	40	0	1	103	270
3:15 PM	0	0	0	16	0	35	112	1	0	148	74	40	0	1	114	262
3:30 PM	0	0	0	13	0	33	132	0	0	165	70	35	0	0	105	270
3:45 PM	0	0	0	21	0	21	105	0	0	126	70	53	0	0	123	249
Hourly Total	0	0	0	56	0	116	489	1	0	606	277	168	0	2	445	1051
4:00 PM	0	0	0	13	0	41	112	0	0	153	54	59	0	0	113	266
4:15 PM	0	0	0	10	0	30	127	0	1	157	66	60	0	0	126	283
4:30 PM	0	0	0	14	0	40	96	0	0	136	71	71	0	0	142	278
4:45 PM	0	0	0	17	0	25	108	1	0	134	65	41	0	0	106	240

Hourly Total	0	0	0	54	0	136	443	1	1	580	256	231	0	0	487	1067
5:00 PM	0	0	0	16	0	46	108	0	0	154	53	60	0	0	113	267
5:15 PM	0	0	0	21	0	34	118	0	0	152	63	49	0	0	112	264
5:30 PM	0	0	0	19	0	33	83	0	0	116	64	46	0	0	110	226
5:45 PM	0	0	0	10	0	21	86	0	0	107	54	30	0	0	84	191
Hourly Total	0	0	0	66	0	134	395	0	0	529	234	185	0	0	419	948
Grand Total	0	3	0	375	3	679	2878	3	9	3560	1716	1307	0	3	3023	6586
Approach %	0.0	100.0	0.0	-	-	19.1	80.8	0.1	-	-	56.8	43.2	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	10.3	43.7	0.0	-	54.1	26.1	19.8	0.0	-	45.9	-
Motorcycles	0	0	0	-	0	1	17	0	-	18	21	2	0	-	23	41
% Motorcycles	-	0.0	-	-	0.0	0.1	0.6	0.0	-	0.5	1.2	0.2	-	-	0.8	0.6
Cars & Light Goods	0	0	0	-	0	670	2773	3	-	3446	1618	1289	0	-	2907	6353
% Cars & Light Goods	-	0.0	-	-	0.0	98.7	96.4	100.0	-	96.8	94.3	98.6	-	-	96.2	96.5
Buses	0	0	0	-	0	1	22	0	-	23	18	3	0	-	21	44
% Buses	-	0.0	-	-	0.0	0.1	0.8	0.0	-	0.6	1.0	0.2	-	-	0.7	0.7
Single-Unit Trucks	0	0	0	-	0	7	36	0	-	43	23	11	0	-	34	77
% Single-Unit Trucks	-	0.0	-	-	0.0	1.0	1.3	0.0	-	1.2	1.3	0.8	-	-	1.1	1.2
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	3	2	0	-	5	9
% Articulated Trucks	-	0.0	-	-	0.0	0.0	0.1	0.0	-	0.1	0.2	0.2	-	-	0.2	0.1
Bicycles on Road	0	3	0	-	3	0	26	0	-	26	33	0	0	-	33	62
% Bicycles on Road	-	100.0	-	-	100.0	0.0	0.9	0.0	-	0.7	1.9	0.0	-	-	1.1	0.9
Bicycles on Crosswalk	-	-	-	21	-	-	-	-	2	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	5.6	-	-	-	-	22.2	-	-	-	-	33.3	-	-
Pedestrians	-	-	-	354	-	-	-	-	7	-	-	-	-	2	-	-
% Pedestrians	-	-	-	94.4	-	-	-	-	77.8	-	-	-	-	66.7	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

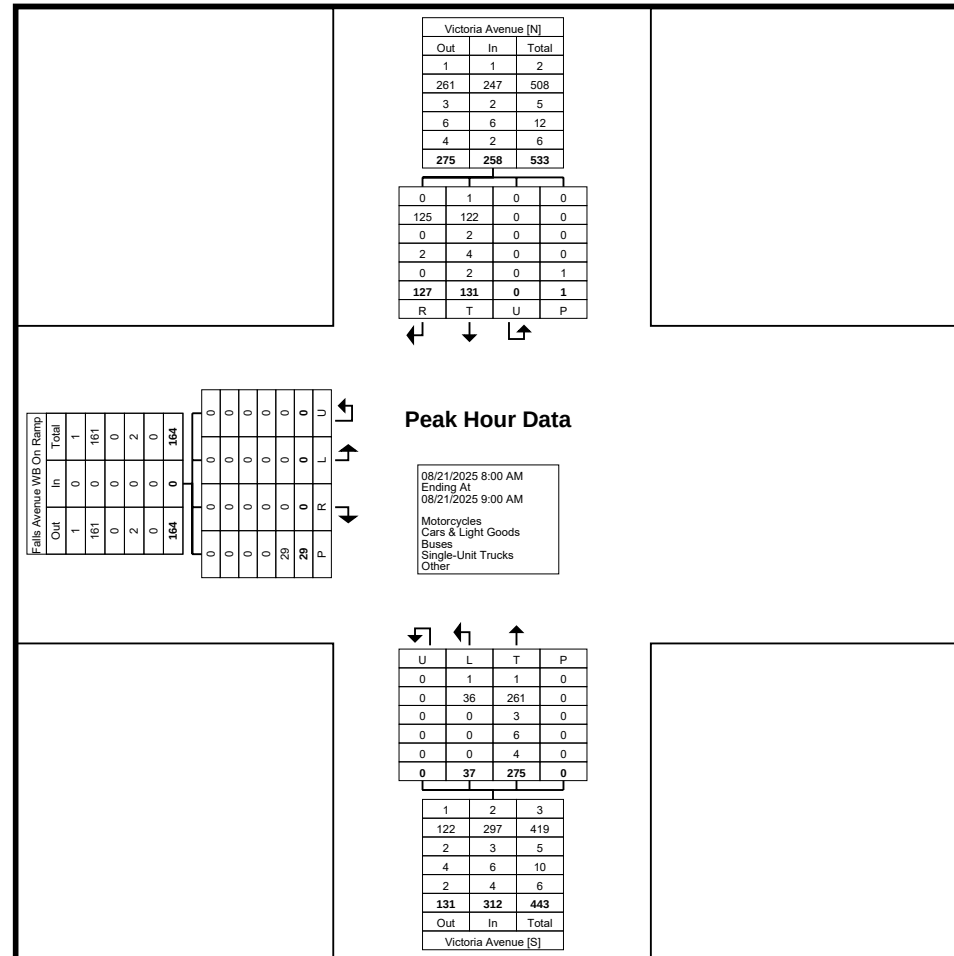
Start Time	Falls Avenue WB On Ramp Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	0	0	0	3	0	7	59	0	0	66	21	35	0	0	56	122
8:15 AM	0	0	0	10	0	11	68	0	0	79	31	28	0	0	59	138
8:30 AM	0	0	0	8	0	7	70	0	0	77	35	32	0	1	67	144
8:45 AM	0	0	0	8	0	12	78	0	0	90	44	32	0	0	76	166
Total	0	0	0	29	0	37	275	0	0	312	131	127	0	1	258	570
Approach %	0.0	0.0	0.0	-	-	11.9	88.1	0.0	-	-	50.8	49.2	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	6.5	48.2	0.0	-	54.7	23.0	22.3	0.0	-	45.3	-
PHF	0.000	0.000	0.000	-	0.000	0.771	0.881	0.000	-	0.867	0.744	0.907	0.000	-	0.849	0.858
Motorcycles	0	0	0	-	0	1	1	0	-	2	1	0	0	-	1	3
% Motorcycles	-	-	-	-	-	2.7	0.4	-	-	0.6	0.8	0.0	-	-	0.4	0.5
Cars & Light Goods	0	0	0	-	0	36	261	0	-	297	122	125	0	-	247	544
% Cars & Light Goods	-	-	-	-	-	97.3	94.9	-	-	95.2	93.1	98.4	-	-	95.7	95.4
Buses	0	0	0	-	0	0	3	0	-	3	2	0	0	-	2	5
% Buses	-	-	-	-	-	0.0	1.1	-	-	1.0	1.5	0.0	-	-	0.8	0.9
Single-Unit Trucks	0	0	0	-	0	0	6	0	-	6	4	2	0	-	6	12
% Single-Unit Trucks	-	-	-	-	-	0.0	2.2	-	-	1.9	3.1	1.6	-	-	2.3	2.1
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	-	-	-	-	-	0.0	0.4	-	-	0.3	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	-	0	0	3	0	-	3	2	0	0	-	2	5
% Bicycles on Road	-	-	-	-	-	0.0	1.1	-	-	1.0	1.5	0.0	-	-	0.8	0.9
Bicycles on Crosswalk	-	-	-	5	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	17.2	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	24	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	82.8	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 6

Turning Movement Peak Hour Data (11:45 AM)

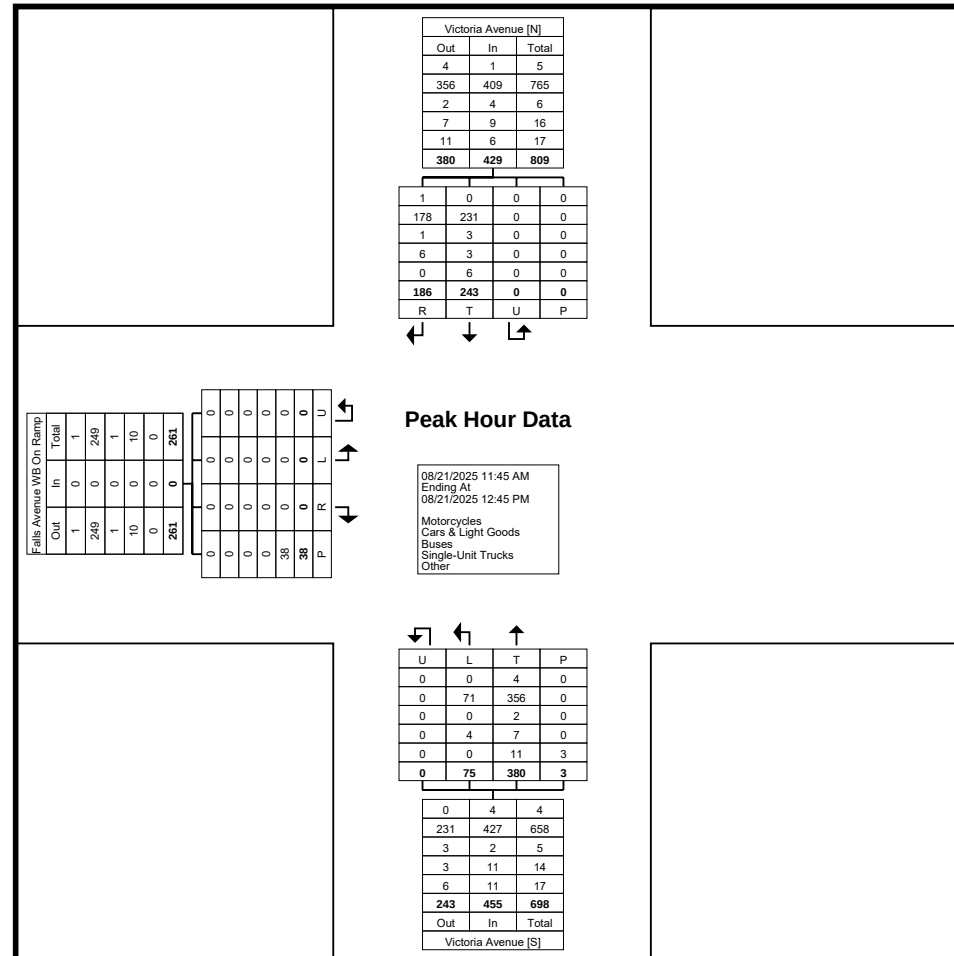
Start Time	Falls Avenue WB On Ramp Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	0	0	0	9	0	18	110	0	0	128	71	43	0	0	114	242
12:00 PM	0	0	0	7	0	14	90	0	2	104	51	38	0	0	89	193
12:15 PM	0	0	0	9	0	18	93	0	1	111	52	56	0	0	108	219
12:30 PM	0	0	0	13	0	25	87	0	0	112	69	49	0	0	118	230
Total	0	0	0	38	0	75	380	0	3	455	243	186	0	0	429	884
Approach %	0.0	0.0	0.0	-	-	16.5	83.5	0.0	-	-	56.6	43.4	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	8.5	43.0	0.0	-	51.5	27.5	21.0	0.0	-	48.5	-
PHF	0.000	0.000	0.000	-	0.000	0.750	0.864	0.000	-	0.889	0.856	0.830	0.000	-	0.909	0.913
Motorcycles	0	0	0	-	0	0	4	0	-	4	0	1	0	-	1	5
% Motorcycles	-	-	-	-	-	0.0	1.1	-	-	0.9	0.0	0.5	-	-	0.2	0.6
Cars & Light Goods	0	0	0	-	0	71	356	0	-	427	231	178	0	-	409	836
% Cars & Light Goods	-	-	-	-	-	94.7	93.7	-	-	93.8	95.1	95.7	-	-	95.3	94.6
Buses	0	0	0	-	0	0	2	0	-	2	3	1	0	-	4	6
% Buses	-	-	-	-	-	0.0	0.5	-	-	0.4	1.2	0.5	-	-	0.9	0.7
Single-Unit Trucks	0	0	0	-	0	4	7	0	-	11	3	6	0	-	9	20
% Single-Unit Trucks	-	-	-	-	-	5.3	1.8	-	-	2.4	1.2	3.2	-	-	2.1	2.3
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	-	-	-	-	-	0.0	0.3	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	10	0	-	10	6	0	0	-	6	16
% Bicycles on Road	-	-	-	-	-	0.0	2.6	-	-	2.2	2.5	0.0	-	-	1.4	1.8
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	1	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	5.3	-	-	-	-	33.3	-	-	-	-	-	-	-
Pedestrians	-	-	-	36	-	-	-	-	2	-	-	-	-	0	-	-
% Pedestrians	-	-	-	94.7	-	-	-	-	66.7	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 7



Turning Movement Peak Hour Data Plot (11:45 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 8

Turning Movement Peak Hour Data (3:45 PM)

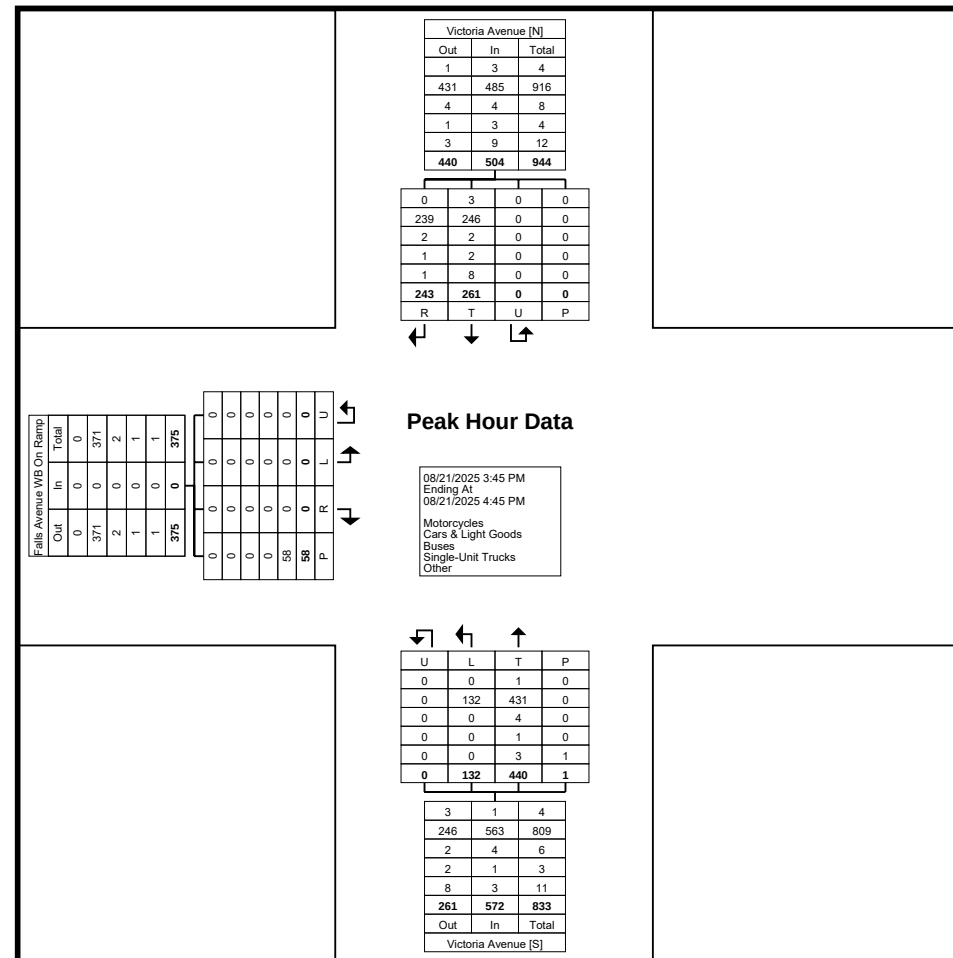
Start Time	Falls Avenue WB On Ramp Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
3:45 PM	0	0	0	21	0	21	105	0	0	126	70	53	0	0	123	249
4:00 PM	0	0	0	13	0	41	112	0	0	153	54	59	0	0	113	266
4:15 PM	0	0	0	10	0	30	127	0	1	157	66	60	0	0	126	283
4:30 PM	0	0	0	14	0	40	96	0	0	136	71	71	0	0	142	278
Total	0	0	0	58	0	132	440	0	1	572	261	243	0	0	504	1076
Approach %	0.0	0.0	0.0	-	-	23.1	76.9	0.0	-	-	51.8	48.2	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	12.3	40.9	0.0	-	53.2	24.3	22.6	0.0	-	46.8	-
PHF	0.000	0.000	0.000	-	0.000	0.805	0.866	0.000	-	0.911	0.919	0.856	0.000	-	0.887	0.951
Motorcycles	0	0	0	-	0	0	1	0	-	1	3	0	0	-	3	4
% Motorcycles	-	-	-	-	-	0.0	0.2	-	-	0.2	1.1	0.0	-	-	0.6	0.4
Cars & Light Goods	0	0	0	-	0	132	431	0	-	563	246	239	0	-	485	1048
% Cars & Light Goods	-	-	-	-	-	100.0	98.0	-	-	98.4	94.3	98.4	-	-	96.2	97.4
Buses	0	0	0	-	0	0	4	0	-	4	2	2	0	-	4	8
% Buses	-	-	-	-	-	0.0	0.9	-	-	0.7	0.8	0.8	-	-	0.8	0.7
Single-Unit Trucks	0	0	0	-	0	0	1	0	-	1	2	1	0	-	3	4
% Single-Unit Trucks	-	-	-	-	-	0.0	0.2	-	-	0.2	0.8	0.4	-	-	0.6	0.4
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Articulated Trucks	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.4	-	-	0.2	0.1
Bicycles on Road	0	0	0	-	0	0	3	0	-	3	8	0	0	-	8	11
% Bicycles on Road	-	-	-	-	-	0.0	0.7	-	-	0.5	3.1	0.0	-	-	1.6	1.0
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	3.4	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	56	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	96.6	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp
Site Code: 250550
Start Date: 08/21/2025
Page No: 9



Turning Movement Peak Hour Data Plot (3:45 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Hunter Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	0	0	3	0	0	15	0	0	15	20	0	0	0	20	35
7:15 AM	0	0	0	2	0	1	30	0	0	31	15	0	0	0	15	46
7:30 AM	0	2	0	5	2	0	36	0	0	36	23	2	0	0	25	63
7:45 AM	2	1	0	4	3	1	22	0	0	23	32	1	0	0	33	59
Hourly Total	2	3	0	14	5	2	103	0	0	105	90	3	0	0	93	203
8:00 AM	0	3	0	4	3	1	39	0	0	40	32	0	0	0	32	75
8:15 AM	1	1	0	6	2	1	34	0	0	35	31	0	0	0	31	68
8:30 AM	1	3	0	3	4	0	51	0	0	51	46	2	0	0	48	103
8:45 AM	1	2	0	9	3	0	48	0	0	48	47	0	0	1	47	98
Hourly Total	3	9	0	22	12	2	172	0	0	174	156	2	0	1	158	344
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	1	1	0	20	2	1	79	0	0	80	73	1	0	0	74	156
11:15 AM	1	4	0	14	5	2	72	0	0	74	50	0	0	0	50	129
11:30 AM	1	0	0	11	1	0	80	0	0	80	81	2	0	0	83	164
11:45 AM	3	1	0	25	4	1	89	0	0	90	78	6	0	0	84	178
Hourly Total	6	6	0	70	12	4	320	0	0	324	282	9	0	0	291	627
12:00 PM	3	2	0	10	5	1	68	0	0	69	68	2	0	1	70	144
12:15 PM	1	2	0	12	3	0	68	0	0	68	66	4	0	0	70	141
12:30 PM	2	2	0	24	4	3	83	0	0	86	80	6	0	0	86	176
12:45 PM	3	2	0	39	5	0	77	0	0	77	81	3	0	0	84	166
Hourly Total	9	8	0	85	17	4	296	0	0	300	295	15	0	1	310	627
1:00 PM	1	1	0	19	2	1	76	0	0	77	67	2	0	1	69	148
1:15 PM	2	8	0	26	10	4	80	0	0	84	69	6	0	0	75	169
1:30 PM	2	3	0	23	5	1	80	0	0	81	72	3	2	0	77	163
1:45 PM	0	1	0	21	1	0	82	0	0	82	84	0	0	0	84	167
Hourly Total	5	13	0	89	18	6	318	0	0	324	292	11	2	1	305	647
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	3	4	0	57	7	0	100	0	0	100	63	1	0	0	64	171
3:15 PM	1	2	0	30	3	4	106	0	0	110	80	6	0	0	86	199
3:30 PM	3	1	0	29	4	1	94	0	0	95	74	5	0	0	79	178
3:45 PM	0	1	0	19	1	2	82	0	0	84	78	2	0	0	80	165
Hourly Total	7	8	0	135	15	7	382	0	0	389	295	14	0	0	309	713
4:00 PM	1	4	0	45	5	0	101	0	0	101	67	8	0	0	75	181
4:15 PM	2	2	0	17	4	0	101	0	0	101	80	4	0	0	84	189
4:30 PM	2	1	0	17	3	0	74	0	0	74	98	7	0	0	105	182
4:45 PM	2	3	0	29	5	3	83	0	0	86	78	4	0	0	82	173

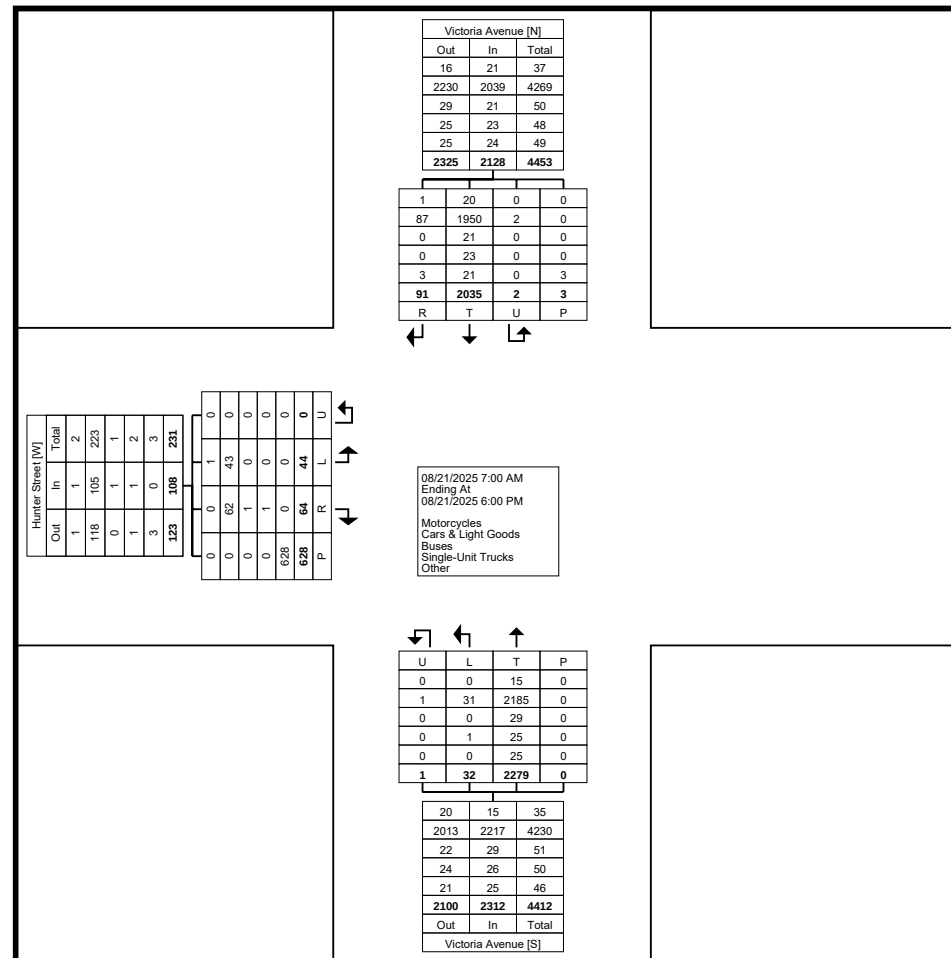
Hourly Total	7	10	0	108	17	3	359	0	0	362	323	23	0	0	346	725
5:00 PM	0	3	0	20	3	2	93	0	0	95	82	2	0	0	84	182
5:15 PM	2	0	0	20	2	1	83	1	0	85	68	1	0	0	69	156
5:30 PM	2	1	0	33	3	0	71	0	0	71	79	5	0	0	84	158
5:45 PM	1	3	0	32	4	1	82	0	0	83	73	6	0	0	79	166
Hourly Total	5	7	0	105	12	4	329	1	0	334	302	14	0	0	316	662
Grand Total	44	64	0	628	108	32	2279	1	0	2312	2035	91	2	3	2128	4548
Approach %	40.7	59.3	0.0	-	-	1.4	98.6	0.0	-	-	95.6	4.3	0.1	-	-	-
Total %	1.0	1.4	0.0	-	2.4	0.7	50.1	0.0	-	50.8	44.7	2.0	0.0	-	46.8	-
Motorcycles	1	0	0	-	1	0	15	0	-	15	20	1	0	-	21	37
% Motorcycles	2.3	0.0	-	-	0.9	0.0	0.7	0.0	-	0.6	1.0	1.1	0.0	-	1.0	0.8
Cars & Light Goods	43	62	0	-	105	31	2185	1	-	2217	1950	87	2	-	2039	4361
% Cars & Light Goods	97.7	96.9	-	-	97.2	96.9	95.9	100.0	-	95.9	95.8	95.6	100.0	-	95.8	95.9
Buses	0	1	0	-	1	0	29	0	-	29	21	0	0	-	21	51
% Buses	0.0	1.6	-	-	0.9	0.0	1.3	0.0	-	1.3	1.0	0.0	0.0	-	1.0	1.1
Single-Unit Trucks	0	1	0	-	1	1	25	0	-	26	23	0	0	-	23	50
% Single-Unit Trucks	0.0	1.6	-	-	0.9	3.1	1.1	0.0	-	1.1	1.1	0.0	0.0	-	1.1	1.1
Articulated Trucks	0	0	0	-	0	0	7	0	-	7	4	0	0	-	4	11
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	0.3	0.2	0.0	0.0	-	0.2	0.2
Bicycles on Road	0	0	0	-	0	0	18	0	-	18	17	3	0	-	20	38
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	0.8	0.8	3.3	0.0	-	0.9	0.8
Bicycles on Crosswalk	-	-	-	23	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	3.7	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	605	-	-	-	-	0	-	-	-	-	3	-	-
% Pedestrians	-	-	-	96.3	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Victoria Avenue & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

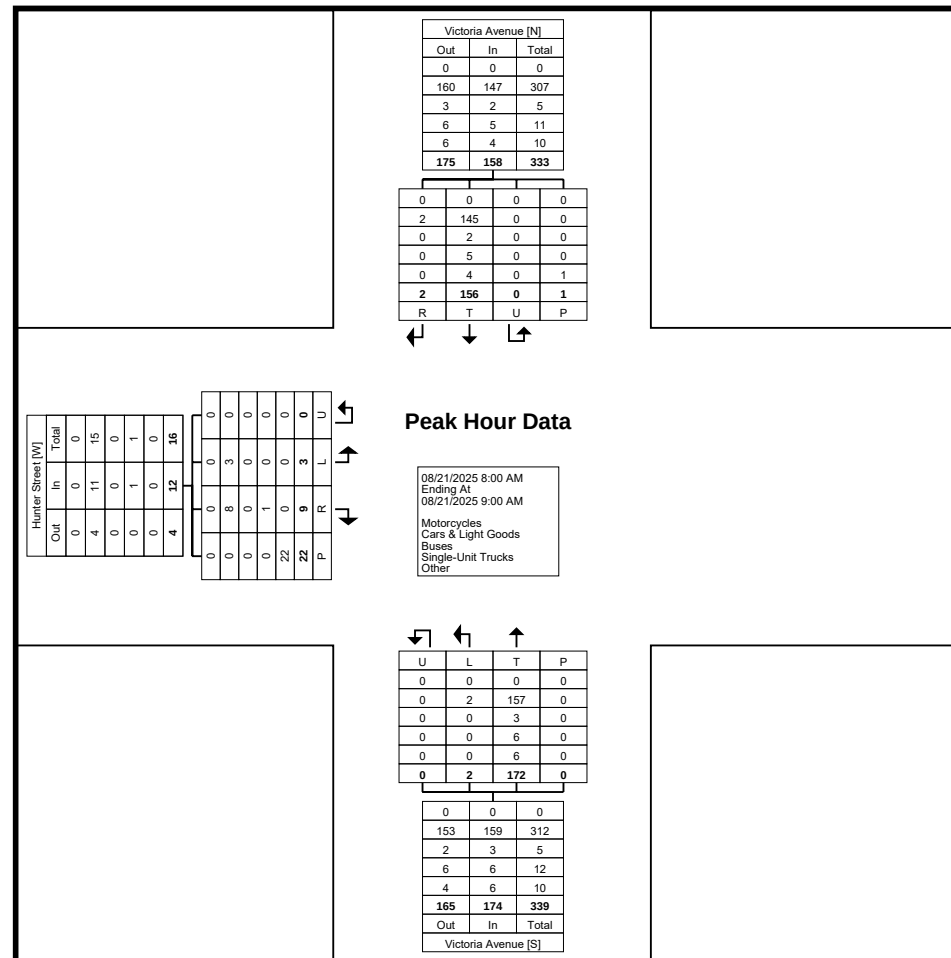
Start Time	Hunter Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	0	3	0	4	3	1	39	0	0	40	32	0	0	0	32	75
8:15 AM	1	1	0	6	2	1	34	0	0	35	31	0	0	0	31	68
8:30 AM	1	3	0	3	4	0	51	0	0	51	46	2	0	0	48	103
8:45 AM	1	2	0	9	3	0	48	0	0	48	47	0	0	1	47	98
Total	3	9	0	22	12	2	172	0	0	174	156	2	0	1	158	344
Approach %	25.0	75.0	0.0	-	-	1.1	98.9	0.0	-	-	98.7	1.3	0.0	-	-	-
Total %	0.9	2.6	0.0	-	3.5	0.6	50.0	0.0	-	50.6	45.3	0.6	0.0	-	45.9	-
PHF	0.750	0.750	0.000	-	0.750	0.500	0.843	0.000	-	0.853	0.830	0.250	0.000	-	0.823	0.835
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	3	8	0	-	11	2	157	0	-	159	145	2	0	-	147	317
% Cars & Light Goods	100.0	88.9	-	-	91.7	100.0	91.3	-	-	91.4	92.9	100.0	-	-	93.0	92.2
Buses	0	0	0	-	0	0	3	0	-	3	2	0	0	-	2	5
% Buses	0.0	0.0	-	-	0.0	0.0	1.7	-	-	1.7	1.3	0.0	-	-	1.3	1.5
Single-Unit Trucks	0	1	0	-	1	0	6	0	-	6	5	0	0	-	5	12
% Single-Unit Trucks	0.0	11.1	-	-	8.3	0.0	3.5	-	-	3.4	3.2	0.0	-	-	3.2	3.5
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	1	0	0	-	1	5
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	2.3	-	-	2.3	0.6	0.0	-	-	0.6	1.5
Bicycles on Road	0	0	0	-	0	0	2	0	-	2	3	0	0	-	3	5
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	1.2	-	-	1.1	1.9	0.0	-	-	1.9	1.5
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	9.1	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	20	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	90.9	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

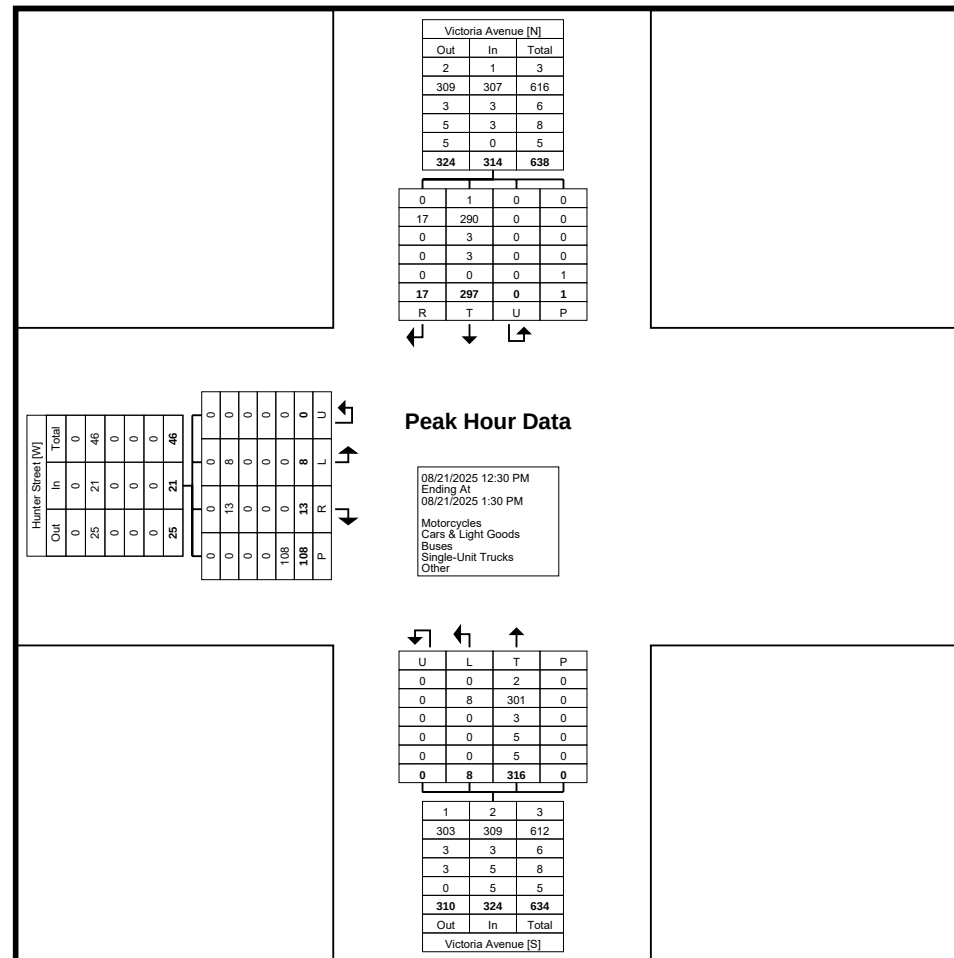
Start Time	Hunter Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
12:30 PM	2	2	0	24	4	3	83	0	0	86	80	6	0	0	86	176
12:45 PM	3	2	0	39	5	0	77	0	0	77	81	3	0	0	84	166
1:00 PM	1	1	0	19	2	1	76	0	0	77	67	2	0	1	69	148
1:15 PM	2	8	0	26	10	4	80	0	0	84	69	6	0	0	75	169
Total	8	13	0	108	21	8	316	0	0	324	297	17	0	1	314	659
Approach %	38.1	61.9	0.0	-	-	2.5	97.5	0.0	-	-	94.6	5.4	0.0	-	-	-
Total %	1.2	2.0	0.0	-	3.2	1.2	48.0	0.0	-	49.2	45.1	2.6	0.0	-	47.6	-
PHF	0.667	0.406	0.000	-	0.525	0.500	0.952	0.000	-	0.942	0.917	0.708	0.000	-	0.913	0.936
Motorcycles	0	0	0	-	0	0	2	0	-	2	1	0	0	-	1	3
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.6	-	-	0.6	0.3	0.0	-	-	0.3	0.5
Cars & Light Goods	8	13	0	-	21	8	301	0	-	309	290	17	0	-	307	637
% Cars & Light Goods	100.0	100.0	-	-	100.0	100.0	95.3	-	-	95.4	97.6	100.0	-	-	97.8	96.7
Buses	0	0	0	-	0	0	3	0	-	3	3	0	0	-	3	6
% Buses	0.0	0.0	-	-	0.0	0.0	0.9	-	-	0.9	1.0	0.0	-	-	1.0	0.9
Single-Unit Trucks	0	0	0	-	0	0	5	0	-	5	3	0	0	-	3	8
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	1.6	-	-	1.5	1.0	0.0	-	-	1.0	1.2
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.0	0.0	-	-	0.0	0.2
Bicycles on Road	0	0	0	-	0	0	4	0	-	4	0	0	0	-	0	4
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	1.3	-	-	1.2	0.0	0.0	-	-	0.0	0.6
Bicycles on Crosswalk	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	3.7	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	104	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	96.3	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 7



Turning Movement Peak Hour Data Plot (12:30 PM)

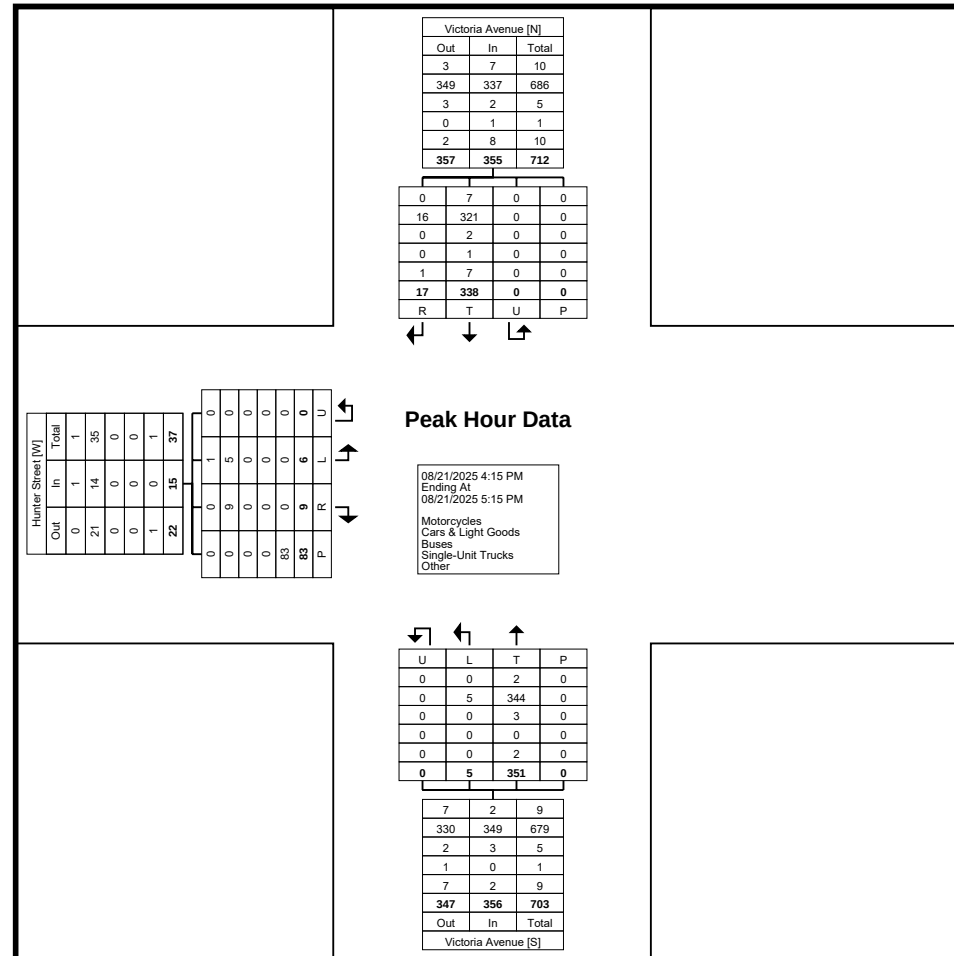
[illegible]



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	4	3	0	2	7	0	13	0	1	13	37	5	0	0	42	62
7:15 AM	7	0	0	2	7	2	18	0	1	20	40	1	0	0	41	68
7:30 AM	5	4	0	4	9	0	26	0	0	26	52	4	0	0	56	91
7:45 AM	2	4	0	2	6	0	23	0	0	23	74	5	0	0	79	108
Hourly Total	18	11	0	10	29	2	80	0	2	82	203	15	0	0	218	329
8:00 AM	5	1	0	2	6	1	21	0	2	22	67	4	0	0	71	99
8:15 AM	5	4	0	8	9	0	24	0	0	24	99	0	0	0	99	132
8:30 AM	5	4	0	2	9	3	35	0	3	38	87	5	0	0	92	139
8:45 AM	4	9	0	7	13	0	36	0	6	36	102	6	0	0	108	157
Hourly Total	19	18	0	19	37	4	116	0	11	120	355	15	0	0	370	527
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	7	4	0	17	11	1	52	0	0	53	90	4	0	0	94	158
11:15 AM	11	4	0	4	15	2	60	0	0	62	74	6	0	0	80	157
11:30 AM	14	5	0	6	19	3	53	0	5	56	113	6	0	0	119	194
11:45 AM	7	6	0	6	13	2	78	0	0	80	111	10	0	0	121	214
Hourly Total	39	19	0	33	58	8	243	0	5	251	388	26	0	0	414	723
12:00 PM	9	4	0	4	13	1	53	0	1	54	83	4	0	0	87	154
12:15 PM	11	6	0	7	17	4	57	0	2	61	85	5	0	0	90	168
12:30 PM	10	10	0	14	20	1	65	0	0	66	122	9	0	0	131	217
12:45 PM	9	3	0	14	12	2	63	0	4	65	124	7	0	0	131	208
Hourly Total	39	23	0	39	62	8	238	0	7	246	414	25	0	0	439	747
1:00 PM	6	4	0	13	10	2	62	0	0	64	93	11	0	0	104	178
1:15 PM	4	7	0	13	11	1	59	0	3	60	100	7	0	0	107	178
1:30 PM	4	3	0	7	7	1	70	0	2	71	102	8	0	0	110	188
1:45 PM	10	8	0	13	18	4	68	0	3	72	120	12	0	0	132	222
Hourly Total	24	22	0	46	46	8	259	0	8	267	415	38	0	0	453	766
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	10	3	0	20	13	0	105	0	0	105	76	6	0	1	82	200
3:15 PM	12	4	0	20	16	1	101	0	0	102	112	12	0	0	124	242
3:30 PM	11	6	0	4	17	1	112	0	0	113	94	8	0	0	102	232
3:45 PM	9	2	0	14	11	2	65	0	3	67	97	7	0	0	104	182
Hourly Total	42	15	0	58	57	4	383	0	3	387	379	33	0	1	412	856
4:00 PM	7	3	0	14	10	1	98	0	0	99	85	5	0	2	90	199
4:15 PM	10	7	0	5	17	2	98	0	0	100	98	13	0	0	111	228
4:30 PM	4	6	0	10	10	4	97	0	0	101	109	14	0	0	123	234
4:45 PM	11	7	0	22	18	3	78	0	2	81	90	11	0	0	101	200

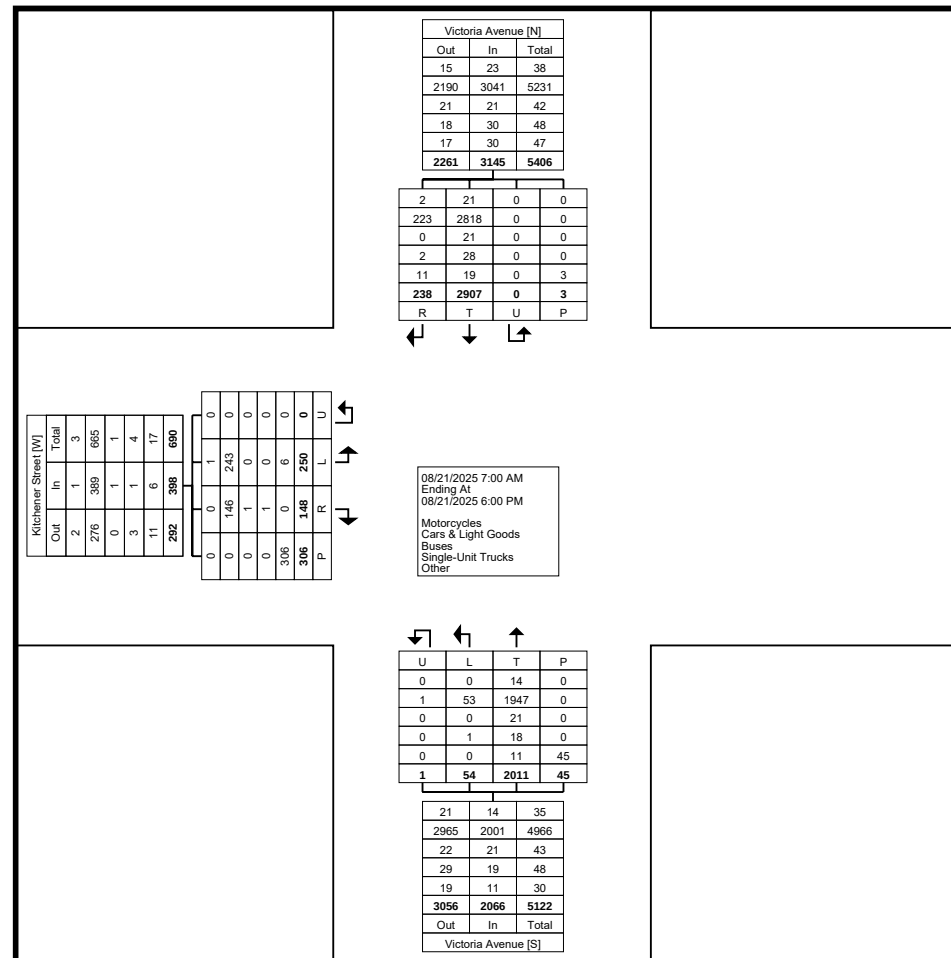
Hourly Total	32	23	0	51	55	10	371	0	2	381	382	43	0	2	425	861
5:00 PM	10	5	0	9	15	4	98	0	2	102	94	11	0	0	105	222
5:15 PM	14	2	0	20	16	4	95	1	3	100	93	14	0	0	107	223
5:30 PM	6	4	0	16	10	1	66	0	2	67	91	12	0	0	103	180
5:45 PM	7	6	0	5	13	1	62	0	0	63	93	6	0	0	99	175
Hourly Total	37	17	0	50	54	10	321	1	7	332	371	43	0	0	414	800
Grand Total	250	148	0	306	398	54	2011	1	45	2066	2907	238	0	3	3145	5609
Approach %	62.8	37.2	0.0	-	-	2.6	97.3	0.0	-	-	92.4	7.6	0.0	-	-	-
Total %	4.5	2.6	0.0	-	7.1	1.0	35.9	0.0	-	36.8	51.8	4.2	0.0	-	56.1	-
Motorcycles	1	0	0	-	1	0	14	0	-	14	21	2	0	-	23	38
% Motorcycles	0.4	0.0	-	-	0.3	0.0	0.7	0.0	-	0.7	0.7	0.8	-	-	0.7	0.7
Cars & Light Goods	243	146	0	-	389	53	1947	1	-	2001	2818	223	0	-	3041	5431
% Cars & Light Goods	97.2	98.6	-	-	97.7	98.1	96.8	100.0	-	96.9	96.9	93.7	-	-	96.7	96.8
Buses	0	1	0	-	1	0	21	0	-	21	21	0	0	-	21	43
% Buses	0.0	0.7	-	-	0.3	0.0	1.0	0.0	-	1.0	0.7	0.0	-	-	0.7	0.8
Single-Unit Trucks	0	1	0	-	1	1	18	0	-	19	28	2	0	-	30	50
% Single-Unit Trucks	0.0	0.7	-	-	0.3	1.9	0.9	0.0	-	0.9	1.0	0.8	-	-	1.0	0.9
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	2	1	0	-	3	4
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.1	0.4	-	-	0.1	0.1
Bicycles on Road	6	0	0	-	6	0	10	0	-	10	17	10	0	-	27	43
% Bicycles on Road	2.4	0.0	-	-	1.5	0.0	0.5	0.0	-	0.5	0.6	4.2	-	-	0.9	0.8
Bicycles on Crosswalk	-	-	-	26	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	8.5	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	280	-	-	-	-	45	-	-	-	-	3	-	-
% Pedestrians	-	-	-	91.5	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

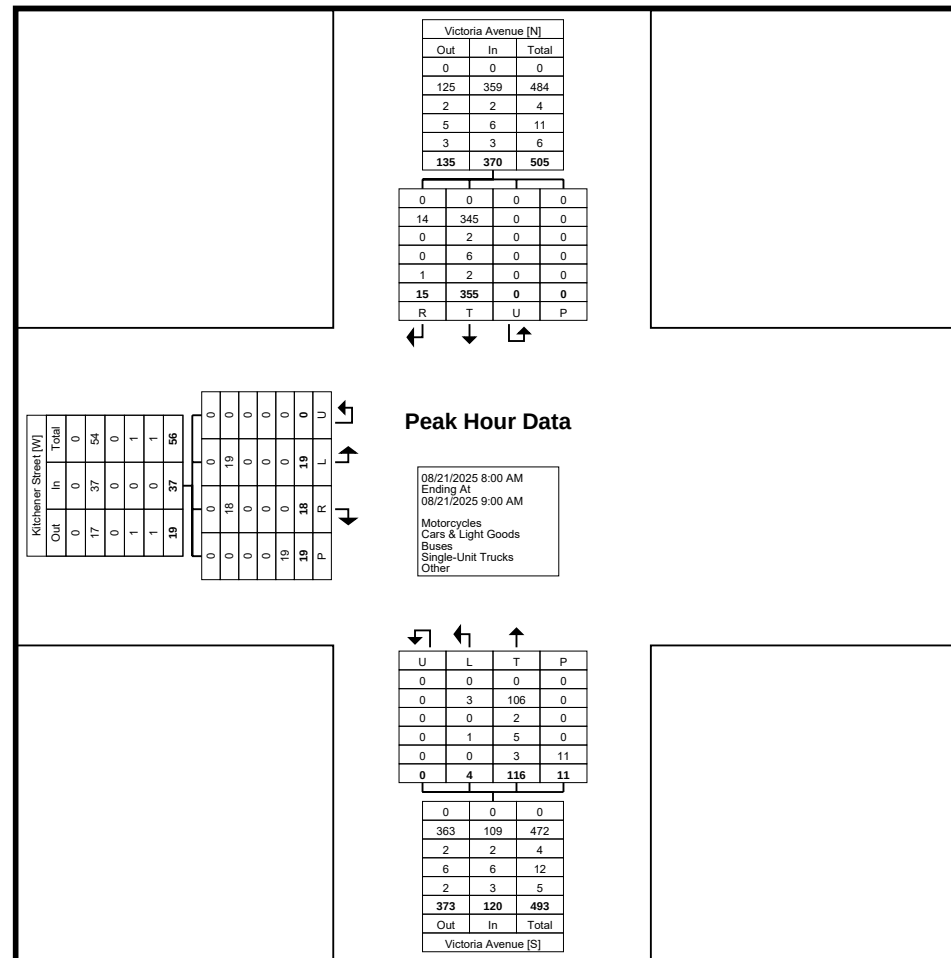
Start Time	Kitchener Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	5	1	0	2	6	1	21	0	2	22	67	4	0	0	71	99
8:15 AM	5	4	0	8	9	0	24	0	0	24	99	0	0	0	99	132
8:30 AM	5	4	0	2	9	3	35	0	3	38	87	5	0	0	92	139
8:45 AM	4	9	0	7	13	0	36	0	6	36	102	6	0	0	108	157
Total	19	18	0	19	37	4	116	0	11	120	355	15	0	0	370	527
Approach %	51.4	48.6	0.0	-	-	3.3	96.7	0.0	-	-	95.9	4.1	0.0	-	-	-
Total %	3.6	3.4	0.0	-	7.0	0.8	22.0	0.0	-	22.8	67.4	2.8	0.0	-	70.2	-
PHF	0.950	0.500	0.000	-	0.712	0.333	0.806	0.000	-	0.789	0.870	0.625	0.000	-	0.856	0.839
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	19	18	0	-	37	3	106	0	-	109	345	14	0	-	359	505
% Cars & Light Goods	100.0	100.0	-	-	100.0	75.0	91.4	-	-	90.8	97.2	93.3	-	-	97.0	95.8
Buses	0	0	0	-	0	0	2	0	-	2	2	0	0	-	2	4
% Buses	0.0	0.0	-	-	0.0	0.0	1.7	-	-	1.7	0.6	0.0	-	-	0.5	0.8
Single-Unit Trucks	0	0	0	-	0	1	5	0	-	6	6	0	0	-	6	12
% Single-Unit Trucks	0.0	0.0	-	-	0.0	25.0	4.3	-	-	5.0	1.7	0.0	-	-	1.6	2.3
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	1	0	0	-	1	2
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.9	-	-	0.8	0.3	0.0	-	-	0.3	0.4
Bicycles on Road	0	0	0	-	0	0	2	0	-	2	1	1	0	-	2	4
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	1.7	-	-	1.7	0.3	6.7	-	-	0.5	0.8
Bicycles on Crosswalk	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	21.1	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	15	-	-	-	-	11	-	-	-	-	0	-	-
% Pedestrians	-	-	-	78.9	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 6

Turning Movement Peak Hour Data (12:30 PM)

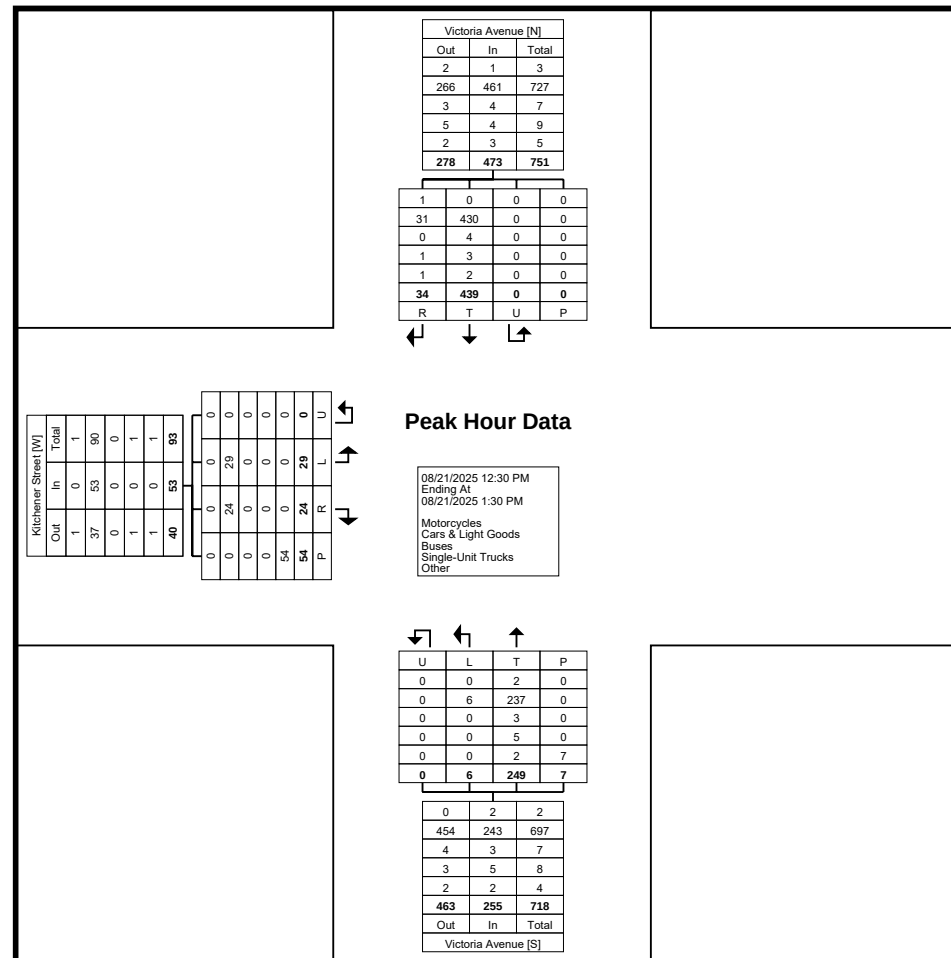
Start Time	Kitchener Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
12:30 PM	10	10	0	14	20	1	65	0	0	66	122	9	0	0	131	217
12:45 PM	9	3	0	14	12	2	63	0	4	65	124	7	0	0	131	208
1:00 PM	6	4	0	13	10	2	62	0	0	64	93	11	0	0	104	178
1:15 PM	4	7	0	13	11	1	59	0	3	60	100	7	0	0	107	178
Total	29	24	0	54	53	6	249	0	7	255	439	34	0	0	473	781
Approach %	54.7	45.3	0.0	-	-	2.4	97.6	0.0	-	-	92.8	7.2	0.0	-	-	-
Total %	3.7	3.1	0.0	-	6.8	0.8	31.9	0.0	-	32.7	56.2	4.4	0.0	-	60.6	-
PHF	0.725	0.600	0.000	-	0.663	0.750	0.958	0.000	-	0.966	0.885	0.773	0.000	-	0.903	0.900
Motorcycles	0	0	0	-	0	0	2	0	-	2	0	1	0	-	1	3
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.8	-	-	0.8	0.0	2.9	-	-	0.2	0.4
Cars & Light Goods	29	24	0	-	53	6	237	0	-	243	430	31	0	-	461	757
% Cars & Light Goods	100.0	100.0	-	-	100.0	100.0	95.2	-	-	95.3	97.9	91.2	-	-	97.5	96.9
Buses	0	0	0	-	0	0	3	0	-	3	4	0	0	-	4	7
% Buses	0.0	0.0	-	-	0.0	0.0	1.2	-	-	1.2	0.9	0.0	-	-	0.8	0.9
Single-Unit Trucks	0	0	0	-	0	0	5	0	-	5	3	1	0	-	4	9
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	2.0	-	-	2.0	0.7	2.9	-	-	0.8	1.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	2	0	-	2	2	1	0	-	3	5
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.8	-	-	0.8	0.5	2.9	-	-	0.6	0.6
Bicycles on Crosswalk	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	3.7	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	52	-	-	-	-	7	-	-	-	-	0	-	-
% Pedestrians	-	-	-	96.3	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
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Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Peak Hour Data Plot (12:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Peak Hour Data (4:15 PM)

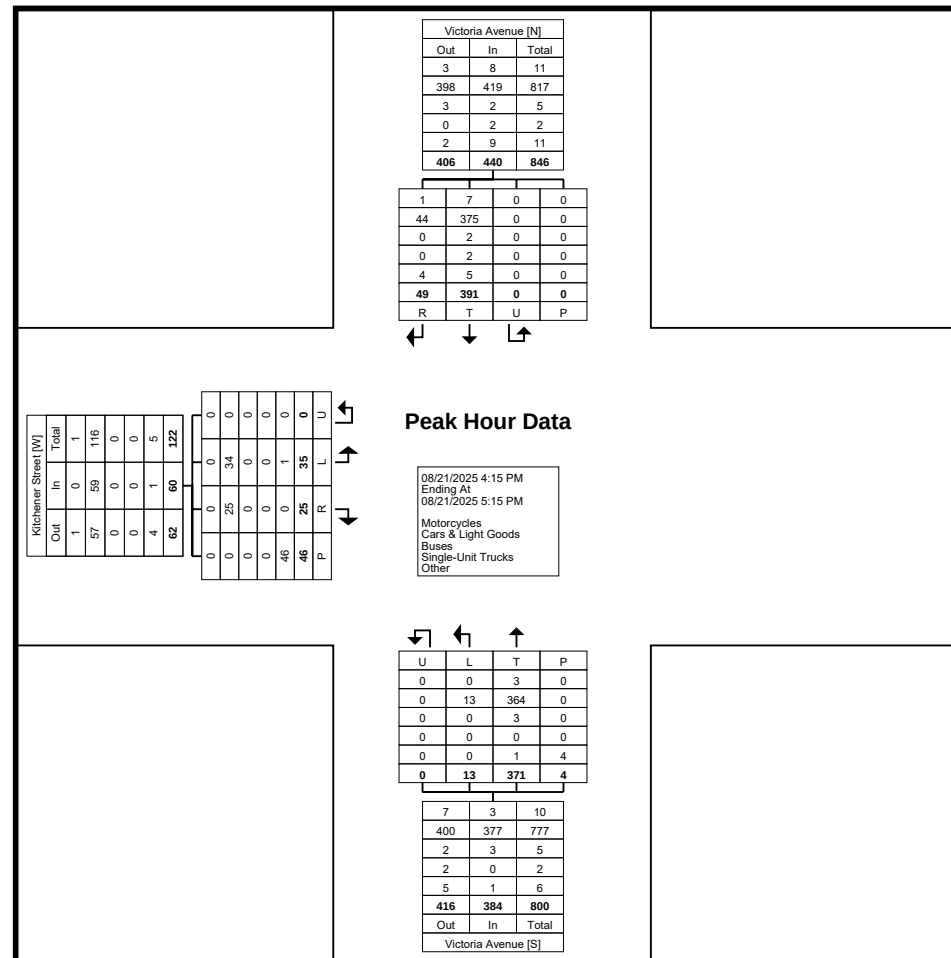
Start Time	Kitchener Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	10	7	0	5	17	2	98	0	0	100	98	13	0	0	111	228
4:30 PM	4	6	0	10	10	4	97	0	0	101	109	14	0	0	123	234
4:45 PM	11	7	0	22	18	3	78	0	2	81	90	11	0	0	101	200
5:00 PM	10	5	0	9	15	4	98	0	2	102	94	11	0	0	105	222
Total	35	25	0	46	60	13	371	0	4	384	391	49	0	0	440	884
Approach %	58.3	41.7	0.0	-	-	3.4	96.6	0.0	-	-	88.9	11.1	0.0	-	-	-
Total %	4.0	2.8	0.0	-	6.8	1.5	42.0	0.0	-	43.4	44.2	5.5	0.0	-	49.8	-
PHF	0.795	0.893	0.000	-	0.833	0.813	0.946	0.000	-	0.941	0.897	0.875	0.000	-	0.894	0.944
Motorcycles	0	0	0	-	0	0	3	0	-	3	7	1	0	-	8	11
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.8	-	-	0.8	1.8	2.0	-	-	1.8	1.2
Cars & Light Goods	34	25	0	-	59	13	364	0	-	377	375	44	0	-	419	855
% Cars & Light Goods	97.1	100.0	-	-	98.3	100.0	98.1	-	-	98.2	95.9	89.8	-	-	95.2	96.7
Buses	0	0	0	-	0	0	3	0	-	3	2	0	0	-	2	5
% Buses	0.0	0.0	-	-	0.0	0.0	0.8	-	-	0.8	0.5	0.0	-	-	0.5	0.6
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	2	0	0	-	2	2
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.5	0.2
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	1	0	0	-	1	0	1	0	-	1	5	4	0	-	9	11
% Bicycles on Road	2.9	0.0	-	-	1.7	0.0	0.3	-	-	0.3	1.3	8.2	-	-	2.0	1.2
Bicycles on Crosswalk	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	8.7	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	42	-	-	-	-	4	-	-	-	-	0	-	-
% Pedestrians	-	-	-	91.3	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Victoria Avenue & Kitchener Street
Site Code: 250550
Start Date: 08/21/2025
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Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Victoria Avenue & Walnut Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 1

Turning Movement Data

Start Time	Walnut Street Eastbound						Driveway Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	2	0	0	0	4	2	4	1	3	0	3	8	0	11	4	0	1	15	3	15	2	0	2	20	45
7:15 AM	1	2	0	0	4	3	2	0	3	0	2	5	0	26	1	0	0	27	0	13	2	0	0	15	50
7:30 AM	3	0	1	0	11	4	0	1	3	0	6	4	0	31	2	0	1	33	2	21	1	0	0	24	65
7:45 AM	2	3	2	0	4	7	4	0	3	0	4	7	1	19	5	0	1	25	3	27	3	0	2	33	72
Hourly Total	8	5	3	0	23	16	10	2	12	0	15	24	1	87	12	0	3	100	8	76	8	0	4	92	232
8:00 AM	4	1	2	0	4	7	3	0	2	0	13	5	0	33	1	0	3	34	4	30	0	0	5	34	80
8:15 AM	2	3	3	0	5	8	5	5	8	0	8	18	0	26	4	0	2	30	2	27	3	0	0	32	88
8:30 AM	5	2	0	0	11	7	4	3	4	0	11	11	0	45	3	0	7	48	3	43	2	0	0	48	114
8:45 AM	2	1	2	0	7	5	5	1	1	0	12	7	2	39	1	0	7	42	3	43	5	0	5	51	105
Hourly Total	13	7	7	0	27	27	17	9	15	0	44	41	2	143	9	0	19	154	12	143	10	0	10	165	387
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	16	6	5	0	39	27	11	5	4	0	32	20	4	61	10	0	2	75	1	69	8	0	3	78	200
11:15 AM	5	5	8	0	24	18	9	2	4	0	24	15	2	64	6	0	8	72	2	56	1	0	4	59	164
11:30 AM	11	5	3	0	22	19	13	4	7	0	36	24	3	60	3	0	13	66	4	71	7	0	5	82	191
11:45 AM	7	3	2	0	41	12	4	4	10	0	26	18	3	74	9	0	7	86	5	70	9	0	7	84	200
Hourly Total	39	19	18	0	126	76	37	15	25	0	118	77	12	259	28	0	30	299	12	266	25	0	19	303	755
12:00 PM	9	2	5	0	27	16	11	6	8	0	32	25	0	51	7	0	7	58	5	55	9	0	4	69	168
12:15 PM	3	3	3	0	31	9	6	8	7	0	18	21	3	57	8	0	14	68	1	62	4	0	16	67	165
12:30 PM	9	2	3	0	28	14	8	5	5	0	13	18	6	71	6	0	7	83	2	73	7	0	10	82	197
12:45 PM	2	2	1	0	46	5	8	8	6	0	30	22	2	66	10	0	4	78	7	66	8	0	9	81	186
Hourly Total	23	9	12	0	132	44	33	27	26	0	93	86	11	245	31	0	32	287	15	256	28	0	39	299	716
1:00 PM	8	0	8	0	42	16	9	3	5	0	51	17	4	64	4	0	19	72	2	61	4	0	16	67	172
1:15 PM	14	1	3	0	26	18	3	2	7	0	37	12	4	62	5	0	9	71	2	60	11	0	19	73	174
1:30 PM	8	1	3	0	37	12	3	4	1	0	20	8	3	71	5	0	24	79	0	72	8	0	19	80	179
1:45 PM	3	2	7	0	32	12	10	5	5	0	47	20	3	74	5	0	31	82	4	77	4	0	9	85	199
Hourly Total	33	4	21	0	137	58	25	14	18	0	155	57	14	271	19	0	83	304	8	270	27	0	63	305	724
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	5	7	4	0	64	16	13	7	9	0	38	29	2	87	2	0	23	91	3	55	7	0	12	65	201
3:15 PM	8	3	5	0	40	16	9	8	13	0	31	30	5	79	8	0	26	92	1	70	6	0	6	77	215
3:30 PM	13	3	5	0	53	21	14	8	1	0	28	23	4	78	4	0	7	86	3	64	11	0	10	78	208
3:45 PM	9	2	5	0	21	16	10	4	6	0	45	20	3	69	12	0	28	84	4	61	9	0	23	74	194
Hourly Total	35	15	19	0	178	69	46	27	29	0	142	102	14	313	26	0	84	353	11	250	33	0	51	294	818
4:00 PM	3	4	7	0	45	14	10	8	12	0	42	30	1	86	4	0	22	91	8	57	7	0	32	72	207
4:15 PM	7	4	4	0	49	15	6	10	8	0	36	24	3	89	10	0	20	102	1	70	10	0	11	81	222
4:30 PM	7	3	1	0	40	11	14	9	8	0	37	31	2	58	6	0	6	66	4	84	6	0	31	94	202

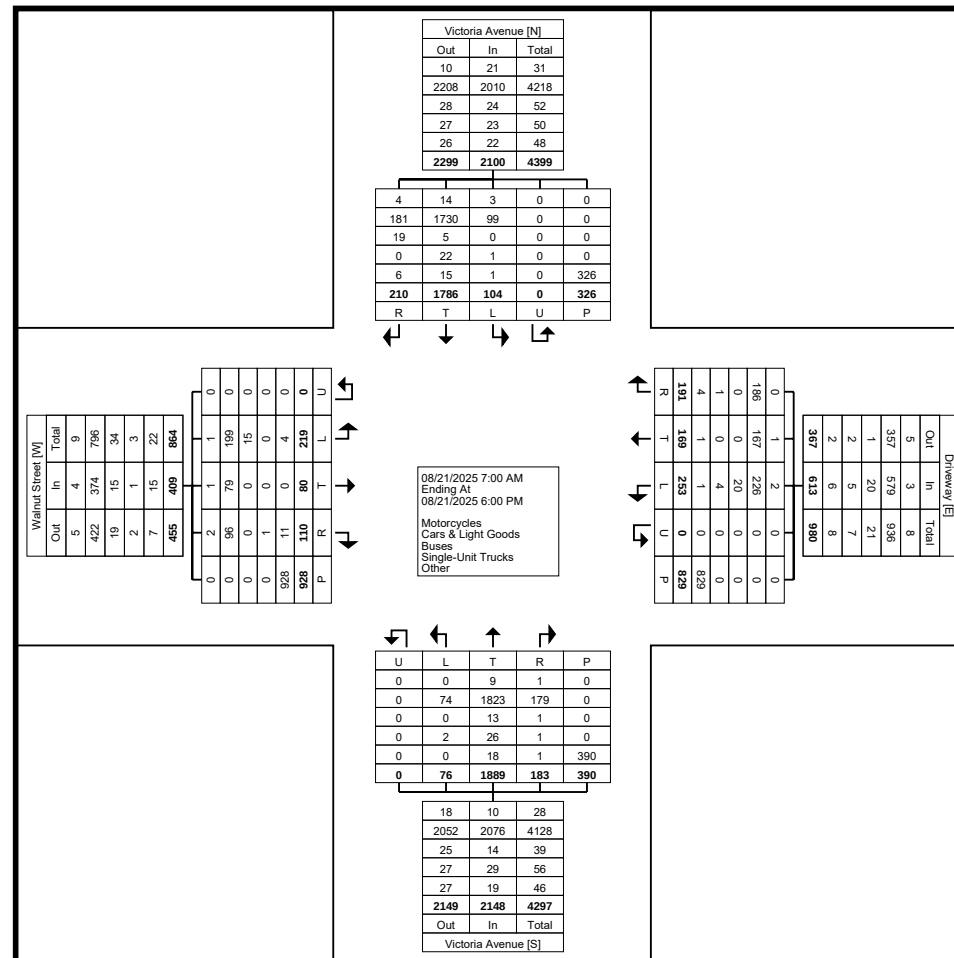
4:45 PM	8	4	3	0	31	15	12	5	9	0	40	26	2	72	10	0	26	84	6	67	12	0	6	85	210
Hourly Total	25	15	15	0	165	55	42	32	37	0	155	111	8	305	30	0	74	343	19	278	35	0	80	332	841
5:00 PM	11	4	4	0	28	19	15	13	7	0	23	35	5	82	9	0	16	96	5	66	11	0	10	82	232
5:15 PM	14	0	3	0	42	17	10	12	8	0	28	30	1	63	6	0	1	70	4	59	10	0	26	73	190
5:30 PM	9	0	7	0	34	16	10	6	5	0	30	21	4	54	6	0	26	64	3	63	11	0	10	77	178
5:45 PM	9	2	1	0	36	12	8	12	9	0	26	29	4	67	7	0	22	78	7	59	12	0	14	78	197
Hourly Total	43	6	15	0	140	64	43	43	29	0	107	115	14	266	28	0	65	308	19	247	44	0	60	310	797
Grand Total	219	80	110	0	928	409	253	169	191	0	829	613	76	1889	183	0	390	2148	104	1786	210	0	326	2100	5270
Approach %	53.5	19.6	26.9	0.0	-	-	41.3	27.6	31.2	0.0	-	-	3.5	87.9	8.5	0.0	-	-	5.0	85.0	10.0	0.0	-	-	-
Total %	4.2	1.5	2.1	0.0	-	7.8	4.8	3.2	3.6	0.0	-	11.6	1.4	35.8	3.5	0.0	-	40.8	2.0	33.9	4.0	0.0	-	39.8	-
Motorcycles	1	1	2	0	-	4	2	1	0	0	-	3	0	9	1	0	-	10	3	14	4	0	-	21	38
% Motorcycles	0.5	1.3	1.8	-	-	1.0	0.8	0.6	0.0	-	-	0.5	0.0	0.5	0.5	-	-	0.5	2.9	0.8	1.9	-	-	1.0	0.7
Cars & Light Goods	199	79	96	0	-	374	226	167	186	0	-	579	74	1823	179	0	-	2076	99	1730	181	0	-	2010	5039
% Cars & Light Goods	90.9	98.8	87.3	-	-	91.4	89.3	98.8	97.4	-	-	94.5	97.4	96.5	97.8	-	-	96.6	95.2	96.9	86.2	-	-	95.7	95.6
Buses	15	0	0	0	-	15	20	0	0	0	-	20	0	13	1	0	-	14	0	5	19	0	-	24	73
% Buses	6.8	0.0	0.0	-	-	3.7	7.9	0.0	0.0	-	-	3.3	0.0	0.7	0.5	-	-	0.7	0.0	0.3	9.0	-	-	1.1	1.4
Single-Unit Trucks	0	0	1	0	-	1	4	0	1	0	-	5	2	26	1	0	-	29	1	22	0	0	-	23	58
% Single-Unit Trucks	0.0	0.0	0.9	-	-	0.2	1.6	0.0	0.5	-	-	0.8	2.6	1.4	0.5	-	-	1.4	1.0	1.2	0.0	-	-	1.1	1.1
Articulated Trucks	2	0	0	0	-	2	0	0	0	0	-	0	0	5	0	0	-	5	0	3	2	0	-	5	12
% Articulated Trucks	0.9	0.0	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.2	0.0	0.2	1.0	-	-	0.2	0.2
Bicycles on Road	2	0	11	0	-	13	1	1	4	0	-	6	0	13	1	0	-	14	1	12	4	0	-	17	50
% Bicycles on Road	0.9	0.0	10.0	-	-	3.2	0.4	0.6	2.1	-	-	1.0	0.0	0.7	0.5	-	-	0.7	1.0	0.7	1.9	-	-	0.8	0.9
Bicycles on Crosswalk	-	-	-	-	23	-	-	-	-	-	35	-	-	-	-	-	2	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	2.5	-	-	-	-	-	4.2	-	-	-	-	-	0.5	-	-	-	-	-	0.6	-	-
Pedestrians	-	-	-	-	905	-	-	-	-	-	794	-	-	-	-	-	388	-	-	-	-	-	324	-	-
% Pedestrians	-	-	-	-	97.5	-	-	-	-	-	95.8	-	-	-	-	-	99.5	-	-	-	-	-	99.4	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Victoria Avenue & Walnut Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Walnut Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 4

Turning Movement Peak Hour Data (8:00 AM)

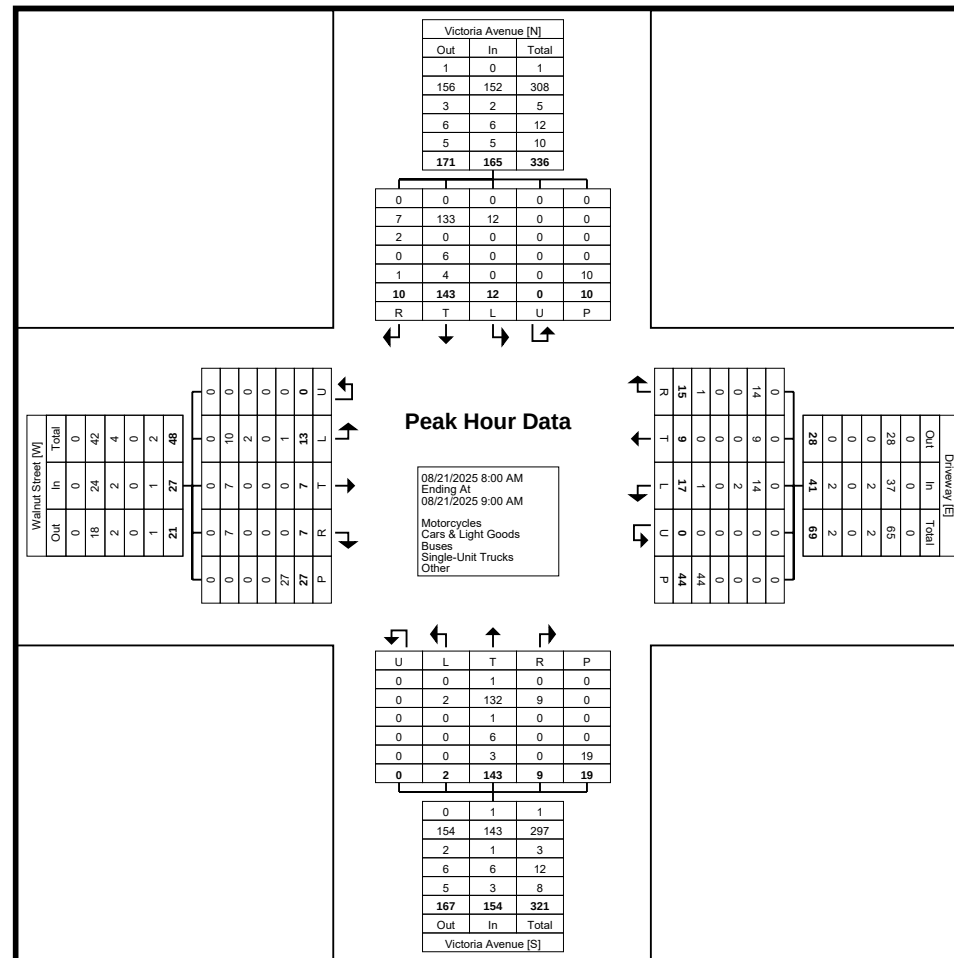
Start Time	Walnut Street Eastbound						Driveway Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
8:00 AM	4	1	2	0	4	7	3	0	2	0	13	5	0	33	1	0	3	34	4	30	0	0	5	34	80
8:15 AM	2	3	3	0	5	8	5	5	8	0	8	18	0	26	4	0	2	30	2	27	3	0	0	32	88
8:30 AM	5	2	0	0	11	7	4	3	4	0	11	11	0	45	3	0	7	48	3	43	2	0	0	48	114
8:45 AM	2	1	2	0	7	5	5	1	1	0	12	7	2	39	1	0	7	42	3	43	5	0	5	51	105
Total	13	7	7	0	27	27	17	9	15	0	44	41	2	143	9	0	19	154	12	143	10	0	10	165	387
Approach %	48.1	25.9	25.9	0.0	-	-	41.5	22.0	36.6	0.0	-	-	1.3	92.9	5.8	0.0	-	-	7.3	86.7	6.1	0.0	-	-	-
Total %	3.4	1.8	1.8	0.0	-	7.0	4.4	2.3	3.9	0.0	-	10.6	0.5	37.0	2.3	0.0	-	39.8	3.1	37.0	2.6	0.0	-	42.6	-
PHF	0.650	0.583	0.583	0.000	-	0.844	0.850	0.450	0.469	0.000	-	0.569	0.250	0.794	0.563	0.000	-	0.802	0.750	0.831	0.500	0.000	-	0.809	0.849
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.6	0.0	0.0	0.0	-	-	0.0	0.3
Cars & Light Goods	10	7	7	0	-	24	14	9	14	0	-	37	2	132	9	0	-	143	12	133	7	0	-	152	356
% Cars & Light Goods	76.9	100.0	100.0	-	-	88.9	82.4	100.0	93.3	-	-	90.2	100.0	92.3	100.0	-	-	92.9	100.0	93.0	70.0	-	-	92.1	92.0
Buses	2	0	0	0	-	2	2	0	0	0	-	2	0	1	0	0	-	1	0	0	2	0	-	2	7
% Buses	15.4	0.0	0.0	-	-	7.4	11.8	0.0	0.0	-	-	4.9	0.0	0.7	0.0	-	-	0.6	0.0	0.0	20.0	-	-	1.2	1.8
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	6	0	0	-	6	0	6	0	0	-	6	12
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	4.2	0.0	-	-	3.9	0.0	4.2	0.0	-	-	3.6	3.1
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	0	1	1	0	-	2	6
% Articulated Trucks	7.7	0.0	0.0	-	-	3.7	0.0	0.0	0.0	-	-	0.0	0.0	2.1	0.0	-	-	1.9	0.0	0.7	10.0	-	-	1.2	1.6
Bicycles on Road	0	0	0	0	-	0	1	0	1	0	-	2	0	0	0	0	-	0	0	3	0	0	-	3	5
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	5.9	0.0	6.7	-	-	4.9	0.0	0.0	0.0	-	-	0.0	0.0	2.1	0.0	-	-	1.8	1.3
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	7.4	-	-	-	-	-	11.4	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	25	-	-	-	-	-	39	-	-	-	-	-	19	-	-	-	-	-	10	-	-
% Pedestrians	-	-	-	-	92.6	-	-	-	-	-	88.6	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Walnut Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 5



Turning Movement Peak Hour Data Plot (8:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Walnut Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 6

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Walnut Street Eastbound						Driveway Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:00 AM	16	6	5	0	39	27	11	5	4	0	32	20	4	61	10	0	2	75	1	69	8	0	3	78	200
11:15 AM	5	5	8	0	24	18	9	2	4	0	24	15	2	64	6	0	8	72	2	56	1	0	4	59	164
11:30 AM	11	5	3	0	22	19	13	4	7	0	36	24	3	60	3	0	13	66	4	71	7	0	5	82	191
11:45 AM	7	3	2	0	41	12	4	4	10	0	26	18	3	74	9	0	7	86	5	70	9	0	7	84	200
Total	39	19	18	0	126	76	37	15	25	0	118	77	12	259	28	0	30	299	12	266	25	0	19	303	755
Approach %	51.3	25.0	23.7	0.0	-	-	48.1	19.5	32.5	0.0	-	-	4.0	86.6	9.4	0.0	-	-	4.0	87.8	8.3	0.0	-	-	-
Total %	5.2	2.5	2.4	0.0	-	10.1	4.9	2.0	3.3	0.0	-	10.2	1.6	34.3	3.7	0.0	-	39.6	1.6	35.2	3.3	0.0	-	40.1	-
PHF	0.609	0.792	0.563	0.000	-	0.704	0.712	0.750	0.625	0.000	-	0.802	0.750	0.875	0.700	0.000	-	0.869	0.600	0.937	0.694	0.000	-	0.902	0.944
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	4	0	0	-	4	6
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	0.0	1.5	0.0	-	-	1.3	0.8
Cars & Light Goods	35	19	17	0	-	71	33	15	24	0	-	72	10	250	27	0	-	287	12	253	22	0	-	287	717
% Cars & Light Goods	89.7	100.0	94.4	-	-	93.4	89.2	100.0	96.0	-	-	93.5	83.3	96.5	96.4	-	-	96.0	100.0	95.1	88.0	-	-	94.7	95.0
Buses	2	0	0	0	-	2	2	0	0	0	-	2	0	1	1	0	-	2	0	0	2	0	-	2	8
% Buses	5.1	0.0	0.0	-	-	2.6	5.4	0.0	0.0	-	-	2.6	0.0	0.4	3.6	-	-	0.7	0.0	0.0	8.0	-	-	0.7	1.1
Single-Unit Trucks	0	0	0	0	-	0	2	0	0	0	-	2	2	3	0	0	-	5	0	4	0	0	-	4	11
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	5.4	0.0	0.0	-	-	2.6	16.7	1.2	0.0	-	-	1.7	0.0	1.5	0.0	-	-	1.3	1.5
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	3
% Articulated Trucks	2.6	0.0	0.0	-	-	1.3	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.7	0.4
Bicycles on Road	1	0	1	0	-	2	0	0	1	0	-	1	0	3	0	0	-	3	0	3	1	0	-	4	10
% Bicycles on Road	2.6	0.0	5.6	-	-	2.6	0.0	0.0	4.0	-	-	1.3	0.0	1.2	0.0	-	-	1.0	0.0	1.1	4.0	-	-	1.3	1.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	2.5	-	-	-	-	-	3.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	126	-	-	-	-	-	115	-	-	-	-	-	29	-	-	-	-	-	19	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	97.5	-	-	-	-	-	96.7	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (11:00 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Walnut Street
Site Code: 250550
Start Date: 08/21/2025
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

Start Time	Walnut Street Eastbound						Driveway Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	7	4	4	0	49	15	6	10	8	0	36	24	3	89	10	0	20	102	1	70	10	0	11	81	222
4:30 PM	7	3	1	0	40	11	14	9	8	0	37	31	2	58	6	0	6	66	4	84	6	0	31	94	202
4:45 PM	8	4	3	0	31	15	12	5	9	0	40	26	2	72	10	0	26	84	6	67	12	0	6	85	210
5:00 PM	11	4	4	0	28	19	15	13	7	0	23	35	5	82	9	0	16	96	5	66	11	0	10	82	232
Total	33	15	12	0	148	60	47	37	32	0	136	116	12	301	35	0	68	348	16	287	39	0	58	342	866
Approach %	55.0	25.0	20.0	0.0	-	-	40.5	31.9	27.6	0.0	-	-	3.4	86.5	10.1	0.0	-	-	4.7	83.9	11.4	0.0	-	-	-
Total %	3.8	1.7	1.4	0.0	-	6.9	5.4	4.3	3.7	0.0	-	13.4	1.4	34.8	4.0	0.0	-	40.2	1.8	33.1	4.5	0.0	-	39.5	-
PHF	0.750	0.938	0.750	0.000	-	0.789	0.783	0.712	0.889	0.000	-	0.829	0.600	0.846	0.875	0.000	-	0.853	0.667	0.854	0.813	0.000	-	0.910	0.933
Motorcycles	1	0	0	0	-	1	0	0	0	0	-	0	0	2	0	0	-	2	2	6	1	0	-	9	12
% Motorcycles	3.0	0.0	0.0	-	-	1.7	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.6	12.5	2.1	2.6	-	-	2.6	1.4
Cars & Light Goods	30	15	12	0	-	57	44	36	30	0	-	110	12	297	34	0	-	343	14	278	33	0	-	325	835
% Cars & Light Goods	90.9	100.0	100.0	-	-	95.0	93.6	97.3	93.8	-	-	94.8	100.0	98.7	97.1	-	-	98.6	87.5	96.9	84.6	-	-	95.0	96.4
Buses	2	0	0	0	-	2	3	0	0	0	-	3	0	2	0	0	-	2	0	0	3	0	-	3	10
% Buses	6.1	0.0	0.0	-	-	3.3	6.4	0.0	0.0	-	-	2.6	0.0	0.7	0.0	-	-	0.6	0.0	0.0	7.7	-	-	0.9	1.2
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	1	2	0	-	3	0	0	1	0	-	1	0	2	2	0	-	4	8
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	2.7	6.3	-	-	2.6	0.0	0.0	2.9	-	-	0.3	0.0	0.7	5.1	-	-	1.2	0.9
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	4.1	-	-	-	-	-	2.9	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	142	-	-	-	-	-	132	-	-	-	-	-	68	-	-	-	-	-	58	-	-
% Pedestrians	-	-	-	-	95.9	-	-	-	-	-	97.1	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (4:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway East - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Driveway Northbound						Driveway East Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	0	8	0	0	0	8	0	3	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0	2	14
9:15 AM	0	8	0	0	0	8	0	6	0	0	0	6	0	0	0	0	0	0	0	0	1	0	0	1	15
9:30 AM	0	12	0	0	0	12	0	3	0	1	0	4	1	0	0	0	0	1	0	0	1	0	0	1	18
9:45 AM	0	8	0	0	0	8	0	6	0	0	0	6	0	0	1	0	0	1	0	0	0	0	3	0	15
Hourly Total	0	36	0	0	0	36	0	18	1	1	0	20	1	0	1	0	0	2	2	0	2	0	3	4	62
10:00 AM	1	15	0	0	0	16	0	14	1	0	0	15	2	0	0	0	0	2	0	0	0	0	0	0	33
10:15 AM	0	6	0	0	0	6	0	11	1	3	2	15	0	0	1	0	0	1	0	0	0	0	5	0	22
10:30 AM	0	18	0	0	1	18	0	6	1	1	0	8	0	0	0	0	0	0	0	0	0	0	1	0	26
10:45 AM	0	12	0	0	1	12	0	7	2	0	0	9	0	0	0	0	0	0	0	0	1	0	0	1	22
Hourly Total	1	51	0	0	2	52	0	38	5	4	2	47	2	0	1	0	0	3	0	0	1	0	6	1	103
11:00 AM	0	13	0	0	0	13	0	5	2	0	2	7	0	0	0	0	1	0	0	0	0	0	1	0	20
11:15 AM	1	16	0	0	0	17	0	9	1	0	0	10	0	0	0	0	1	0	0	0	0	0	4	0	27
11:30 AM	0	18	0	0	0	18	0	2	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	22
11:45 AM	1	12	0	0	0	13	2	9	1	0	0	12	0	0	0	0	3	0	4	0	0	0	0	4	29
Hourly Total	2	59	0	0	0	61	2	25	6	0	2	33	0	0	0	0	5	0	4	0	0	0	5	4	98
12:00 PM	1	21	0	0	0	22	0	12	1	0	0	13	1	0	1	0	0	2	1	0	0	0	0	1	38
12:15 PM	1	11	0	0	0	12	0	11	4	1	0	16	0	0	0	0	0	0	1	1	1	0	3	3	31
12:30 PM	0	17	0	0	5	17	0	6	4	0	1	10	0	0	0	0	1	0	0	0	0	0	2	0	27
12:45 PM	0	16	0	0	11	16	0	6	2	0	1	8	0	1	0	0	1	1	3	0	0	0	2	3	28
Hourly Total	2	65	0	0	16	67	0	35	11	1	2	47	1	1	1	0	2	3	5	1	1	0	7	7	124
1:00 PM	0	9	0	0	0	9	0	10	1	2	2	13	0	0	0	0	1	0	1	0	0	0	0	1	23
1:15 PM	0	10	0	0	0	10	0	11	1	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	22
1:30 PM	1	6	0	0	1	7	1	5	1	0	3	7	0	0	1	0	2	1	2	0	0	0	1	2	17
1:45 PM	2	13	0	0	1	15	1	9	0	0	1	10	0	0	0	0	1	0	2	0	0	0	4	2	27
Hourly Total	3	38	0	0	2	41	2	35	3	2	6	42	0	0	1	0	4	1	5	0	0	0	5	5	89
2:00 PM	2	14	0	0	8	16	0	8	5	0	1	13	1	0	0	0	0	1	1	0	1	0	0	2	32
2:15 PM	1	15	0	0	0	16	0	11	1	0	0	12	0	0	0	0	2	0	1	0	0	0	0	1	29
2:30 PM	0	22	0	0	0	22	0	9	3	0	0	12	0	0	0	0	0	0	1	0	0	0	7	1	35
2:45 PM	0	18	0	0	0	18	0	13	2	2	0	17	0	0	0	0	0	0	3	0	0	0	5	3	38
Hourly Total	3	69	0	0	8	72	0	41	11	2	1	54	1	0	0	0	2	1	6	0	1	0	12	7	134
3:00 PM	1	20	0	0	0	21	1	21	0	0	0	22	3	0	0	0	1	3	0	0	1	0	13	1	47
3:15 PM	0	24	0	0	3	24	0	14	1	0	1	15	0	1	0	0	1	1	1	0	0	0	4	1	41
3:30 PM	0	14	0	0	1	14	0	8	1	1	2	10	0	0	1	0	0	1	1	0	1	0	10	2	27
3:45 PM	0	11	0	0	0	11	0	16	2	0	2	18	1	1	1	0	2	3	0	0	0	0	10	0	32
Hourly Total	1	69	0	0	4	70	1	59	4	1	5	65	4	2	2	0	4	8	2	0	2	0	37	4	147

4:00 PM	1	24	0	0	8	25	0	14	3	0	1	17	1	0	0	0	0	1	1	3	0	0	8	4	47
4:15 PM	1	22	0	0	0	23	0	9	1	0	1	10	0	0	1	0	0	1	3	0	0	0	6	3	37
4:30 PM	0	18	0	0	1	18	0	8	6	0	1	14	0	0	0	0	0	0	6	0	0	0	9	6	38
4:45 PM	0	14	0	0	0	9	0	11	7	0	0	18	0	0	0	0	0	0	1	0	0	0	4	1	33
Hourly Total	2	78	0	0	18	80	0	42	17	0	3	59	1	0	1	0	0	2	11	3	0	0	27	14	155
Grand Total	14	465	0	0	50	479	5	293	58	11	21	367	10	3	7	0	17	20	35	4	7	0	102	46	912
Approach %	2.9	97.1	0.0	0.0	-	-	1.4	79.8	15.8	3.0	-	-	50.0	15.0	35.0	0.0	-	-	76.1	8.7	15.2	0.0	-	-	-
Total %	1.5	51.0	0.0	0.0	-	52.5	0.5	32.1	6.4	1.2	-	40.2	1.1	0.3	0.8	0.0	-	2.2	3.8	0.4	0.8	0.0	-	5.0	-
Motorcycles	0	6	0	0	-	6	0	3	0	0	-	3	0	0	0	0	-	0	0	0	0	0	-	0	9
% Motorcycles	0.0	1.3	-	-	-	1.3	0.0	1.0	0.0	0.0	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	1.0
Cars & Light Goods	12	448	0	0	-	460	0	284	58	11	-	353	9	0	2	0	-	11	35	0	7	0	-	42	866
% Cars & Light Goods	85.7	96.3	-	-	-	96.0	0.0	96.9	100.0	100.0	-	96.2	90.0	0.0	28.6	-	-	55.0	100.0	0.0	100.0	-	-	91.3	95.0
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.2	-	-	-	0.2	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	2	10	0	0	-	12	5	6	0	0	-	11	1	3	5	0	-	9	0	4	0	0	-	4	36
% Bicycles on Road	14.3	2.2	-	-	-	2.5	100.0	2.0	0.0	0.0	-	3.0	10.0	100.0	71.4	-	-	45.0	0.0	100.0	0.0	-	-	8.7	3.9
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	11.8	-	-	-	-	-	1.0	-	-
Pedestrians	-	-	-	-	50	-	-	-	-	-	21	-	-	-	-	-	15	-	-	-	-	-	101	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	88.2	-	-	-	-	-	99.0	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway East - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (2:30 PM)

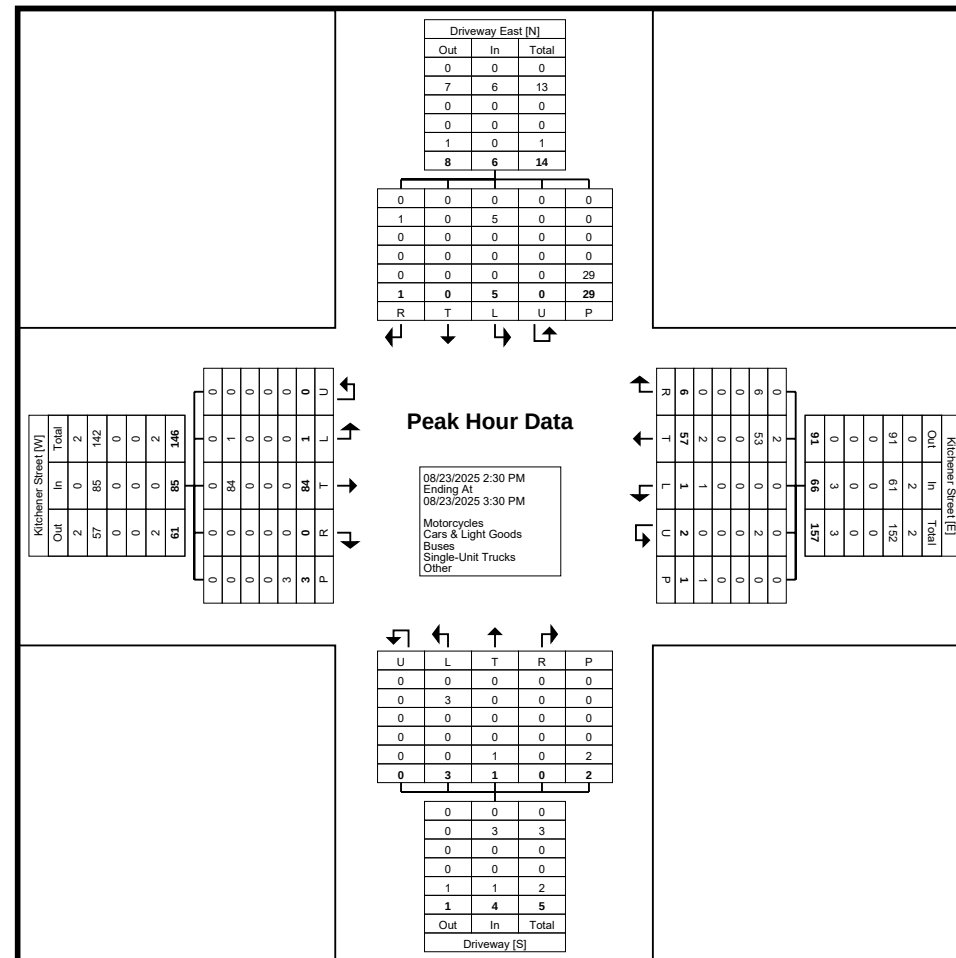
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Driveway Northbound						Driveway East Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
2:30 PM	0	22	0	0	0	22	0	9	3	0	0	12	0	0	0	0	0	0	1	0	0	0	7	1	35
2:45 PM	0	18	0	0	0	18	0	13	2	2	0	17	0	0	0	0	0	0	3	0	0	0	5	3	38
3:00 PM	1	20	0	0	0	21	1	21	0	0	0	22	3	0	0	0	1	3	0	0	1	0	13	1	47
3:15 PM	0	24	0	0	3	24	0	14	1	0	1	15	0	1	0	0	1	1	1	0	0	0	4	1	41
Total	1	84	0	0	3	85	1	57	6	2	1	66	3	1	0	0	2	4	5	0	1	0	29	6	161
Approach %	1.2	98.8	0.0	0.0	-	-	1.5	86.4	9.1	3.0	-	-	75.0	25.0	0.0	0.0	-	-	83.3	0.0	16.7	0.0	-	-	-
Total %	0.6	52.2	0.0	0.0	-	52.8	0.6	35.4	3.7	1.2	-	41.0	1.9	0.6	0.0	0.0	-	2.5	3.1	0.0	0.6	0.0	-	3.7	-
PHF	0.250	0.875	0.000	0.000	-	0.885	0.250	0.679	0.500	0.250	-	0.750	0.250	0.250	0.000	0.000	-	0.333	0.417	0.000	0.250	0.000	-	0.500	0.856
Motorcycles	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	2
% Motorcycles	0.0	0.0	-	-	-	0.0	0.0	3.5	0.0	0.0	-	3.0	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	1.2
Cars & Light Goods	1	84	0	0	-	85	0	53	6	2	-	61	3	0	0	0	-	3	5	0	1	0	-	6	155
% Cars & Light Goods	100.0	100.0	-	-	-	100.0	0.0	93.0	100.0	100.0	-	92.4	100.0	0.0	-	-	-	75.0	100.0	-	100.0	-	-	100.0	96.3
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	-	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	1	2	0	0	-	3	0	1	0	0	-	1	0	0	0	0	-	0	4
% Bicycles on Road	0.0	0.0	-	-	-	0.0	100.0	3.5	0.0	0.0	-	4.5	0.0	100.0	-	-	-	25.0	0.0	-	0.0	-	-	0.0	2.5
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	50.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	29	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	50.0	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway East - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 5



Turning Movement Peak Hour Data Plot (2:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound					Kitchener Street Westbound					Driveway West Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
9:00 AM	0	9	0	0	9	2	1	0	0	3	0	0	0	0	0	12
9:15 AM	0	9	0	0	9	7	0	0	0	7	0	0	0	0	0	16
9:30 AM	0	9	0	0	9	7	0	0	0	7	0	0	0	1	0	16
9:45 AM	1	9	0	1	10	4	0	0	0	4	0	0	0	3	0	14
Hourly Total	1	36	0	1	37	20	1	0	0	21	0	0	0	4	0	58
10:00 AM	0	15	0	0	15	16	1	0	0	17	0	0	0	2	0	32
10:15 AM	0	9	0	3	9	10	0	0	2	10	0	0	0	4	0	19
10:30 AM	0	14	0	1	14	6	0	0	0	6	1	0	0	1	1	21
10:45 AM	0	14	0	1	14	8	0	0	0	8	0	0	0	1	0	22
Hourly Total	0	52	0	5	52	40	1	0	2	41	1	0	0	8	1	94
11:00 AM	0	14	0	0	14	7	0	0	0	7	1	2	0	1	3	24
11:15 AM	1	14	0	0	15	8	0	0	0	8	1	0	0	0	1	24
11:30 AM	0	19	0	0	19	2	0	0	0	2	0	0	0	2	0	21
11:45 AM	3	13	0	0	16	8	1	0	0	9	0	1	0	1	1	26
Hourly Total	4	60	0	0	64	25	1	0	0	26	2	3	0	4	5	95
12:00 PM	0	20	0	1	20	15	0	0	0	15	0	1	0	3	1	36
12:15 PM	0	11	0	0	11	9	0	0	0	9	1	0	0	3	1	21
12:30 PM	1	19	0	0	20	6	1	0	0	7	1	0	0	5	1	28
12:45 PM	1	9	0	0	10	4	1	0	0	5	4	0	0	2	4	19
Hourly Total	2	59	0	1	61	34	2	0	0	36	6	1	0	13	7	104
1:00 PM	1	9	0	0	10	8	2	0	0	10	0	0	0	0	0	20
1:15 PM	0	9	0	0	9	10	0	0	0	10	1	1	0	1	2	21
1:30 PM	1	7	0	0	8	5	1	0	0	6	1	1	0	0	2	16
1:45 PM	2	15	0	0	17	10	0	0	0	10	1	0	0	2	1	28
Hourly Total	4	40	0	0	44	33	3	0	0	36	3	2	0	3	5	85
2:00 PM	0	17	0	0	17	9	0	0	0	9	0	2	0	0	2	28
2:15 PM	1	11	0	0	12	10	0	0	0	10	2	1	0	0	3	25
2:30 PM	1	24	0	0	25	10	0	0	0	10	1	0	0	2	1	36
2:45 PM	2	15	0	0	17	13	1	0	0	14	1	0	0	0	1	32
Hourly Total	4	67	0	0	71	42	1	0	0	43	4	3	0	2	7	121
3:00 PM	0	23	0	3	23	24	0	0	0	24	0	1	0	8	1	48
3:15 PM	4	21	0	0	25	13	0	0	0	13	1	0	0	1	1	39
3:30 PM	1	15	0	2	16	11	0	0	0	11	2	3	0	2	5	32
3:45 PM	1	15	0	0	16	13	1	0	0	14	0	0	0	0	0	30
Hourly Total	6	74	0	5	80	61	1	0	0	62	3	4	0	11	7	149
4:00 PM	2	18	0	9	20	14	2	0	0	16	2	1	0	3	3	39

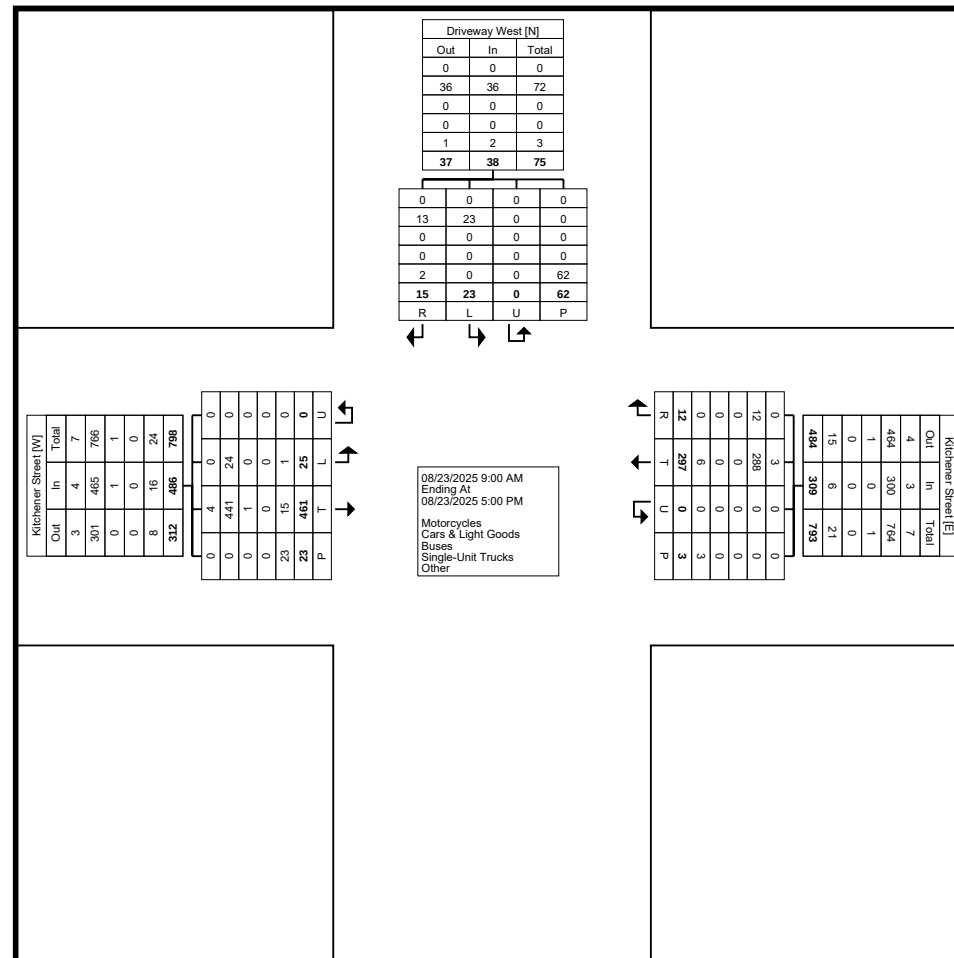
4:15 PM	1	23	0	0	24	9	0	0	0	9	0	0	0	0	0	33
4:30 PM	0	18	0	1	18	7	0	0	1	7	1	1	0	9	2	27
4:45 PM	1	14	0	1	15	12	0	0	0	12	1	0	0	5	1	28
Hourly Total	4	73	0	11	77	42	2	0	1	44	4	2	0	17	6	127
Grand Total	25	461	0	23	486	297	12	0	3	309	23	15	0	62	38	833
Approach %	5.1	94.9	0.0	-	-	96.1	3.9	0.0	-	-	60.5	39.5	0.0	-	-	-
Total %	3.0	55.3	0.0	-	58.3	35.7	1.4	0.0	-	37.1	2.8	1.8	0.0	-	4.6	-
Motorcycles	0	4	0	-	4	3	0	0	-	3	0	0	0	-	0	7
% Motorcycles	0.0	0.9	-	-	0.8	1.0	0.0	-	-	1.0	0.0	0.0	-	-	0.0	0.8
Cars & Light Goods	24	441	0	-	465	288	12	0	-	300	23	13	0	-	36	801
% Cars & Light Goods	96.0	95.7	-	-	95.7	97.0	100.0	-	-	97.1	100.0	86.7	-	-	94.7	96.2
Buses	0	1	0	-	1	0	0	0	-	0	0	0	0	-	0	1
% Buses	0.0	0.2	-	-	0.2	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.1
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	1	15	0	-	16	6	0	0	-	6	0	2	0	-	2	24
% Bicycles on Road	4.0	3.3	-	-	3.3	2.0	0.0	-	-	1.9	0.0	13.3	-	-	5.3	2.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	3.2	-	-
Pedestrians	-	-	-	23	-	-	-	-	3	-	-	-	-	60	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	96.8	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (2:30 PM)

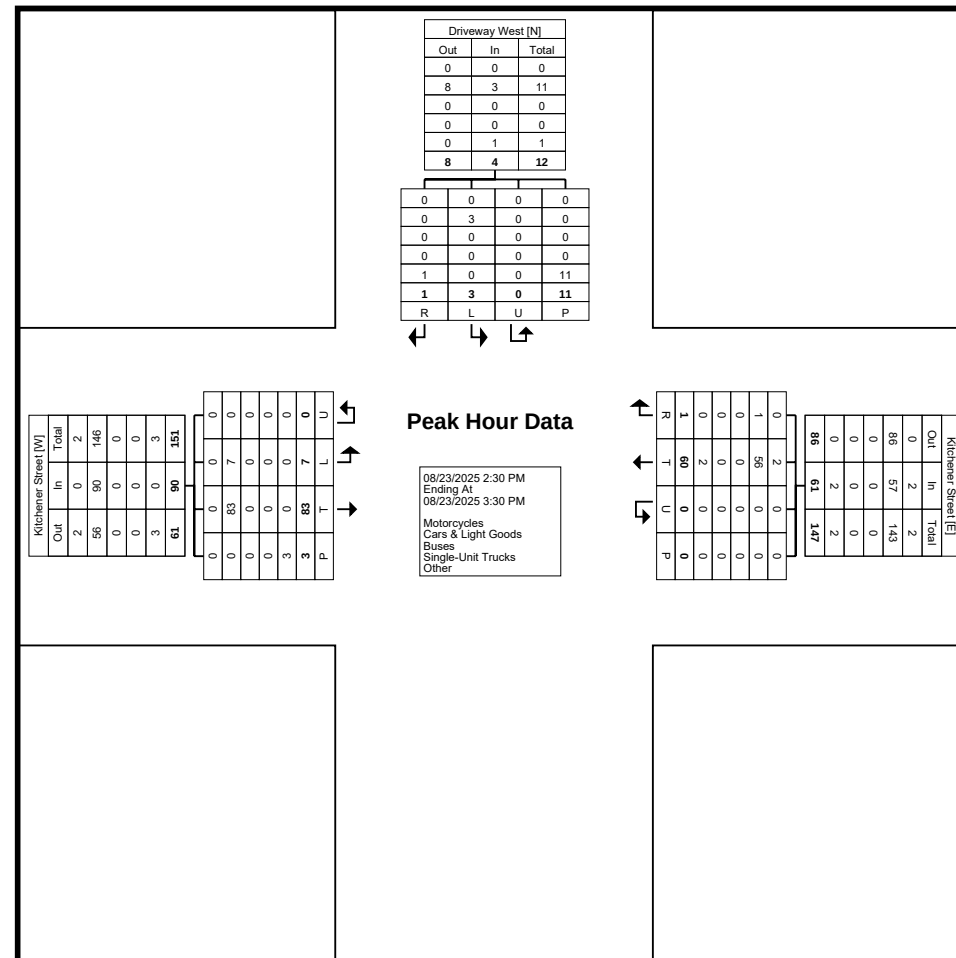
Start Time	Kitchener Street Eastbound					Kitchener Street Westbound					Driveway West Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
2:30 PM	1	24	0	0	25	10	0	0	0	10	1	0	0	2	1	36
2:45 PM	2	15	0	0	17	13	1	0	0	14	1	0	0	0	1	32
3:00 PM	0	23	0	3	23	24	0	0	0	24	0	1	0	8	1	48
3:15 PM	4	21	0	0	25	13	0	0	0	13	1	0	0	1	1	39
Total	7	83	0	3	90	60	1	0	0	61	3	1	0	11	4	155
Approach %	7.8	92.2	0.0	-	-	98.4	1.6	0.0	-	-	75.0	25.0	0.0	-	-	-
Total %	4.5	53.5	0.0	-	58.1	38.7	0.6	0.0	-	39.4	1.9	0.6	0.0	-	2.6	-
PHF	0.438	0.865	0.000	-	0.900	0.625	0.250	0.000	-	0.635	0.750	0.250	0.000	-	1.000	0.807
Motorcycles	0	0	0	-	0	2	0	0	-	2	0	0	0	-	0	2
% Motorcycles	0.0	0.0	-	-	0.0	3.3	0.0	-	-	3.3	0.0	0.0	-	-	0.0	1.3
Cars & Light Goods	7	83	0	-	90	56	1	0	-	57	3	0	0	-	3	150
% Cars & Light Goods	100.0	100.0	-	-	100.0	93.3	100.0	-	-	93.4	100.0	0.0	-	-	75.0	96.8
Buses	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Buses	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	2	0	0	-	2	0	1	0	-	1	3
% Bicycles on Road	0.0	0.0	-	-	0.0	3.3	0.0	-	-	3.3	0.0	100.0	-	-	25.0	1.9
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	11	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Driveway West - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 5



Turning Movement Peak Hour Data Plot (2:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Falls Avenue & MacDonald
Avenue - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Falls Avenue Eastbound						Falls Avenue Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	3	107	13	2	2	125	0	58	1	0	0	59	25	2	4	0	0	31	0	3	4	0	0	7	222
9:15 AM	2	160	10	0	2	172	2	57	1	1	0	61	20	3	2	0	0	25	0	3	10	0	0	13	271
9:30 AM	0	139	17	0	1	156	0	70	0	0	1	70	27	4	3	0	0	34	0	7	5	0	0	12	272
9:45 AM	4	168	18	0	1	190	1	84	0	0	0	85	29	1	1	0	0	31	2	3	3	0	0	8	314
Hourly Total	9	574	58	2	6	643	3	269	2	1	1	275	101	10	10	0	0	121	2	16	22	0	0	40	1079
10:00 AM	5	134	29	0	0	168	1	67	1	0	0	69	28	3	1	0	0	32	0	1	9	0	0	10	279
10:15 AM	10	173	30	1	1	214	0	71	2	4	0	77	26	0	4	0	0	30	0	2	7	0	0	9	330
10:30 AM	5	178	25	1	2	209	0	99	2	0	1	101	30	0	4	0	0	34	3	7	8	0	0	18	362
10:45 AM	4	167	28	0	1	199	5	100	0	2	0	107	41	8	4	0	0	53	2	10	3	0	0	15	374
Hourly Total	24	652	112	2	4	790	6	337	5	6	1	354	125	11	13	0	0	149	5	20	27	0	0	52	1345
11:00 AM	6	174	34	1	2	215	1	90	1	2	3	94	51	1	7	0	0	59	1	4	10	0	0	15	383
11:15 AM	5	157	40	2	3	204	2	103	1	0	0	106	42	5	1	0	0	48	0	8	5	0	0	13	371
11:30 AM	11	156	47	1	0	215	1	111	0	1	1	113	39	3	6	0	0	48	0	6	5	0	0	11	387
11:45 AM	14	175	42	0	3	231	3	112	1	0	1	116	33	4	1	0	0	38	0	9	5	0	0	14	399
Hourly Total	36	662	163	4	8	865	7	416	3	3	5	429	165	13	15	0	0	193	1	27	25	0	0	53	1540
12:00 PM	2	182	33	2	0	219	6	101	1	1	2	109	35	2	6	0	0	43	1	6	11	0	0	18	389
12:15 PM	1	170	36	0	2	207	3	119	3	0	0	125	33	3	5	0	0	41	0	1	4	0	0	5	378
12:30 PM	3	149	36	0	0	188	1	110	4	0	0	115	34	7	7	0	0	48	1	3	6	0	0	10	361
12:45 PM	7	149	42	0	3	198	2	95	0	1	0	98	34	6	2	0	0	42	0	3	7	0	0	10	348
Hourly Total	13	650	147	2	5	812	12	425	8	2	2	447	136	18	20	0	0	174	2	13	28	0	0	43	1476
1:00 PM	3	179	33	0	0	215	3	101	0	0	1	104	36	2	3	0	0	41	0	6	5	0	1	11	371
1:15 PM	5	168	35	4	0	212	1	112	2	1	0	116	41	2	5	0	0	48	0	5	2	0	0	7	383
1:30 PM	5	163	35	3	5	206	8	123	0	0	1	131	43	3	3	0	0	49	0	5	5	0	1	10	396
1:45 PM	4	210	47	0	0	261	3	105	0	1	0	109	40	2	7	0	0	49	2	6	5	0	0	13	432
Hourly Total	17	720	150	7	5	894	15	441	2	2	2	460	160	9	18	0	0	187	2	22	17	0	2	41	1582
2:00 PM	3	196	50	1	0	250	10	115	1	3	1	129	40	5	4	0	0	49	1	3	5	0	0	9	437
2:15 PM	12	177	40	0	0	229	3	137	2	2	0	144	39	2	2	0	1	43	0	4	5	0	0	9	425
2:30 PM	7	192	53	1	5	253	11	128	1	1	3	141	45	3	5	0	0	53	2	12	3	0	0	17	464
2:45 PM	4	187	60	1	1	252	9	124	2	0	1	135	49	6	6	0	0	61	2	9	4	0	0	15	463
Hourly Total	26	752	203	3	6	984	33	504	6	6	5	549	173	16	17	0	1	206	5	28	17	0	0	50	1789
3:00 PM	4	184	44	2	1	234	4	129	0	1	0	134	60	9	4	0	0	73	5	5	3	0	0	13	454
3:15 PM	4	183	40	4	3	231	6	115	0	1	1	122	56	7	8	0	0	71	0	6	2	0	0	8	432
3:30 PM	8	187	65	2	7	262	11	146	0	0	0	157	42	4	4	0	0	50	2	0	8	0	0	10	479
3:45 PM	11	204	45	1	6	261	8	141	0	0	0	149	41	7	6	0	0	54	0	6	6	0	0	12	476
Hourly Total	27	758	194	9	17	988	29	531	0	2	1	562	199	27	22	0	0	248	7	17	19	0	0	43	1841

4:00 PM	8	199	41	0	1	248	3	140	1	4	0	148	49	3	7	0	0	59	2	2	5	0	0	9	464
4:15 PM	8	187	54	2	4	251	3	141	3	1	0	148	56	3	6	0	0	65	3	5	7	0	0	15	479
4:30 PM	4	199	52	2	2	257	6	142	2	0	0	150	56	9	4	0	0	69	0	7	4	0	2	11	487
4:45 PM	9	171	73	3	6	256	9	141	1	3	0	154	64	4	2	0	0	70	1	9	5	0	0	15	495
Hourly Total	29	756	220	7	13	1012	21	564	7	8	0	600	225	19	19	0	0	263	6	23	21	0	2	50	1925
Grand Total	181	5524	1247	36	64	6988	126	3487	33	30	17	3676	1284	123	134	0	1	1541	30	166	176	0	4	372	12577
Approach %	2.6	79.0	17.8	0.5	-	-	3.4	94.9	0.9	0.8	-	-	83.3	8.0	8.7	0.0	-	-	8.1	44.6	47.3	0.0	-	-	-
Total %	1.4	43.9	9.9	0.3	-	55.6	1.0	27.7	0.3	0.2	-	29.2	10.2	1.0	1.1	0.0	-	12.3	0.2	1.3	1.4	0.0	-	3.0	-
Motorcycles	2	24	4	1	-	31	0	16	1	0	-	17	4	3	0	0	-	7	0	9	1	0	-	10	65
% Motorcycles	1.1	0.4	0.3	2.8	-	0.4	0.0	0.5	3.0	0.0	-	0.5	0.3	2.4	0.0	-	-	0.5	0.0	5.4	0.6	-	-	2.7	0.5
Cars & Light Goods	179	5458	1236	35	-	6908	124	3425	30	30	-	3609	1271	116	133	0	-	1520	30	150	175	0	-	355	12392
% Cars & Light Goods	98.9	98.8	99.1	97.2	-	98.9	98.4	98.2	90.9	100.0	-	98.2	99.0	94.3	99.3	-	-	98.6	100.0	90.4	99.4	-	-	95.4	98.5
Buses	0	30	2	0	-	32	2	31	0	0	-	33	1	0	1	0	-	2	0	0	0	0	-	0	67
% Buses	0.0	0.5	0.2	0.0	-	0.5	1.6	0.9	0.0	0.0	-	0.9	0.1	0.0	0.7	-	-	0.1	0.0	0.0	0.0	-	-	0.0	0.5
Single-Unit Trucks	0	10	3	0	-	13	0	14	0	0	-	14	5	0	0	0	-	5	0	0	0	0	-	0	32
% Single-Unit Trucks	0.0	0.2	0.2	0.0	-	0.2	0.0	0.4	0.0	0.0	-	0.4	0.4	0.0	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.3
Articulated Trucks	0	2	2	0	-	4	0	1	0	0	-	1	3	0	0	0	-	3	0	0	0	0	-	0	8
% Articulated Trucks	0.0	0.0	0.2	0.0	-	0.1	0.0	0.0	0.0	0.0	-	0.0	0.2	0.0	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	2	0	-	2	0	4	0	0	-	4	0	7	0	0	-	7	13
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	6.1	0.0	-	0.1	0.0	3.3	0.0	-	-	0.3	0.0	4.2	0.0	-	-	1.9	0.1
Bicycles on Crosswalk	-	-	-	-	7	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	10.9	-	-	-	-	-	11.8	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	57	-	-	-	-	-	15	-	-	-	-	-	1	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	89.1	-	-	-	-	-	88.2	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Falls Avenue & MacDonald
Avenue - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (4:00 PM)

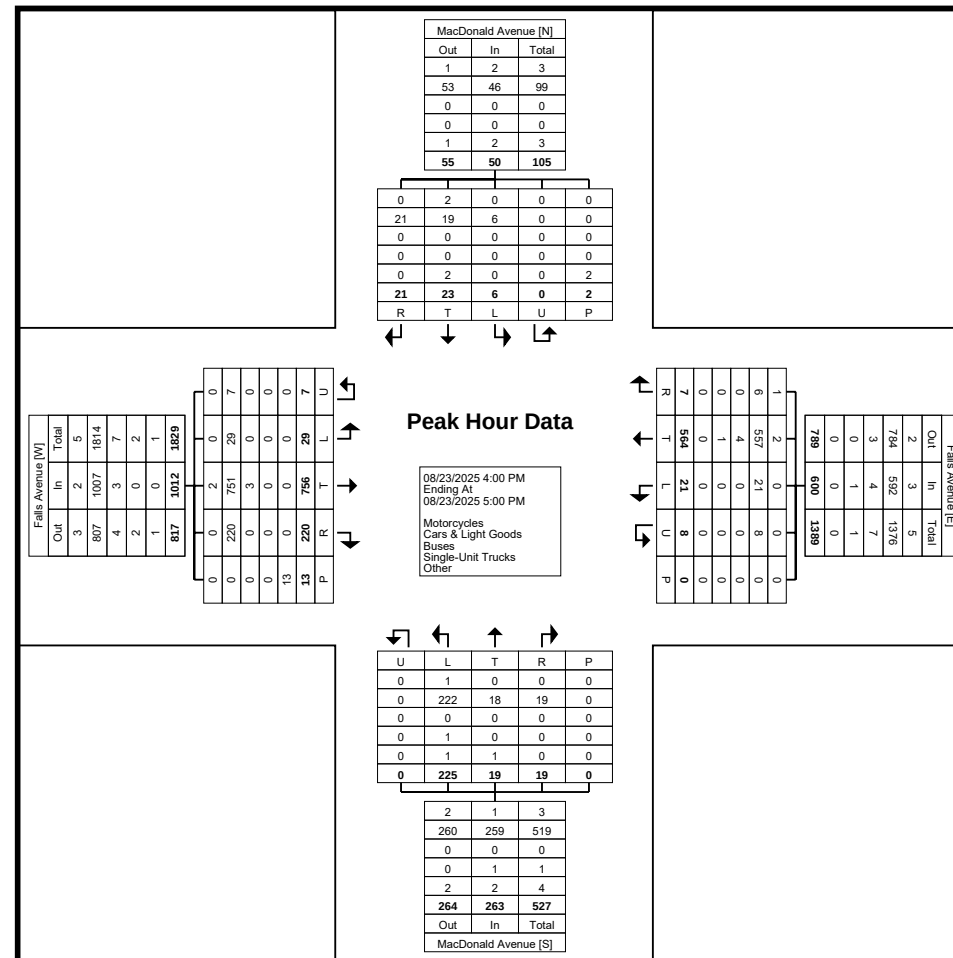
Start Time	Falls Avenue Eastbound						Falls Avenue Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:00 PM	8	199	41	0	1	248	3	140	1	4	0	148	49	3	7	0	0	59	2	2	5	0	0	9	464
4:15 PM	8	187	54	2	4	251	3	141	3	1	0	148	56	3	6	0	0	65	3	5	7	0	0	15	479
4:30 PM	4	199	52	2	2	257	6	142	2	0	0	150	56	9	4	0	0	69	0	7	4	0	2	11	487
4:45 PM	9	171	73	3	6	256	9	141	1	3	0	154	64	4	2	0	0	70	1	9	5	0	0	15	495
Total	29	756	220	7	13	1012	21	564	7	8	0	600	225	19	19	0	0	263	6	23	21	0	2	50	1925
Approach %	2.9	74.7	21.7	0.7	-	-	3.5	94.0	1.2	1.3	-	-	85.6	7.2	7.2	0.0	-	-	12.0	46.0	42.0	0.0	-	-	-
Total %	1.5	39.3	11.4	0.4	-	52.6	1.1	29.3	0.4	0.4	-	31.2	11.7	1.0	1.0	0.0	-	13.7	0.3	1.2	1.1	0.0	-	2.6	-
PHF	0.806	0.950	0.753	0.583	-	0.984	0.583	0.993	0.583	0.500	-	0.974	0.879	0.528	0.679	0.000	-	0.939	0.500	0.639	0.750	0.000	-	0.833	0.972
Motorcycles	0	2	0	0	-	2	0	2	1	0	-	3	1	0	0	0	-	1	0	2	0	0	-	2	8
% Motorcycles	0.0	0.3	0.0	0.0	-	0.2	0.0	0.4	14.3	0.0	-	0.5	0.4	0.0	0.0	-	-	0.4	0.0	8.7	0.0	-	-	4.0	0.4
Cars & Light Goods	29	751	220	7	-	1007	21	557	6	8	-	592	222	18	19	0	-	259	6	19	21	0	-	46	1904
% Cars & Light Goods	100.0	99.3	100.0	100.0	-	99.5	100.0	98.8	85.7	100.0	-	98.7	98.7	94.7	100.0	-	-	98.5	100.0	82.6	100.0	-	-	92.0	98.9
Buses	0	3	0	0	-	3	0	4	0	0	-	4	0	0	0	0	-	0	0	0	0	0	-	0	7
% Buses	0.0	0.4	0.0	0.0	-	0.3	0.0	0.7	0.0	0.0	-	0.7	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.4
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	1	0	0	0	-	1	0	0	0	0	-	0	2
% Single-Unit Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.2	0.0	0.0	-	0.2	0.4	0.0	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	1	0	0	0	-	1	0	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.4	0.0	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	2	0	0	-	2	3
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	5.3	0.0	-	-	0.4	0.0	8.7	0.0	-	-	4.0	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Falls Avenue & MacDonald
Avenue - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 5





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Hunter Street Northbound						2nd Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	0	10	0	0	0	10	1	2	0	0	0	3	1	0	0	0	0	1	0	0	0	0	0	0	14
9:15 AM	0	8	1	0	0	9	0	8	0	0	0	8	2	0	1	0	0	3	0	0	0	0	2	0	20
9:30 AM	0	8	1	0	0	9	0	7	0	0	0	7	2	0	1	0	0	3	0	0	0	0	0	0	19
9:45 AM	0	9	1	0	0	10	1	3	0	0	1	4	1	0	1	0	1	2	0	0	0	0	2	0	16
Hourly Total	0	35	3	0	0	38	2	20	0	0	1	22	6	0	3	0	1	9	0	0	0	0	4	0	69
10:00 AM	0	15	0	0	0	15	1	15	0	0	0	16	1	0	0	0	0	1	0	0	0	0	0	0	32
10:15 AM	0	9	1	1	0	11	1	7	1	0	0	9	3	0	0	0	0	3	0	0	1	0	3	1	24
10:30 AM	0	14	3	0	0	17	0	6	0	0	2	6	2	0	0	0	1	2	0	0	0	0	2	0	25
10:45 AM	0	14	0	0	1	14	1	6	1	0	0	8	2	0	0	0	0	2	0	0	1	0	1	1	25
Hourly Total	0	52	4	1	1	57	3	34	2	0	2	39	8	0	0	0	1	8	0	0	2	0	6	2	106
11:00 AM	0	14	0	0	0	14	1	9	0	0	0	10	3	0	0	0	1	3	0	0	0	0	0	0	27
11:15 AM	0	14	1	0	0	15	0	7	0	0	0	7	5	0	1	0	7	6	0	0	0	0	0	0	28
11:30 AM	0	18	2	0	0	20	1	3	0	0	0	4	2	0	2	0	0	4	0	0	0	0	2	0	28
11:45 AM	0	12	1	0	0	13	0	9	0	0	2	9	2	0	3	0	0	5	0	0	0	0	1	0	27
Hourly Total	0	58	4	0	0	62	2	28	0	0	2	30	12	0	6	0	8	18	0	0	0	0	3	0	110
12:00 PM	0	18	2	0	0	20	1	14	0	0	0	15	3	0	1	0	1	4	0	0	0	0	2	0	39
12:15 PM	1	10	3	0	0	14	0	10	0	0	1	10	3	0	1	0	1	4	0	0	1	0	4	1	29
12:30 PM	0	20	1	0	0	21	0	7	0	0	0	7	4	0	0	0	1	4	0	0	1	0	3	1	33
12:45 PM	0	10	2	0	0	12	0	4	0	0	2	4	4	0	0	0	3	4	0	0	1	0	0	1	21
Hourly Total	1	58	8	0	0	67	1	35	0	0	3	36	14	0	2	0	6	16	0	0	3	0	9	3	122
1:00 PM	0	11	0	0	0	11	1	7	0	0	0	8	0	0	0	0	1	0	0	0	0	0	0	0	19
1:15 PM	0	8	1	0	0	9	2	10	0	0	0	12	1	0	0	0	1	1	0	0	0	0	2	0	22
1:30 PM	0	9	1	0	0	10	0	6	0	0	0	6	3	0	0	0	0	3	0	0	0	0	0	0	19
1:45 PM	0	14	2	0	1	16	1	9	0	0	0	10	2	0	3	0	1	5	0	0	0	0	1	0	31
Hourly Total	0	42	4	0	1	46	4	32	0	0	0	36	6	0	3	0	3	9	0	0	0	0	3	0	91
2:00 PM	1	15	5	0	0	21	1	10	0	0	2	11	3	0	1	0	3	4	0	0	1	0	0	1	37
2:15 PM	0	13	2	0	0	15	0	11	0	0	1	11	5	0	0	0	0	5	0	0	0	0	0	0	31
2:30 PM	0	24	2	0	0	26	1	9	0	0	0	10	4	0	1	0	0	5	0	0	1	0	3	1	42
2:45 PM	0	17	0	0	0	17	3	8	2	0	0	13	3	0	0	0	0	3	0	0	0	0	0	0	33
Hourly Total	1	69	9	0	0	79	5	38	2	0	3	45	15	0	2	0	3	17	0	0	2	0	3	2	143
3:00 PM	0	19	2	0	0	21	0	23	1	0	0	24	6	0	4	0	5	10	0	0	1	0	3	1	56
3:15 PM	0	24	5	0	0	29	1	13	0	0	4	14	7	0	4	0	0	11	0	0	0	0	4	0	54
3:30 PM	0	14	3	0	1	17	1	12	1	0	0	14	2	0	0	0	4	2	0	0	0	0	0	0	33
3:45 PM	0	16	3	0	0	19	0	13	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	32
Hourly Total	0	73	13	0	1	86	2	61	2	0	4	65	15	0	8	0	9	23	0	0	1	0	7	1	175

4:00 PM	0	19	4	0	0	23	1	14	0	0	1	15	4	0	2	0	1	6	0	0	0	0	3	0	44
4:15 PM	0	22	1	0	2	23	0	9	0	0	1	9	2	0	1	0	0	3	0	0	0	0	0	0	35
4:30 PM	0	17	0	0	0	17	1	8	0	0	1	9	1	0	2	0	0	3	0	0	0	0	5	0	29
4:45 PM	0	14	1	0	0	15	0	12	0	0	4	12	0	0	0	0	0	0	0	0	0	0	2	0	27
Hourly Total	0	72	6	0	2	78	2	43	0	0	7	45	7	0	5	0	1	12	0	0	0	0	10	0	135
Grand Total	2	459	51	1	5	513	21	291	6	0	22	318	83	0	29	0	32	112	0	0	8	0	45	8	951
Approach %	0.4	89.5	9.9	0.2	-	-	6.6	91.5	1.9	0.0	-	-	74.1	0.0	25.9	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.2	48.3	5.4	0.1	-	53.9	2.2	30.6	0.6	0.0	-	33.4	8.7	0.0	3.0	0.0	-	11.8	0.0	0.0	0.8	0.0	-	0.8	-
Motorcycles	0	5	0	0	-	5	0	2	0	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	7
% Motorcycles	0.0	1.1	0.0	0.0	-	1.0	0.0	0.7	0.0	-	-	0.6	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.7
Cars & Light Goods	2	440	51	1	-	494	20	281	6	0	-	307	81	0	26	0	-	107	0	0	7	0	-	7	915
% Cars & Light Goods	100.0	95.9	100.0	100.0	-	96.3	95.2	96.6	100.0	-	-	96.5	97.6	-	89.7	-	-	95.5	-	-	87.5	-	-	87.5	96.2
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Buses	0.0	0.2	0.0	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.1
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	13	0	0	-	13	1	8	0	0	-	9	2	0	3	0	-	5	0	0	1	0	-	1	28
% Bicycles on Road	0.0	2.8	0.0	0.0	-	2.5	4.8	2.7	0.0	-	-	2.8	2.4	-	10.3	-	-	4.5	-	-	12.5	-	-	12.5	2.9
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	3	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	20.0	-	-	-	-	-	4.5	-	-	-	-	-	9.4	-	-	-	-	-	8.9	-	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	21	-	-	-	-	-	29	-	-	-	-	-	41	-	-
% Pedestrians	-	-	-	-	80.0	-	-	-	-	-	95.5	-	-	-	-	-	90.6	-	-	-	-	-	91.1	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (2:30 PM)

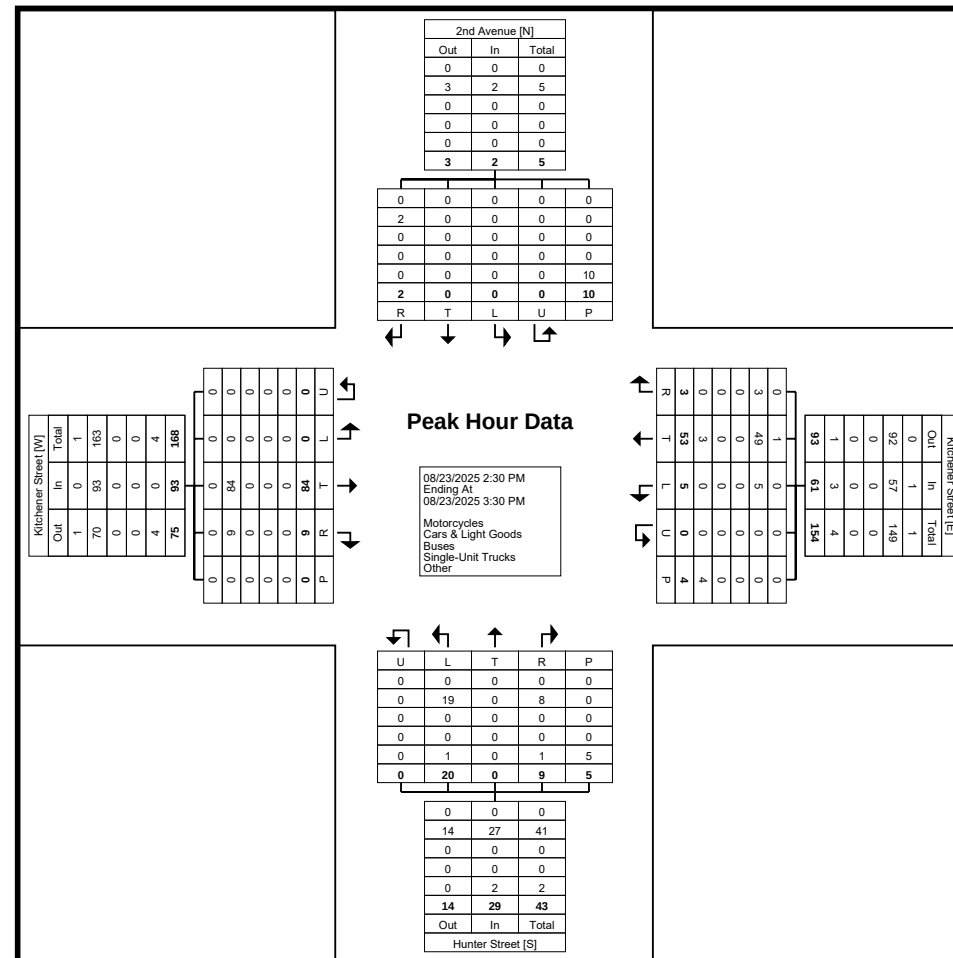
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						Hunter Street Northbound						2nd Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
2:30 PM	0	24	2	0	0	26	1	9	0	0	0	10	4	0	1	0	0	5	0	0	1	0	3	1	42
2:45 PM	0	17	0	0	0	17	3	8	2	0	0	13	3	0	0	0	0	3	0	0	0	0	0	0	33
3:00 PM	0	19	2	0	0	21	0	23	1	0	0	24	6	0	4	0	5	10	0	0	1	0	3	1	56
3:15 PM	0	24	5	0	0	29	1	13	0	0	4	14	7	0	4	0	0	11	0	0	0	0	4	0	54
Total	0	84	9	0	0	93	5	53	3	0	4	61	20	0	9	0	5	29	0	0	2	0	10	2	185
Approach %	0.0	90.3	9.7	0.0	-	-	8.2	86.9	4.9	0.0	-	-	69.0	0.0	31.0	0.0	-	-	0.0	0.0	100.0	0.0	-	-	-
Total %	0.0	45.4	4.9	0.0	-	50.3	2.7	28.6	1.6	0.0	-	33.0	10.8	0.0	4.9	0.0	-	15.7	0.0	0.0	1.1	0.0	-	1.1	-
PHF	0.000	0.875	0.450	0.000	-	0.802	0.417	0.576	0.375	0.000	-	0.635	0.714	0.000	0.563	0.000	-	0.659	0.000	0.000	0.500	0.000	-	0.500	0.826
Motorcycles	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Motorcycles	-	0.0	0.0	-	-	0.0	0.0	1.9	0.0	-	-	1.6	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.5
Cars & Light Goods	0	84	9	0	-	93	5	49	3	0	-	57	19	0	8	0	-	27	0	0	2	0	-	2	179
% Cars & Light Goods	-	100.0	100.0	-	-	100.0	100.0	92.5	100.0	-	-	93.4	95.0	-	88.9	-	-	93.1	-	-	100.0	-	-	100.0	96.8
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Single-Unit Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	-	-	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	0	-	0	0	3	0	0	-	3	1	0	1	0	-	2	0	0	0	0	-	0	5
% Bicycles on Road	-	0.0	0.0	-	-	0.0	0.0	5.7	0.0	-	-	4.9	5.0	-	11.1	-	-	6.9	-	-	0.0	-	-	0.0	2.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	25.0	-	-	-	-	-	40.0	-	-	-	-	-	10.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-	-	9	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	75.0	-	-	-	-	-	60.0	-	-	-	-	-	90.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & Hunter Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 5



Turning Movement Peak Hour Data Plot (2:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Kitchener Street & MacDonald
Avenue - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	3	9	1	0	2	13	0	3	9	0	0	12	0	19	0	0	0	19	3	12	1	0	0	16	60
9:15 AM	1	5	4	0	2	10	0	5	9	0	0	14	1	15	0	0	0	16	3	8	4	0	2	15	55
9:30 AM	3	6	1	0	3	10	0	7	14	0	1	21	1	19	0	0	0	20	6	15	0	0	0	21	72
9:45 AM	2	7	2	0	2	11	0	5	10	0	0	15	0	16	1	0	0	17	6	13	3	0	0	22	65
Hourly Total	9	27	8	0	9	44	0	20	42	0	1	62	2	69	1	0	0	72	18	48	8	0	2	74	252
10:00 AM	2	5	4	0	0	11	0	5	11	0	0	16	0	16	1	0	0	17	7	22	2	0	0	31	75
10:15 AM	5	7	2	0	1	14	0	10	10	0	0	20	1	15	1	0	0	17	9	21	2	0	3	32	83
10:30 AM	4	8	2	0	0	14	2	4	6	0	0	12	0	23	1	0	0	24	11	20	2	0	1	33	83
10:45 AM	5	10	1	0	1	16	0	6	17	0	0	23	1	33	0	0	0	34	9	30	5	0	2	44	117
Hourly Total	16	30	9	0	2	55	2	25	44	0	0	71	2	87	3	0	0	92	36	93	11	0	6	140	358
11:00 AM	3	9	0	0	8	12	2	6	17	0	2	25	0	37	0	0	0	37	13	24	1	0	1	38	112
11:15 AM	7	12	0	0	4	19	0	5	20	0	0	25	0	24	0	0	2	24	20	28	3	0	3	51	119
11:30 AM	7	16	5	0	0	28	0	3	9	0	1	12	0	33	0	0	0	33	15	34	7	0	0	56	129
11:45 AM	2	6	2	0	6	10	1	10	13	0	2	24	1	24	1	0	0	26	13	35	3	0	1	51	111
Hourly Total	19	43	7	0	18	69	3	24	59	0	5	86	1	118	1	0	2	120	61	121	14	0	5	196	471
12:00 PM	4	12	2	0	0	18	2	9	18	0	0	29	0	21	0	0	1	21	10	27	7	0	1	44	112
12:15 PM	5	8	2	0	1	15	1	11	9	0	4	21	1	31	0	0	0	32	12	20	2	0	0	34	102
12:30 PM	6	11	0	0	0	17	1	4	12	0	0	17	1	29	0	0	0	30	14	25	3	0	0	42	106
12:45 PM	1	5	1	0	2	7	1	2	18	0	4	21	0	25	1	0	0	26	7	41	2	0	0	50	104
Hourly Total	16	36	5	0	3	57	5	26	57	0	8	88	2	106	1	0	1	109	43	113	14	0	1	170	424
1:00 PM	4	5	0	0	0	9	4	9	14	0	3	27	2	24	0	0	1	26	8	28	3	0	0	39	101
1:15 PM	1	8	2	0	0	11	1	9	7	0	0	17	3	35	1	0	1	39	11	26	8	0	0	45	112
1:30 PM	1	1	1	0	2	3	3	4	20	0	8	27	2	28	1	0	0	31	8	36	3	0	1	47	108
1:45 PM	5	11	2	0	2	18	3	5	4	0	0	12	0	38	1	0	0	39	13	35	6	0	0	54	123
Hourly Total	11	25	5	0	4	41	11	27	45	0	11	83	7	125	3	0	2	135	40	125	20	0	1	185	444
2:00 PM	5	8	6	0	1	19	1	11	14	0	1	26	1	36	3	0	0	40	8	51	7	0	1	66	151
2:15 PM	2	6	1	0	0	9	3	13	14	0	0	30	2	27	1	0	0	30	10	31	5	0	0	46	115
2:30 PM	5	16	3	0	3	24	4	11	12	0	2	27	0	36	2	0	0	38	22	46	6	0	0	74	163
2:45 PM	7	11	1	0	4	19	1	7	12	0	1	20	2	48	1	0	0	51	12	59	10	0	0	81	171
Hourly Total	19	41	11	0	8	71	9	42	52	0	4	103	5	147	7	0	0	159	52	187	28	0	1	267	600
3:00 PM	6	8	1	0	1	15	3	24	18	0	0	45	0	46	0	0	0	46	15	34	5	0	2	54	160
3:15 PM	8	16	1	0	2	25	4	9	20	0	1	33	1	44	0	0	0	45	14	36	4	0	1	54	157
3:30 PM	6	4	1	0	11	11	1	11	19	0	0	31	1	29	1	0	0	31	20	49	7	0	0	76	149
3:45 PM	6	8	2	0	10	16	3	9	8	0	0	20	1	43	1	0	0	45	15	43	4	0	0	62	143
Hourly Total	26	36	5	0	24	67	11	53	65	0	1	129	3	162	2	0	0	167	64	162	20	0	3	246	609

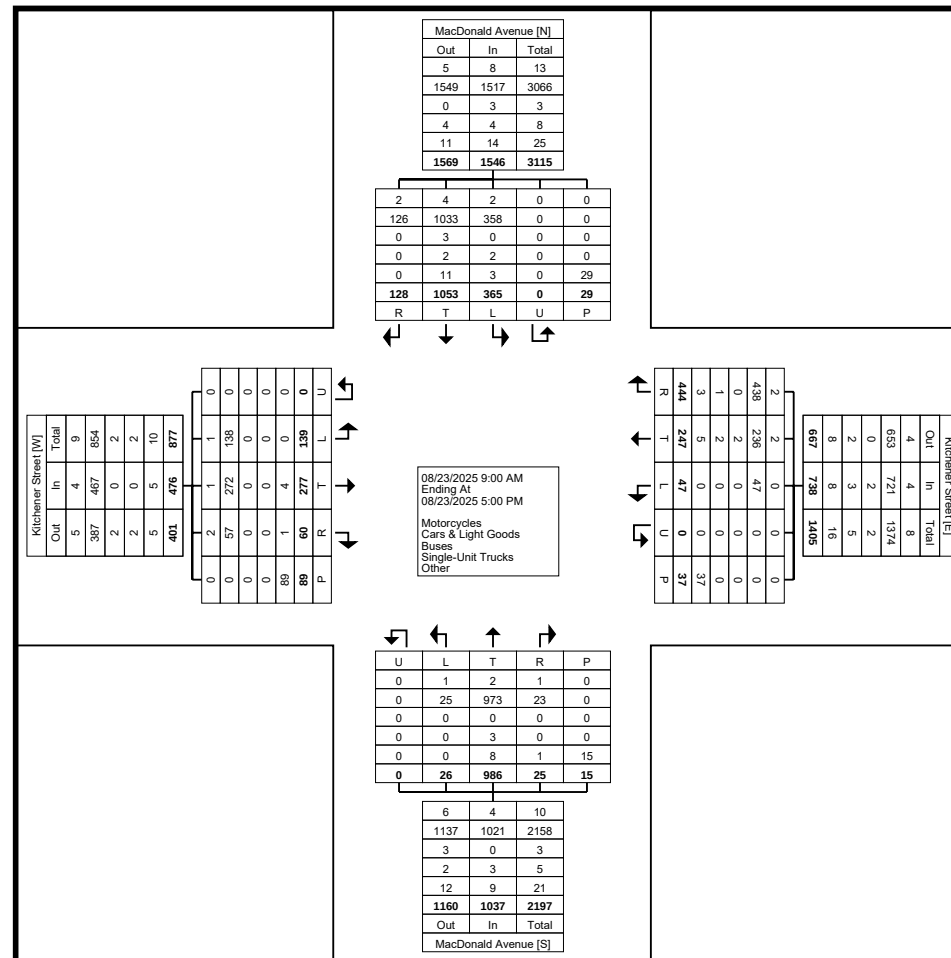
4:00 PM	8	8	3	0	1	19	1	10	15	0	0	26	3	41	1	0	2	45	16	30	1	0	0	47	137
4:15 PM	5	8	1	0	9	14	2	6	21	0	0	29	1	38	4	0	1	43	12	48	4	0	2	64	150
4:30 PM	3	12	3	0	5	18	0	5	25	0	5	30	0	49	1	0	3	50	11	49	2	0	6	62	160
4:45 PM	7	11	3	0	6	21	3	9	19	0	2	31	0	44	1	0	4	45	12	77	6	0	2	95	192
Hourly Total	23	39	10	0	21	72	6	30	80	0	7	116	4	172	7	0	10	183	51	204	13	0	10	268	639
Grand Total	139	277	60	0	89	476	47	247	444	0	37	738	26	986	25	0	15	1037	365	1053	128	0	29	1546	3797
Approach %	29.2	58.2	12.6	0.0	-	-	6.4	33.5	60.2	0.0	-	-	2.5	95.1	2.4	0.0	-	-	23.6	68.1	8.3	0.0	-	-	-
Total %	3.7	7.3	1.6	0.0	-	12.5	1.2	6.5	11.7	0.0	-	19.4	0.7	26.0	0.7	0.0	-	27.3	9.6	27.7	3.4	0.0	-	40.7	-
Motorcycles	1	1	2	0	-	4	0	2	2	0	-	4	1	2	1	0	-	4	2	4	2	0	-	8	20
% Motorcycles	0.7	0.4	3.3	-	-	0.8	0.0	0.8	0.5	-	-	0.5	3.8	0.2	4.0	-	-	0.4	0.5	0.4	1.6	-	-	0.5	0.5
Cars & Light Goods	138	272	57	0	-	467	47	236	438	0	-	721	25	973	23	0	-	1021	358	1033	126	0	-	1517	3726
% Cars & Light Goods	99.3	98.2	95.0	-	-	98.1	100.0	95.5	98.6	-	-	97.7	96.2	98.7	92.0	-	-	98.5	98.1	98.1	98.4	-	-	98.1	98.1
Buses	0	0	0	0	-	0	0	2	0	0	-	2	0	0	0	0	-	0	0	3	0	0	-	3	5
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.2	0.1
Single-Unit Trucks	0	0	0	0	-	0	0	2	1	0	-	3	0	3	0	0	-	3	2	2	0	0	-	4	10
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.8	0.2	-	-	0.4	0.0	0.3	0.0	-	-	0.3	0.5	0.2	0.0	-	-	0.3	0.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	2	0	0	-	2	5
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	0.2	0.0	-	-	0.1	0.1
Bicycles on Road	0	4	1	0	-	5	0	5	3	0	-	8	0	5	1	0	-	6	3	9	0	0	-	12	31
% Bicycles on Road	0.0	1.4	1.7	-	-	1.1	0.0	2.0	0.7	-	-	1.1	0.0	0.5	4.0	-	-	0.6	0.8	0.9	0.0	-	-	0.8	0.8
Bicycles on Crosswalk	-	-	-	-	8	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	9.0	-	-	-	-	-	5.4	-	-	-	-	-	0.0	-	-	-	-	-	10.3	-	-
Pedestrians	-	-	-	-	81	-	-	-	-	-	35	-	-	-	-	-	15	-	-	-	-	-	26	-	-
% Pedestrians	-	-	-	-	91.0	-	-	-	-	-	94.6	-	-	-	-	-	100.0	-	-	-	-	-	89.7	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Kitchener Street & MacDonald
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Site Code: 250550
Start Date: 08/23/2025
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Kitchener Street & MacDonald
Avenue - Saturday
Site Code: 250550
Start Date: 08/23/2025
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Turning Movement Peak Hour Data (2:30 PM)

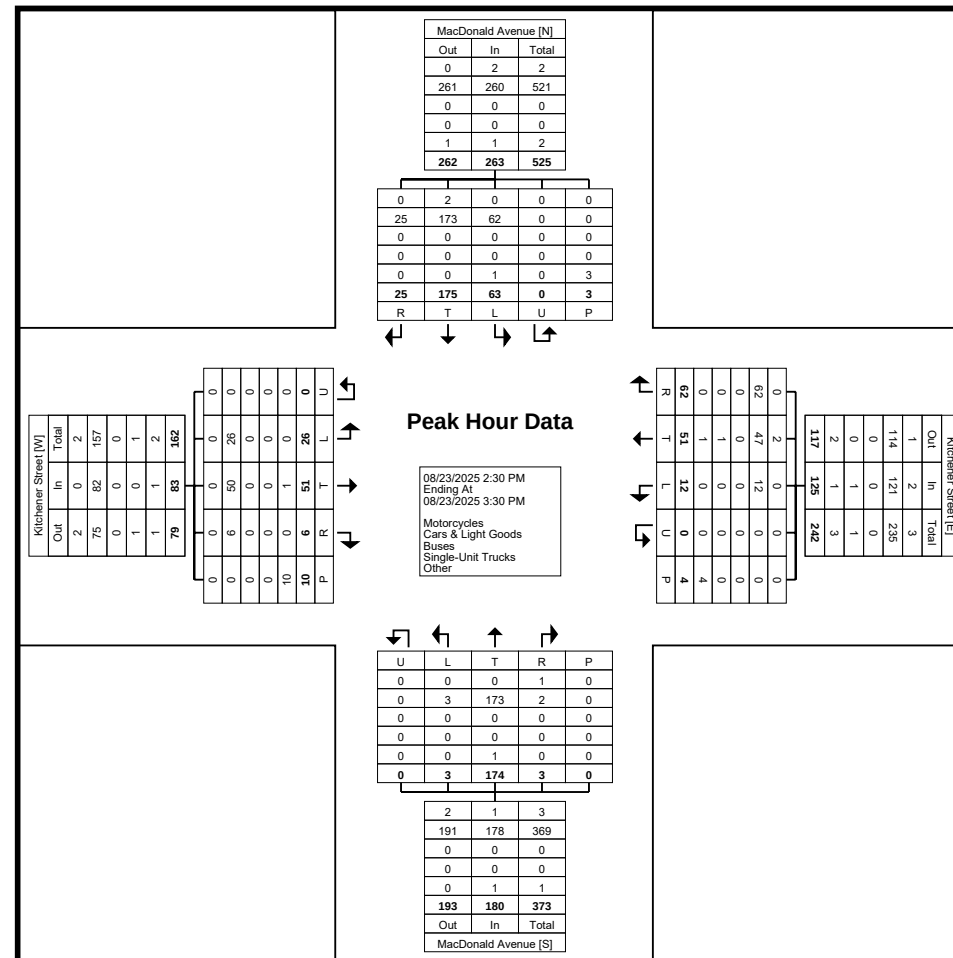
Start Time	Kitchener Street Eastbound						Kitchener Street Westbound						MacDonald Avenue Northbound						MacDonald Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
2:30 PM	5	16	3	0	3	24	4	11	12	0	2	27	0	36	2	0	0	38	22	46	6	0	0	74	163
2:45 PM	7	11	1	0	4	19	1	7	12	0	1	20	2	48	1	0	0	51	12	59	10	0	0	81	171
3:00 PM	6	8	1	0	1	15	3	24	18	0	0	45	0	46	0	0	0	46	15	34	5	0	2	54	160
3:15 PM	8	16	1	0	2	25	4	9	20	0	1	33	1	44	0	0	0	45	14	36	4	0	1	54	157
Total	26	51	6	0	10	83	12	51	62	0	4	125	3	174	3	0	0	180	63	175	25	0	3	263	651
Approach %	31.3	61.4	7.2	0.0	-	-	9.6	40.8	49.6	0.0	-	-	1.7	96.7	1.7	0.0	-	-	24.0	66.5	9.5	0.0	-	-	-
Total %	4.0	7.8	0.9	0.0	-	12.7	1.8	7.8	9.5	0.0	-	19.2	0.5	26.7	0.5	0.0	-	27.6	9.7	26.9	3.8	0.0	-	40.4	-
PHF	0.813	0.797	0.500	0.000	-	0.830	0.750	0.531	0.775	0.000	-	0.694	0.375	0.906	0.375	0.000	-	0.882	0.716	0.742	0.625	0.000	-	0.812	0.952
Motorcycles	0	0	0	0	-	0	0	2	0	0	-	2	0	0	1	0	-	1	0	2	0	0	-	2	5
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	3.9	0.0	-	-	1.6	0.0	0.0	33.3	-	-	0.6	0.0	1.1	0.0	-	-	0.8	0.8
Cars & Light Goods	26	50	6	0	-	82	12	47	62	0	-	121	3	173	2	0	-	178	62	173	25	0	-	260	641
% Cars & Light Goods	100.0	98.0	100.0	-	-	98.8	100.0	92.2	100.0	-	-	96.8	100.0	99.4	66.7	-	-	98.9	98.4	98.9	100.0	-	-	98.9	98.5
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Single-Unit Trucks	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	2.0	0.0	-	-	0.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.2
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	1	0	0	-	1	0	1	0	0	-	1	0	1	0	0	-	1	1	0	0	0	-	1	4
% Bicycles on Road	0.0	2.0	0.0	-	-	1.2	0.0	2.0	0.0	-	-	0.8	0.0	0.6	0.0	-	-	0.6	1.6	0.0	0.0	-	-	0.4	0.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	10	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Kitchener Street & MacDonald
Avenue - Saturday
Site Code: 250550
Start Date: 08/23/2025
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Turning Movement Peak Hour Data Plot (2:30 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Bender Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
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Turning Movement Data

Start Time	Bender Street Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
9:00 AM	10	7	0	14	17	24	22	0	2	46	15	33	0	2	48	111
9:15 AM	9	5	0	10	14	29	29	0	7	58	29	40	0	9	69	141
9:30 AM	9	13	0	2	22	33	20	0	0	53	34	43	0	2	77	152
9:45 AM	11	16	0	16	27	29	27	0	2	56	36	28	0	2	64	147
Hourly Total	39	41	0	42	80	115	98	0	11	213	114	144	0	15	258	551
10:00 AM	11	12	0	8	23	33	26	0	5	59	33	39	0	5	72	154
10:15 AM	11	16	0	3	27	42	52	0	3	94	31	38	0	5	69	190
10:30 AM	17	22	0	4	39	44	28	0	5	72	54	29	0	6	83	194
10:45 AM	16	15	0	17	31	45	32	1	0	78	50	47	0	15	97	206
Hourly Total	55	65	0	32	120	164	138	1	13	303	168	153	0	31	321	744
11:00 AM	13	18	0	13	31	45	40	0	13	85	45	44	1	10	90	206
11:15 AM	26	27	0	24	53	43	30	0	7	73	50	43	0	6	93	219
11:30 AM	16	6	0	18	22	41	33	0	4	74	52	60	0	7	112	208
11:45 AM	40	19	0	15	59	42	45	0	5	87	56	74	0	4	130	276
Hourly Total	95	70	0	70	165	171	148	0	29	319	203	221	1	27	425	909
12:00 PM	23	28	0	62	51	46	41	0	13	87	34	72	0	23	106	244
12:15 PM	24	20	0	35	44	54	57	0	10	111	39	53	0	22	92	247
12:30 PM	20	20	0	13	40	51	33	0	8	84	53	53	0	5	106	230
12:45 PM	18	15	0	32	33	42	32	0	5	74	44	63	0	20	107	214
Hourly Total	85	83	0	142	168	193	163	0	36	356	170	241	0	70	411	935
1:00 PM	11	26	0	27	37	51	31	0	4	82	57	55	2	7	114	233
1:15 PM	34	14	0	27	48	44	50	0	11	94	51	66	0	2	117	259
1:30 PM	28	16	0	16	44	51	45	0	6	96	30	67	0	8	97	237
1:45 PM	21	19	0	18	40	43	37	0	7	80	63	65	0	20	128	248
Hourly Total	94	75	0	88	169	189	163	0	28	352	201	253	2	37	456	977
2:00 PM	24	32	0	20	56	54	44	0	0	98	45	81	0	4	126	280
2:15 PM	21	29	0	17	50	50	31	0	5	81	46	59	0	7	105	236
2:30 PM	35	33	0	46	68	43	42	0	14	85	61	84	0	8	145	298
2:45 PM	22	33	0	43	55	52	45	0	19	97	62	69	0	19	131	283
Hourly Total	102	127	0	126	229	199	162	0	38	361	214	293	0	38	507	1097
3:00 PM	23	38	0	23	61	64	47	0	3	111	43	70	0	12	113	285
3:15 PM	16	34	0	29	50	46	55	0	9	101	54	73	0	4	127	278
3:30 PM	26	41	0	26	67	54	48	0	2	102	54	64	0	1	118	287
3:45 PM	32	37	0	27	69	46	66	0	5	112	70	59	0	13	129	310
Hourly Total	97	150	0	105	247	210	216	0	19	426	221	266	0	30	487	1160
4:00 PM	25	38	0	61	63	56	59	0	17	115	56	63	0	12	119	297

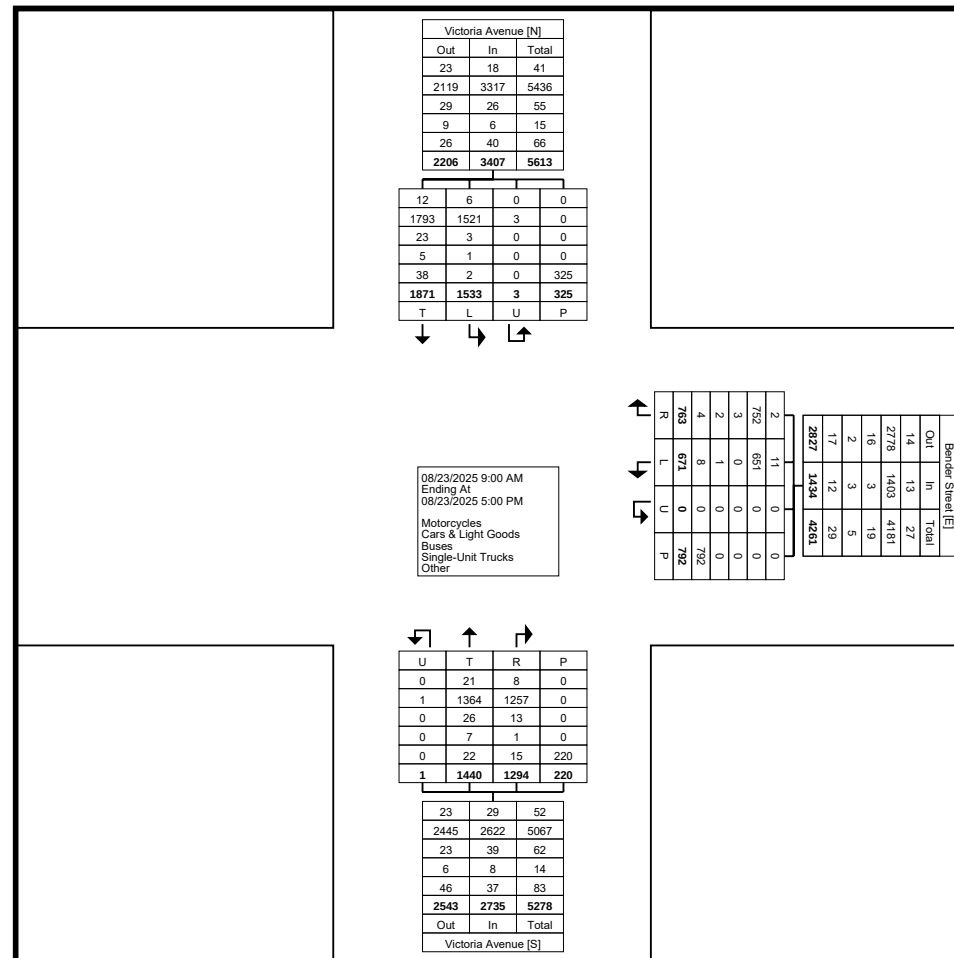
4:15 PM	22	42	0	25	64	52	47	0	6	99	60	79	0	38	139	302
4:30 PM	33	38	0	46	71	44	46	0	13	90	68	77	0	11	145	306
4:45 PM	24	34	0	55	58	47	54	0	10	101	58	81	0	16	139	298
Hourly Total	104	152	0	187	256	199	206	0	46	405	242	300	0	77	542	1203
Grand Total	671	763	0	792	1434	1440	1294	1	220	2735	1533	1871	3	325	3407	7576
Approach %	46.8	53.2	0.0	-	-	52.7	47.3	0.0	-	-	45.0	54.9	0.1	-	-	-
Total %	8.9	10.1	0.0	-	18.9	19.0	17.1	0.0	-	36.1	20.2	24.7	0.0	-	45.0	-
Motorcycles	11	2	0	-	13	21	8	0	-	29	6	12	0	-	18	60
% Motorcycles	1.6	0.3	-	-	0.9	1.5	0.6	0.0	-	1.1	0.4	0.6	0.0	-	0.5	0.8
Cars & Light Goods	651	752	0	-	1403	1364	1257	1	-	2622	1521	1793	3	-	3317	7342
% Cars & Light Goods	97.0	98.6	-	-	97.8	94.7	97.1	100.0	-	95.9	99.2	95.8	100.0	-	97.4	96.9
Buses	0	3	0	-	3	26	13	0	-	39	3	23	0	-	26	68
% Buses	0.0	0.4	-	-	0.2	1.8	1.0	0.0	-	1.4	0.2	1.2	0.0	-	0.8	0.9
Single-Unit Trucks	1	2	0	-	3	7	1	0	-	8	1	5	0	-	6	17
% Single-Unit Trucks	0.1	0.3	-	-	0.2	0.5	0.1	0.0	-	0.3	0.1	0.3	0.0	-	0.2	0.2
Articulated Trucks	0	0	0	-	0	3	3	0	-	6	0	2	0	-	2	8
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	0.2	0.0	-	0.2	0.0	0.1	0.0	-	0.1	0.1
Bicycles on Road	8	4	0	-	12	19	12	0	-	31	2	36	0	-	38	81
% Bicycles on Road	1.2	0.5	-	-	0.8	1.3	0.9	0.0	-	1.1	0.1	1.9	0.0	-	1.1	1.1
Bicycles on Crosswalk	-	-	-	19	-	-	-	-	7	-	-	-	-	8	-	-
% Bicycles on Crosswalk	-	-	-	2.4	-	-	-	-	3.2	-	-	-	-	2.5	-	-
Pedestrians	-	-	-	773	-	-	-	-	213	-	-	-	-	317	-	-
% Pedestrians	-	-	-	97.6	-	-	-	-	96.8	-	-	-	-	97.5	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Victoria Avenue & Bender Street -
Saturday
Site Code: 250550
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Victoria Avenue & Bender Street -
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Turning Movement Peak Hour Data (3:45 PM)

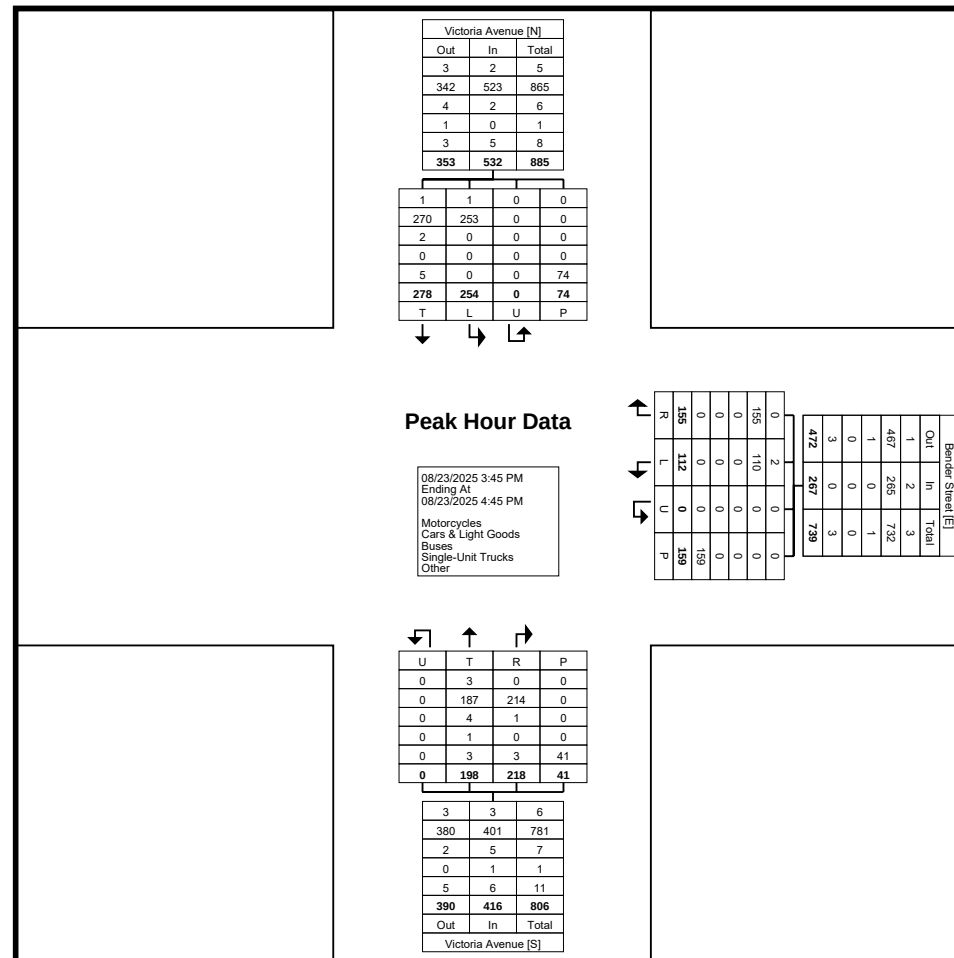
Start Time	Bender Street Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
3:45 PM	32	37	0	27	69	46	66	0	5	112	70	59	0	13	129	310
4:00 PM	25	38	0	61	63	56	59	0	17	115	56	63	0	12	119	297
4:15 PM	22	42	0	25	64	52	47	0	6	99	60	79	0	38	139	302
4:30 PM	33	38	0	46	71	44	46	0	13	90	68	77	0	11	145	306
Total	112	155	0	159	267	198	218	0	41	416	254	278	0	74	532	1215
Approach %	41.9	58.1	0.0	-	-	47.6	52.4	0.0	-	-	47.7	52.3	0.0	-	-	-
Total %	9.2	12.8	0.0	-	22.0	16.3	17.9	0.0	-	34.2	20.9	22.9	0.0	-	43.8	-
PHF	0.848	0.923	0.000	-	0.940	0.884	0.826	0.000	-	0.904	0.907	0.880	0.000	-	0.917	0.980
Motorcycles	2	0	0	-	2	3	0	0	-	3	1	1	0	-	2	7
% Motorcycles	1.8	0.0	-	-	0.7	1.5	0.0	-	-	0.7	0.4	0.4	-	-	0.4	0.6
Cars & Light Goods	110	155	0	-	265	187	214	0	-	401	253	270	0	-	523	1189
% Cars & Light Goods	98.2	100.0	-	-	99.3	94.4	98.2	-	-	96.4	99.6	97.1	-	-	98.3	97.9
Buses	0	0	0	-	0	4	1	0	-	5	0	2	0	-	2	7
% Buses	0.0	0.0	-	-	0.0	2.0	0.5	-	-	1.2	0.0	0.7	-	-	0.4	0.6
Single-Unit Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.2	0.0	0.0	-	-	0.0	0.1
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	3	3	0	-	6	0	5	0	-	5	11
% Bicycles on Road	0.0	0.0	-	-	0.0	1.5	1.4	-	-	1.4	0.0	1.8	-	-	0.9	0.9
Bicycles on Crosswalk	-	-	-	4	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	2.5	-	-	-	-	0.0	-	-	-	-	1.4	-	-
Pedestrians	-	-	-	155	-	-	-	-	41	-	-	-	-	73	-	-
% Pedestrians	-	-	-	97.5	-	-	-	-	100.0	-	-	-	-	98.6	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Bender Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
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Turning Movement Peak Hour Data Plot (3:45 PM)



Paradigm Transportation Solutions Limited
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Cambridge, Ontario, Canada N1R 8J8
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Count Name: Victoria Avenue & Falls Avenue
EB Ramp - Saturday
Site Code: 250550
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Turning Movement Data

Start Time	Falls Avenue EB Ramp Eastbound						Falls Avenue EB Ramp Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	11	0	23	0	11	34	0	0	0	0	10	0	0	39	1	0	0	40	3	32	0	0	0	35	109
9:15 AM	26	1	27	0	5	54	0	0	0	0	7	0	0	38	0	0	0	38	8	42	0	0	0	50	142
9:30 AM	20	0	41	0	8	61	0	0	0	0	4	0	0	48	2	0	0	50	5	37	0	0	0	42	153
9:45 AM	39	0	39	0	7	78	0	0	0	0	5	0	0	45	1	0	0	46	5	29	0	0	0	34	158
Hourly Total	96	1	130	0	31	227	0	0	0	0	26	0	0	170	4	0	0	174	21	140	0	0	0	161	562
10:00 AM	20	0	37	0	6	57	0	0	0	0	4	0	0	49	0	0	0	49	6	44	0	0	0	50	156
10:15 AM	26	0	33	0	4	59	0	0	0	0	9	0	0	62	1	0	1	63	8	35	0	0	0	43	165
10:30 AM	37	0	51	0	10	88	0	0	0	0	3	0	0	64	1	0	0	65	13	33	0	0	0	46	199
10:45 AM	34	0	45	0	5	79	0	0	0	0	12	0	0	67	1	0	1	68	16	50	0	0	0	66	213
Hourly Total	117	0	166	0	25	283	0	0	0	0	28	0	0	242	3	0	2	245	43	162	0	0	0	205	733
11:00 AM	40	2	42	0	15	84	0	0	0	0	7	0	0	73	0	0	1	73	14	57	0	0	0	71	228
11:15 AM	41	2	50	0	8	93	0	0	0	0	9	0	0	78	2	0	0	80	9	49	0	0	0	58	231
11:30 AM	24	0	55	0	9	79	0	0	0	0	6	0	0	68	1	0	0	69	13	59	1	0	0	73	221
11:45 AM	36	0	56	0	18	92	0	0	0	0	10	0	0	72	1	0	3	73	10	80	0	0	1	90	255
Hourly Total	141	4	203	0	50	348	0	0	0	0	32	0	0	291	4	0	4	295	46	245	1	0	1	292	935
12:00 PM	35	2	43	0	13	80	0	0	0	0	11	0	0	80	1	0	0	81	10	70	0	0	0	80	241
12:15 PM	31	0	40	0	9	71	0	0	0	0	11	0	0	75	3	0	5	78	6	58	0	0	0	64	213
12:30 PM	34	0	47	0	15	81	0	0	0	0	6	0	0	66	3	0	3	69	15	64	0	0	0	79	229
12:45 PM	22	0	44	0	33	66	0	0	0	0	13	0	0	62	0	0	3	62	13	66	0	0	0	79	207
Hourly Total	122	2	174	0	70	298	0	0	0	0	41	0	0	283	7	0	11	290	44	258	0	0	0	302	890
1:00 PM	33	0	57	0	8	90	0	0	0	0	16	0	0	74	1	0	5	75	12	67	0	0	0	79	244
1:15 PM	48	0	56	0	7	104	0	0	0	0	11	0	0	63	4	1	2	68	7	63	0	0	0	70	242
1:30 PM	31	0	45	0	17	76	0	0	0	0	9	0	0	64	2	0	0	66	7	63	0	0	0	70	212
1:45 PM	36	0	77	0	21	113	0	0	0	0	6	0	0	63	4	0	5	67	13	58	0	0	0	71	251
Hourly Total	148	0	235	0	53	383	0	0	0	0	42	0	0	264	11	1	12	276	39	251	0	0	0	290	949
2:00 PM	34	1	56	0	9	91	0	0	0	0	3	0	0	93	1	0	1	94	13	72	0	0	0	85	270
2:15 PM	25	0	44	0	12	69	0	0	0	0	10	0	0	84	1	0	9	85	10	64	0	0	0	74	228
2:30 PM	28	1	75	0	20	104	0	0	0	0	22	0	0	83	1	0	0	84	7	76	0	0	0	83	271
2:45 PM	24	1	70	0	17	95	0	0	0	0	14	0	0	93	0	0	0	93	10	62	0	0	0	72	260
Hourly Total	111	3	245	0	58	359	0	0	0	0	49	0	0	353	3	0	10	356	40	274	0	0	0	314	1029
3:00 PM	32	2	46	0	29	80	0	0	0	0	16	0	0	101	7	0	2	108	12	75	0	0	0	87	275
3:15 PM	34	0	62	0	13	96	0	0	0	0	11	0	0	86	1	0	2	87	16	72	0	0	0	88	271
3:30 PM	23	2	52	0	18	77	0	0	0	0	19	0	0	112	2	0	9	114	14	72	0	0	0	86	277
3:45 PM	36	0	67	0	14	103	0	0	0	0	10	0	0	86	3	0	8	89	25	75	0	0	2	100	292
Hourly Total	125	4	227	0	74	356	0	0	0	0	56	0	0	385	13	0	21	398	67	294	0	0	2	361	1115

4:00 PM	37	0	65	0	29	102	0	0	0	0	22	0	0	89	3	0	8	92	13	51	0	0	0	64	258
4:15 PM	33	0	66	0	32	99	0	0	0	0	9	0	0	103	3	0	6	106	12	79	0	0	0	91	296
4:30 PM	41	0	77	0	11	118	0	0	0	0	16	0	0	91	5	0	12	96	14	69	0	0	0	83	297
4:45 PM	24	0	70	0	23	94	0	0	0	0	15	0	0	77	3	0	2	80	6	79	1	0	0	86	260
Hourly Total	135	0	278	0	95	413	0	0	0	0	62	0	0	360	14	0	28	374	45	278	1	0	0	324	1111
Grand Total	995	14	1658	0	456	2667	0	0	0	0	336	0	0	2348	59	1	88	2408	345	1902	2	0	3	2249	7324
Approach %	37.3	0.5	62.2	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	97.5	2.5	0.0	-	-	15.3	84.6	0.1	0.0	-	-	-
Total %	13.6	0.2	22.6	0.0	-	36.4	0.0	0.0	0.0	0.0	-	0.0	0.0	32.1	0.8	0.0	-	32.9	4.7	26.0	0.0	0.0	-	30.7	-
Motorcycles	5	0	5	0	-	10	0	0	0	0	-	0	0	26	0	0	-	26	2	18	0	0	-	20	56
% Motorcycles	0.5	0.0	0.3	-	-	0.4	-	-	-	-	-	-	-	1.1	0.0	0.0	-	1.1	0.6	0.9	0.0	-	-	0.9	0.8
Cars & Light Goods	978	14	1643	0	-	2635	0	0	0	0	-	0	0	2255	59	1	-	2315	337	1817	1	0	-	2155	7105
% Cars & Light Goods	98.3	100.0	99.1	-	-	98.8	-	-	-	-	-	-	-	96.0	100.0	100.0	-	96.1	97.7	95.5	50.0	-	-	95.8	97.0
Buses	3	0	9	0	-	12	0	0	0	0	-	0	0	29	0	0	-	29	4	18	0	0	-	22	63
% Buses	0.3	0.0	0.5	-	-	0.4	-	-	-	-	-	-	-	1.2	0.0	0.0	-	1.2	1.2	0.9	0.0	-	-	1.0	0.9
Single-Unit Trucks	5	0	1	0	-	6	0	0	0	0	-	0	0	8	0	0	-	8	2	4	0	0	-	6	20
% Single-Unit Trucks	0.5	0.0	0.1	-	-	0.2	-	-	-	-	-	-	-	0.3	0.0	0.0	-	0.3	0.6	0.2	0.0	-	-	0.3	0.3
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	0	2	0	0	-	2	6
% Articulated Trucks	0.1	0.0	0.0	-	-	0.0	-	-	-	-	-	-	-	0.1	0.0	0.0	-	0.1	0.0	0.1	0.0	-	-	0.1	0.1
Bicycles on Road	3	0	0	0	-	3	0	0	0	0	-	0	0	27	0	0	-	27	0	43	1	0	-	44	74
% Bicycles on Road	0.3	0.0	0.0	-	-	0.1	-	-	-	-	-	-	-	1.1	0.0	0.0	-	1.1	0.0	2.3	50.0	-	-	2.0	1.0
Bicycles on Crosswalk	-	-	-	-	37	-	-	-	-	-	22	-	-	-	-	-	2	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	8.1	-	-	-	-	-	6.5	-	-	-	-	-	2.3	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	419	-	-	-	-	-	314	-	-	-	-	-	86	-	-	-	-	-	3	-	-
% Pedestrians	-	-	-	-	91.9	-	-	-	-	-	93.5	-	-	-	-	-	97.7	-	-	-	-	-	100.0	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
EB Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (3:45 PM)

Start Time	Falls Avenue EB Ramp Eastbound						Falls Avenue EB Ramp Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:45 PM	36	0	67	0	14	103	0	0	0	0	10	0	0	86	3	0	8	89	25	75	0	0	2	100	292
4:00 PM	37	0	65	0	29	102	0	0	0	0	22	0	0	89	3	0	8	92	13	51	0	0	0	64	258
4:15 PM	33	0	66	0	32	99	0	0	0	0	9	0	0	103	3	0	6	106	12	79	0	0	0	91	296
4:30 PM	41	0	77	0	11	118	0	0	0	0	16	0	0	91	5	0	12	96	14	69	0	0	0	83	297
Total	147	0	275	0	86	422	0	0	0	0	57	0	0	369	14	0	34	383	64	274	0	0	2	338	1143
Approach %	34.8	0.0	65.2	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	96.3	3.7	0.0	-	-	18.9	81.1	0.0	0.0	-	-	-
Total %	12.9	0.0	24.1	0.0	-	36.9	0.0	0.0	0.0	0.0	-	0.0	0.0	32.3	1.2	0.0	-	33.5	5.6	24.0	0.0	0.0	-	29.6	-
PHF	0.896	0.000	0.893	0.000	-	0.894	0.000	0.000	0.000	0.000	-	0.000	0.000	0.896	0.700	0.000	-	0.903	0.640	0.867	0.000	0.000	-	0.845	0.962
Motorcycles	0	0	1	0	-	1	0	0	0	0	-	0	0	3	0	0	-	3	0	4	0	0	-	4	8
% Motorcycles	0.0	-	0.4	-	-	0.2	-	-	-	-	-	-	-	0.8	0.0	-	-	0.8	0.0	1.5	-	-	-	1.2	0.7
Cars & Light Goods	146	0	274	0	-	420	0	0	0	0	-	0	0	361	14	0	-	375	63	264	0	0	-	327	1122
% Cars & Light Goods	99.3	-	99.6	-	-	99.5	-	-	-	-	-	-	-	97.8	100.0	-	-	97.9	98.4	96.4	-	-	-	96.7	98.2
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	4	0	0	-	4	1	2	0	0	-	3	7
% Buses	0.0	-	0.0	-	-	0.0	-	-	-	-	-	-	-	1.1	0.0	-	-	1.0	1.6	0.7	-	-	-	0.9	0.6
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	-	0.0	-	-	0.0	-	-	-	-	-	-	-	0.3	0.0	-	-	0.3	0.0	0.0	-	-	-	0.0	0.1
Articulated Trucks	1	0	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	1
% Articulated Trucks	0.7	-	0.0	-	-	0.2	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	4	0	0	-	4	4
% Bicycles on Road	0.0	-	0.0	-	-	0.0	-	-	-	-	-	-	-	0.0	0.0	-	-	0.0	0.0	1.5	-	-	-	1.2	0.3
Bicycles on Crosswalk	-	-	-	-	6	-	-	-	-	-	4	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	7.0	-	-	-	-	-	7.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	80	-	-	-	-	-	53	-	-	-	-	-	34	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	93.0	-	-	-	-	-	93.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (3:45 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Falls Avenue WB Off Ramp Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
9:00 AM	3	6	0	9	9	49	0	0	0	49	0	32	0	0	32	90
9:15 AM	3	6	0	9	9	66	0	0	0	66	0	48	0	6	48	123
9:30 AM	6	3	0	4	9	69	0	0	0	69	0	35	0	1	35	113
9:45 AM	4	3	0	6	7	84	0	0	0	84	0	33	0	1	33	124
Hourly Total	16	18	0	28	34	268	0	0	0	268	0	148	0	8	148	450
10:00 AM	5	3	0	3	8	69	0	0	0	69	0	45	0	0	45	122
10:15 AM	11	3	0	9	14	87	0	0	0	87	0	31	0	0	31	132
10:30 AM	7	4	0	2	11	100	0	0	0	100	0	41	0	0	41	152
10:45 AM	12	4	0	15	16	98	0	0	0	98	0	52	0	0	52	166
Hourly Total	35	14	0	29	49	354	0	0	0	354	0	169	0	0	169	572
11:00 AM	10	8	0	6	18	111	0	0	0	111	0	62	0	0	62	191
11:15 AM	7	5	0	9	12	116	0	0	0	116	0	52	1	0	53	181
11:30 AM	12	4	0	7	16	85	0	0	0	85	0	67	0	0	67	168
11:45 AM	12	7	0	10	19	103	0	0	0	103	0	77	0	2	77	199
Hourly Total	41	24	0	32	65	415	0	0	0	415	0	258	1	2	259	739
12:00 PM	18	11	0	9	29	117	0	0	0	117	0	62	0	0	62	208
12:15 PM	9	4	0	12	13	105	0	0	0	105	0	56	0	2	56	174
12:30 PM	13	12	0	6	25	101	0	0	0	101	0	67	0	0	67	193
12:45 PM	10	5	0	14	15	86	0	0	0	86	0	70	0	0	70	171
Hourly Total	50	32	0	41	82	409	0	0	0	409	0	255	0	2	255	746
1:00 PM	19	9	0	18	28	110	0	0	0	110	0	61	1	0	62	200
1:15 PM	11	6	0	9	17	108	0	0	0	108	0	55	0	0	55	180
1:30 PM	12	7	0	14	19	96	0	0	0	96	0	56	0	2	56	171
1:45 PM	12	9	0	5	21	95	0	1	1	96	0	60	0	0	60	177
Hourly Total	54	31	0	46	85	409	0	1	1	410	0	232	1	2	233	728
2:00 PM	10	10	0	5	20	128	0	0	0	128	0	74	0	0	74	222
2:15 PM	7	8	0	9	15	107	0	0	0	107	0	68	1	0	69	191
2:30 PM	10	7	0	23	17	111	0	0	0	111	0	74	0	0	74	202
2:45 PM	6	6	0	14	12	115	0	0	0	115	0	68	0	0	68	195
Hourly Total	33	31	0	51	64	461	0	0	0	461	0	284	1	0	285	810
3:00 PM	5	13	0	17	18	133	0	0	0	133	0	86	0	0	86	237
3:15 PM	16	5	0	10	21	122	0	0	0	122	0	75	0	0	75	218
3:30 PM	8	11	0	18	19	135	0	0	0	135	0	78	1	0	79	233
3:45 PM	21	9	0	12	30	120	0	0	0	120	0	74	0	1	74	224
Hourly Total	50	38	0	57	88	510	0	0	0	510	0	313	1	1	314	912
4:00 PM	2	7	0	19	9	131	0	0	0	131	0	69	1	0	70	210

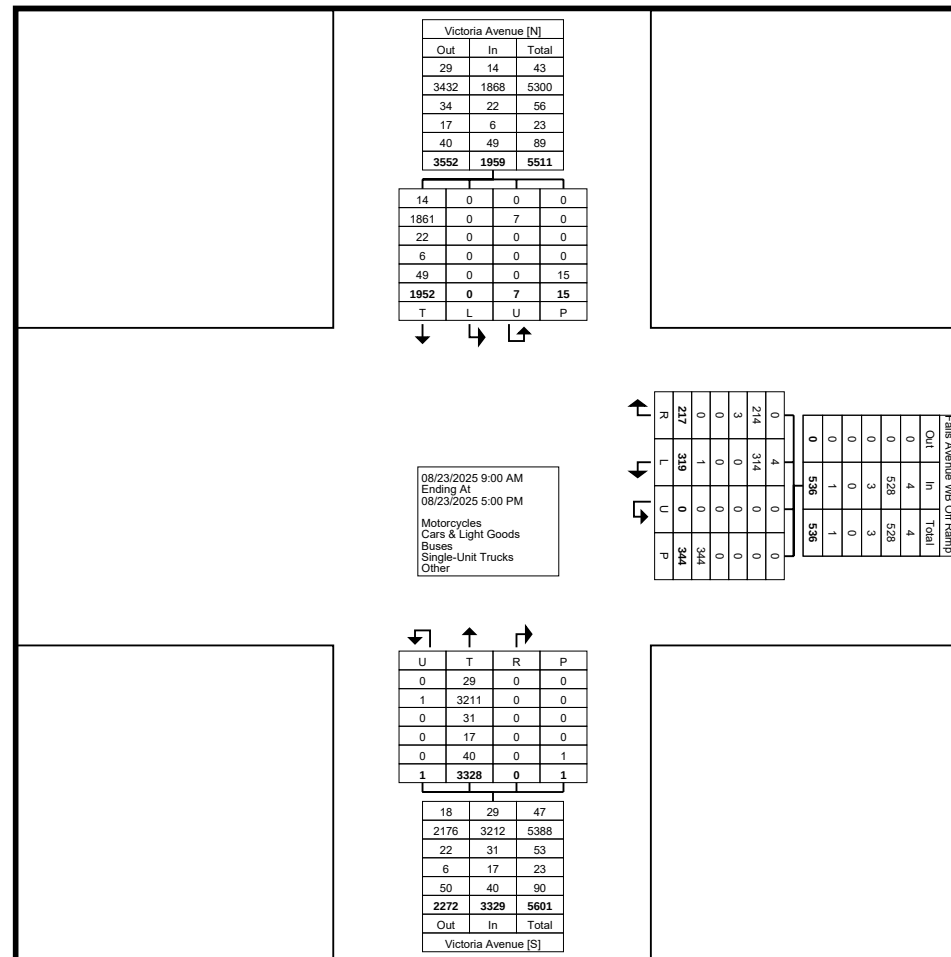
4:15 PM	12	5	0	8	17	137	0	0	0	137	0	77	1	0	78	232
4:30 PM	14	7	0	17	21	134	0	0	0	134	0	69	0	0	69	224
4:45 PM	12	10	0	16	22	100	0	0	0	100	0	78	1	0	79	201
Hourly Total	40	29	0	60	69	502	0	0	0	502	0	293	3	0	296	867
Grand Total	319	217	0	344	536	3328	0	1	1	3329	0	1952	7	15	1959	5824
Approach %	59.5	40.5	0.0	-	-	100.0	0.0	0.0	-	-	0.0	99.6	0.4	-	-	-
Total %	5.5	3.7	0.0	-	9.2	57.1	0.0	0.0	-	57.2	0.0	33.5	0.1	-	33.6	-
Motorcycles	4	0	0	-	4	29	0	0	-	29	0	14	0	-	14	47
% Motorcycles	1.3	0.0	-	-	0.7	0.9	-	0.0	-	0.9	-	0.7	0.0	-	0.7	0.8
Cars & Light Goods	314	214	0	-	528	3211	0	1	-	3212	0	1861	7	-	1868	5608
% Cars & Light Goods	98.4	98.6	-	-	98.5	96.5	-	100.0	-	96.5	-	95.3	100.0	-	95.4	96.3
Buses	0	3	0	-	3	31	0	0	-	31	0	22	0	-	22	56
% Buses	0.0	1.4	-	-	0.6	0.9	-	0.0	-	0.9	-	1.1	0.0	-	1.1	1.0
Single-Unit Trucks	0	0	0	-	0	17	0	0	-	17	0	6	0	-	6	23
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.5	-	0.0	-	0.5	-	0.3	0.0	-	0.3	0.4
Articulated Trucks	1	0	0	-	1	4	0	0	-	4	0	1	0	-	1	6
% Articulated Trucks	0.3	0.0	-	-	0.2	0.1	-	0.0	-	0.1	-	0.1	0.0	-	0.1	0.1
Bicycles on Road	0	0	0	-	0	36	0	0	-	36	0	48	0	-	48	84
% Bicycles on Road	0.0	0.0	-	-	0.0	1.1	-	0.0	-	1.1	-	2.5	0.0	-	2.5	1.4
Bicycles on Crosswalk	-	-	-	20	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	5.8	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	324	-	-	-	-	1	-	-	-	-	15	-	-
% Pedestrians	-	-	-	94.2	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB Off Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (3:00 PM)

Start Time	Falls Avenue WB Off Ramp Westbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
3:00 PM	5	13	0	17	18	133	0	0	0	133	0	86	0	0	86	237
3:15 PM	16	5	0	10	21	122	0	0	0	122	0	75	0	0	75	218
3:30 PM	8	11	0	18	19	135	0	0	0	135	0	78	1	0	79	233
3:45 PM	21	9	0	12	30	120	0	0	0	120	0	74	0	1	74	224
Total	50	38	0	57	88	510	0	0	0	510	0	313	1	1	314	912
Approach %	56.8	43.2	0.0	-	-	100.0	0.0	0.0	-	-	0.0	99.7	0.3	-	-	-
Total %	5.5	4.2	0.0	-	9.6	55.9	0.0	0.0	-	55.9	0.0	34.3	0.1	-	34.4	-
PHF	0.595	0.731	0.000	-	0.733	0.944	0.000	0.000	-	0.944	0.000	0.910	0.250	-	0.913	0.962
Motorcycles	0	0	0	-	0	3	0	0	-	3	0	2	0	-	2	5
% Motorcycles	0.0	0.0	-	-	0.0	0.6	-	-	-	0.6	-	0.6	0.0	-	0.6	0.5
Cars & Light Goods	50	38	0	-	88	497	0	0	-	497	0	304	1	-	305	890
% Cars & Light Goods	100.0	100.0	-	-	100.0	97.5	-	-	-	97.5	-	97.1	100.0	-	97.1	97.6
Buses	0	0	0	-	0	4	0	0	-	4	0	3	0	-	3	7
% Buses	0.0	0.0	-	-	0.0	0.8	-	-	-	0.8	-	1.0	0.0	-	1.0	0.8
Single-Unit Trucks	0	0	0	-	0	1	0	0	-	1	0	1	0	-	1	2
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.2	-	-	-	0.2	-	0.3	0.0	-	0.3	0.2
Articulated Trucks	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Articulated Trucks	0.0	0.0	-	-	0.0	0.2	-	-	-	0.2	-	0.0	0.0	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	4	0	0	-	4	0	3	0	-	3	7
% Bicycles on Road	0.0	0.0	-	-	0.0	0.8	-	-	-	0.8	-	1.0	0.0	-	1.0	0.8
Bicycles on Crosswalk	-	-	-	5	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	8.8	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	52	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	91.2	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (3:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Falls Avenue WB On Ramp Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	0	0	0	11	0	8	46	1	1	55	28	28	0	0	56	111
9:15 AM	0	0	0	3	0	12	60	0	4	72	45	24	0	0	69	141
9:30 AM	0	0	0	7	0	12	59	0	0	71	34	25	0	0	59	130
9:45 AM	0	0	0	7	0	10	77	0	0	87	31	41	0	0	72	159
Hourly Total	0	0	0	28	0	42	242	1	5	285	138	118	0	0	256	541
10:00 AM	0	0	0	6	0	10	62	0	1	72	45	30	0	0	75	147
10:15 AM	0	0	0	10	0	16	75	0	4	91	31	27	0	0	58	149
10:30 AM	0	0	0	8	0	20	84	0	0	104	41	44	0	0	85	189
10:45 AM	0	0	0	7	0	18	88	0	0	106	52	39	0	1	91	197
Hourly Total	0	0	0	31	0	64	309	0	5	373	169	140	0	1	309	682
11:00 AM	0	1	0	15	1	20	99	0	0	119	62	38	0	0	100	220
11:15 AM	0	0	0	8	0	21	100	0	0	121	52	37	0	0	89	210
11:30 AM	0	0	0	9	0	7	84	0	1	91	67	56	0	0	123	214
11:45 AM	0	0	0	17	0	19	92	0	0	111	77	44	0	0	121	232
Hourly Total	0	1	0	49	1	67	375	0	1	442	258	175	0	0	433	876
12:00 PM	0	0	0	14	0	21	107	0	0	128	62	38	0	0	100	228
12:15 PM	0	0	0	13	0	19	91	0	0	110	56	40	0	0	96	206
12:30 PM	0	0	0	16	0	12	100	0	0	112	68	46	0	1	114	226
12:45 PM	0	0	0	28	0	15	77	0	0	92	71	31	0	0	102	194
Hourly Total	0	0	0	71	0	67	375	0	0	442	257	155	0	1	412	854
1:00 PM	0	0	0	6	0	23	92	1	0	116	61	35	0	1	96	212
1:15 PM	0	0	0	11	0	18	100	0	0	118	58	44	0	0	102	220
1:30 PM	0	0	0	17	0	18	85	0	0	103	56	44	0	1	100	203
1:45 PM	0	0	0	22	0	22	84	0	0	106	60	37	0	0	97	203
Hourly Total	0	0	0	56	0	81	361	1	0	443	235	160	0	2	395	838
2:00 PM	0	0	0	7	0	30	108	0	0	138	73	48	1	0	122	260
2:15 PM	0	1	0	10	1	32	85	0	0	117	68	45	0	0	113	231
2:30 PM	0	0	0	20	0	25	92	0	0	117	73	49	0	0	122	239
2:45 PM	0	0	0	14	0	23	99	0	3	122	69	43	0	0	112	234
Hourly Total	0	1	0	51	1	110	384	0	3	494	283	185	1	0	469	964
3:00 PM	0	0	0	28	0	30	117	0	0	147	86	52	0	0	138	285
3:15 PM	0	0	0	7	0	30	93	1	0	124	71	47	0	0	118	242
3:30 PM	0	0	0	11	0	34	112	1	4	147	79	49	0	0	128	275
3:45 PM	0	0	0	17	0	39	89	0	1	128	75	36	0	0	111	239
Hourly Total	0	0	0	63	0	133	411	2	5	546	311	184	0	0	495	1041
4:00 PM	0	0	0	18	0	33	111	0	0	144	72	38	0	0	110	254

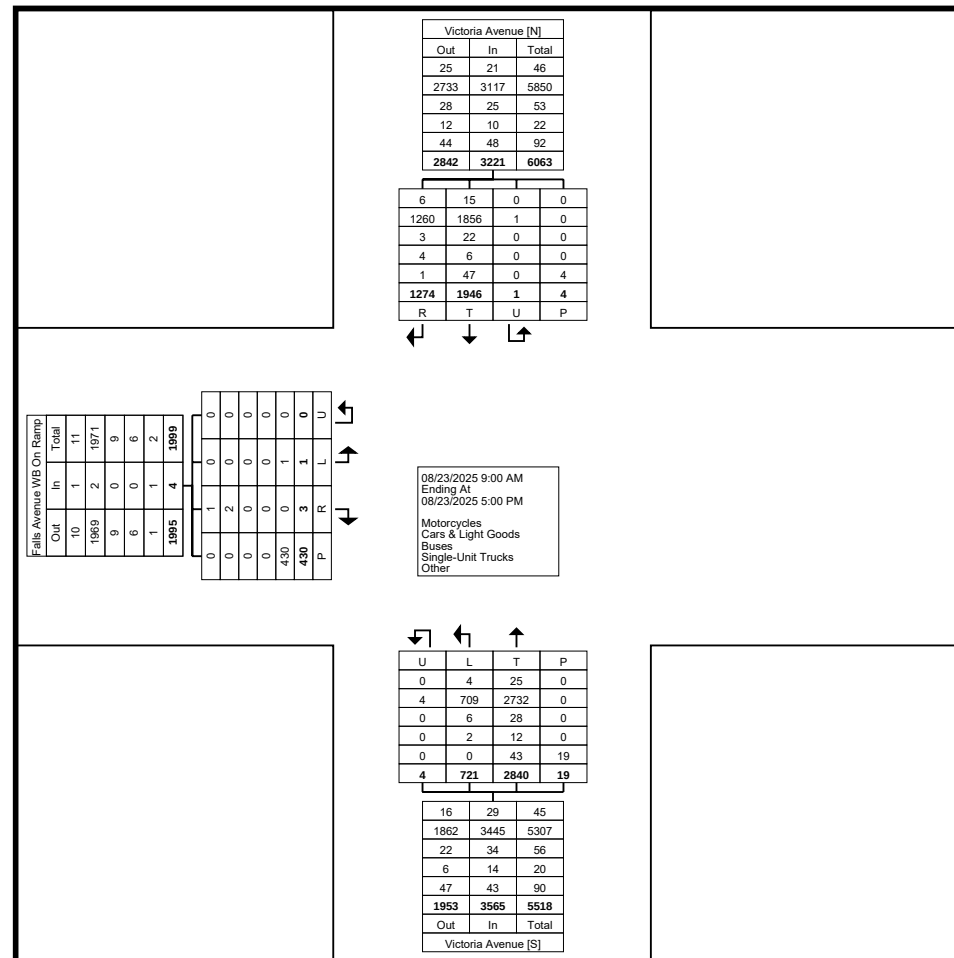
4:15 PM	0	1	0	18	1	51	93	0	0	144	74	43	0	0	117	262
4:30 PM	0	0	0	27	0	35	106	0	0	141	69	33	0	0	102	243
4:45 PM	1	0	0	18	1	38	73	0	0	111	80	43	0	0	123	235
Hourly Total	1	1	0	81	2	157	383	0	0	540	295	157	0	0	452	994
Grand Total	1	3	0	430	4	721	2840	4	19	3565	1946	1274	1	4	3221	6790
Approach %	25.0	75.0	0.0	-	-	20.2	79.7	0.1	-	-	60.4	39.6	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.1	10.6	41.8	0.1	-	52.5	28.7	18.8	0.0	-	47.4	-
Motorcycles	0	1	0	-	1	4	25	0	-	29	15	6	0	-	21	51
% Motorcycles	0.0	33.3	-	-	25.0	0.6	0.9	0.0	-	0.8	0.8	0.5	0.0	-	0.7	0.8
Cars & Light Goods	0	2	0	-	2	709	2732	4	-	3445	1856	1260	1	-	3117	6564
% Cars & Light Goods	0.0	66.7	-	-	50.0	98.3	96.2	100.0	-	96.6	95.4	98.9	100.0	-	96.8	96.7
Buses	0	0	0	-	0	6	28	0	-	34	22	3	0	-	25	59
% Buses	0.0	0.0	-	-	0.0	0.8	1.0	0.0	-	1.0	1.1	0.2	0.0	-	0.8	0.9
Single-Unit Trucks	0	0	0	-	0	2	12	0	-	14	6	4	0	-	10	24
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.3	0.4	0.0	-	0.4	0.3	0.3	0.0	-	0.3	0.4
Articulated Trucks	0	0	0	-	0	0	4	0	-	4	1	0	0	-	1	5
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	0.1	0.1	0.0	0.0	-	0.0	0.1
Bicycles on Road	1	0	0	-	1	0	39	0	-	39	46	1	0	-	47	87
% Bicycles on Road	100.0	0.0	-	-	25.0	0.0	1.4	0.0	-	1.1	2.4	0.1	0.0	-	1.5	1.3
Bicycles on Crosswalk	-	-	-	33	-	-	-	-	0	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	7.7	-	-	-	-	0.0	-	-	-	-	25.0	-	-
Pedestrians	-	-	-	397	-	-	-	-	19	-	-	-	-	3	-	-
% Pedestrians	-	-	-	92.3	-	-	-	-	100.0	-	-	-	-	75.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (3:00 PM)

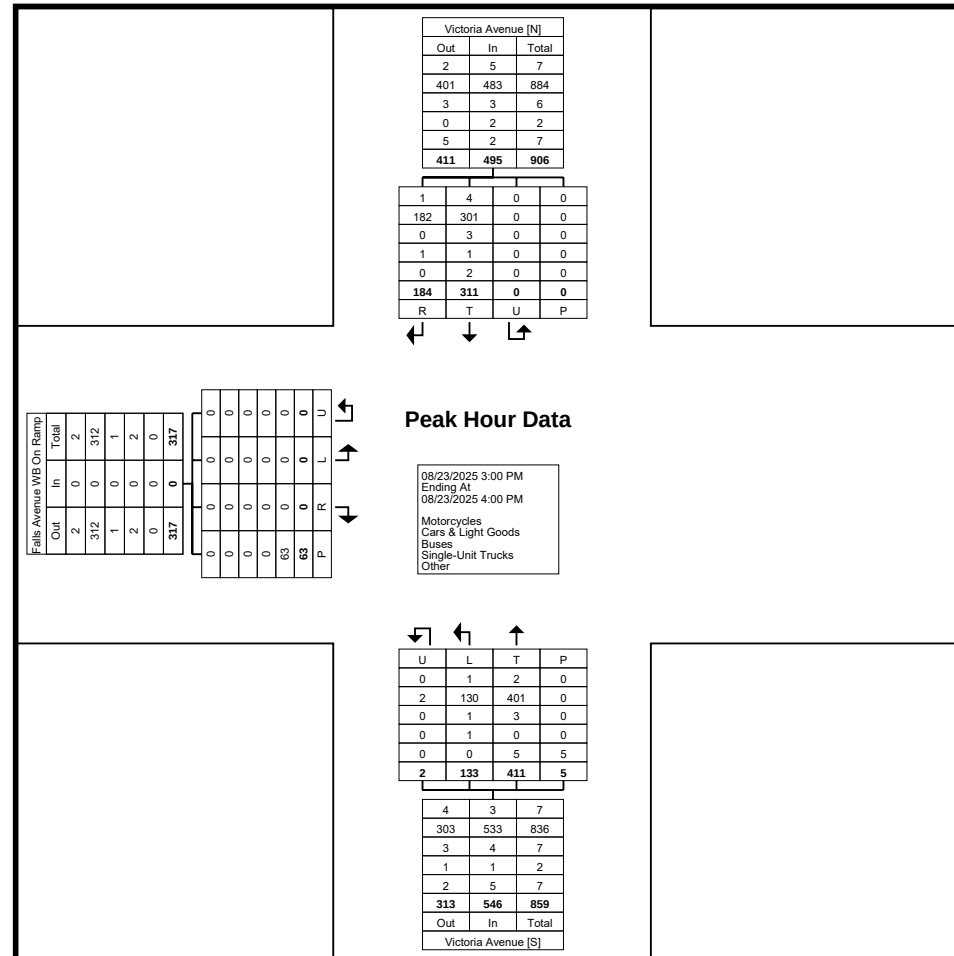
Start Time	Falls Avenue WB On Ramp Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
3:00 PM	0	0	0	28	0	30	117	0	0	147	86	52	0	0	138	285
3:15 PM	0	0	0	7	0	30	93	1	0	124	71	47	0	0	118	242
3:30 PM	0	0	0	11	0	34	112	1	4	147	79	49	0	0	128	275
3:45 PM	0	0	0	17	0	39	89	0	1	128	75	36	0	0	111	239
Total	0	0	0	63	0	133	411	2	5	546	311	184	0	0	495	1041
Approach %	0.0	0.0	0.0	-	-	24.4	75.3	0.4	-	-	62.8	37.2	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	12.8	39.5	0.2	-	52.4	29.9	17.7	0.0	-	47.6	-
PHF	0.000	0.000	0.000	-	0.000	0.853	0.878	0.500	-	0.929	0.904	0.885	0.000	-	0.897	0.913
Motorcycles	0	0	0	-	0	1	2	0	-	3	4	1	0	-	5	8
% Motorcycles	-	-	-	-	-	0.8	0.5	0.0	-	0.5	1.3	0.5	-	-	1.0	0.8
Cars & Light Goods	0	0	0	-	0	130	401	2	-	533	301	182	0	-	483	1016
% Cars & Light Goods	-	-	-	-	-	97.7	97.6	100.0	-	97.6	96.8	98.9	-	-	97.6	97.6
Buses	0	0	0	-	0	1	3	0	-	4	3	0	0	-	3	7
% Buses	-	-	-	-	-	0.8	0.7	0.0	-	0.7	1.0	0.0	-	-	0.6	0.7
Single-Unit Trucks	0	0	0	-	0	1	0	0	-	1	1	1	0	-	2	3
% Single-Unit Trucks	-	-	-	-	-	0.8	0.0	0.0	-	0.2	0.3	0.5	-	-	0.4	0.3
Articulated Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Articulated Trucks	-	-	-	-	-	0.0	0.2	0.0	-	0.2	0.0	0.0	-	-	0.0	0.1
Bicycles on Road	0	0	0	-	0	0	4	0	-	4	2	0	0	-	2	6
% Bicycles on Road	-	-	-	-	-	0.0	1.0	0.0	-	0.7	0.6	0.0	-	-	0.4	0.6
Bicycles on Crosswalk	-	-	-	5	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	7.9	-	-	-	-	0.0	-	-	-	-	-	-	-
Pedestrians	-	-	-	58	-	-	-	-	5	-	-	-	-	0	-	-
% Pedestrians	-	-	-	92.1	-	-	-	-	100.0	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Falls Avenue
WB On Ramp - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 5



Turning Movement Peak Hour Data Plot (3:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Hunter Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	2	3	0	11	5	1	45	0	0	46	43	2	0	0	45	96
9:15 AM	2	2	0	21	4	0	56	1	0	57	48	0	0	1	48	109
9:30 AM	6	1	0	17	7	0	49	0	1	49	52	3	0	1	55	111
9:45 AM	3	3	0	3	6	1	52	0	0	53	38	2	0	0	40	99
Hourly Total	13	9	0	52	22	2	202	1	1	205	181	7	0	2	188	415
10:00 AM	4	1	0	14	5	0	59	0	0	59	50	0	0	0	50	114
10:15 AM	3	2	0	14	5	2	88	0	0	90	48	0	0	0	48	143
10:30 AM	4	0	0	12	4	1	69	0	0	70	45	0	0	0	45	119
10:45 AM	5	2	0	14	7	0	73	0	0	73	63	1	0	0	64	144
Hourly Total	16	5	0	54	21	3	289	0	0	292	206	1	0	0	207	520
11:00 AM	6	2	0	17	8	0	78	0	0	78	57	1	0	0	58	144
11:15 AM	0	2	0	21	2	1	72	0	1	73	67	2	0	0	69	144
11:30 AM	0	4	0	30	4	0	75	0	0	75	73	2	1	0	76	155
11:45 AM	0	0	0	30	0	1	88	0	0	89	109	2	0	0	111	200
Hourly Total	6	8	0	98	14	2	313	0	1	315	306	7	1	0	314	643
12:00 PM	1	0	0	55	1	1	91	0	0	92	93	3	0	0	96	189
12:15 PM	2	3	0	31	5	4	105	0	0	109	74	4	0	0	78	192
12:30 PM	1	1	0	37	2	1	82	0	0	83	69	3	0	0	72	157
12:45 PM	0	2	0	61	2	2	75	0	0	77	73	8	0	0	81	160
Hourly Total	4	6	0	184	10	8	353	0	0	361	309	18	0	0	327	698
1:00 PM	2	2	0	22	4	1	81	0	0	82	66	2	0	0	68	154
1:15 PM	1	2	0	13	3	1	93	0	0	94	95	4	0	0	99	196
1:30 PM	1	2	0	35	3	0	98	1	0	99	90	5	0	1	95	197
1:45 PM	1	1	0	35	2	1	75	0	0	76	81	5	0	0	86	164
Hourly Total	5	7	0	105	12	3	347	1	0	351	332	16	0	1	348	711
2:00 PM	2	2	0	25	4	2	97	1	0	100	103	3	0	0	106	210
2:15 PM	0	3	0	31	3	2	82	0	1	84	77	8	0	0	85	172
2:30 PM	3	0	0	39	3	0	80	0	3	80	114	7	0	0	121	204
2:45 PM	3	3	0	65	6	1	98	0	0	99	80	8	0	0	88	193
Hourly Total	8	8	0	160	16	5	357	1	4	363	374	26	0	0	400	779
3:00 PM	4	4	0	49	8	3	104	0	0	107	86	8	0	0	94	209
3:15 PM	6	2	0	16	8	1	96	0	0	97	83	9	0	0	92	197
3:30 PM	1	4	0	25	5	0	98	0	0	98	87	4	0	2	91	194
3:45 PM	0	2	0	33	2	1	111	0	0	112	87	1	1	0	89	203
Hourly Total	11	12	0	123	23	5	409	0	0	414	343	22	1	2	366	803
4:00 PM	3	2	0	48	5	1	107	0	0	108	81	8	0	0	89	202

4:15 PM	1	1	0	80	2	1	100	0	0	101	94	5	0	0	99	202
4:30 PM	0	1	0	42	1	0	88	0	0	88	107	2	1	1	110	199
4:45 PM	2	0	0	55	2	0	91	0	0	91	96	6	2	0	104	197
Hourly Total	6	4	0	225	10	2	386	0	0	388	378	21	3	1	402	800
Grand Total	69	59	0	1001	128	30	2656	3	6	2689	2429	118	5	6	2552	5369
Approach %	53.9	46.1	0.0	-	-	1.1	98.8	0.1	-	-	95.2	4.6	0.2	-	-	-
Total %	1.3	1.1	0.0	-	2.4	0.6	49.5	0.1	-	50.1	45.2	2.2	0.1	-	47.5	-
Motorcycles	1	0	0	-	1	0	29	0	-	29	26	1	0	-	27	57
% Motorcycles	1.4	0.0	-	-	0.8	0.0	1.1	0.0	-	1.1	1.1	0.8	0.0	-	1.1	1.1
Cars & Light Goods	66	58	0	-	124	30	2551	3	-	2584	2330	112	5	-	2447	5155
% Cars & Light Goods	95.7	98.3	-	-	96.9	100.0	96.0	100.0	-	96.1	95.9	94.9	100.0	-	95.9	96.0
Buses	2	0	0	-	2	0	36	0	-	36	24	1	0	-	25	63
% Buses	2.9	0.0	-	-	1.6	0.0	1.4	0.0	-	1.3	1.0	0.8	0.0	-	1.0	1.2
Single-Unit Trucks	0	0	0	-	0	0	9	0	-	9	5	0	0	-	5	14
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	0.3	0.2	0.0	0.0	-	0.2	0.3
Articulated Trucks	0	0	0	-	0	0	5	0	-	5	2	0	0	-	2	7
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	0.2	0.1	0.0	0.0	-	0.1	0.1
Bicycles on Road	0	1	0	-	1	0	26	0	-	26	42	4	0	-	46	73
% Bicycles on Road	0.0	1.7	-	-	0.8	0.0	1.0	0.0	-	1.0	1.7	3.4	0.0	-	1.8	1.4
Bicycles on Crosswalk	-	-	-	28	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	2.8	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	973	-	-	-	-	6	-	-	-	-	6	-	-
% Pedestrians	-	-	-	97.2	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (3:45 PM)

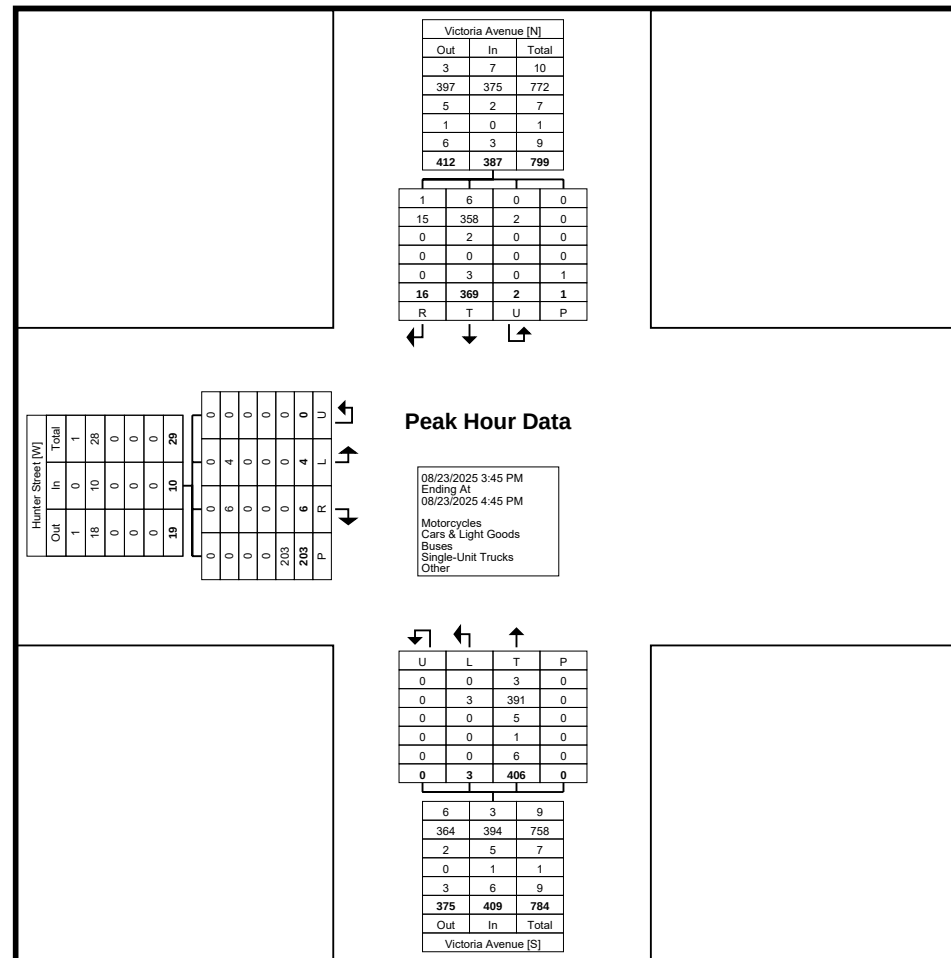
Start Time	Hunter Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
3:45 PM	0	2	0	33	2	1	111	0	0	112	87	1	1	0	89	203
4:00 PM	3	2	0	48	5	1	107	0	0	108	81	8	0	0	89	202
4:15 PM	1	1	0	80	2	1	100	0	0	101	94	5	0	0	99	202
4:30 PM	0	1	0	42	1	0	88	0	0	88	107	2	1	1	110	199
Total	4	6	0	203	10	3	406	0	0	409	369	16	2	1	387	806
Approach %	40.0	60.0	0.0	-	-	0.7	99.3	0.0	-	-	95.3	4.1	0.5	-	-	-
Total %	0.5	0.7	0.0	-	1.2	0.4	50.4	0.0	-	50.7	45.8	2.0	0.2	-	48.0	-
PHF	0.333	0.750	0.000	-	0.500	0.750	0.914	0.000	-	0.913	0.862	0.500	0.500	-	0.880	0.993
Motorcycles	0	0	0	-	0	0	3	0	-	3	6	1	0	-	7	10
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.7	-	-	0.7	1.6	6.3	0.0	-	1.8	1.2
Cars & Light Goods	4	6	0	-	10	3	391	0	-	394	358	15	2	-	375	779
% Cars & Light Goods	100.0	100.0	-	-	100.0	100.0	96.3	-	-	96.3	97.0	93.8	100.0	-	96.9	96.7
Buses	0	0	0	-	0	0	5	0	-	5	2	0	0	-	2	7
% Buses	0.0	0.0	-	-	0.0	0.0	1.2	-	-	1.2	0.5	0.0	0.0	-	0.5	0.9
Single-Unit Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.2	-	-	0.2	0.0	0.0	0.0	-	0.0	0.1
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	0	0	-	0	0	6	0	-	6	3	0	0	-	3	9
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	1.5	-	-	1.5	0.8	0.0	0.0	-	0.8	1.1
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.5	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	202	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	99.5	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Hunter Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 5



Turning Movement Peak Hour Data Plot (3:45 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Kitchener
Street - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Kitchener Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	6	3	0	9	9	1	34	0	2	35	49	3	0	0	52	96
9:15 AM	3	6	0	3	9	0	37	0	6	37	60	7	0	0	67	113
9:30 AM	3	7	0	6	10	1	44	0	3	45	72	3	0	0	75	130
9:45 AM	5	4	0	4	9	2	44	1	4	47	61	1	0	0	62	118
Hourly Total	17	20	0	22	37	4	159	1	15	164	242	14	0	0	256	457
10:00 AM	5	9	0	3	14	4	40	0	1	44	67	12	0	2	79	137
10:15 AM	6	6	0	5	12	5	58	0	9	63	62	9	0	1	71	146
10:30 AM	6	9	0	11	15	5	60	0	0	65	81	4	0	0	85	165
10:45 AM	7	7	0	4	14	3	59	0	3	62	86	7	0	0	93	169
Hourly Total	24	31	0	23	55	17	217	0	13	234	296	32	0	3	328	617
11:00 AM	7	6	0	16	13	3	60	0	1	63	90	6	0	0	96	172
11:15 AM	10	5	0	9	15	1	72	0	6	73	91	7	0	0	98	186
11:30 AM	12	6	0	9	18	0	47	0	0	47	107	4	0	0	111	176
11:45 AM	10	6	0	14	16	2	58	0	0	60	128	10	0	0	138	214
Hourly Total	39	23	0	48	62	6	237	0	7	243	416	27	0	0	443	748
12:00 PM	13	9	0	12	22	2	69	0	0	71	102	13	0	0	115	208
12:15 PM	8	5	0	7	13	4	68	0	2	72	89	9	0	0	98	183
12:30 PM	8	8	0	12	16	6	60	0	1	66	107	6	0	0	113	195
12:45 PM	11	6	0	31	17	1	51	0	4	52	102	7	0	0	109	178
Hourly Total	40	28	0	62	68	13	248	0	7	261	400	35	0	0	435	764
1:00 PM	4	8	0	6	12	3	72	0	0	75	115	9	0	0	124	211
1:15 PM	6	4	0	3	10	2	61	0	1	63	115	8	0	0	123	196
1:30 PM	5	4	0	16	9	1	62	0	1	63	100	6	0	0	106	178
1:45 PM	7	7	0	23	14	2	59	0	1	61	124	8	0	0	132	207
Hourly Total	22	23	0	48	45	8	254	0	3	262	454	31	0	0	485	792
2:00 PM	13	3	0	7	16	4	78	0	1	82	121	8	0	0	129	227
2:15 PM	6	10	0	7	16	3	80	0	1	83	97	8	0	0	105	204
2:30 PM	12	12	0	23	24	2	70	0	1	72	143	12	0	0	155	251
2:45 PM	14	9	0	23	23	3	80	0	6	83	122	13	0	2	135	241
Hourly Total	45	34	0	60	79	12	308	0	9	320	483	41	0	2	524	923
3:00 PM	11	10	0	30	21	5	96	0	5	101	107	16	0	0	123	245
3:15 PM	13	10	0	9	23	5	72	0	10	77	124	8	0	0	132	232
3:30 PM	9	10	0	10	19	1	102	0	3	103	113	11	0	0	124	246
3:45 PM	7	5	0	10	12	3	81	0	0	84	129	14	1	0	144	240
Hourly Total	40	35	0	59	75	14	351	0	18	365	473	49	1	0	523	963
4:00 PM	11	13	0	25	24	3	89	0	8	92	102	14	0	6	116	232

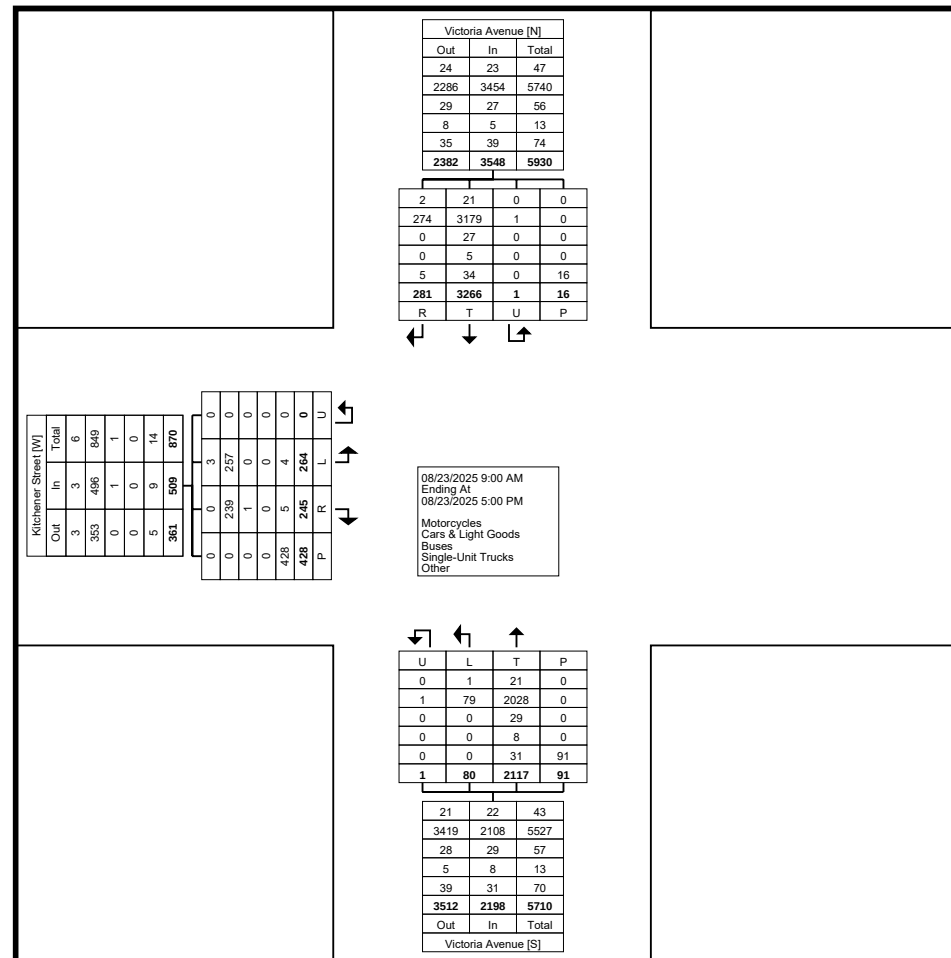
4:15 PM	9	14	0	36	23	0	96	0	6	96	133	11	0	4	144	263
4:30 PM	9	14	0	17	23	1	85	0	2	86	137	10	0	1	147	256
4:45 PM	8	10	0	28	18	2	73	0	3	75	130	17	0	0	147	240
Hourly Total	37	51	0	106	88	6	343	0	19	349	502	52	0	11	554	991
Grand Total	264	245	0	428	509	80	2117	1	91	2198	3266	281	1	16	3548	6255
Approach %	51.9	48.1	0.0	-	-	3.6	96.3	0.0	-	-	92.1	7.9	0.0	-	-	-
Total %	4.2	3.9	0.0	-	8.1	1.3	33.8	0.0	-	35.1	52.2	4.5	0.0	-	56.7	-
Motorcycles	3	0	0	-	3	1	21	0	-	22	21	2	0	-	23	48
% Motorcycles	1.1	0.0	-	-	0.6	1.3	1.0	0.0	-	1.0	0.6	0.7	0.0	-	0.6	0.8
Cars & Light Goods	257	239	0	-	496	79	2028	1	-	2108	3179	274	1	-	3454	6058
% Cars & Light Goods	97.3	97.6	-	-	97.4	98.8	95.8	100.0	-	95.9	97.3	97.5	100.0	-	97.4	96.9
Buses	0	1	0	-	1	0	29	0	-	29	27	0	0	-	27	57
% Buses	0.0	0.4	-	-	0.2	0.0	1.4	0.0	-	1.3	0.8	0.0	0.0	-	0.8	0.9
Single-Unit Trucks	0	0	0	-	0	0	8	0	-	8	5	0	0	-	5	13
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.4	0.0	-	0.4	0.2	0.0	0.0	-	0.1	0.2
Articulated Trucks	0	0	0	-	0	0	3	0	-	3	2	0	0	-	2	5
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.1	0.0	-	0.1	0.1	0.0	0.0	-	0.1	0.1
Bicycles on Road	4	5	0	-	9	0	28	0	-	28	32	5	0	-	37	74
% Bicycles on Road	1.5	2.0	-	-	1.8	0.0	1.3	0.0	-	1.3	1.0	1.8	0.0	-	1.0	1.2
Bicycles on Crosswalk	-	-	-	30	-	-	-	-	3	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	7.0	-	-	-	-	3.3	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	398	-	-	-	-	88	-	-	-	-	16	-	-
% Pedestrians	-	-	-	93.0	-	-	-	-	96.7	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Kitchener
Street - Saturday
Site Code: 250550
Start Date: 08/23/2025
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Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Kitchener
Street - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (3:45 PM)

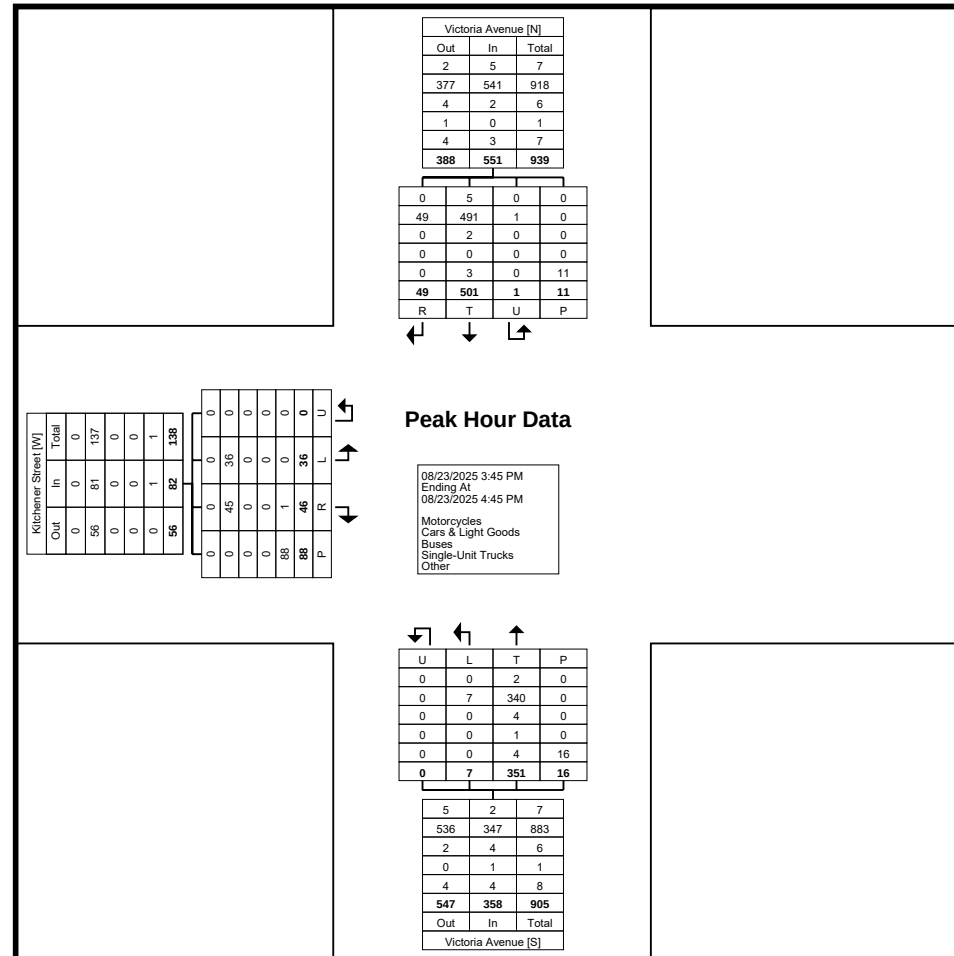
Start Time	Kitchener Street Eastbound					Victoria Avenue Northbound					Victoria Avenue Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
3:45 PM	7	5	0	10	12	3	81	0	0	84	129	14	1	0	144	240
4:00 PM	11	13	0	25	24	3	89	0	8	92	102	14	0	6	116	232
4:15 PM	9	14	0	36	23	0	96	0	6	96	133	11	0	4	144	263
4:30 PM	9	14	0	17	23	1	85	0	2	86	137	10	0	1	147	256
Total	36	46	0	88	82	7	351	0	16	358	501	49	1	11	551	991
Approach %	43.9	56.1	0.0	-	-	2.0	98.0	0.0	-	-	90.9	8.9	0.2	-	-	-
Total %	3.6	4.6	0.0	-	8.3	0.7	35.4	0.0	-	36.1	50.6	4.9	0.1	-	55.6	-
PHF	0.818	0.821	0.000	-	0.854	0.583	0.914	0.000	-	0.932	0.914	0.875	0.250	-	0.937	0.942
Motorcycles	0	0	0	-	0	0	2	0	-	2	5	0	0	-	5	7
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.6	-	-	0.6	1.0	0.0	0.0	-	0.9	0.7
Cars & Light Goods	36	45	0	-	81	7	340	0	-	347	491	49	1	-	541	969
% Cars & Light Goods	100.0	97.8	-	-	98.8	100.0	96.9	-	-	96.9	98.0	100.0	100.0	-	98.2	97.8
Buses	0	0	0	-	0	0	4	0	-	4	2	0	0	-	2	6
% Buses	0.0	0.0	-	-	0.0	0.0	1.1	-	-	1.1	0.4	0.0	0.0	-	0.4	0.6
Single-Unit Trucks	0	0	0	-	0	0	1	0	-	1	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	-	-	0.0	0.0	0.3	-	-	0.3	0.0	0.0	0.0	-	0.0	0.1
Articulated Trucks	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Road	0	1	0	-	1	0	4	0	-	4	3	0	0	-	3	8
% Bicycles on Road	0.0	2.2	-	-	1.2	0.0	1.1	-	-	1.1	0.6	0.0	0.0	-	0.5	0.8
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	1.1	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	87	-	-	-	-	16	-	-	-	-	11	-	-
% Pedestrians	-	-	-	98.9	-	-	-	-	100.0	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Kitchener
Street - Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 5



Turning Movement Peak Hour Data Plot (3:45 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Walnut Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 1

Turning Movement Data

Start Time	Walnut Street Eastbound						Driveway Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
9:00 AM	5	1	1	0	28	7	6	1	4	0	15	11	2	38	2	0	15	42	1	43	4	0	4	48	108
9:15 AM	6	1	4	0	30	11	7	3	2	0	6	12	2	51	3	0	4	56	2	42	7	0	5	51	130
9:30 AM	4	0	4	0	19	8	3	4	1	0	27	8	2	44	2	0	22	48	3	47	2	0	8	52	116
9:45 AM	6	0	2	0	8	8	3	5	4	0	28	12	3	44	3	0	16	50	2	34	4	0	3	40	110
Hourly Total	21	2	11	0	85	34	19	13	11	0	76	43	9	177	10	0	57	196	8	166	17	0	20	191	464
10:00 AM	8	1	9	0	26	18	3	1	2	0	10	6	6	48	6	0	13	60	1	44	6	0	11	51	135
10:15 AM	13	1	2	0	31	16	7	1	5	0	6	13	2	68	2	0	7	72	3	42	7	0	23	52	153
10:30 AM	3	2	3	0	30	8	8	5	6	0	21	19	3	61	5	0	12	69	1	43	2	0	6	46	142
10:45 AM	5	6	5	0	35	16	11	6	0	0	13	17	2	64	7	0	18	73	4	51	8	0	27	63	169
Hourly Total	29	10	19	0	122	58	29	13	13	0	50	55	13	241	20	0	50	274	9	180	23	0	67	212	599
11:00 AM	14	5	2	0	29	21	9	7	8	0	25	24	4	57	13	0	9	74	5	49	4	0	10	58	177
11:15 AM	5	12	2	0	42	19	13	9	5	0	36	27	0	61	9	0	31	70	6	59	5	0	5	70	186
11:30 AM	10	10	4	0	43	24	7	4	4	0	34	15	3	59	5	0	14	67	8	59	7	0	22	74	180
11:45 AM	7	6	5	0	72	18	6	6	7	0	51	19	3	74	6	0	10	83	7	78	18	0	27	103	223
Hourly Total	36	33	13	0	186	82	35	26	24	0	146	85	10	251	33	0	64	294	26	245	34	0	64	305	766
12:00 PM	9	3	1	0	55	13	8	5	5	0	67	18	5	80	6	0	26	91	4	83	10	0	0	97	219
12:15 PM	12	1	5	0	27	18	11	1	3	0	36	15	2	94	7	0	9	103	1	71	7	0	11	79	215
12:30 PM	8	4	5	0	38	17	3	8	3	0	33	14	5	72	8	0	11	85	1	63	6	0	1	70	186
12:45 PM	6	2	2	0	81	10	13	9	2	0	47	24	4	73	9	0	15	86	3	62	7	0	15	72	192
Hourly Total	35	10	13	0	201	58	35	23	13	0	183	71	16	319	30	0	61	365	9	279	30	0	27	318	812
1:00 PM	9	2	1	0	34	12	8	7	5	0	50	20	6	65	9	0	24	80	2	58	11	0	10	71	183
1:15 PM	12	3	2	0	23	17	9	4	6	0	40	19	3	79	8	0	27	90	4	80	13	0	18	97	223
1:30 PM	13	2	3	0	49	18	10	8	5	0	50	23	6	79	11	0	30	96	3	80	6	0	24	89	226
1:45 PM	9	0	6	0	29	15	8	3	7	0	32	18	6	56	4	0	21	66	1	68	10	1	4	80	179
Hourly Total	43	7	12	0	135	62	35	22	23	0	172	80	21	279	32	0	102	332	10	286	40	1	56	337	811
2:00 PM	13	3	3	0	45	19	4	7	5	0	63	16	4	80	7	0	12	91	2	88	11	0	10	101	227
2:15 PM	8	0	4	0	43	12	4	6	10	0	67	20	5	69	8	0	17	82	3	64	12	0	12	79	193
2:30 PM	15	3	8	0	55	26	8	6	6	0	90	20	5	61	13	0	15	79	5	87	18	0	36	110	235
2:45 PM	10	4	6	0	62	20	7	8	7	0	72	22	6	81	6	0	27	93	5	67	10	0	16	82	217
Hourly Total	46	10	21	0	205	77	23	27	28	0	292	78	20	291	34	0	71	345	15	306	51	0	74	372	872
3:00 PM	21	7	7	0	58	35	12	7	8	0	61	27	3	79	2	0	17	84	3	71	12	0	25	86	232
3:15 PM	13	1	4	0	28	18	9	11	3	0	42	23	9	82	7	0	22	98	1	75	13	0	16	89	228
3:30 PM	14	2	7	0	36	23	8	8	6	0	42	22	5	78	10	0	31	93	4	77	6	0	9	87	225
3:45 PM	18	5	3	0	33	26	13	7	9	0	44	29	2	85	11	0	9	98	8	69	13	0	17	90	243
Hourly Total	66	15	21	0	155	102	42	33	26	0	189	101	19	324	30	0	79	373	16	292	44	0	67	352	928

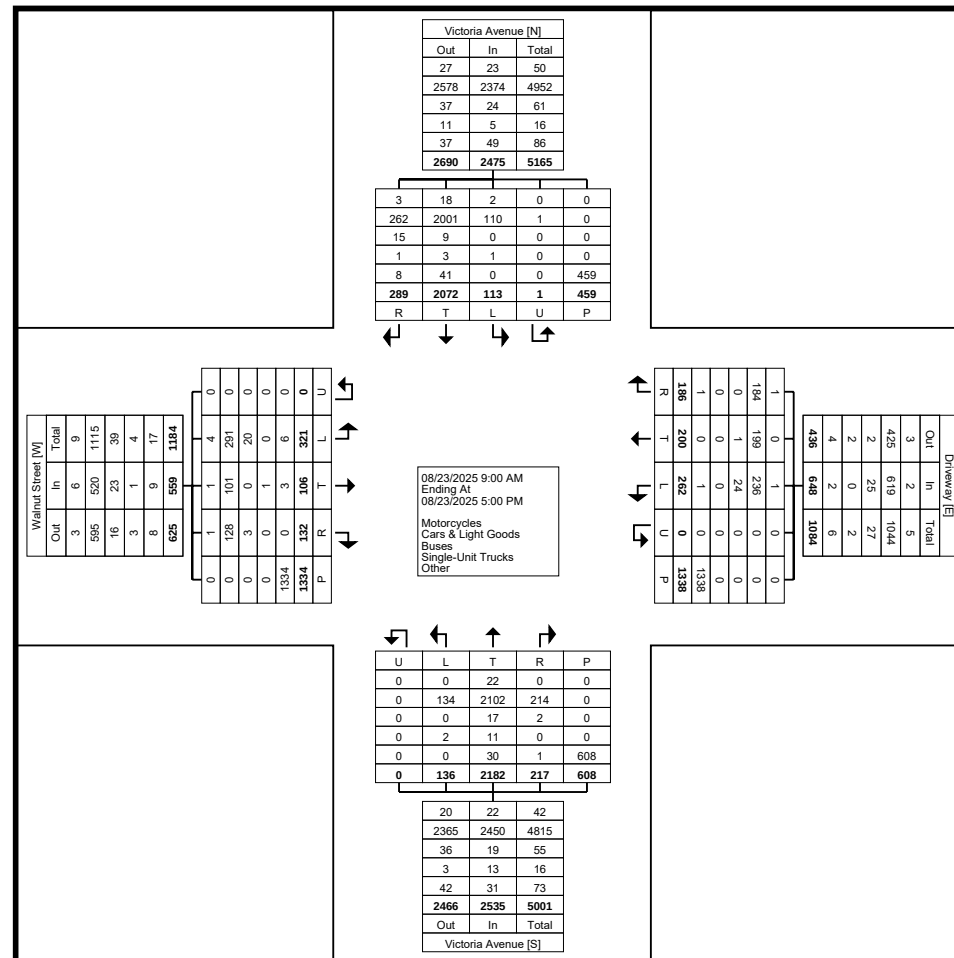
4:00 PM	14	4	3	0	43	21	10	8	21	0	55	39	6	74	6	0	23	86	4	70	9	0	17	83	229
4:15 PM	11	6	6	0	73	23	11	14	10	0	55	35	11	81	6	0	29	98	2	88	11	0	18	101	257
4:30 PM	8	6	7	0	62	21	10	14	8	0	72	32	7	75	5	0	24	87	5	84	19	0	16	108	248
4:45 PM	12	3	6	0	67	21	13	7	9	0	48	29	4	70	11	0	48	85	9	76	11	0	33	96	231
Hourly Total	45	19	22	0	245	86	44	43	48	0	230	135	28	300	28	0	124	356	20	318	50	0	84	388	965
Grand Total	321	106	132	0	1334	559	262	200	186	0	1338	648	136	2182	217	0	608	2535	113	2072	289	1	459	2475	6217
Approach %	57.4	19.0	23.6	0.0	-	-	40.4	30.9	28.7	0.0	-	-	5.4	86.1	8.6	0.0	-	-	4.6	83.7	11.7	0.0	-	-	-
Total %	5.2	1.7	2.1	0.0	-	9.0	4.2	3.2	3.0	0.0	-	10.4	2.2	35.1	3.5	0.0	-	40.8	1.8	33.3	4.6	0.0	-	39.8	-
Motorcycles	4	1	1	0	-	6	1	0	1	0	-	2	0	22	0	0	-	22	2	18	3	0	-	23	53
% Motorcycles	1.2	0.9	0.8	-	-	1.1	0.4	0.0	0.5	-	-	0.3	0.0	1.0	0.0	-	-	0.9	1.8	0.9	1.0	0.0	-	0.9	0.9
Cars & Light Goods	291	101	128	0	-	520	236	199	184	0	-	619	134	2102	214	0	-	2450	110	2001	262	1	-	2374	5963
% Cars & Light Goods	90.7	95.3	97.0	-	-	93.0	90.1	99.5	98.9	-	-	95.5	98.5	96.3	98.6	-	-	96.6	97.3	96.6	90.7	100.0	-	95.9	95.9
Buses	20	0	3	0	-	23	24	1	0	0	-	25	0	17	2	0	-	19	0	9	15	0	-	24	91
% Buses	6.2	0.0	2.3	-	-	4.1	9.2	0.5	0.0	-	-	3.9	0.0	0.8	0.9	-	-	0.7	0.0	0.4	5.2	0.0	-	1.0	1.5
Single-Unit Trucks	0	1	0	0	-	1	0	0	0	0	-	0	2	11	0	0	-	13	1	3	1	0	-	5	19
% Single-Unit Trucks	0.0	0.9	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	1.5	0.5	0.0	-	-	0.5	0.9	0.1	0.3	0.0	-	0.2	0.3
Articulated Trucks	1	0	0	0	-	1	0	0	1	0	-	1	0	3	0	0	-	3	0	2	0	0	-	2	7
% Articulated Trucks	0.3	0.0	0.0	-	-	0.2	0.0	0.0	0.5	-	-	0.2	0.0	0.1	0.0	-	-	0.1	0.0	0.1	0.0	0.0	-	0.1	0.1
Bicycles on Road	5	3	0	0	-	8	1	0	0	0	-	1	0	27	1	0	-	28	0	39	8	0	-	47	84
% Bicycles on Road	1.6	2.8	0.0	-	-	1.4	0.4	0.0	0.0	-	-	0.2	0.0	1.2	0.5	-	-	1.1	0.0	1.9	2.8	0.0	-	1.9	1.4
Bicycles on Crosswalk	-	-	-	-	11	-	-	-	-	-	26	-	-	-	-	-	9	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.8	-	-	-	-	-	1.9	-	-	-	-	-	1.5	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	1323	-	-	-	-	-	1312	-	-	-	-	-	599	-	-	-	-	-	459	-	-
% Pedestrians	-	-	-	-	99.2	-	-	-	-	-	98.1	-	-	-	-	-	98.5	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Walnut Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Victoria Avenue & Walnut Street -
Saturday
Site Code: 250550
Start Date: 08/23/2025
Page No: 4

Turning Movement Peak Hour Data (3:45 PM)

Start Time	Walnut Street Eastbound						Driveway Westbound						Victoria Avenue Northbound						Victoria Avenue Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:45 PM	18	5	3	0	33	26	13	7	9	0	44	29	2	85	11	0	9	98	8	69	13	0	17	90	243
4:00 PM	14	4	3	0	43	21	10	8	21	0	55	39	6	74	6	0	23	86	4	70	9	0	17	83	229
4:15 PM	11	6	6	0	73	23	11	14	10	0	55	35	11	81	6	0	29	98	2	88	11	0	18	101	257
4:30 PM	8	6	7	0	62	21	10	14	8	0	72	32	7	75	5	0	24	87	5	84	19	0	16	108	248
Total	51	21	19	0	211	91	44	43	48	0	226	135	26	315	28	0	85	369	19	311	52	0	68	382	977
Approach %	56.0	23.1	20.9	0.0	-	-	32.6	31.9	35.6	0.0	-	-	7.0	85.4	7.6	0.0	-	-	5.0	81.4	13.6	0.0	-	-	-
Total %	5.2	2.1	1.9	0.0	-	9.3	4.5	4.4	4.9	0.0	-	13.8	2.7	32.2	2.9	0.0	-	37.8	1.9	31.8	5.3	0.0	-	39.1	-
PHF	0.708	0.875	0.679	0.000	-	0.875	0.846	0.768	0.571	0.000	-	0.865	0.591	0.926	0.636	0.000	-	0.941	0.594	0.884	0.684	0.000	-	0.884	0.950
Motorcycles	0	0	0	0	-	0	0	0	1	0	-	1	0	1	0	0	-	1	2	3	0	0	-	5	7
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	2.1	-	-	0.7	0.0	0.3	0.0	-	-	0.3	10.5	1.0	0.0	-	-	1.3	0.7
Cars & Light Goods	48	20	19	0	-	87	41	42	47	0	-	130	26	303	26	0	-	355	17	304	48	0	-	369	941
% Cars & Light Goods	94.1	95.2	100.0	-	-	95.6	93.2	97.7	97.9	-	-	96.3	100.0	96.2	92.9	-	-	96.2	89.5	97.7	92.3	-	-	96.6	96.3
Buses	2	0	0	0	-	2	3	1	0	0	-	4	0	3	1	0	-	4	0	0	2	0	-	2	12
% Buses	3.9	0.0	0.0	-	-	2.2	6.8	2.3	0.0	-	-	3.0	0.0	1.0	3.6	-	-	1.1	0.0	0.0	3.8	-	-	0.5	1.2
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	0	0	0	-	0	1
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	0.0	0.0	-	-	0.0	0.1
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Road	1	1	0	0	-	2	0	0	0	0	-	0	0	7	1	0	-	8	0	4	2	0	-	6	16
% Bicycles on Road	2.0	4.8	0.0	-	-	2.2	0.0	0.0	0.0	-	-	0.0	0.0	2.2	3.6	-	-	2.2	0.0	1.3	3.8	-	-	1.6	1.6
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	2.2	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	211	-	-	-	-	-	221	-	-	-	-	-	85	-	-	-	-	-	68	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	97.8	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Turning Movement Peak Hour Data Plot (3:45 PM)

Signal Code: BNDVCT

Intersection: BENDER STREET & VICTORIA STREET

Municipality: niagarafalls

Owner: city

Last Modified: 2025-08-01 10:30:00 AM

Timing Parameters	SBD ADVANCE VICTORIA AVE.	NBD & SBD THRU VICTORIA AVE.	WBD THRU BENDER ST.	EBD PED	--	--
Min Green	6	8	8	0	0	0
Walk	0	10	8	8	0	0
Ped Clearance	0	14	12	12	0	0
Vehicle Ext.	3	3.5	2.5	0	0	0
Max Green	25	35	30	0	0	0
Yellow	3	4.1	4.1	0	0	0
All Red	0	2.2	2.2	0	0	0

Offset		
Minimum Cycle	28.6	0
Pedestrian Cycle	50.3	
Maximum Cycle	105.6	0
Operation	FA	

Installed On: 2013-01-28

Count Date: --/--/----

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: 420MCD

Intersection: RR 420 (Falls Avenue) & MacDonald Avenue

Municipality: niagarafalls

Owner: region

Last Modified: 2025-08-01 9:57:22 AM

Timing Parameters	EBD & WBD ADVANCE FALLS AVE.	EBD & WBD THRU FALLS AVE.	NBD THRU MacDONALD AVE.	SBD THRU MacDONALD AVE.	n/ a	n/ a
Min Green	6	10	10	10	0	0
Walk	0	10	12	12	0	0
Ped Clearance	0	16	21	21	0	0
Vehicle Ext.	2.5	5	2.5	5	0	0
Max Green	12	45	25	25	0	0
Yellow	3	4.1	4.1	4.1	0	0
All Red	0	2.2	3.2	3.2	0	0

Offset		
Minimum Cycle	33.6	0
Pedestrian Cycle	72.6	
Maximum Cycle	98.6	0
Operation	FA	

Installed On: 2009-04-15

Count Date: --/--/----

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: 420VCT

Intersection: RR420(Falls Ave.) & Victoria Ave.

Municipality: niagarafalls

Owner: region

Last Modified: 2012-03-26 9:49:42 AM

Timing Parameters	EBD Falls Ave. Ramp	NBD/SBD Victoria Ave.	n/a	n/a	n/a	n/a
Min Green	8	8	0	0	0	0
Walk	8	7	0	0	0	0
Ped Clearance	14	11	0	0	0	0
Vehicle Ext.	2.1	2.1	0	0	0	0
Max Green	30	40	0	0	0	0
Yellow	4.1	4.1	0	0	0	0
All Red	2	2	0	0	0	0

Offset		
Minimum Cycle	28.2	0
Pedestrian Cycle	52.2	
Maximum Cycle	82.2	0
Operation	FA	

Installed On: 2003-09-24

Count Date: --/--/----

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Signal Code: VCTWLN

Intersection: VICTORIA AVE. & WALNUT ST.

Municipality: niagarafalls

Owner: city

Last Modified: 2013-06-27 1:36:35 PM

Timing Parameters	NBD & SBD THRU VICTORIA AVE.	EBD & WBD THRU WALNUT ST.	n/a	n/a	n/a	n/a
Min Green	10	8	0	0	0	0
Walk	10	8	0	0	0	0
Ped Clearance	14	10	0	0	0	0
Vehicle Ext.	2.5	2.5	0	0	0	0
Max Green	35	20	0	0	0	0
Yellow	4.1	4.1	0	0	0	0
All Red	3.1	2.6	0	0	0	0

Offset		
Minimum Cycle	31.9	0
Pedestrian Cycle	55.9	
Maximum Cycle	68.9	0
Operation	FA	

Installed On: 2013-01-10

Count Date: --/--/----

FA = Fully Actuated

SA = Semi Actuated

FT = Fixed Time

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Appendix C

Base Year Operations



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	38	284	136	130
Future Volume (vph)	0	0	38	284	136	130
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934					
Flt Protected	0.950					
Satd. Flow (prot)	0	0	1381	1518	1207	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	0	1381	1518	1207	0
Link Speed (k/h)	40	50				50
Link Distance (m)	75.7	60.3				168.1
Travel Time (s)	6.8	4.3				12.1
Confl. Peds. (#/hr)	1	29				29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	44	330	158	151
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	44	330	309	0
Sign Control	Stop	Free				Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	38	284	136	130
Future Volume (Veh/h)	0	0	38	284	136	130
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	44	330	158	151
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	682	263	338			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	682	263	338			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	96			
cM capacity (veh/h)	403	781	1232			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	44	330	309			
Volume Left	44	0	0			
Volume Right	0	0	151			
cSH	1232	1700	1700			
Volume to Capacity	0.04	0.19	0.18			
Queue Length 95th (m)	0.8	0.0	0.0			
Control Delay (s/veh)	8.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	0.9		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			32.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	7	315	0	0	136
Future Volume (vph)	9	7	315	0	0	136
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		2		10	10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	11	9	384	0	0	166
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	384	0	0	166
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	57.6%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	7	315	0	0	136
Future Volume (Veh/h)	9	7	315	0	0	136
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	9	384	0	0	166
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.97	0.97			0.97	
vC, conflicting volume	560	396			394	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	361			359	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	474	630			1162	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	384	166			
Volume Left	11	0	0			
Volume Right	9	0	0			
cSH	533	1700	1700			
Volume to Capacity	0.04	0.23	0.10			
Queue Length 95th (m)	0.9	0.0	0.0			
Control Delay (s/veh)	12.0	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	12.0	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		57.6%		ICU Level of Service		B
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	240	0	0	0	0	143	5	7	138	0
Future Volume (vph)	172	0	240	0	0	0	0	143	5	7	138	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.98		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1256	0	1381	1504	0
Flt Permitted	0.950									0.650		
Satd. Flow (perm)	1381	0	1071	0	0	0	0	1256	0	923	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			276					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	198	0	276	0	0	0	0	164	6	8	159	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	0	276	0	0	0	0	170	0	8	159	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	36.1		36.1					46.1		46.1	46.1	
Total Split (%)	43.9%		43.9%					56.1%		56.1%	56.1%	
Maximum Green (s)	30.0		30.0					40.0		40.0	40.0	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	9.8		9.8					10.0		10.0	10.0	
Actuated g/C Ratio	0.30		0.30					0.31		0.31	0.31	
v/c Ratio	0.47		0.53					0.44		0.03	0.34	
Control Delay (s/veh)	13.8		6.1					13.2		8.6	11.3	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	13.8		6.1					13.2		8.6	11.3	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		A	B	
Approach Delay (s/veh)		9.3						13.2			11.2	
Approach LOS		A						B			B	
Queue Length 50th (m)	7.3		0.0					6.4		0.3	5.8	
Queue Length 95th (m)	21.3		10.0					19.1		2.0	17.0	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1276		1010					1250		918	1497	
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	0.16		0.27					0.14		0.01	0.11	

Intersection Summary

Area Type: Other

Cycle Length: 82.2

Actuated Cycle Length: 32.2

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay (s/veh): 10.5

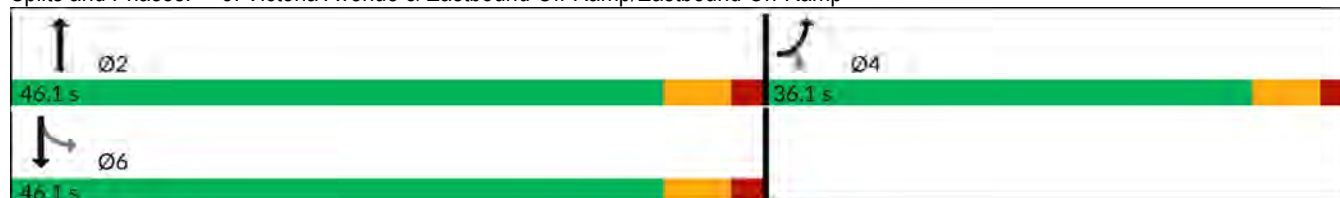
Intersection LOS: B

Intersection Capacity Utilization 57.6%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Base Year AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	240	0	0	0	0	143	5	7	138	0
Future Volume (vph)	172	0	240	0	0	0	0	143	5	7	138	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1257		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.65	1.00	
Satd. Flow (perm)	1381		1072					1257		936	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	198	0	276	0	0	0	0	164	6	8	159	0
RTOR Reduction (vph)	0	0	191	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	198	0	85	0	0	0	0	168	0	8	159	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	9.8		9.8					10.0		10.0	10.0	
Effective Green, g (s)	9.8		9.8					10.0		10.0	10.0	
Actuated g/C Ratio	0.31		0.31					0.31		0.31	0.31	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	422		328					392		292	470	
v/s Ratio Prot	c0.14							c0.13			0.11	
v/s Ratio Perm			0.08							0.01		
v/c Ratio	0.47		0.26					0.43		0.03	0.34	
Uniform Delay, d1	9.0		8.4					8.7		7.6	8.5	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.4		0.2					0.3		0.0	0.2	
Delay (s)	9.4		8.5					9.1		7.6	8.6	
Level of Service	A		A					A		A	A	
Approach Delay (s/veh)		8.9			0.0			9.1			8.6	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		8.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		32.0			Sum of lost time (s)			12.2				
Intersection Capacity Utilization		57.6%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	19	4	128	363	15
Future Volume (vph)	20	19	4	128	363	15
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934				0.995	
Flt Protected	0.975			0.998		
Satd. Flow (prot)	1305	0	0	1093	1294	0
Flt Permitted	0.975			0.998		
Satd. Flow (perm)	1305	0	0	1093	1294	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	24	23	5	152	432	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	0	0	157	450	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	19	4	128	363	15
Future Volume (Veh/h)	20	19	4	128	363	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	24	23	5	152	432	18
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.97	0.97	0.97			
vC, conflicting volume	622	471	469			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	597	442	440			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	95	96	99			
cM capacity (veh/h)	445	585	962			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	47	157	450			
Volume Left	24	5	0			
Volume Right	23	0	18			
cSH	504	962	1700			
Volume to Capacity	0.09	0.00*	0.26			
Queue Length 95th (m)	2.3	0.1	0.0			
Control Delay (s/veh)	12.9	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s/veh)	12.9	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		41.7%		ICU Level of Service		A
Analysis Period (min)		15				
* Value less than 0.01.						

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	32	100	78	257	125
Future Volume (vph)	41	32	100	78	257	125
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.96		0.97	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.528	
Satd. Flow (perm)	1307	1061	1449	1020	748	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		37		90		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	47	37	115	90	295	144
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	37	115	90	295	144
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	36.3	36.3	41.3	41.3	28.0	69.3
Total Split (%)	34.4%	34.4%	39.1%	39.1%	26.5%	65.6%
Maximum Green (s)	30.0	30.0	35.0	35.0	25.0	63.0
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.4	8.4	10.1	10.1	27.1	23.8
Actuated g/C Ratio	0.19	0.19	0.22	0.22	0.60	0.53
v/c Ratio	0.19	0.16	0.35	0.30	0.49	0.18

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	19.6	9.6	18.7	7.5	7.5	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	19.6	9.6	18.7	7.5	7.5	6.0
LOS	B	A	B	A	A	A
Approach Delay (s/veh)	15.2		13.8			7.0
Approach LOS	B		B			A
Queue Length 50th (m)	3.1	0.0	7.8	0.0	9.0	5.1
Queue Length 95th (m)	11.1	5.7	20.3	8.1	18.8	11.5
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	883	729	1143	823	816	1490
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.05	0.10	0.11	0.36	0.10

Intersection Summary

Area Type: Other

Cycle Length: 105.6

Actuated Cycle Length: 44.9

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay (s/veh): 9.9

Intersection LOS: A

Intersection Capacity Utilization 44.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	41	32	100	78	257	125
Future Volume (vph)	41	32	100	78	257	125
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1074	1449	1032	1363	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.53	1.00
Satd. Flow (perm)	1312	1074	1449	1032	757	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	47	37	115	90	295	144
RTOR Reduction (vph)	0	30	0	70	0	0
Lane Group Flow (vph)	47	7	115	20	295	144
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.4	8.4	10.2	10.2	23.8	23.8
Effective Green, g (s)	8.4	8.4	10.2	10.2	23.8	23.8
Actuated g/C Ratio	0.19	0.19	0.23	0.23	0.53	0.53
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	246	201	329	234	545	791
v/s Ratio Prot			0.08		c0.13	0.10
v/s Ratio Perm	c0.04	0.01		0.02	c0.16	
v/c Ratio	0.19	0.03	0.35	0.09	0.54	0.18
Uniform Delay, d1	15.3	14.9	14.5	13.6	6.4	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.8	0.2	1.1	0.1
Delay (s)	15.6	14.9	15.3	13.8	7.5	5.6
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	15.3		14.6			6.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			10.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.49			
Actuated Cycle Length (s)			44.8		Sum of lost time (s)	15.6
Intersection Capacity Utilization			44.8%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	9	2	175	164	2
Future Volume (vph)	3	9	2	175	164	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.901					0.850
Flt Protected	0.987					
Satd. Flow (prot)	1179	0	0	1092	1504	1106
Flt Permitted	0.987					
Satd. Flow (perm)	1179	0	0	1092	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	11	2	208	195	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	0	210	195	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Base Year AM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	9	2	175	164	2
Future Volume (Veh/h)	3	9	2	175	164	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	11	2	208	195	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.99	0.99	0.99			
vC, conflicting volume	430	217	219			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	397	201	203			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	594	790	1334			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	15	210	195	2		
Volume Left	4	2	0	0		
Volume Right	11	0	0	2		
cSH	726	1334	1700	1700		
Volume to Capacity	0.02	0.00*	0.11	0.00*		
Queue Length 95th (m)	0.5	0.0	0.0	0.0		
Control Delay (s/veh)	10.1	0.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	10.1	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	30.2%			ICU Level of Service	A	
Analysis Period (min)	15					
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	7	7	17	9	15	2	149	9	12	151	10
Future Volume (vph)	13	7	7	17	9	15	2	149	9	12	151	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.97			0.99			1.00	0.94
Frt		0.965			0.950			0.992				0.850
Flt Protected		0.976			0.980			0.999			0.996	
Satd. Flow (prot)	0	1197	0	0	1254	0	0	1327	0	0	1121	851
Flt Permitted		0.821			0.853			0.995			0.961	
Satd. Flow (perm)	0	998	0	0	1076	0	0	1321	0	0	1078	801
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			18			7				59
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	15	8	8	20	11	18	2	175	11	14	178	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	31	0	0	49	0	0	188	0	0	192	12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	26.7	26.7		26.7	26.7		42.2	42.2		42.2	42.2	42.2
Total Split (%)	38.8%	38.8%		38.8%	38.8%		61.2%	61.2%		61.2%	61.2%	61.2%
Maximum Green (s)	20.0	20.0		20.0	20.0		35.0	35.0		35.0	35.0	35.0
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.1			8.1			11.7			11.7	11.7
Actuated g/C Ratio		0.24			0.24			0.35			0.35	0.35
v/c Ratio		0.13			0.18			0.41			0.52	0.04
Control Delay (s/veh)		11.2			10.5			11.0			14.3	0.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		11.2			10.5			11.0			14.3	0.2

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			B	A
Approach Delay (s/veh)		11.2			10.5			11.0			13.5	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		0.9			1.2			7.4			8.1	0.0
Queue Length 95th (m)		5.2			6.7			16.3			18.3	0.0
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		597			648			1293			1055	785
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		0.05			0.08			0.15			0.18	0.02

Intersection Summary

Area Type: Other

Cycle Length: 68.9

Actuated Cycle Length: 33.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay (s/veh): 12.0

Intersection LOS: B

Intersection Capacity Utilization 59.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	7	7	17	9	15	2	149	9	12	151	10
Future Volume (vph)	13	7	7	17	9	15	2	149	9	12	151	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		1.00			0.99			1.00			1.00	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1198			1250			1330			1120	818
Flt Permitted		0.82			0.85			1.00			0.96	1.00
Satd. Flow (perm)		1008			1088			1324			1080	818
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	15	8	8	20	11	18	2	175	11	14	178	12
RTOR Reduction (vph)	0	6	0	0	14	0	0	5	0	0	0	8
Lane Group Flow (vph)	0	25	0	0	35	0	0	183	0	0	192	4
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		8.1			8.1			11.7			11.7	11.7
Effective Green, g (s)		8.1			8.1			11.7			11.7	11.7
Actuated g/C Ratio		0.24			0.24			0.35			0.35	0.35
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		242			261			459			374	283
v/s Ratio Prot												
v/s Ratio Perm		0.02			0.03			0.14			0.18	0.01
v/c Ratio		0.10			0.14			0.40			0.51	0.01
Uniform Delay, d1		10.0			10.1			8.3			8.7	7.2
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.2			0.4			0.9	0.0
Delay (s)		10.1			10.2			8.8			9.6	7.2
Level of Service		B			B			A			A	A
Approach Delay (s/veh)		10.1			10.2			8.8			9.5	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		9.3										
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		33.7										
Intersection Capacity Utilization		59.9%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	581	74	4	241	1	138	18	10	2	14	19
Future Volume (vph)	23	581	74	4	241	1	138	18	10	2	14	19
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.983			0.999			0.992			0.925	
Flt Protected	0.950			0.950				0.960			0.997	
Satd. Flow (prot)	1316	2920	0	1381	2938	0	0	1341	0	0	1305	0
Flt Permitted	0.558			0.361				0.736			0.981	
Satd. Flow (perm)	772	2920	0	525	2938	0	0	1019	0	0	1284	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						3			21	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	25	632	80	4	262	1	150	20	11	2	15	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	712	0	4	263	0	0	181	0	0	38	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	15.0	51.3		15.0	51.3		32.3	32.3		32.3	32.3	
Total Split (%)	15.2%	52.0%		15.2%	52.0%		32.8%	32.8%		32.8%	32.8%	
Maximum Green (s)	12.0	45.0		12.0	45.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	28.7	24.3		27.9	22.4			16.1			16.1	
Actuated g/C Ratio	0.51	0.43		0.50	0.40			0.29			0.29	
v/c Ratio	0.05	0.56		0.01	0.22			0.62			0.10	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	7.7	14.4		7.5	13.4			29.7			12.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	7.7	14.4		7.5	13.4			29.7			12.3	
LOS	A	B		A	B			C			B	
Approach Delay (s/veh)		14.2			13.3			29.7			12.3	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	1.1	23.1		0.2	7.3			13.9			1.1	
Queue Length 95th (m)	4.8	58.3		1.4	21.4			45.5			8.7	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	523	2418		467	2430			488			625	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.05	0.29		0.01	0.11			0.37			0.06	

Intersection Summary

Area Type: Other

Cycle Length: 98.6

Actuated Cycle Length: 56.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay (s/veh): 16.2

Intersection LOS: B

Intersection Capacity Utilization 56.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis 8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	581	74	4	241	1	138	18	10	2	14	19
Future Volume (vph)	23	581	74	4	241	1	138	18	10	2	14	19
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2920		1381	2940			1335			1309	
Flt Permitted	0.56	1.00		0.36	1.00			0.74			0.98	
Satd. Flow (perm)	772	2920		525	2940			1023			1288	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	632	80	4	262	1	150	20	11	2	15	21
RTOR Reduction (vph)	0	10	0	0	0	0	0	2	0	0	15	0
Lane Group Flow (vph)	25	702	0	4	263	0	0	179	0	0	23	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	26.3	24.2		23.7	22.9			16.1			16.1	
Effective Green, g (s)	26.3	24.2		23.7	22.9			16.1			16.1	
Actuated g/C Ratio	0.46	0.42		0.41	0.40			0.28			0.28	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	371	1224		227	1166			285			359	
v/s Ratio Prot	c0.00	c0.24		0.00	0.09							
v/s Ratio Perm	0.03			0.01				c0.17			0.02	
v/c Ratio	0.07	0.57		0.02	0.23			0.63			0.06	
Uniform Delay, d1	8.7	12.8		10.1	11.5			18.2			15.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.0		0.0	0.2			3.7			0.2	
Delay (s)	8.8	13.8		10.1	11.7			21.9			15.4	
Level of Service	A	B		B	B			C			B	
Approach Delay (s/veh)		13.7			11.7			21.9			15.4	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			57.7			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			56.5%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	40	6	1	16	26	1	134	1	19	67	6
Future Volume (vph)	6	40	6	1	16	26	1	134	1	19	67	6
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.918			0.999			0.992	
Flt Protected		0.994			0.999						0.990	
Satd. Flow (prot)	0	1371	0	0	1290	0	0	1390	0	0	1387	0
Flt Permitted		0.994			0.999						0.990	
Satd. Flow (perm)	0	1371	0	0	1290	0	0	1390	0	0	1387	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	7	49	7	1	20	32	1	163	1	23	82	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	63	0	0	53	0	0	165	0	0	112	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	36.9%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis 9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	6	40	6	1	16	26	1	134	1	19	67	6
Future Volume (vph)	6	40	6	1	16	26	1	134	1	19	67	6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	7	49	7	1	20	32	1	163	1	23	82	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	63	53	165	112								
Volume Left (vph)	7	1	1	23								
Volume Right (vph)	7	32	1	7								
Hadj (s)	0.00	-0.33	0.05	0.03								
Departure Headway (s)	4.6	4.3	4.3	4.4								
Degree Utilization, x	0.08	0.06	0.20	0.14								
Capacity (veh/h)	727	775	799	784								
Control Delay (s/veh)	8.0	7.6	8.4	8.1								
Approach Delay (s/veh)	8.0	7.6	8.4	8.1								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.1									
Level of Service			A									
Intersection Capacity Utilization			36.9%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	37	8	1	18	0	5	0	3	0	1	0
Future Volume (vph)	1	37	8	1	18	0	5	0	3	0	1	0
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.976				0.951							
Flt Protected	0.999				0.998				0.969			
Satd. Flow (prot)	0	1397	0	0	1303	0	0	1321	0	0	1433	0
Flt Permitted	0.999				0.998				0.969			
Satd. Flow (perm)	0	1397	0	0	1303	0	0	1321	0	0	1433	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	362.4				79.0				93.8			
Travel Time (s)	26.1				5.7				6.8			
Confl. Peds. (#/hr)	3	6		6	3		2		2			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	49	11	1	24	0	7	0	4	0	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	61	0	0	25	0	0	11	0	0	1	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.1%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

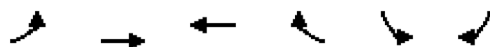
4873 and 4898 Kitchener Street TIS
Base Year AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	37	8	1	18	0	5	0	3	0	1	0
Future Volume (Veh/h)	1	37	8	1	18	0	5	0	3	0	1	0
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	1	49	11	1	24	0	7	0	4	0	1	0
Pedestrians					2				6		3	
Lane Width (m)					3.6				3.6		3.6	
Walking Speed (m/s)					1.0				1.0		1.0	
Percent Blockage					0				1		0	
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	27			66			89	92	63	92	97	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	27			66			89	92	63	92	97	27
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1595			1081			887	794	1000	882	788	1051
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	61	25	11	1								
Volume Left	1	1	7	0								
Volume Right	11	0	4	0								
cSH	1595	1081	925	788								
Volume to Capacity	0.00*	0.00*	0.01	0.00*								
Queue Length 95th (m)	0.0	0.0	0.3	0.0								
Control Delay (s/veh)	0.1	0.3	8.9	9.6								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.3	8.9	9.6								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			19.1%	ICU Level of Service				A				
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

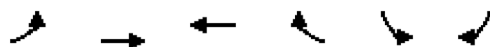
4873 and 4898 Kitchener Street TIS
Base Year AM



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	38	18	0	1	1
Future Volume (vph)	2	38	18	0	1	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected		0.997			0.976	
Satd. Flow (prot)	0	1174	1262	0	869	0
Flt Permitted		0.997			0.976	
Satd. Flow (perm)	0	1174	1262	0	869	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	3	52	25	0	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	55	25	0	2	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year AM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	38	18	0	1	1
Future Volume (Veh/h)	2	38	18	0	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	3	52	25	0	1	1
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	29				87	31
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	29				87	31
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	100				100	100
cM capacity (veh/h)	1591				914	815
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	55	25	2			
Volume Left	3	0	1			
Volume Right	0	0	1			
cSH	1591	1700	862			
Volume to Capacity	0.00*	0.01	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.4	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s/veh)	0.4	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			16.5%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	38	0	0	17	2	1	0	0	1	0	0
Future Volume (vph)	1	38	0	0	17	2	1	0	0	1	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.986											
Flt Protected	0.999								0.950		0.950	
Satd. Flow (prot)	0	1177	0	0	1242	0	0	1361	0	0	1361	0
Flt Permitted	0.999								0.950		0.950	
Satd. Flow (perm)	0	1177	0	0	1242	0	0	1361	0	0	1361	0
Link Speed (k/h)	50								50		50	
Link Distance (m)	37.0								32.6		36.9	
Travel Time (s)	2.7								2.3		2.7	
Confl. Peds. (#/hr)	3								2		2	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	55	0	0	25	3	1	0	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	56	0	0	28	0	0	1	0	0	1	0
Sign Control	Free		Free						Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	15.2%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	38	0	0	17	2	1	0	0	1	0	0
Future Volume (Veh/h)	1	38	0	0	17	2	1	0	0	1	0	0
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	1	55	0	0	25	3	1	0	0	1	0	0
Pedestrians					2				3			
Lane Width (m)					3.6				3.6			
Walking Speed (m/s)					1.0				1.0			
Percent Blockage					0				0			
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	31			55			84	88	57	89	87	30
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	31			55			84	88	57	89	87	30
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1590			1563			906	803	1013	895	805	1048
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	56	28	1	1								
Volume Left	1	0	1	1								
Volume Right	0	3	0	0								
cSH	1590	1700	906	895								
Volume to Capacity	0.00*	0.02	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s/veh)	0.1	0.0	9.0	9.0								
Lane LOS	A		A	A								
Approach Delay (s/veh)	0.1	0.0	9.0	9.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			15.2%	ICU Level of Service				A				
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	144	477	297	248
Future Volume (vph)	0	0	144	477	297	248
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.939	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1563	1232	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1563	1232	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		1	58			58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	152	502	313	261
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	152	502	574	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	69.8%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	144	477	297	248
Future Volume (Veh/h)	0	0	144	477	297	248
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	152	502	313	261
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1308	503	632			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1308	503	632			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	84			
cM capacity (veh/h)	150	572	960			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	152	502	574			
Volume Left	152	0	0			
Volume Right	0	0	261			
cSH	960	1700	1700			
Volume to Capacity	0.16	0.30	0.34			
Queue Length 95th (m)	4.2	0.0	0.0			
Control Delay (s/veh)	9.5	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.2		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			69.8%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	46	43	578	0	0	297
Future Volume (vph)	46	43	578	0	0	297
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	49	46	622	0	0	319
Shared Lane Traffic (%)						
Lane Group Flow (vph)	95	0	622	0	0	319
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	84.3%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	46	43	578	0	0	297
Future Volume (Veh/h)	46	43	578	0	0	297
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	49	46	622	0	0	319
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.74	0.74			0.74	
vC, conflicting volume	975	658			655	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	793	365			361	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	81	91			100	
cM capacity (veh/h)	258	490			867	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	95	622	319			
Volume Left	49	0	0			
Volume Right	46	0	0			
cSH	335	1700	1700			
Volume to Capacity	0.28	0.37	0.19			
Queue Length 95th (m)	8.6	0.0	0.0			
Control Delay (s/veh)	19.9	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	19.9	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		1.8				
Intersection Capacity Utilization		84.3%		ICU Level of Service		E
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	0	160	0	0	0	0	419	15	51	292	0
Future Volume (vph)	159	0	160	0	0	0	0	419	15	51	292	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.97		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1302	0	1354	1563	0
Flt Permitted	0.950									0.436		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1302	0	604	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			174					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	173	0	174	0	0	0	0	455	16	55	317	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	0	174	0	0	0	0	471	0	55	317	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	36.1		36.1					46.1		46.1	46.1	
Total Split (%)	43.9%		43.9%					56.1%		56.1%	56.1%	
Maximum Green (s)	30.0		30.0					40.0		40.0	40.0	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	12.1		12.1					21.8		21.8	21.8	
Actuated g/C Ratio	0.26		0.26					0.46		0.46	0.46	
v/c Ratio	0.49		0.42					0.78		0.20	0.44	
Control Delay (s/veh)	22.9		7.4					20.7		9.4	10.5	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	22.9		7.4					20.7		9.4	10.5	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		A					C		A	B	
Approach Delay (s/veh)		15.1						20.7			10.3	
Approach LOS		B						C			B	
Queue Length 50th (m)	11.1		0.0					26.8		2.2	14.5	
Queue Length 95th (m)	36.0		13.2					69.3		8.6	35.8	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	944		809					1104		511	1324	
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	0.18		0.22					0.43		0.11	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 82.2

Actuated Cycle Length: 47.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 15.8

Intersection LOS: B

Intersection Capacity Utilization 84.3%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Base Year PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	0	160	0	0	0	0	419	15	51	292	0
Future Volume (vph)	159	0	160	0	0	0	0	419	15	51	292	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1304		1327	1563	
Flt Permitted	0.95		1.00					1.00		0.44	1.00	
Satd. Flow (perm)	1368		1095					1304		610	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	173	0	174	0	0	0	0	455	16	55	317	0
RTOR Reduction (vph)	0	0	128	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	173	0	46	0	0	0	0	469	0	55	317	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	12.1		12.1					21.8		21.8	21.8	
Effective Green, g (s)	12.1		12.1					21.8		21.8	21.8	
Actuated g/C Ratio	0.26		0.26					0.47		0.47	0.47	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	359		287					616		288	739	
v/s Ratio Prot	c0.13							c0.36			0.20	
v/s Ratio Perm			0.04							0.09		
v/c Ratio	0.48		0.16					0.76		0.19	0.43	
Uniform Delay, d1	14.4		13.1					10.0		7.0	8.0	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.4		0.1					5.1		0.1	0.2	
Delay (s)	14.8		13.2					15.1		7.2	8.2	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		14.0			0.0			15.1			8.1	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			12.6									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			46.1									
Intersection Capacity Utilization			84.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	37	26	14	397	400	52
Future Volume (vph)	37	26	14	397	400	52
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.944				0.985	
Flt Protected	0.972			0.998		
Satd. Flow (prot)	1315	0	0	1164	1306	0
Flt Permitted	0.972			0.998		
Satd. Flow (perm)	1315	0	0	1164	1306	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	39	28	15	422	426	55
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	0	0	437	481	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	64.7%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	37	26	14	397	400	52
Future Volume (Veh/h)	37	26	14	397	400	52
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	39	28	15	422	426	55
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.94	0.89	0.89			
vC, conflicting volume	952	504	527			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	662	376	403			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	90	95	98			
cM capacity (veh/h)	380	568	987			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	67	437	481			
Volume Left	39	15	0			
Volume Right	28	0	55			
cSH	441	987	1700			
Volume to Capacity	0.15	0.02	0.28			
Queue Length 95th (m)	4.0	0.3	0.0			
Control Delay (s/veh)	14.6	0.5	0.0			
Lane LOS	B	A				
Approach Delay (s/veh)	14.6	0.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		64.7%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	109	160	251	132	173	253
Future Volume (vph)	109	160	251	132	173	253
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95	0.95		0.91	0.95	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.500	
Satd. Flow (perm)	1318	1052	1563	1001	685	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		168		139		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	115	168	264	139	182	266
Shared Lane Traffic (%)						
Lane Group Flow (vph)	115	168	264	139	182	266
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	36.3	36.3	41.3	41.3	28.0	69.3
Total Split (%)	34.4%	34.4%	39.1%	39.1%	26.5%	65.6%
Maximum Green (s)	30.0	30.0	35.0	35.0	25.0	63.0
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.7	10.7	15.4	15.4	31.1	27.7
Actuated g/C Ratio	0.21	0.21	0.30	0.30	0.60	0.54
v/c Ratio	0.42	0.48	0.56	0.35	0.34	0.32

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Base Year PM

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	25.1	9.4	21.0	6.1	6.8	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.1	9.4	21.0	6.1	6.8	7.9
LOS	C	A	C	A	A	A
Approach Delay (s/veh)	15.8		15.9			7.4
Approach LOS	B		B			A
Queue Length 50th (m)	8.6	0.0	18.8	0.0	5.8	11.0
Queue Length 95th (m)	25.8	13.6	45.2	10.1	16.4	27.2
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	799	704	1106	748	769	1532
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.24	0.24	0.19	0.24	0.17

Intersection Summary

Area Type: Other

Cycle Length: 105.6

Actuated Cycle Length: 51.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay (s/veh): 12.5

Intersection LOS: B

Intersection Capacity Utilization 56.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	109	160	251	132	173	253
Future Volume (vph)	109	160	251	132	173	253
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1351	1069	1563	1048	1350	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.50	1.00
Satd. Flow (perm)	1351	1069	1563	1048	711	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	115	168	264	139	182	266
RTOR Reduction (vph)	0	133	0	96	0	0
Lane Group Flow (vph)	115	35	264	43	182	266
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.7	10.7	15.6	15.6	27.7	27.7
Effective Green, g (s)	10.7	10.7	15.6	15.6	27.7	27.7
Actuated g/C Ratio	0.21	0.21	0.31	0.31	0.54	0.54
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	283	224	478	320	500	848
v/s Ratio Prot			c0.17		c0.06	0.17
v/s Ratio Perm	c0.09	0.03		0.04	0.13	
v/c Ratio	0.41	0.16	0.55	0.13	0.36	0.31
Uniform Delay, d1	17.4	16.5	14.8	12.8	6.3	6.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	1.5	0.2	0.5	0.3
Delay (s)	18.1	16.7	16.3	13.0	6.7	6.7
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	17.3		15.2			6.7
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.46			
Actuated Cycle Length (s)			51.0		Sum of lost time (s)	15.6
Intersection Capacity Utilization			56.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	9	5	377	345	17
Future Volume (vph)	6	9	5	377	345	17
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919					0.850
Flt Protected	0.980			0.999		
Satd. Flow (prot)	1291	0	0	1165	1563	1106
Flt Permitted	0.980			0.999		
Satd. Flow (perm)	1291	0	0	1165	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	6	9	5	393	359	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	0	398	359	18
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	52.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Base Year PM

											
Movement	EBL	EBR	NBL	NBT	SBT	SBR					
Lane Configurations											
Traffic Volume (veh/h)	6	9	5	377	345	17					
Future Volume (Veh/h)	6	9	5	377	345	17					
Sign Control	Stop			Free	Free						
Grade	0%			0%	0%						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96					
Hourly flow rate (vph)	6	9	5	393	359	18					
Pedestrians	83										
Lane Width (m)	3.6										
Walking Speed (m/s)	1.0										
Percent Blockage	8										
Right turn flare (veh)											
Median type				None	None						
Median storage veh											
Upstream signal (m)				75	59						
pX, platoon unblocked	0.91	0.90	0.90								
vC, conflicting volume	845	442	460								
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	535	324	344								
tC, single (s)	6.4	6.2	4.1								
tC, 2 stage (s)											
tF (s)	3.5	3.3	2.2								
p0 queue free %	99	98	100								
cM capacity (veh/h)	424	595	1012								
Direction, Lane #	EB 1	NB 1	SB 1	SB 2							
Volume Total	15	398	359	18							
Volume Left	6	5	0	0							
Volume Right	9	0	0	18							
cSH	513	1012	1700	1700							
Volume to Capacity	0.03	0.00*	0.21	0.01							
Queue Length 95th (m)	0.7	0.1	0.0	0.0							
Control Delay (s/veh)	12.2	0.2	0.0	0.0							
Lane LOS	B	A									
Approach Delay (s/veh)	12.2	0.2	0.0								
Approach LOS	B										
Intersection Summary											
Average Delay	0.3										
Intersection Capacity Utilization	52.0%			ICU Level of Service	A						
Analysis Period (min)	15										

* Value less than 0.01.

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	15	12	48	38	34	12	313	36	16	297	41
Future Volume (vph)	35	15	12	48	38	34	12	313	36	16	297	41
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.92			0.97			0.99	0.77
Frt		0.974			0.962			0.986				0.850
Flt Protected		0.972			0.980			0.998			0.997	
Satd. Flow (prot)	0	1274	0	0	1271	0	0	1368	0	0	1163	1024
Flt Permitted		0.753			0.840			0.981			0.967	
Satd. Flow (perm)	0	936	0	0	1038	0	0	1339	0	0	1122	790
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			29			12				59
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	38	16	13	52	41	37	13	337	39	17	319	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	67	0	0	130	0	0	389	0	0	336	44
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	26.7	26.7		26.7	26.7		42.2	42.2		42.2	42.2	42.2
Total Split (%)	38.8%	38.8%		38.8%	38.8%		61.2%	61.2%		61.2%	61.2%	61.2%
Maximum Green (s)	20.0	20.0		20.0	20.0		35.0	35.0		35.0	35.0	35.0
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		10.9			10.9			19.5			19.5	19.5
Actuated g/C Ratio		0.24			0.24			0.43			0.43	0.43
v/c Ratio		0.28			0.48			0.67			0.70	0.12
Control Delay (s/veh)		17.8			20.7			16.2			19.1	2.7
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		17.8			20.7			16.2			19.1	2.7

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			C			B			B	A
Approach Delay (s/veh)		17.8			20.7			16.2			17.2	
Approach LOS		B			C			B			B	
Queue Length 50th (m)		3.2			6.1			18.9			17.3	0.0
Queue Length 95th (m)		14.3			24.2			51.5			49.1	3.3
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		449			506			1085			907	650
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		0.15			0.26			0.36			0.37	0.07

Intersection Summary

Area Type: Other

Cycle Length: 68.9

Actuated Cycle Length: 45.3

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay (s/veh): 17.3

Intersection LOS: B

Intersection Capacity Utilization 78.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	35	15	12	48	38	34	12	313	36	16	297	41
Future Volume (vph)	35	15	12	48	38	34	12	313	36	16	297	41
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.98			0.97			0.99			1.00	0.85
Flpb, ped/bikes		0.97			0.97			1.00			1.00	1.00
Frt		0.97			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1243			1246			1375			1160	866
Flt Permitted		0.75			0.84			0.98			0.97	1.00
Satd. Flow (perm)		962			1067			1352			1125	866
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	38	16	13	52	41	37	13	337	39	17	319	44
RTOR Reduction (vph)	0	10	0	0	22	0	0	7	0	0	0	25
Lane Group Flow (vph)	0	57	0	0	108	0	0	382	0	0	336	19
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		10.9			10.9			19.5			19.5	19.5
Effective Green, g (s)		10.9			10.9			19.5			19.5	19.5
Actuated g/C Ratio		0.25			0.25			0.44			0.44	0.44
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		236			262			595			495	381
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.10			0.28			0.30	0.02
v/c Ratio		0.24			0.41			0.64			0.68	0.05
Uniform Delay, d1		13.4			14.0			9.7			9.9	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.4			0.8			2.1			3.3	0.0
Delay (s)		13.8			14.8			11.8			13.2	7.1
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		13.8			14.8			11.8			12.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			12.6									
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			44.3									
Intersection Capacity Utilization			78.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	570	154	36	650	12	227	27	21	2	23	22
Future Volume (vph)	49	570	154	36	650	12	227	27	21	2	23	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.968			0.997			0.990			0.936	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1381	2875	0	1381	2961	0	0	1338	0	0	1295	0
Flt Permitted	0.301			0.271				0.728			0.987	
Satd. Flow (perm)	437	2875	0	394	2961	0	0	1007	0	0	1281	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		46			2			4			24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	53	613	166	39	699	13	244	29	23	2	25	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	779	0	39	712	0	0	296	0	0	51	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	15.0	51.3		15.0	51.3		32.3	32.3		32.3	32.3	
Total Split (%)	15.2%	52.0%		15.2%	52.0%		32.8%	32.8%		32.8%	32.8%	
Maximum Green (s)	12.0	45.0		12.0	45.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	36.4	29.1		35.7	28.8			25.7			25.7	
Actuated g/C Ratio	0.49	0.39		0.48	0.39			0.35			0.35	
v/c Ratio	0.18	0.67		0.14	0.62			0.84			0.11	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	9.4	20.5		9.1	20.8			49.7			14.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	9.4	20.5		9.1	20.8			49.7			14.9	
LOS	A	C		A	C			D			B	
Approach Delay (s/veh)		19.8			20.2			49.7			14.9	
Approach LOS		B			C			D			B	
Queue Length 50th (m)	3.4	45.8		2.5	43.3			40.1			2.7	
Queue Length 95th (m)	7.8	64.8		6.2	61.4			#104.0			11.8	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	380	1817		365	1855			353			461	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.14	0.43		0.11	0.38			0.84			0.11	

Intersection Summary

Area Type: Other

Cycle Length: 98.6

Actuated Cycle Length: 74

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 24.4

Intersection LOS: C

Intersection Capacity Utilization 71.7%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	570	154	36	650	12	227	27	21	2	23	22
Future Volume (vph)	49	570	154	36	650	12	227	27	21	2	23	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2875		1381	2962			1331			1297	
Flt Permitted	0.30	1.00		0.27	1.00			0.73			0.99	
Satd. Flow (perm)	437	2875		394	2962			1009			1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	53	613	166	39	699	13	244	29	23	2	25	24
RTOR Reduction (vph)	0	28	0	0	1	0	0	3	0	0	16	0
Lane Group Flow (vph)	53	751	0	39	711	0	0	293	0	0	35	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	32.9	29.1		32.3	28.8			25.7			25.7	
Effective Green, g (s)	32.9	29.1		32.3	28.8			25.7			25.7	
Actuated g/C Ratio	0.44	0.39		0.43	0.38			0.34			0.34	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	239	1116		216	1138			346			439	
v/s Ratio Prot	c0.01	c0.26		0.01	0.24							
v/s Ratio Perm	0.09			0.07				c0.29			0.03	
v/c Ratio	0.22	0.67		0.18	0.62			0.85			0.08	
Uniform Delay, d1	12.5	19.0		12.8	18.7			22.8			16.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	2.1		0.3	1.5			17.0			0.2	
Delay (s)	12.9	21.1		13.1	20.2			39.8			16.8	
Level of Service	B	C		B	C			D			B	
Approach Delay (s/veh)		20.5			19.8			39.8			16.8	
Approach LOS		C			B			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			23.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			74.9			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			71.7%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	34	8	3	52	60	5	192	6	45	151	17
Future Volume (vph)	23	34	8	3	52	60	5	192	6	45	151	17
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.982			0.929			0.996			0.989	
Flt Protected		0.983			0.999			0.999			0.990	
Satd. Flow (prot)	0	1383	0	0	1330	0	0	1386	0	0	1393	0
Flt Permitted		0.983			0.999			0.999			0.990	
Satd. Flow (perm)	0	1383	0	0	1330	0	0	1386	0	0	1393	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	24	36	9	3	55	64	5	204	6	48	161	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	122	0	0	215	0	0	227	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	51.0%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	23	34	8	3	52	60	5	192	6	45	151	17
Future Volume (vph)	23	34	8	3	52	60	5	192	6	45	151	17
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	24	36	9	3	55	64	5	204	6	48	161	18
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	69	122	215	227								
Volume Left (vph)	24	3	5	48								
Volume Right (vph)	9	64	6	18								
Hadj (s)	-0.01	-0.31	0.04	0.01								
Departure Headway (s)	5.1	4.7	4.7	4.7								
Degree Utilization, x	0.10	0.16	0.28	0.29								
Capacity (veh/h)	630	685	729	732								
Control Delay (s/veh)	8.7	8.7	9.5	9.6								
Approach Delay (s/veh)	8.7	8.7	9.5	9.6								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.3									
Level of Service			A									
Intersection Capacity Utilization			51.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	54	15	2	58	2	5	1	1	1	2	3
Future Volume (vph)	1	54	15	2	58	2	5	1	1	1	2	3
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.971			0.996			0.983			0.923	
Flt Protected		0.999			0.999			0.964			0.993	
Satd. Flow (prot)	0	1390	0	0	1426	0	0	1358	0	0	1313	0
Flt Permitted		0.999			0.999			0.964			0.993	
Satd. Flow (perm)	0	1390	0	0	1426	0	0	1358	0	0	1313	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			79.0			93.8			56.1	
Travel Time (s)		26.1			5.7			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	64	18	2	68	2	6	1	1	1	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	0	0	72	0	0	8	0	0	7	0
Sign Control	FreeFreeStopStop											
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	16.9%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	54	15	2	58	2	5	1	1	1	2	3
Future Volume (Veh/h)	1	54	15	2	58	2	5	1	1	1	2	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	64	18	2	68	2	6	1	1	1	2	4
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	72			83			156	152	75	153	160	73
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	72			83			156	152	75	153	160	73
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 %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1538			1525			804	740	990	812	732	991
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	83	72	8	7								
Volume Left	1	2	6	1								
Volume Right	18	2	1	4								
cSH	1538	1525	815	875								
Volume to Capacity	0.00*	0.00*	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.2	0.2								
Control Delay (s/veh)	0.1	0.2	9.5	9.1								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.2	9.5	9.1								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			16.9%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

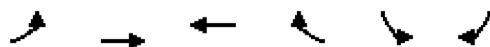
Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year PM

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	55	62	2	4	0
Future Volume (vph)	1	55	62	2	4	0
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.996					
Flt Protected	0.999		0.950			
Satd. Flow (prot)	0	1177	1333	0	1361	0
Flt Permitted	0.999		0.950			
Satd. Flow (perm)	0	1177	1333	0	1361	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	79.0		37.0		36.9	
Travel Time (s)	5.7		2.7		2.7	
Confl. Peds. (#/hr)	5				5	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	62	70	2	4	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	63	72	0	4	0
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year PM



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	55	62	2	4	0
Future Volume (Veh/h)	1	55	62	2	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	62	70	2	4	0
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	77				140	76
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	77				140	76
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)	1527				853	986
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	63	72	4			
Volume Left	1	0	4			
Volume Right	0	2	0			
cSH	1527	1700	853			
Volume to Capacity	0.00*	0.04	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.1	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s/veh)	0.1	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			16.1%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year PM

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	59	0	0	64	2	0	0	2	2	0	0	
Future Volume (vph)	0	59	0	0	64	2	0	0	2	2	0	0	
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor													
Frt					0.996	0.865							
Flt Protected											0.950		
Satd. Flow (prot)	0	1178	0	0	1333	0	0	1240	0	0	1361	0	
Flt Permitted											0.950		
Satd. Flow (perm)	0	1178	0	0	1333	0	0	1240	0	0	1361	0	
Link Speed (k/h)	50				50				50				
Link Distance (m)	37.0				57.8				32.6				
Travel Time (s)	2.7				4.2				2.3				
Confl. Peds. (#/hr)	7					7	1	3		3	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	0	67	0	0	73	2	0	0	2	2	0	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	67	0	0	75	0	0	2	0	0	2	0	
Sign Control	Free				Free				Stop		Stop		
Intersection Summary													
Area Type:	Other												
Control Type: Unsignalized													
Intersection Capacity Utilization 17.7%													
ICU Level of Service A													
Analysis Period (min) 15													

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	59	0	0	64	2	0	0	2	2	0	0
Future Volume (Veh/h)	0	59	0	0	64	2	0	0	2	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	67	0	0	73	2	0	0	2	2	0	0
Pedestrians		1			3						7	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.0			1.0						1.0	
Percent Blockage		0			0						1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	82			67			142	149	70	153	148	82
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	82			67			142	149	70	153	148	82
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1517			1547			827	741	995	805	742	975
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	67	75	2	2								
Volume Left	0	0	0	2								
Volume Right	0	2	2	0								
cSH	1517	1700	995	805								
Volume to Capacity	0.00	0.04	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.1								
Control Delay (s/veh)	0.0	0.0	8.6	9.5								
Lane LOS			A	A								
Approach Delay (s/veh)	0.0	0.0	8.6	9.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			17.7%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	142	433	320	188
Future Volume (vph)	0	0	142	433	320	188
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.950	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1259	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1259	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		5	63			63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	156	476	352	207
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	156	476	559	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	67.1%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	142	433	320	188
Future Volume (Veh/h)	0	0	142	433	320	188
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	156	476	352	207
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1307	524	622			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1307	524	622			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	84			
cM capacity (veh/h)	149	555	959			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	156	476	559			
Volume Left	156	0	0			
Volume Right	0	0	207			
cSH	959	1700	1700			
Volume to Capacity	0.16	0.28	0.33			
Queue Length 95th (m)	4.3	0.0	0.0			
Control Delay (s/veh)	9.5	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.3		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			67.1%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	51	39	536	0	0	320
Future Volume (vph)	51	39	536	0	0	320
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		1		57	57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	53	41	558	0	0	333
Shared Lane Traffic (%)						
Lane Group Flow (vph)	94	0	558	0	0	333
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	96.7%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	51	39	536	0	0	320
Future Volume (Veh/h)	51	39	536	0	0	320
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	53	41	558	0	0	333
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.78	0.78			0.78	
vC, conflicting volume	948	616			615	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	793	368			366	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	92			100	
cM capacity (veh/h)	265	502			886	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	94	558	333			
Volume Left	53	0	0			
Volume Right	41	0	0			
cSH	334	1700	1700			
Volume to Capacity	0.28	0.33	0.20			
Queue Length 95th (m)	8.5	0.0	0.0			
Control Delay (s/veh)	20.0	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	20.0	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		1.9				
Intersection Capacity Utilization		96.7%		ICU Level of Service		F
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	0	281	0	0	0	0	386	14	70	301	0
Future Volume (vph)	150	0	281	0	0	0	0	386	14	70	301	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.92					0.99		0.94		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1312	0	1354	1563	0
Flt Permitted	0.950									0.492		
Satd. Flow (perm)	1363	0	1015	0	0	0	0	1312	0	660	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			293					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	156	0	293	0	0	0	0	402	15	73	314	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	0	293	0	0	0	0	417	0	73	314	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	36.1		36.1					46.1		46.1	46.1	
Total Split (%)	43.9%		43.9%					56.1%		56.1%	56.1%	
Maximum Green (s)	30.0		30.0					40.0		40.0	40.0	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	11.1		11.1					17.9		17.9	17.9	
Actuated g/C Ratio	0.26		0.26					0.43		0.43	0.43	
v/c Ratio	0.43		0.61					0.74		0.26	0.47	
Control Delay (s/veh)	19.2		8.8					19.3		10.6	11.2	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	19.2		8.8					19.3		10.6	11.2	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		B	B	
Approach Delay (s/veh)		12.4						19.3			11.1	
Approach LOS		B						B			B	
Queue Length 50th (m)	8.5		0.0					20.3		2.8	13.2	
Queue Length 95th (m)	28.6		17.1					57.2		11.1	35.9	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1042		843					1183		595	1409	
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	0.15		0.35					0.35		0.12	0.22	

Intersection Summary

Area Type: Other

Cycle Length: 82.2

Actuated Cycle Length: 42.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay (s/veh): 14.3

Intersection LOS: B

Intersection Capacity Utilization 96.7%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Base Year Sat

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	0	281	0	0	0	0	386	14	70	301	0
Future Volume (vph)	150	0	281	0	0	0	0	386	14	70	301	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.95					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.96	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1049					1315		1306	1563	
Flt Permitted	0.95		1.00					1.00		0.49	1.00	
Satd. Flow (perm)	1368		1049					1315		676	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	156	0	293	0	0	0	0	402	15	73	314	0
RTOR Reduction (vph)	0	0	214	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	156	0	79	0	0	0	0	415	0	73	314	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	11.1		11.1					18.0		18.0	18.0	
Effective Green, g (s)	11.1		11.1					18.0		18.0	18.0	
Actuated g/C Ratio	0.27		0.27					0.44		0.44	0.44	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	367		281					573		294	681	
v/s Ratio Prot	c0.11							c0.32			0.20	
v/s Ratio Perm			0.08							0.11		
v/c Ratio	0.43		0.28					0.72		0.25	0.46	
Uniform Delay, d1	12.5		11.9					9.6		7.4	8.2	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.3		0.2					3.9		0.2	0.2	
Delay (s)	12.8		12.2					13.5		7.6	8.4	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		12.4			0.0			13.5			8.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			11.5									
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			41.3							12.2		
Intersection Capacity Utilization			96.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	53	8	358	523	59
Future Volume (vph)	42	53	8	358	523	59
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.925				0.986	
Flt Protected	0.978			0.999		
Satd. Flow (prot)	1296	0	0	1165	1308	0
Flt Permitted	0.978			0.999		
Satd. Flow (perm)	1296	0	0	1165	1308	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	45	56	9	381	556	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	101	0	0	390	619	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	61.8%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	42	53	8	358	523	59
Future Volume (Veh/h)	42	53	8	358	523	59
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	45	56	9	381	556	63
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.92	0.88	0.88			
vC, conflicting volume	1086	692	707			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	865	580	598			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	86	99			
cM capacity (veh/h)	267	408	793			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	101	390	619			
Volume Left	45	9	0			
Volume Right	56	0	63			
cSH	330	793	1700			
Volume to Capacity	0.31	0.01	0.36			
Queue Length 95th (m)	9.5	0.3	0.0			
Control Delay (s/veh)	20.6	0.4	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	20.6	0.4	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization		61.8%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	114	158	208	222	274	302
Future Volume (vph)	114	158	208	222	274	302
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.94	0.79		0.78	0.86	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.519	
Satd. Flow (perm)	1292	872	1533	857	652	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		161		227		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	116	161	212	227	280	308
Shared Lane Traffic (%)						
Lane Group Flow (vph)	116	161	212	227	280	308
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	36.3	36.3	41.3	41.3	28.0	69.3
Total Split (%)	34.4%	34.4%	39.1%	39.1%	26.5%	65.6%
Maximum Green (s)	30.0	30.0	35.0	35.0	25.0	63.0
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	11.0	11.0	14.5	14.5	32.6	29.1
Actuated g/C Ratio	0.21	0.21	0.27	0.27	0.61	0.55
v/c Ratio	0.44	0.52	0.51	0.57	0.50	0.36

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	26.6	11.5	22.2	9.4	8.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.6	11.5	22.2	9.4	8.7	8.2
LOS	C	B	C	A	A	A
Approach Delay (s/veh)	17.9		15.6			8.4
Approach LOS	B		B			A
Queue Length 50th (m)	9.3	0.0	16.1	0.0	9.8	13.5
Queue Length 95th (m)	27.2	14.7	41.2	16.4	26.1	32.3
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	760	579	1053	660	764	1519
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.28	0.20	0.34	0.37	0.20

Intersection Summary

Area Type: Other

Cycle Length: 105.6

Actuated Cycle Length: 53.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay (s/veh): 12.8

Intersection LOS: B

Intersection Capacity Utilization 69.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	114	158	208	222	274	302
Future Volume (vph)	114	158	208	222	274	302
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.88	1.00	0.89	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.96	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1336	978	1533	969	1331	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1336	978	1533	969	728	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	116	161	212	227	280	308
RTOR Reduction (vph)	0	127	0	164	0	0
Lane Group Flow (vph)	116	34	212	63	280	308
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	11.0	11.0	14.7	14.7	29.2	29.2
Effective Green, g (s)	11.0	11.0	14.7	14.7	29.2	29.2
Actuated g/C Ratio	0.21	0.21	0.28	0.28	0.55	0.55
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	278	203	426	269	533	864
v/s Ratio Prot			0.14		c0.11	0.20
v/s Ratio Perm	c0.09	0.03		0.07	c0.18	
v/c Ratio	0.42	0.17	0.50	0.23	0.53	0.36
Uniform Delay, d1	18.1	17.1	16.0	14.7	6.8	6.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.3	1.1	0.5	0.9	0.3
Delay (s)	18.9	17.4	17.0	15.2	7.7	6.9
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	18.0		16.1			7.3
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			52.8		Sum of lost time (s)	15.6
Intersection Capacity Utilization			69.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	6	3	426	400	16
Future Volume (vph)	4	6	3	426	400	16
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919					0.850
Flt Protected	0.980					
Satd. Flow (prot)	1291	0	0	1166	1563	1106
Flt Permitted	0.980					
Satd. Flow (perm)	1291	0	0	1166	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	4	6	3	430	404	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	433	404	16
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.4%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	6	3	426	400	16
Future Volume (Veh/h)	4	6	3	426	400	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	4	6	3	430	404	16
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.92	0.88	0.88			
vC, conflicting volume	1044	607	623			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	705	480	499			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	298	412	751			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	10	433	404	16		
Volume Left	4	3	0	0		
Volume Right	6	0	0	16		
cSH	357	751	1700	1700		
Volume to Capacity	0.03	0.00*	0.24	0.00*		
Queue Length 95th (m)	0.6	0.1	0.0	0.0		
Control Delay (s/veh)	15.4	0.1	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s/veh)	15.4	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		56.4%		ICU Level of Service		B
Analysis Period (min)		15				
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	21	19	45	44	50	27	326	29	20	331	55
Future Volume (vph)	53	21	19	45	44	50	27	326	29	20	331	55
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.91			0.90			0.96			0.99	0.68
Frt		0.972			0.951			0.990				0.850
Flt Protected		0.972			0.984			0.997			0.997	
Satd. Flow (prot)	0	1275	0	0	1234	0	0	1362	0	0	1174	1063
Flt Permitted		0.743			0.855			0.953			0.961	
Satd. Flow (perm)	0	917	0	0	1023	0	0	1286	0	0	1121	726
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			42			9				59
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	56	22	20	47	46	53	28	343	31	21	348	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	146	0	0	402	0	0	369	58
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	26.7	26.7		26.7	26.7		42.2	42.2		42.2	42.2	42.2
Total Split (%)	38.8%	38.8%		38.8%	38.8%		61.2%	61.2%		61.2%	61.2%	61.2%
Maximum Green (s)	20.0	20.0		20.0	20.0		35.0	35.0		35.0	35.0	35.0
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.4			11.4			20.6			20.6	20.6
Actuated g/C Ratio		0.24			0.24			0.44			0.44	0.44
v/c Ratio		0.41			0.52			0.71			0.75	0.17
Control Delay (s/veh)		20.8			21.1			18.1			21.8	3.9
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		20.8			21.1			18.1			21.8	3.9

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			C			B			C	A
Approach Delay (s/veh)		20.8			21.1			18.1			19.4	
Approach LOS		C			C			B			B	
Queue Length 50th (m)		5.1			6.9			21.0			20.2	0.0
Queue Length 95th (m)		19.6			26.2			58.4			58.4	4.9
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		430			491			1007			875	580
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		0.23			0.30			0.40			0.42	0.10

Intersection Summary

Area Type: Other

Cycle Length: 68.9

Actuated Cycle Length: 47

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay (s/veh): 19.2

Intersection LOS: B

Intersection Capacity Utilization 82.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	21	19	45	44	50	27	326	29	20	331	55
Future Volume (vph)	53	21	19	45	44	50	27	326	29	20	331	55
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.96			0.98			1.00	0.78
Flpb, ped/bikes		0.96			0.97			0.99			0.99	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1238			1216			1360			1167	832
Flt Permitted		0.74			0.86			0.95			0.96	1.00
Satd. Flow (perm)		946			1056			1301			1125	832
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	56	22	20	47	46	53	28	343	31	21	348	58
RTOR Reduction (vph)	0	14	0	0	32	0	0	5	0	0	0	32
Lane Group Flow (vph)	0	84	0	0	114	0	0	397	0	0	369	26
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.4			11.4			20.6			20.6	20.6
Effective Green, g (s)		11.4			11.4			20.6			20.6	20.6
Actuated g/C Ratio		0.25			0.25			0.45			0.45	0.45
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		234			262			583			504	373
v/s Ratio Prot												
v/s Ratio Perm		0.09			0.11			0.31			0.33	0.03
v/c Ratio		0.36			0.44			0.68			0.73	0.07
Uniform Delay, d1		14.2			14.5			10.0			10.4	7.2
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.7			0.8			3.0			5.1	0.1
Delay (s)		14.9			15.4			13.0			15.5	7.3
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		14.9			15.4			13.0			14.4	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		14.1										
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		45.9										
Intersection Capacity Utilization		82.0%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	771	224	30	575	7	230	19	19	6	23	21
Future Volume (vph)	37	771	224	30	575	7	230	19	19	6	23	21
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.966			0.998			0.990			0.943	
Flt Protected	0.950			0.950				0.959			0.994	
Satd. Flow (prot)	1381	2876	0	1381	2964	0	0	1349	0	0	1330	0
Flt Permitted	0.386			0.183				0.720			0.955	
Satd. Flow (perm)	560	2876	0	266	2964	0	0	1003	0	0	1278	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		50			2			4			22	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	38	795	231	31	593	7	237	20	20	6	24	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	1026	0	31	600	0	0	277	0	0	52	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	15.0	51.3		15.0	51.3		32.3	32.3		32.3	32.3	
Total Split (%)	15.2%	52.0%		15.2%	52.0%		32.8%	32.8%		32.8%	32.8%	
Maximum Green (s)	12.0	45.0		12.0	45.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	45.1	38.2		44.9	38.1			25.6			25.6	
Actuated g/C Ratio	0.55	0.46		0.54	0.46			0.31			0.31	
v/c Ratio	0.10	0.76		0.14	0.44			0.89			0.13	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	7.8	21.9		8.4	16.4			61.8			17.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	7.8	21.9		8.4	16.4			61.8			17.9	
LOS	A	C		A	B			E			B	
Approach Delay (s/veh)		21.4			16.0			61.8			17.9	
Approach LOS		C			B			E			B	
Queue Length 50th (m)	2.4	69.3		2.0	34.4			46.7			3.8	
Queue Length 95th (m)	6.0	94.6		5.1	48.7			#99.9			12.8	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	437	1622		315	1650			312			410	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.09	0.63		0.10	0.36			0.89			0.13	

Intersection Summary

Area Type: Other

Cycle Length: 98.6

Actuated Cycle Length: 82.7

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay (s/veh): 25.1

Intersection LOS: C

Intersection Capacity Utilization 77.9%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis 8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	771	224	30	575	7	230	19	19	6	23	21
Future Volume (vph)	37	771	224	30	575	7	230	19	19	6	23	21
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2876		1381	2965			1339			1331	
Flt Permitted	0.39	1.00		0.18	1.00			0.72			0.96	
Satd. Flow (perm)	561	2876		266	2965			1005			1279	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	38	795	231	31	593	7	237	20	20	6	24	22
RTOR Reduction (vph)	0	27	0	0	1	0	0	3	0	0	15	0
Lane Group Flow (vph)	38	999	0	31	599	0	0	274	0	0	37	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	41.7	38.2		41.5	38.1			25.6			25.6	
Effective Green, g (s)	41.7	38.2		41.5	38.1			25.6			25.6	
Actuated g/C Ratio	0.50	0.46		0.50	0.45			0.31			0.31	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	313	1311		176	1348			307			390	
v/s Ratio Prot	0.01	c0.35		c0.01	0.20							
v/s Ratio Perm	0.06			0.08				c0.27			0.03	
v/c Ratio	0.12	0.76		0.18	0.44			0.89			0.09	
Uniform Delay, d1	11.0	19.0		12.0	15.6			27.8			20.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	3.2		0.3	0.5			26.1			0.2	
Delay (s)	11.1	22.2		12.4	16.1			53.9			21.0	
Level of Service	B	C		B	B			D			C	
Approach Delay (s/veh)		21.8			15.9			53.9			21.0	
Approach LOS		C			B			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		24.3			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		83.8			Sum of lost time (s)			16.6				
Intersection Capacity Utilization		77.9%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	52	6	12	52	63	3	178	3	66	184	27
Future Volume (vph)	27	52	6	12	52	63	3	178	3	66	184	27
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.934			0.998			0.987	
Flt Protected		0.985			0.995			0.999			0.988	
Satd. Flow (prot)	0	1399	0	0	1321	0	0	1429	0	0	1397	0
Flt Permitted		0.985			0.995			0.999			0.988	
Satd. Flow (perm)	0	1399	0	0	1321	0	0	1429	0	0	1397	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	28	55	6	13	55	66	3	187	3	69	194	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	89	0	0	134	0	0	193	0	0	291	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	55.7%				ICU Level of Service B							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	27	52	6	12	52	63	3	178	3	66	184	27
Future Volume (vph)	27	52	6	12	52	63	3	178	3	66	184	27
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	55	6	13	55	66	3	187	3	69	194	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	89	134	193	291								
Volume Left (vph)	28	13	3	69								
Volume Right (vph)	6	66	3	28								
Hadj (s)	0.02	-0.26	-0.01	-0.01								
Departure Headway (s)	5.3	5.0	4.9	4.7								
Degree Utilization, x	0.13	0.18	0.26	0.38								
Capacity (veh/h)	605	653	698	722								
Control Delay (s/veh)	9.1	9.1	9.6	10.6								
Approach Delay (s/veh)	9.1	9.1	9.6	10.6								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			9.8									
Level of Service			A									
Intersection Capacity Utilization			55.7%	ICU Level of Service				B				
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	86	9	5	57	3	20	0	9	0	0	2
Future Volume (vph)	0	86	9	5	57	3	20	0	9	0	0	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.987				0.993				0.958		0.865	
Flt Protected					0.996				0.967			
Satd. Flow (prot)	0	1414	0	0	1417	0	0	1328	0	0	1240	0
Flt Permitted					0.996				0.967			
Satd. Flow (perm)	0	1414	0	0	1417	0	0	1328	0	0	1240	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	362.4				79.0				93.8			
Travel Time (s)	26.1				5.7				6.8			
Confl. Peds. (#/hr)	10	5		5	10		4		4			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	104	11	6	69	4	24	0	11	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	115	0	0	79	0	0	35	0	0	2	0
Sign Control	Free				Free				Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	27.0%				ICU Level of Service A							
Analysis Period (min)	15											

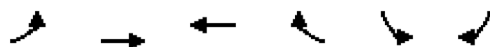
HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	86	9	5	57	3	20	0	9	0	0	2
Future Volume (Veh/h)	0	86	9	5	57	3	20	0	9	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	0	104	11	6	69	4	24	0	11	0	0	2
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	83			120			200	210	119	218	213	81
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	83			120			200	210	119	218	213	81
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 %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	1512			1473			747	678	930	714	675	975
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	115	79	35	2								
Volume Left	0	6	24	0								
Volume Right	11	4	11	2								
cSH	1512	1473	796	975								
Volume to Capacity	0.00	0.00*	0.04	0.00*								
Queue Length 95th (m)	0.0	0.1	1.0	0.0								
Control Delay (s/veh)	0.0	0.6	9.7	8.7								
Lane LOS		A	A	A								
Approach Delay (s/veh)	0.0	0.6	9.7	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			27.0%		ICU Level of Service		A					
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

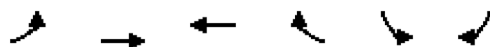
4873 and 4898 Kitchener Street TIS
Base Year Sat



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	88	64	1	3	1
Future Volume (vph)	7	88	64	1	3	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.973	
Flt Protected		0.996			0.962	
Satd. Flow (prot)	0	1173	1335	0	1341	0
Flt Permitted		0.996			0.962	
Satd. Flow (perm)	0	1173	1335	0	1341	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	109	79	1	4	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	118	80	0	5	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	25.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year Sat



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	88	64	1	3	1
Future Volume (Veh/h)	7	88	64	1	3	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	9	109	79	1	4	1
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	91				218	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	91				218	94
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				99	100
cM capacity (veh/h)	1500				762	955
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	118	80	5			
Volume Left	9	0	4			
Volume Right	0	1	1			
cSH	1500	1700	794			
Volume to Capacity	0.00*	0.05	0.00*			
Queue Length 95th (m)	0.1	0.0	0.1			
Control Delay (s/veh)	0.6	0.0	9.6			
Lane LOS	A		A			
Approach Delay (s/veh)	0.6	0.0	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			25.7%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	90	0	0	61	6	3	1	0	5	0	1
Future Volume (vph)	1	90	0	0	61	6	3	1	0	5	0	1
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.988						0.981					
Flt Protected							0.964					
Satd. Flow (prot)	0	1178	0	0	1322	0	0	1381	0	0	1348	0
Flt Permitted							0.964					
Satd. Flow (perm)	0	1178	0	0	1322	0	0	1381	0	0	1348	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	37.0			57.8			32.6			36.9		
Travel Time (s)	2.7			4.2			2.3			2.7		
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	105	0	0	71	7	3	1	0	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	106	0	0	78	0	0	4	0	0	7	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.2%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Base Year Sat

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	90	0	0	61	6	3	1	0	5	0	1
Future Volume (Veh/h)	1	90	0	0	61	6	3	1	0	5	0	1
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	1	105	0	0	71	7	3	1	0	6	0	1
Pedestrians	3				1				2		29	
Lane Width (m)	3.6				3.6				3.6		3.6	
Walking Speed (m/s)	1.0				1.0				1.0		1.0	
Percent Blockage	0				0				0		3	
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	107			107			188	216	108	212	213	107
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	107			107			188	216	108	212	213	107
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 %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1453			1494			754	664	948	708	667	923
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	106	78	4	7								
Volume Left	1	0	3	6								
Volume Right	0	7	0	1								
cSH	1453	1700	729	733								
Volume to Capacity	0.00*	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.1	0.2								
Control Delay (s/veh)	0.1	0.0	10.0	10.0								
Lane LOS	A		A	A								
Approach Delay (s/veh)	0.1	0.0	10.0	10.0								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			21.2%	ICU Level of Service				A				
Analysis Period (min)			15									
* Value less than 0.01.												

Appendix D

Music Hall Trip Generation Statistics



Table 3 – Project Vehicle Trip Generation During Pre-Event Peak Hour					
Trip Generator	Description	Attendees Transported During Pre-Event Peak Hour	Vehicle Trips Generated ⁵		
			Inbound	Outbound	Total
Private Vehicles	Park at Site	606 ¹	263	0	263
Private Vehicles	Park at Remote Lots or On-Street	476 ²	207	0	207
Uber/Lyft/Taxi	Dropped Off at Site	311 ³	135	135	270
Shuttle Buses	4 round trips	173 ⁴	4	4	8
Total Project Vehicle Trip Generation ⁶			601	131	732
Project Site Vehicle Trip Generation ⁷			402	139	541
Notes: 1 Calculated as 2,219 persons x 75% mode split x 65% peak hour arrival x 56% of all parking. 2 Calculated as 2,219 persons x 75% mode split x 65% peak hour arrival x 44% of all parking. 3 Calculated as 2,219 persons x 20% mode split x 70% peak hour arrival. 4 2,219 persons x (9% "park and shuttle" + 3% "LRT and shuttle" mode split) x 65% peak hour arrival = 173 shuttle riders. At 45 seats per bus, four bus round trips are required. 5 Average vehicle occupancy is 2.3 event attendees for private vehicles and Uber/Lyft/Taxi. 6 These are vehicle trips that enter/exit the overall study area. 7 These are vehicle trips that enter/exit the project site on Ramona Avenue. Of those spaces dedicated for event attendees, 408 (55%) would be located at the project site. The remainder would consist of on-street parking (162 spaces, 22%), a nearby off-street lot (100 spaces, 13%) and an off-street remote lots (75 spaces, 10%). Source: Fehr & Peers, 2022.					

Appendix E

Internal Capture Calculations



NCHRP 8-51 Internal Trip Capture Estimation Tool					
Project Name:	4873 and 4898 Kitchener Street			Organization:	PTSL (250550)
Project Location:	Niagara Falls			Performed By:	
Scenario Description:				Date:	
Analysis Year:				Checked By:	
Analysis Period:	AM Street Peak Hour			Date:	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	712	9,360		15	13	2
Retail	822	11,010		43	24	19
Restaurant				0		
Cinema/Entertainment				0		
Residential				0		
Hotel	310		413	140	73	67
All Other Land Uses ²				0		
Total				198	110	88

Table 2-A: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant						
Cinema/Entertainment						
Residential						
Hotel	1.00			1.00		
All Other Land Uses ²						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	1		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	1	0	0	0	

Table 5-A: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	198	110	88
Internal Capture Percentage	3%	3%	3%
External Vehicle-Trips ³	192	107	85
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	8%	50%
Retail	8%	5%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	0%	1%

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	4873 and 4898 Kitchener Street
Analysis Period:	AM Street Peak Hour

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	13	13	1.00	2	2
Retail	1.00	24	24	1.00	19	19
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	73	73	1.00	67	67

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	1	0	0	0
Retail	6		2	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	50	9	6	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		8	0	0	0	0
Retail	1		0	0	0	0
Restaurant	2	2		0	0	3
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	0	0		0
Hotel	0	1	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	1	12	13	12	0	0
Retail	2	22	24	22	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	0	73	73	73	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	1	1	2	1	0	0
Retail	1	18	19	18	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	1	66	67	66	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool					
Project Name:	4873 and 4898 Kitchener Street			Organization:	PTSL (250550)
Project Location:	Niagara Falls			Performed By:	
Scenario Description:				Date:	
Analysis Year:				Checked By:	
Analysis Period:	PM Street Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	712	9,360		20	7	13
Retail	822	11,010		82	41	41
Restaurant				0		
Cinema/Entertainment				0		
Residential				0		
Hotel	310		413	296	151	145
All Other Land Uses ²				0		
Total				398	199	199

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant						
Cinema/Entertainment						
Residential						
Hotel	1.00			1.00		
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	0	0
Retail	1		0	0	0	2
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	1	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	398	199	199
Internal Capture Percentage	4%	4%	4%
External Vehicle-Trips ³	384	192	192
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	14%	23%
Retail	10%	7%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	1%	1%

¹ Land Use Codes (LUCs) from <i>Trip Generation Informational Report</i> , published by the Institute of Transportation Engineers.
² Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
³ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P
⁴ Person-Trips
*Indicates computation that has been rounded to the nearest whole number.
<i>Estimation Tool Developed by the Texas Transportation Institute</i>

Project Name:	4873 and 4898 Kitchener Street
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	7	7	1.00	13	13
Retail	1.00	41	41	1.00	41	41
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	151	151	1.00	145	145

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	0	0
Retail	1		12	2	11	2
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	23	99	0	3	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	0	0
Retail	2		0	0	0	26
Restaurant	2	21		0	0	107
Cinema/Entertainment	0	2	0		0	2
Residential	4	4	0	0		18
Hotel	0	1	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	1	6	7	6	0	0
Retail	4	37	41	37	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	2	149	151	149	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	3	10	13	10	0	0
Retail	3	38	41	38	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	1	144	145	144	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool					
Project Name:	4873 and 4898 Kitchener Street			Organization:	PTSL (250550)
Project Location:	Niagara Falls			Performed By:	
Scenario Description:				Date:	
Analysis Year:				Checked By:	
Analysis Period:	Saturday Peak Hour			Date:	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)						
Land Use	Development Data (For Information Only)			Estimated Vehicle-Trips		
	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting
Office	712	9,360		9	5	4
Retail	822	11,010		73	37	36
Restaurant				0		
Cinema/Entertainment				0		
Residential				0		
Hotel	310		413	194	99	95
All Other Land Uses ²				0		
Total				276	141	135

Table 2-P: Mode Split and Vehicle Occupancy Estimates						
Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office	1.00			1.00		
Retail	1.00			1.00		
Restaurant						
Cinema/Entertainment						
Residential						
Hotel	1.00			1.00		
All Other Land Uses ²						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	1		0	0	0	2
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	1	0	0	0	

Table 5-P: Computations Summary			
	Total	Entering	Exiting
All Person-Trips	276	141	135
Internal Capture Percentage	4%	4%	4%
External Vehicle-Trips ³	266	136	130
External Transit-Trips ⁴	0	0	0
External Non-Motorized Trips ⁴	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use		
Land Use	Entering Trips	Exiting Trips
Office	20%	25%
Retail	5%	8%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	N/A	N/A
Hotel	2%	1%

¹Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

³Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

⁴Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	4873 and 4898 Kitchener Street
Analysis Period:	Saturday Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends						
Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	5	5	1.00	4	4
Retail	1.00	37	37	1.00	36	36
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	0	0	1.00	0	0
Hotel	1.00	99	99	1.00	95	95

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	1		10	1	9	2
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	15	65	0	2	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)						
Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	0	0	0	0
Retail	2		0	0	0	17
Restaurant	2	19		0	0	70
Cinema/Entertainment	0	1	0		0	1
Residential	3	4	0	0		12
Hotel	0	1	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)						
Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	1	4	5	4	0	0
Retail	2	35	37	35	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	2	97	99	97	0	0
All Other Land Uses ³	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)						
Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles ¹	Transit ²	Non-Motorized ²
Office	1	3	4	3	0	0
Retail	3	33	36	33	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	0	0	0	0	0
Hotel	1	94	95	94	0	0
All Other Land Uses ³	0	0	0	0	0	0

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

²Person-Trips

³Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

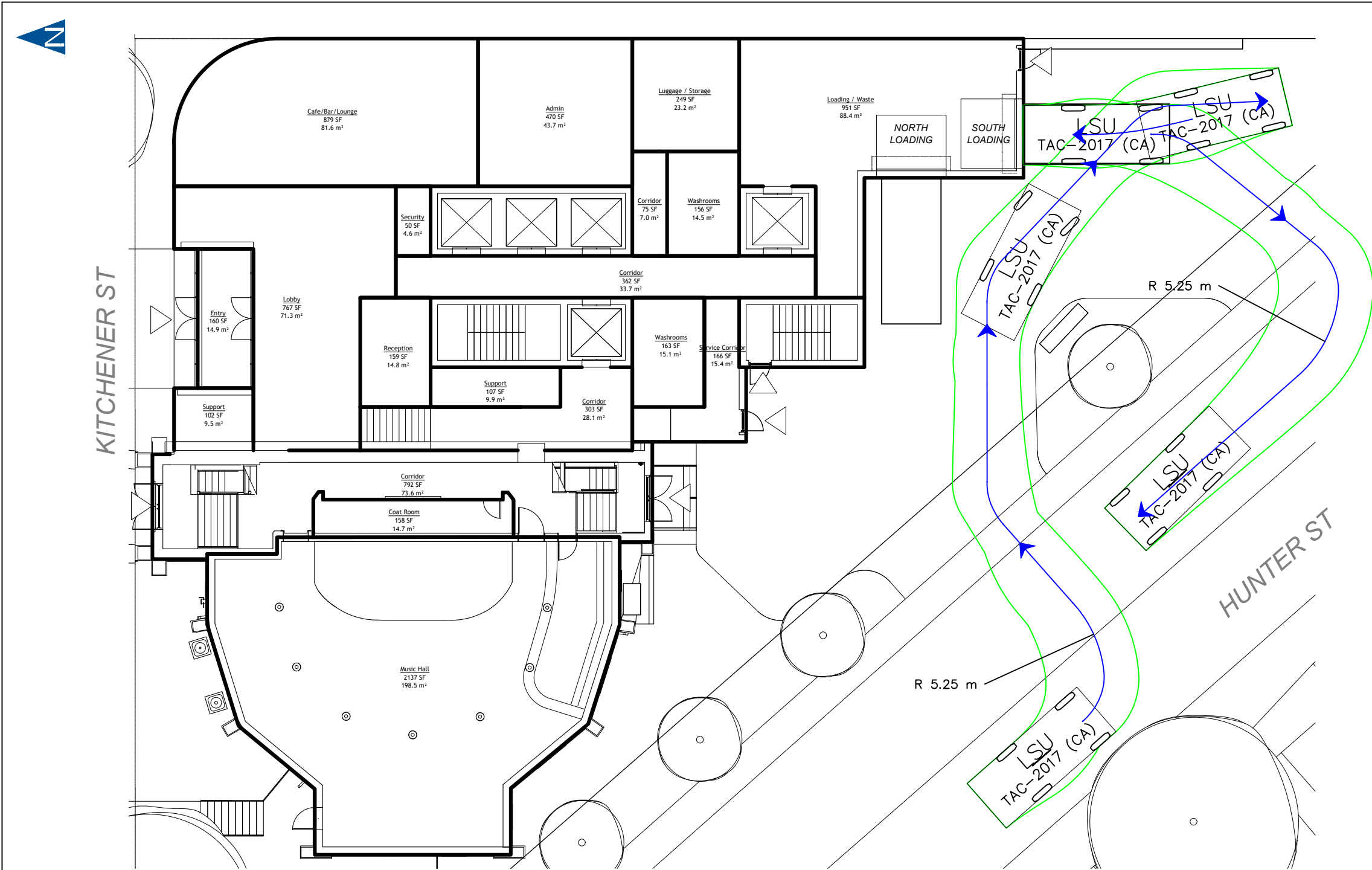
*Indicates computation that has been rounded to the nearest whole number.

Appendix F

AutoTURN Analysis

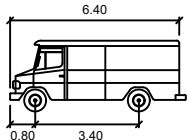


THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.



NO.	DATE	INITIAL	REVISION DETAIL

DESIGN VEHICLE:



LSU

Width : 2.60
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.3

AUTOTURN ASSESSMENT
4873 & 4898 KITCHENER ST
CITY OF NIAGARA FALLS



PROJECT NO.: 250550

DATE: FEB 2026

SCALE: 1:200

DRAWING NO.:

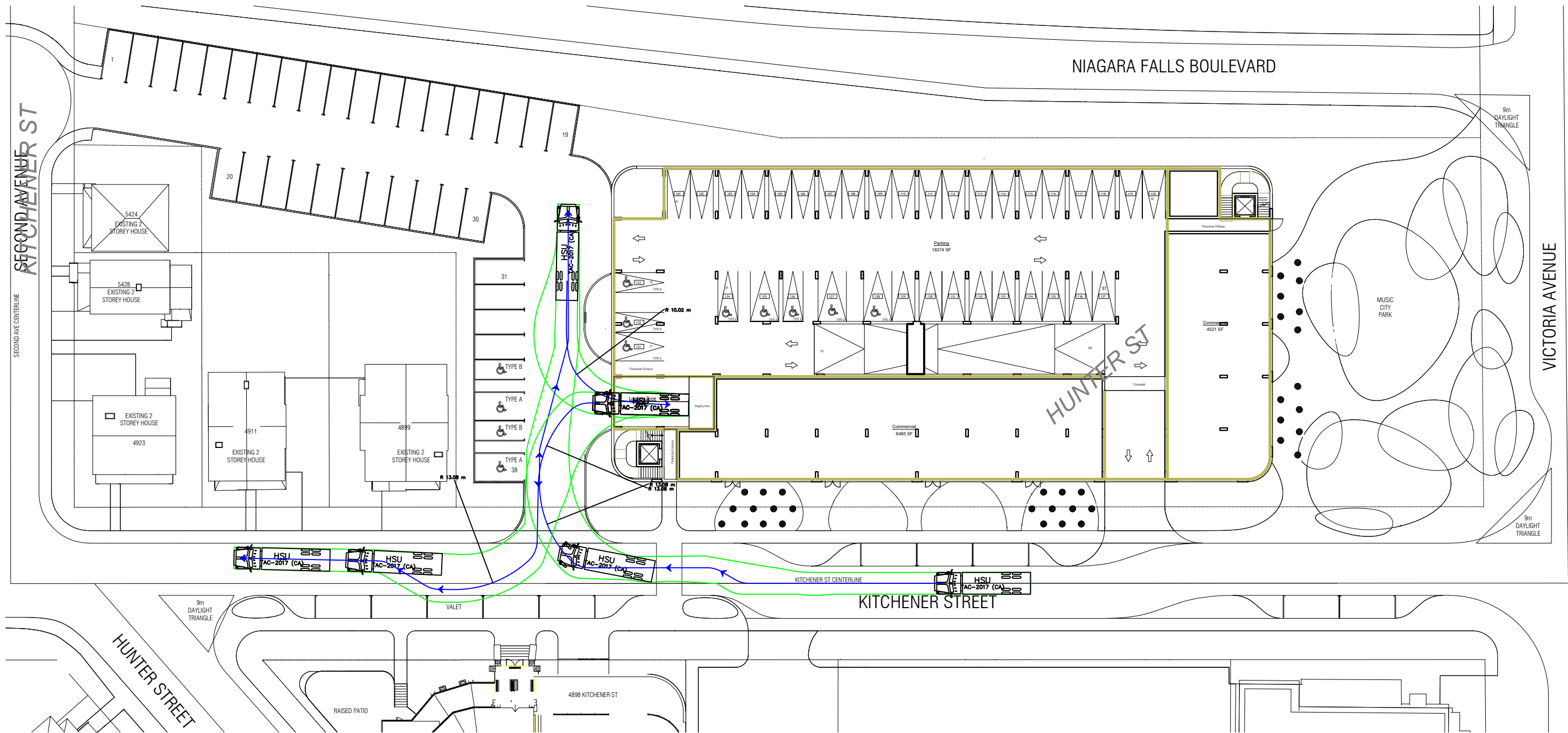
DESIGN: SC

DRAWN: SC

CHECK: AS

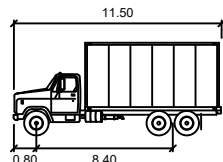
03

THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.



NO.	DATE	INITIAL	REVISION DETAIL

DESIGN VEHICLE:



HSU

- Width : 2.60
- Track : 2.60
- Lock to Lock Time : 6.0
- Steering Angle : 40.0

AUTOTURN ASSESSMENT
4873 & 4898 KITCHENER ST
CITY OF NIAGARA FALLS



PROJECT NO.: 250550

DATE: FEB 2026

SCALE: 1:500

DRAWING NO.:

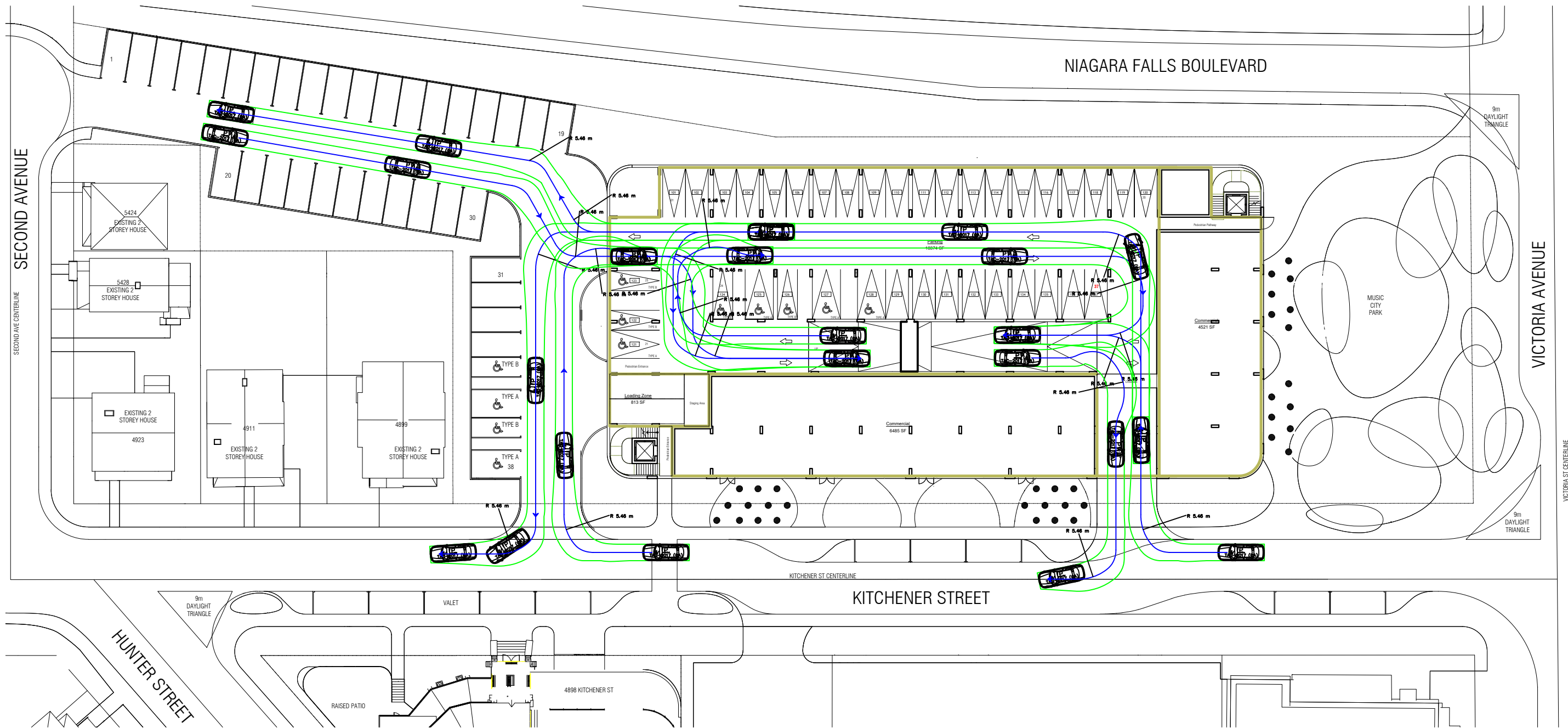
DESIGN: SC

DRAWN: SC

CHECK: ASst

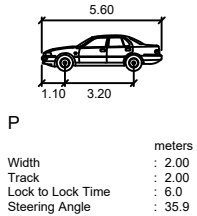
04

THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.



NO.	DATE	INITIAL	REVISION DETAIL

DESIGN VEHICLE:



AUTOTURN ASSESSMENT
4873 & 4898 KITCHENER ST
CITY OF NIAGARA FALLS



PROJECT NO.: 250550

DATE: FEB 2026

SCALE: 1:500

DRAWING NO.:

DESIGN: SC

DRAWN: SC

CHECK: AS

05

Appendix G

Valet Service Material

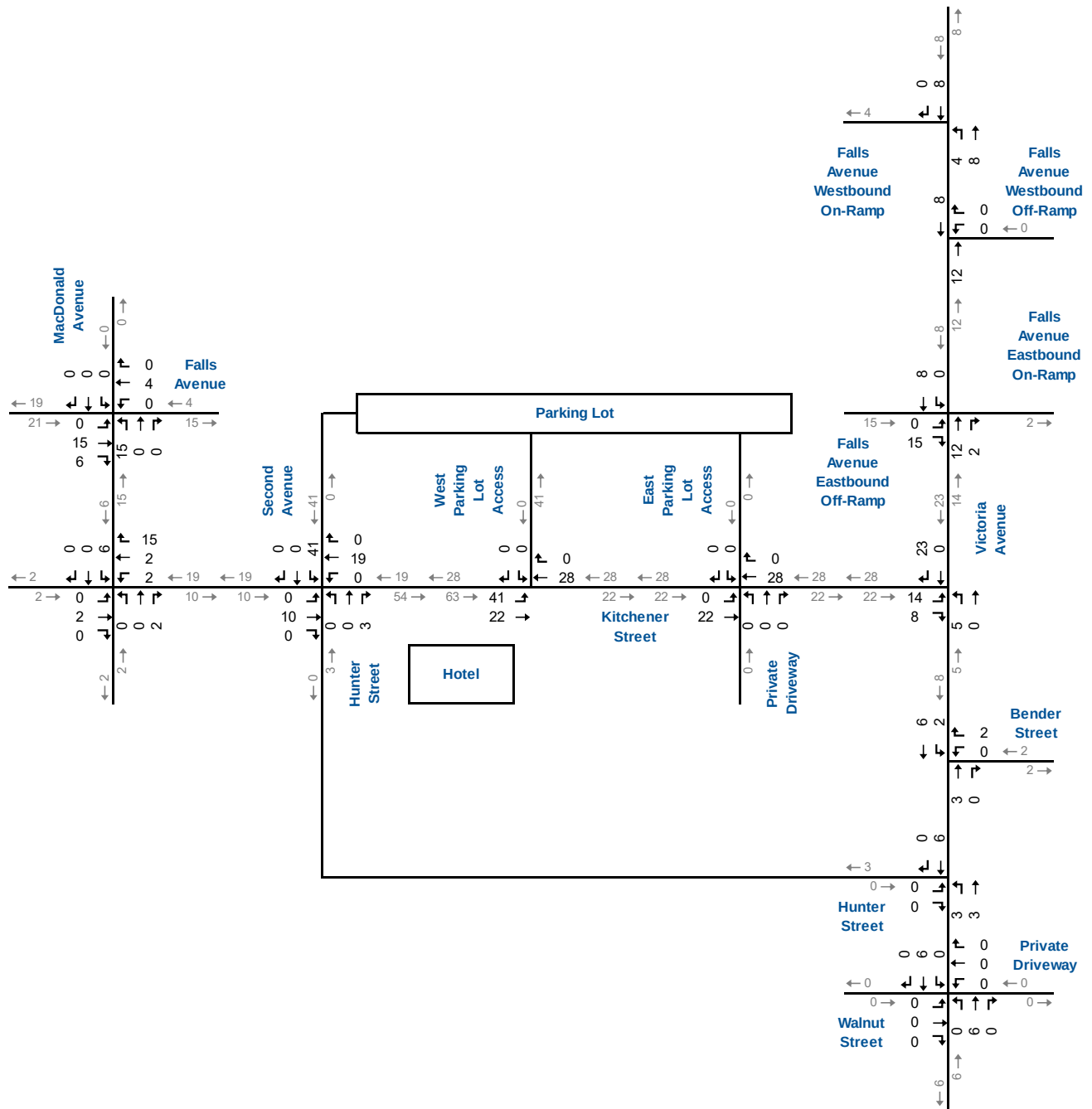


Inputs		
Arrival rate	48.00	vehicle/hour
Process duration	0.125	hours/vehicle
Distribution parameter	6.00	[unitless]
Rooms - Proxy Site	432	
Rooms - Kitchener Street	412	
Arrivals - Proxy Site	50	
Arrivals - Kitchener Street	48	

	Minute	Hour
Service Time	1	0.017
	2	0.033
	3	0.050
	4	0.067
	5	0.083
	6	0.100
	7	0.117
	8	0.133
	9	0.150
	10	0.167

OCCUPENCY			
X	P(cars = X)	P(cars <= X)	P(cars > X)
0	0.2%	0.2%	99.8%
1	1.5%	1.7%	98.3%
2	4.5%	6.2%	93.8%
3	8.9%	15.1%	84.9%
4	13.4%	28.5%	71.5%
5	16.1%	44.6%	55.4%
6	16.1%	60.6%	39.4%
7	13.8%	74.4%	25.6%
8	10.3%	84.7%	15.3%
9	6.9%	91.6%	8.4%
10	4.1%	95.7%	4.3%
11	2.3%	98.0%	2.0%
12	1.1%	99.1%	0.9%
13	0.5%	99.6%	0.4%
14	0.2%	99.9%	0.1%
15	0.1%	99.9%	0.1%
16	0.0%	99.98%	0.0%
17	0.0%	99.99%	0.0%
18	0.0%	100.00%	0.0%
19	0.0%	100.00%	0.0%
20	0.0%	100.00%	0.0%
21	0.0%	100.00%	0.0%

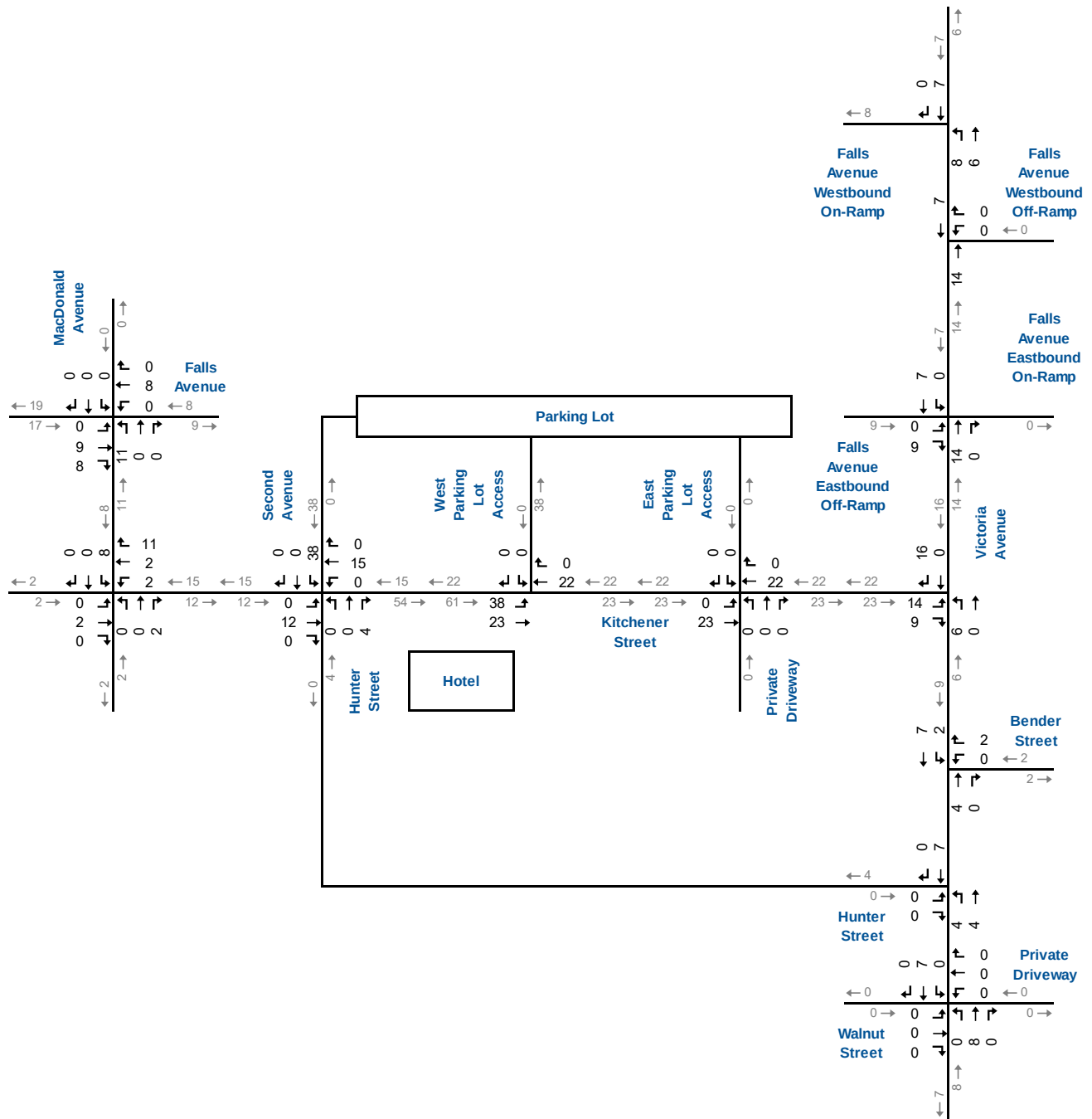
Queue Length (vehicles)	% of time queue length not exceeded
0	0.2%
1	1.7%
2	6.2%
3	15.1%
4	28.5%
5	44.6%
6	60.6%
7	74.4%
8	84.7%
9	91.6%
10	95.7%
11	98.0%
12	99.1%
13	99.6%
14	99.9%
15	99.9%
16	100.0%
17	100.0%
18	100.0%
19	100.0%
20	100.0%



Valet Traffic Volumes

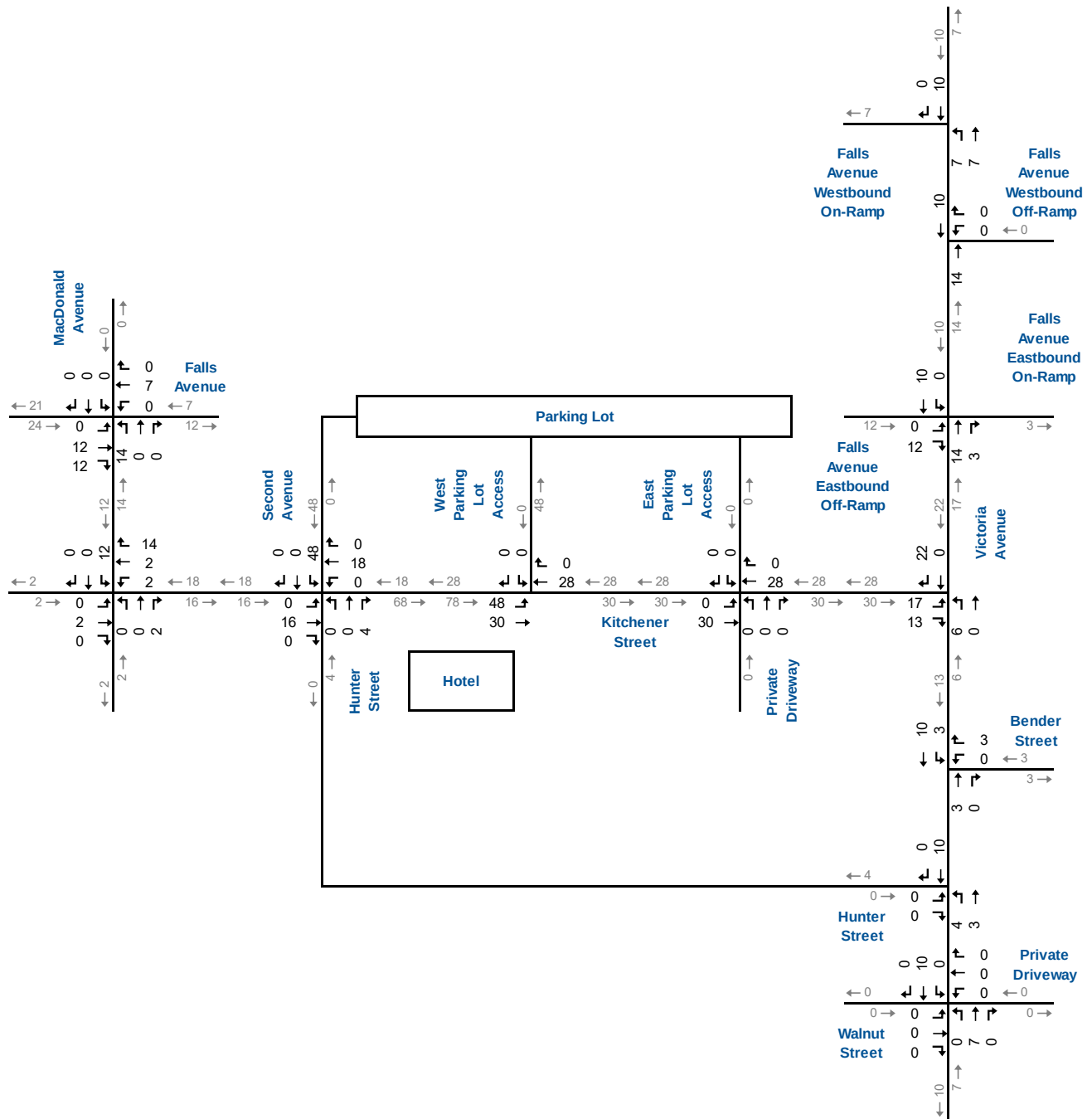
4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

Weekday AM Peak Hour



Valet Traffic Volumes

Weekday PM Peak Hour



Valet Traffic Volumes

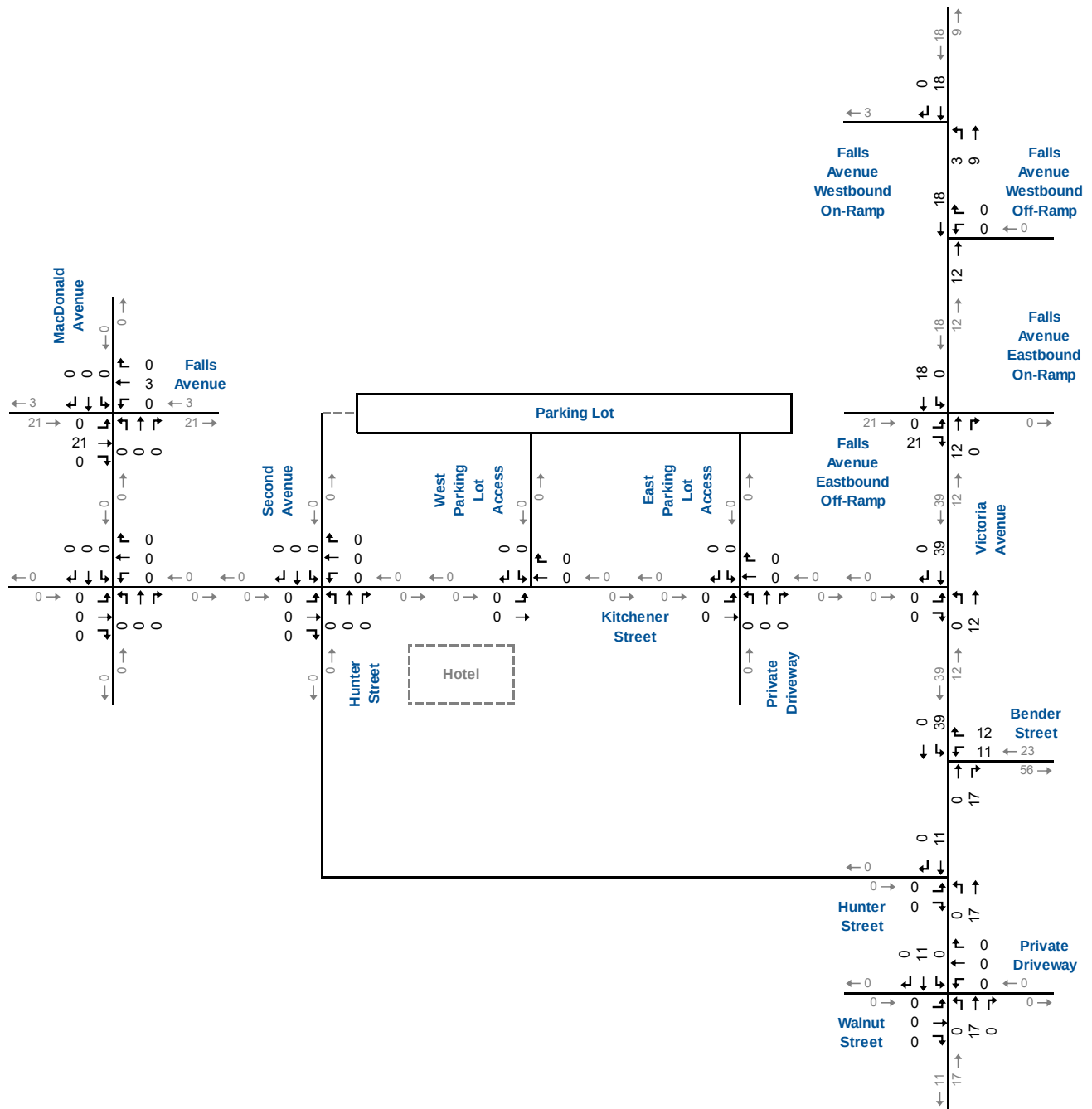
4873 and 4898 Kitchener Street, Niagara Falls TIS and PS
250550

Saturday Peak Hour

Appendix H

Background Development Traffic Volumes

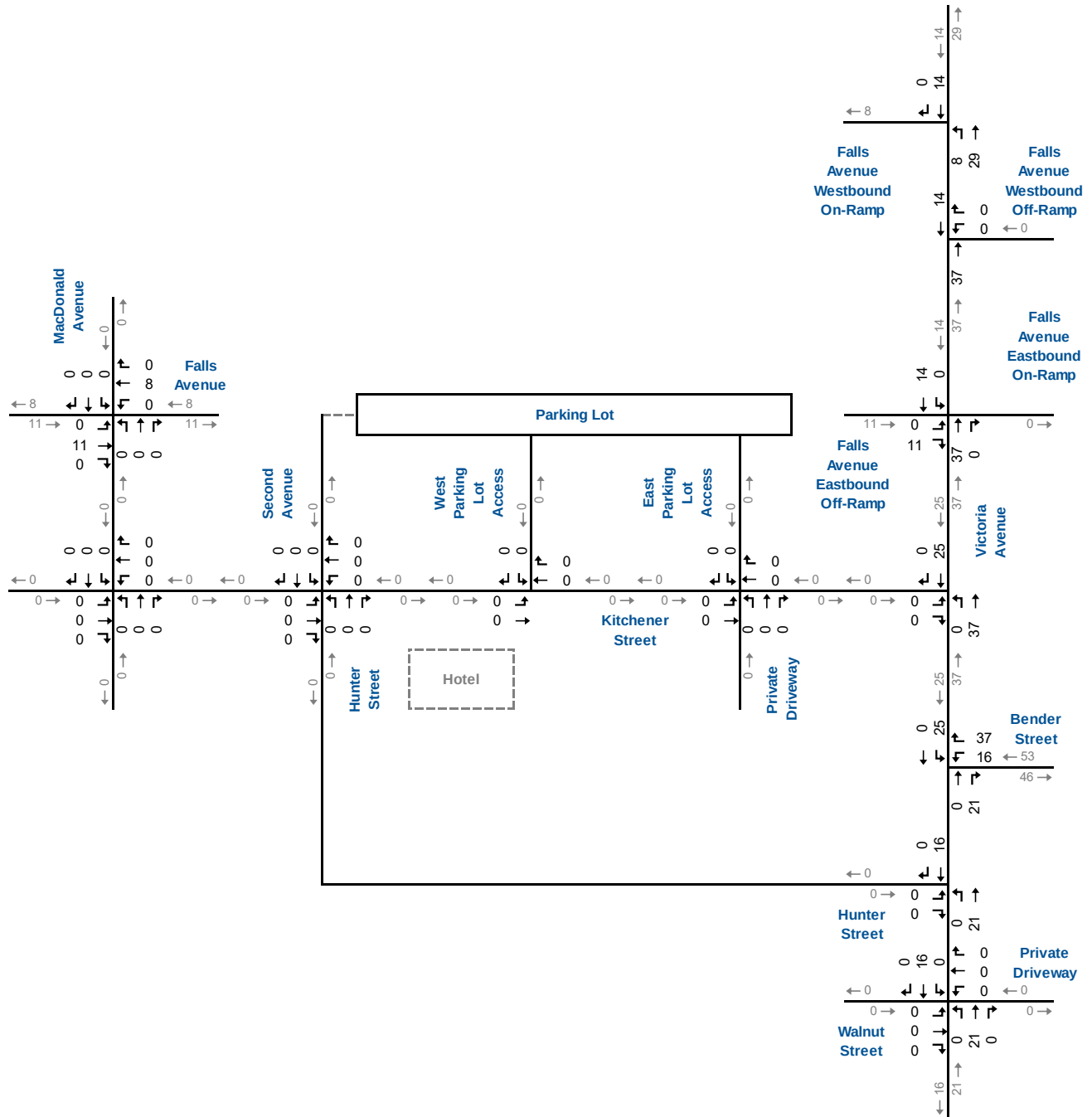




Background Development Traffic Volumes (Weekday AM Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

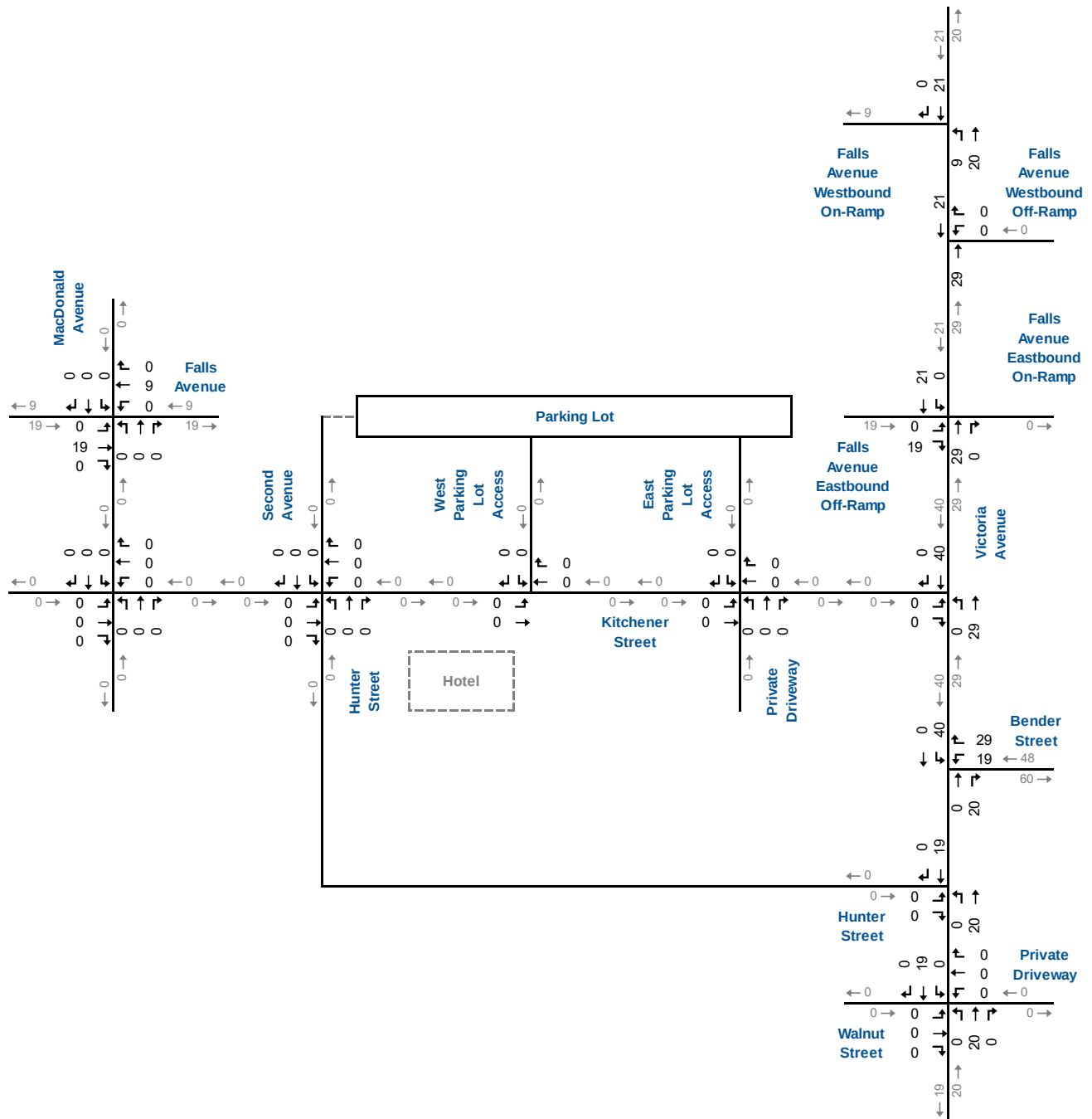
4709 Bender Street



Background Development Traffic Volumes (Weekday PM Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

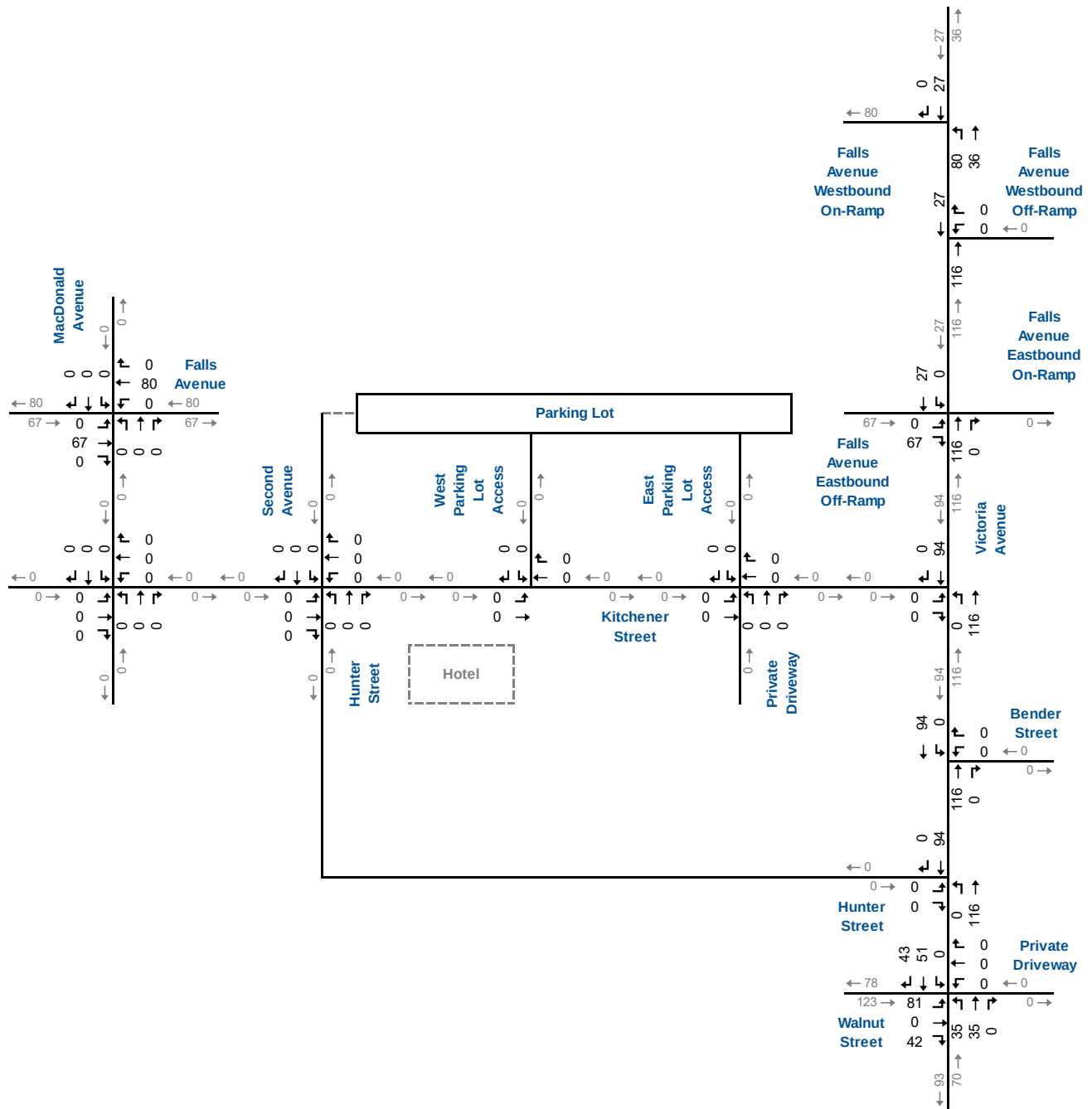
4709 Bender Street



Background Development Traffic Volumes (Saturday Peak Hour)

4873 and 4898 Kitchener Street, Niagara Falls TIS and PS
250550

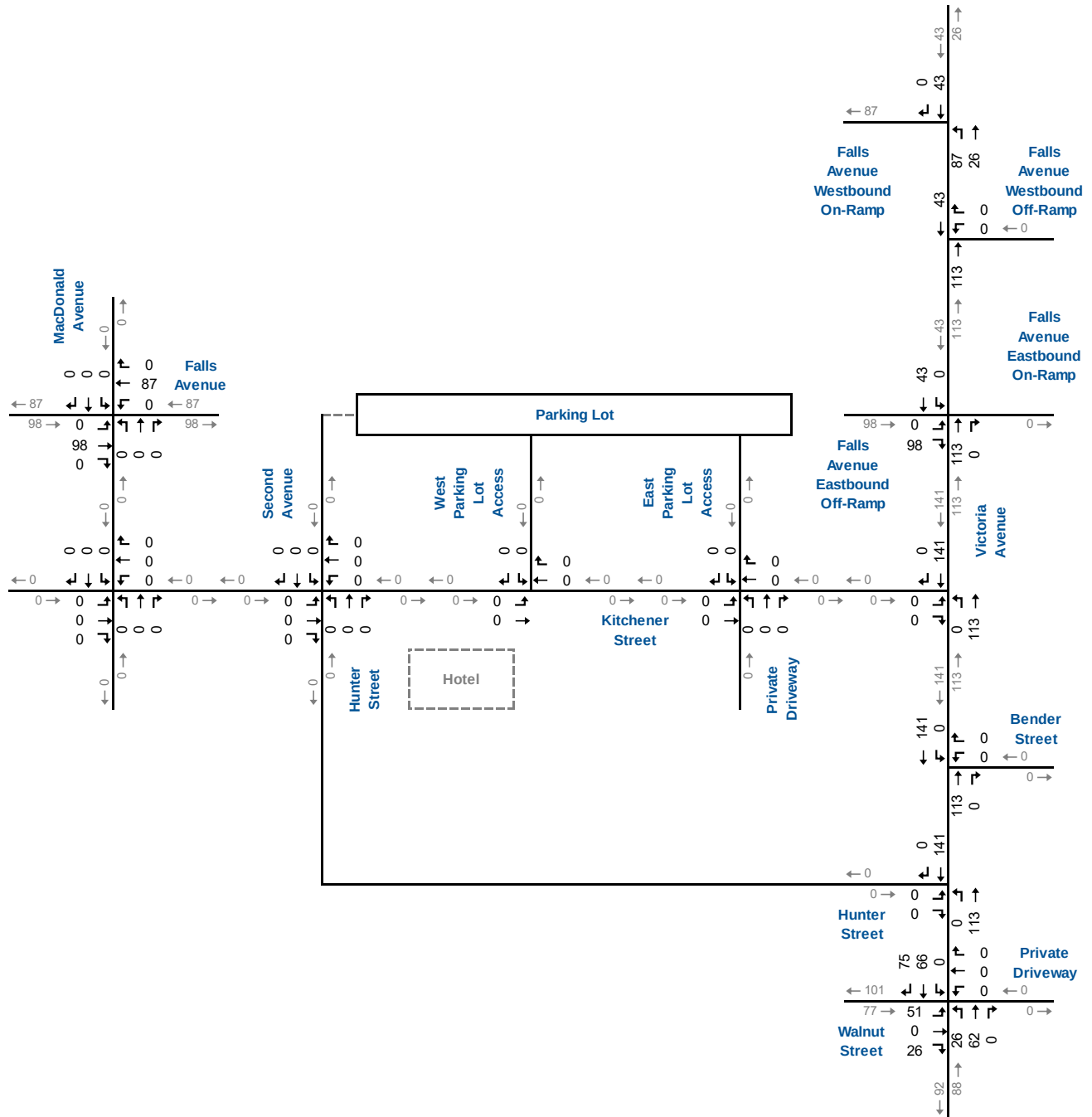
4709 Bender Street



Background Development Traffic Volumes (Weekday AM Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

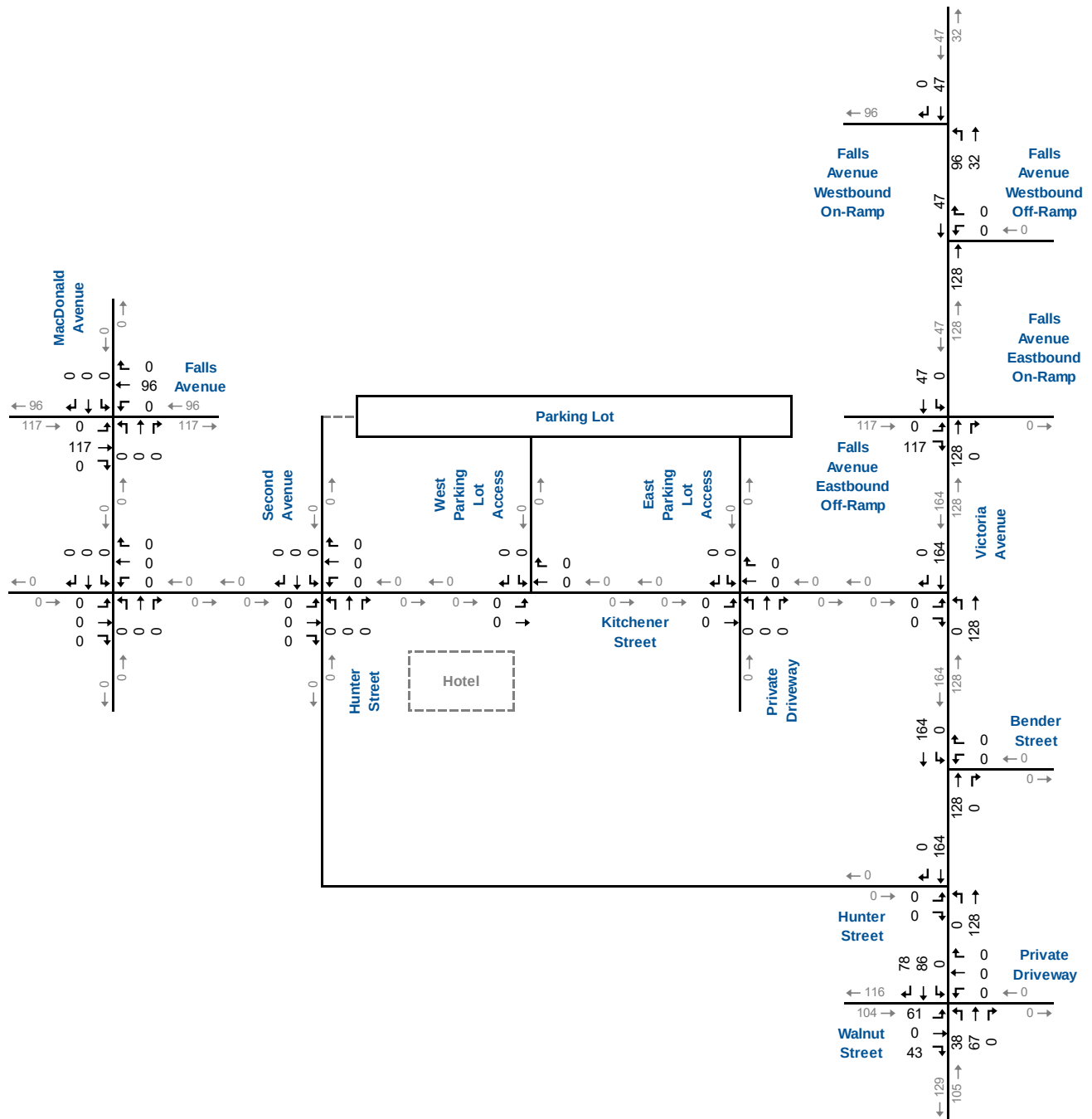
5613 Victoria Avenue



Background Development Traffic Volumes (Weekday PM Peak Hour)

4873 and 4898 Kitchen Street, Niagara Falls TIS and PS
250550

5613 Victoria Avenue



Appendix I

Opening Year Background Traffic Operations without Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	40	295	141	135
Future Volume (vph)	0	0	40	295	141	135
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.934	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1518	1207	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1518	1207	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	1		29			29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	47	343	164	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	47	343	321	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	33.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	40	295	141	135
Future Volume (Veh/h)	0	0	40	295	141	135
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	47	343	164	157
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	710	272	350			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	710	272	350			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	96			
cM capacity (veh/h)	387	772	1220			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	47	343	321			
Volume Left	47	0	0			
Volume Right	0	0	157			
cSH	1220	1700	1700			
Volume to Capacity	0.04	0.20	0.19			
Queue Length 95th (m)	0.9	0.0	0.0			
Control Delay (s/veh)	8.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	1.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			33.5%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	7	328	0	0	141
Future Volume (vph)	9	7	328	0	0	141
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		2		10	10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	11	9	400	0	0	172
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	400	0	0	172
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.1%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	7	328	0	0	141
Future Volume (Veh/h)	9	7	328	0	0	141
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	9	400	0	0	172
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.96	0.96			0.96	
vC, conflicting volume	582	412			410	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	545	368			366	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	461	619			1145	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	400	172			
Volume Left	11	0	0			
Volume Right	9	0	0			
cSH	521	1700	1700			
Volume to Capacity	0.04	0.24	0.10			
Queue Length 95th (m)	0.9	0.0	0.0			
Control Delay (s/veh)	12.2	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	12.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		59.1%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	250	0	0	0	0	149	5	7	144	0
Future Volume (vph)	179	0	250	0	0	0	0	149	5	7	144	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.98		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1257	0	1381	1504	0
Flt Permitted	0.950									0.646		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1257	0	923	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			287					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	206	0	287	0	0	0	0	171	6	8	166	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	206	0	287	0	0	0	0	177	0	8	166	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	32.0		32.0					28.0		28.0	28.0	
Total Split (%)	53.3%		53.3%					46.7%		46.7%	46.7%	
Maximum Green (s)	25.9		25.9					21.9		21.9	21.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	10.2		10.2					9.9		9.9	9.9	
Actuated g/C Ratio	0.31		0.31					0.30		0.30	0.30	
v/c Ratio	0.48		0.54					0.46		0.03	0.36	
Control Delay (s/veh)	13.7		6.0					14.1		9.0	12.0	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	13.7		6.0					14.1		9.0	12.0	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		A	B	
Approach Delay (s/veh)		9.2						14.1			11.9	
Approach LOS		A						B			B	
Queue Length 50th (m)	7.5		0.0					6.8		0.3	6.2	
Queue Length 95th (m)	22.0		9.9					21.0		2.1	18.7	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1123		925					865		634	1034	
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	0.18		0.31					0.20		0.01	0.16	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 32.6

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay (s/veh): 10.8

Intersection LOS: B

Intersection Capacity Utilization 59.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	250	0	0	0	0	149	5	7	144	0
Future Volume (vph)	179	0	250	0	0	0	0	149	5	7	144	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1258		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.65	1.00	
Satd. Flow (perm)	1381		1072					1258		930	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	206	0	287	0	0	0	0	171	6	8	166	0
RTOR Reduction (vph)	0	0	196	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	206	0	91	0	0	0	0	175	0	8	166	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	10.2		10.2					9.9		9.9	9.9	
Effective Green, g (s)	10.2		10.2					9.9		9.9	9.9	
Actuated g/C Ratio	0.32		0.32					0.31		0.31	0.31	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	436		338					385		285	460	
v/s Ratio Prot	c0.15							c0.14			0.11	
v/s Ratio Perm			0.08							0.01		
v/c Ratio	0.47		0.27					0.45		0.03	0.36	
Uniform Delay, d1	8.9		8.3					9.0		7.8	8.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.4		0.2					0.4		0.0	0.2	
Delay (s)	9.2		8.4					9.4		7.9	8.9	
Level of Service	A		A					A		A	A	
Approach Delay (s/veh)		8.8			0.0			9.4			8.9	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		8.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.46										
Actuated Cycle Length (s)		32.3			Sum of lost time (s)			12.2				
Intersection Capacity Utilization		59.1%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	20	4	133	378	16
Future Volume (vph)	21	20	4	133	378	16
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934				0.995	
Flt Protected	0.975			0.998		
Satd. Flow (prot)	1305	0	0	1093	1294	0
Flt Permitted	0.975			0.998		
Satd. Flow (perm)	1305	0	0	1093	1294	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	25	24	5	158	450	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	0	163	469	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	43.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	20	4	133	378	16
Future Volume (Veh/h)	21	20	4	133	378	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	25	24	5	158	450	19
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	647	490	488			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	616	453	451			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	94	96	99			
cM capacity (veh/h)	431	572	945			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	49	163	469			
Volume Left	25	5	0			
Volume Right	24	0	19			
cSH	490	945	1700			
Volume to Capacity	0.10	0.00*	0.28			
Queue Length 95th (m)	2.5	0.1	0.0			
Control Delay (s/veh)	13.2	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s/veh)	13.2	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		43.0%		ICU Level of Service	A	
Analysis Period (min)		15				
* Value less than 0.01.						

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	33	104	81	267	130
Future Volume (vph)	43	33	104	81	267	130
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.518	
Satd. Flow (perm)	1310	1069	1449	1027	738	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		38		93		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	49	38	120	93	307	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	38	120	93	307	149
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.2	8.2	9.6	9.6	25.3	21.9
Actuated g/C Ratio	0.19	0.19	0.22	0.22	0.59	0.51
v/c Ratio	0.20	0.16	0.37	0.31	0.54	0.20

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	17.8	8.7	17.8	7.1	8.5	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	17.8	8.7	17.8	7.1	8.5	6.3
LOS	B	A	B	A	A	A
Approach Delay (s/veh)	13.8		13.2			7.8
Approach LOS	B		B			A
Queue Length 50th (m)	3.2	0.0	8.1	0.0	9.5	5.3
Queue Length 95th (m)	10.1	5.2	18.5	7.5	19.5	11.9
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	614	521	829	627	583	1307
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.14	0.15	0.53	0.11

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 42.8

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay (s/veh): 10.0

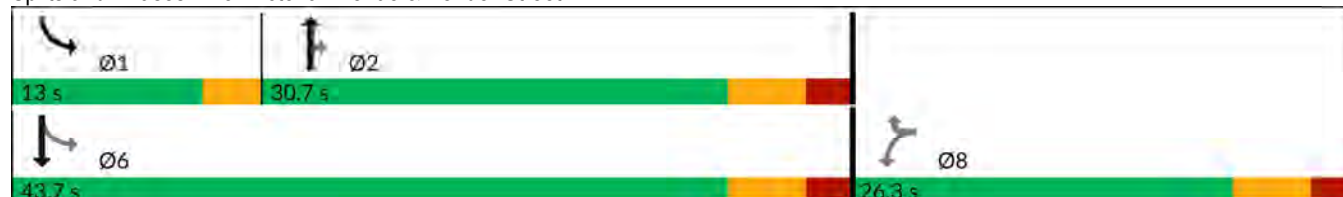
Intersection LOS: A

Intersection Capacity Utilization 45.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	33	104	81	267	130
Future Volume (vph)	43	33	104	81	267	130
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1074	1449	1032	1363	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1312	1074	1449	1032	743	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	49	38	120	93	307	149
RTOR Reduction (vph)	0	31	0	72	0	0
Lane Group Flow (vph)	49	7	120	21	307	149
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.2	8.2	9.6	9.6	21.9	21.9
Effective Green, g (s)	8.2	8.2	9.6	9.6	21.9	21.9
Actuated g/C Ratio	0.19	0.19	0.22	0.22	0.51	0.51
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	251	206	325	232	516	764
v/s Ratio Prot			0.08		c0.13	0.10
v/s Ratio Perm	c0.04	0.01		0.02	c0.18	
v/c Ratio	0.20	0.04	0.37	0.09	0.59	0.20
Uniform Delay, d1	14.5	14.0	14.0	13.1	6.7	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.8	0.2	1.8	0.1
Delay (s)	14.8	14.1	14.8	13.3	8.5	5.8
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	14.5		14.2			7.6
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			10.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			42.7		Sum of lost time (s)	15.6
Intersection Capacity Utilization			45.5%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	9	2	182	171	2
Future Volume (vph)	3	9	2	182	171	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.901					0.850
Flt Protected	0.987					
Satd. Flow (prot)	1179	0	0	1091	1504	1106
Flt Permitted	0.987					
Satd. Flow (perm)	1179	0	0	1091	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	11	2	217	204	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	0	219	204	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	9	2	182	171	2
Future Volume (Veh/h)	3	9	2	182	171	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	11	2	217	204	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.99	0.98	0.98			
vC, conflicting volume	448	226	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	402	206	208			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	587	782	1324			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	15	219	204	2		
Volume Left	4	2	0	0		
Volume Right	11	0	0	2		
cSH	718	1324	1700	1700		
Volume to Capacity	0.02	0.00*	0.12	0.00*		
Queue Length 95th (m)	0.5	0.0	0.0	0.0		
Control Delay (s/veh)	10.1	0.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	10.1	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay				0.4		
Intersection Capacity Utilization				30.8%	ICU Level of Service	A
Analysis Period (min)				15		
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	7	7	18	9	16	2	155	9	12	157	10
Future Volume (vph)	14	7	7	18	9	16	2	155	9	12	157	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.97			1.00			1.00	0.95
Frt		0.966			0.950			0.992				0.850
Flt Protected		0.976			0.980			0.999			0.996	
Satd. Flow (prot)	0	1196	0	0	1254	0	0	1327	0	0	1121	851
Flt Permitted		0.816			0.852			0.995			0.963	
Satd. Flow (perm)	0	992	0	0	1077	0	0	1322	0	0	1081	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			19			7				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	16	8	8	21	11	19	2	182	11	14	185	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	51	0	0	195	0	0	199	12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.2			8.2			12.3			12.3	12.3
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
v/c Ratio		0.13			0.19			0.41			0.52	0.04
Control Delay (s/veh)		11.8			11.0			10.8			14.0	0.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		11.8			11.0			10.8			14.0	0.2

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			B	A
Approach Delay (s/veh)		11.8			11.0			10.8			13.3	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		1.0			1.3			7.7			8.4	0.0
Queue Length 95th (m)		5.7			7.3			17.0			19.1	0.0
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		534			584			1075			878	667
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		0.06			0.09			0.18			0.23	0.02

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 34.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay (s/veh): 12.0

Intersection LOS: B

Intersection Capacity Utilization 60.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis 7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	14	7	7	18	9	16	2	155	9	12	157	10
Future Volume (vph)	14	7	7	18	9	16	2	155	9	12	157	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		1.00			0.99			1.00			1.00	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1195			1248			1330			1120	818
Flt Permitted		0.82			0.85			1.00			0.96	1.00
Satd. Flow (perm)		999			1085			1325			1082	818
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	16	8	8	21	11	19	2	182	11	14	185	12
RTOR Reduction (vph)	0	6	0	0	14	0	0	4	0	0	0	8
Lane Group Flow (vph)	0	26	0	0	37	0	0	191	0	0	199	4
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		8.2			8.2			12.3			12.3	12.3
Effective Green, g (s)		8.2			8.2			12.3			12.3	12.3
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		238			258			473			386	292
v/s Ratio Prot												
v/s Ratio Perm		0.03			0.03			0.14			0.18	0.01
v/c Ratio		0.11			0.14			0.40			0.52	0.01
Uniform Delay, d1		10.2			10.3			8.3			8.7	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.2			0.4			0.9	0.0
Delay (s)		10.4			10.5			8.7			9.6	7.2
Level of Service		B			B			A			A	A
Approach Delay (s/veh)		10.4			10.5			8.7			9.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		9.3										
HCM 2000 Volume to Capacity ratio		0.37										
Actuated Cycle Length (s)		34.4										
Intersection Capacity Utilization		60.0%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	604	77	4	251	1	144	19	10	2	15	20
Future Volume (vph)	24	604	77	4	251	1	144	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.983			0.999			0.992			0.926	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1316	2920	0	1381	2938	0	0	1341	0	0	1309	0
Flt Permitted	0.556			0.336				0.734			0.983	
Satd. Flow (perm)	769	2920	0	489	2938	0	0	1017	0	0	1289	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						4			22	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	26	657	84	4	273	1	157	21	11	2	16	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	741	0	4	274	0	0	189	0	0	40	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.0		9.0	40.0		41.0	41.0		41.0	41.0	
Total Split (%)	10.0%	44.4%		10.0%	44.4%		45.6%	45.6%		45.6%	45.6%	
Maximum Green (s)	6.0	33.7		6.0	33.7		33.7	33.7		33.7	33.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	27.9	23.6		27.4	21.9			16.8			16.8	
Actuated g/C Ratio	0.50	0.42		0.49	0.39			0.30			0.30	
v/c Ratio	0.06	0.60		0.01	0.24			0.62			0.10	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	8.6	15.9		8.5	14.2			28.3			11.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	8.6	15.9		8.5	14.2			28.3			11.3	
LOS	A	B		A	B			C			B	
Approach Delay (s/veh)		15.7			14.1			28.3			11.3	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	1.2	24.6		0.2	7.7			14.4			1.2	
Queue Length 95th (m)	5.6	67.5		1.6	24.0			44.4			8.4	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	445	1895		341	1900			659			841	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.39		0.01	0.14			0.29			0.05	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 56.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay (s/veh): 17.1

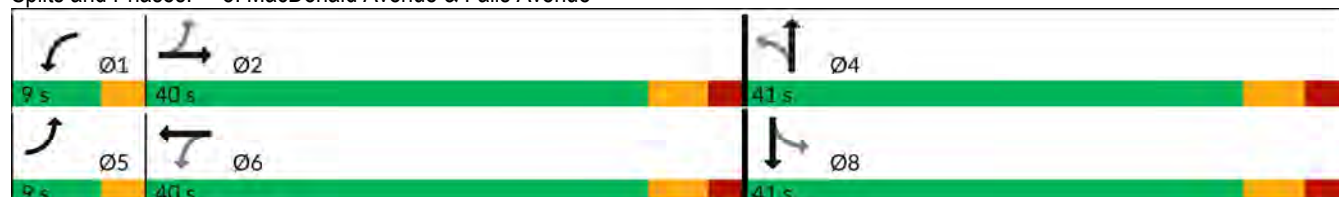
Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis 8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	604	77	4	251	1	144	19	10	2	15	20
Future Volume (vph)	24	604	77	4	251	1	144	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2920		1381	2940			1335			1310	
Flt Permitted	0.56	1.00		0.34	1.00			0.73			0.98	
Satd. Flow (perm)	770	2920		489	2940			1021			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	657	84	4	273	1	157	21	11	2	16	22
RTOR Reduction (vph)	0	11	0	0	0	0	0	3	0	0	16	0
Lane Group Flow (vph)	26	730	0	4	274	0	0	186	0	0	24	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	25.5	23.6		23.3	22.5			16.8			16.8	
Effective Green, g (s)	25.5	23.6		23.3	22.5			16.8			16.8	
Actuated g/C Ratio	0.44	0.41		0.40	0.39			0.29			0.29	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	357	1192		209	1144			296			374	
v/s Ratio Prot	c0.00	c0.25		0.00	0.09							
v/s Ratio Perm	0.03			0.01				c0.18			0.02	
v/c Ratio	0.07	0.61		0.02	0.24			0.63			0.07	
Uniform Delay, d1	9.2	13.5		10.4	11.9			17.8			14.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.4		0.0	0.2			3.6			0.2	
Delay (s)	9.3	14.8		10.4	12.1			21.4			15.0	
Level of Service	A	B		B	B			C			B	
Approach Delay (s/veh)		14.7			12.1			21.4			15.0	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			15.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			57.8			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			58.0%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Future Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.919			0.999			0.992	
Flt Protected		0.995			0.999						0.990	
Satd. Flow (prot)	0	1372	0	0	1292	0	0	1390	0	0	1387	0
Flt Permitted		0.995			0.999						0.990	
Satd. Flow (perm)	0	1372	0	0	1292	0	0	1390	0	0	1387	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	7	51	7	1	21	33	1	170	1	24	85	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	0	0	55	0	0	172	0	0	116	0
Sign Control	Stop											
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	37.6%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Future Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	7	51	7	1	21	33	1	170	1	24	85	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	65	55	172	116								
Volume Left (vph)	7	1	1	24								
Volume Right (vph)	7	33	1	7								
Hadj (s)	0.00	-0.33	0.05	0.03								
Departure Headway (s)	4.6	4.3	4.4	4.4								
Degree Utilization, x	0.08	0.07	0.21	0.14								
Capacity (veh/h)	721	768	796	779								
Control Delay (s/veh)	8.0	7.6	8.5	8.1								
Approach Delay (s/veh)	8.0	7.6	8.5	8.1								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.2									
Level of Service			A									
Intersection Capacity Utilization			37.6%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	38	8	1	19	0	5	0	3	0	1	0
Future Volume (vph)	1	38	8	1	19	0	5	0	3	0	1	0
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.976				0.951							
Flt Protected	0.999				0.998				0.969			
Satd. Flow (prot)	0	1397	0	0	1305	0	0	1321	0	0	1433	0
Flt Permitted	0.999				0.998				0.969			
Satd. Flow (perm)	0	1397	0	0	1305	0	0	1321	0	0	1433	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	362.4				79.0				93.8			
Travel Time (s)	26.1				5.7				6.8			
Confl. Peds. (#/hr)	3	6		6	3		2		2			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	50	11	1	25	0	7	0	4	0	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	0	26	0	0	11	0	0	1	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.2%				ICU Level of Service A							
Analysis Period (min)	15											

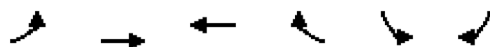
HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	38	8	1	19	0	5	0	3	0	1	0
Future Volume (Veh/h)	1	38	8	1	19	0	5	0	3	0	1	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	1	50	11	1	25	0	7	0	4	0	1	0
Pedestrians				2			6			3		
Lane Width (m)				3.6			3.6			3.6		
Walking Speed (m/s)				1.0			1.0			1.0		
Percent Blockage				0			1			0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	28			67			91	94	64	94	99	28
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			67			91	94	64	94	99	28
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1594			1080			885	792	999	880	786	1050
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	62	26	11	1								
Volume Left	1	1	7	0								
Volume Right	11	0	4	0								
cSH	1594	1080	923	786								
Volume to Capacity	0.00*	0.00*	0.01	0.00*								
Queue Length 95th (m)	0.0	0.0	0.3	0.0								
Control Delay (s/veh)	0.1	0.3	8.9	9.6								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.3	8.9	9.6								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			19.2%	ICU Level of Service				A				
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	40	19	0	1	1
Future Volume (vph)	2	40	19	0	1	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected		0.997			0.976	
Satd. Flow (prot)	0	1174	1262	0	869	0
Flt Permitted		0.997			0.976	
Satd. Flow (perm)	0	1174	1262	0	869	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	3	55	26	0	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	58	26	0	2	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

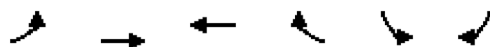
Control Type: Unsignalized

Intersection Capacity Utilization 16.7% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (Open)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	40	19	0	1	1
Future Volume (Veh/h)	2	40	19	0	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	3	55	26	0	1	1
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	30				91	32
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	30				91	32
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	100				100	100
cM capacity (veh/h)	1590				909	814
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	58	26	2			
Volume Left	3	0	1			
Volume Right	0	0	1			
cSH	1590	1700	859			
Volume to Capacity	0.00*	0.02	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.4	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s/veh)	0.4	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			16.7%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	40	0	0	18	2	1	0	0	1	0	0
Future Volume (vph)	1	40	0	0	18	2	1	0	0	1	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.986											
Flt Protected	0.999								0.950		0.950	
Satd. Flow (prot)	0	1177	0	0	1241	0	0	1361	0	0	1361	0
Flt Permitted	0.999								0.950		0.950	
Satd. Flow (perm)	0	1177	0	0	1241	0	0	1361	0	0	1361	0
Link Speed (k/h)	50								50		50	
Link Distance (m)	37.0								32.6		36.9	
Travel Time (s)	2.7								2.3		2.7	
Confl. Peds. (#/hr)	3								2		2	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	58	0	0	26	3	1	0	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	29	0	0	1	0	0	1	0
Sign Control	Free		Free						Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	15.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (Open)

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	1	40	0	0	18	2	1	0	0	1	0	0	
Future Volume (Veh/h)	1	40	0	0	18	2	1	0	0	1	0	0	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	
Hourly flow rate (vph)	1	58	0	0	26	3	1	0	0	1	0	0	
Pedestrians						2							3
Lane Width (m)						3.6							3.6
Walking Speed (m/s)						1.0							1.0
Percent Blockage						0							0
Right turn flare (veh)													
Median type	None			None									
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	32			58			88	92	60	93	91	31	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	32			58			88	92	60	93	91	31	
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 %	100			100			100	100	100	100	100	100	
cM capacity (veh/h)	1588			1559			900	799	1009	889	800	1046	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	59	29	1	1									
Volume Left	1	0	1	1									
Volume Right	0	3	0	0									
cSH	1588	1700	900	889									
Volume to Capacity	0.00*	0.02	0.00*	0.00*									
Queue Length 95th (m)	0.0	0.0	0.0	0.0									
Control Delay (s/veh)	0.1	0.0	9.0	9.1									
Lane LOS	A		A	A									
Approach Delay (s/veh)	0.1	0.0	9.0	9.1									
Approach LOS			A	A									
Intersection Summary													
Average Delay			0.3										
Intersection Capacity Utilization			15.3%	ICU Level of Service				A					
Analysis Period (min)			15										
* Value less than 0.01.													

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	150	496	309	258
Future Volume (vph)	0	0	150	496	309	258
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.938					
Flt Protected	0.950					
Satd. Flow (prot)	0	0	1381	1563	1230	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	0	1381	1563	1230	0
Link Speed (k/h)	40	50				50
Link Distance (m)	75.7	60.3				168.1
Travel Time (s)	6.8	4.3				12.1
Confl. Peds. (#/hr)	1		58	58		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	158	522	325	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	158	522	597	0
Sign Control	Stop	Free			Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	72.0%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	150	496	309	258
Future Volume (Veh/h)	0	0	150	496	309	258
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	158	522	325	272
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1357	520	655			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1357	520	655			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	83			
cM capacity (veh/h)	138	560	942			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	158	522	597			
Volume Left	158	0	0			
Volume Right	0	0	272			
cSH	942	1700	1700			
Volume to Capacity	0.17	0.31	0.35			
Queue Length 95th (m)	4.5	0.0	0.0			
Control Delay (s/veh)	9.6	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.2		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			72.0%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	45	601	0	0	309
Future Volume (vph)	48	45	601	0	0	309
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	52	48	646	0	0	332
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	0	646	0	0	332
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	87.2%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	48	45	601	0	0	309
Future Volume (Veh/h)	48	45	601	0	0	309
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	52	48	646	0	0	332
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.73	0.73			0.73	
vC, conflicting volume	1012	682			679	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	829	374			370	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	90			100	
cM capacity (veh/h)	241	474			843	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	100	646	332			
Volume Left	52	0	0			
Volume Right	48	0	0			
cSH	315	1700	1700			
Volume to Capacity	0.32	0.38	0.20			
Queue Length 95th (m)	10.0	0.0	0.0			
Control Delay (s/veh)	21.6	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	21.6	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			87.2%	ICU Level of Service		E
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	166	0	0	0	0	436	16	53	304	0
Future Volume (vph)	165	0	166	0	0	0	0	436	16	53	304	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.98		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1303	0	1354	1563	0
Flt Permitted	0.950									0.424		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1303	0	591	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180					4				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	180	0	0	0	0	474	17	58	330	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	180	0	0	0	0	491	0	58	330	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					31.8		31.8	31.8	
Total Split (%)	47.0%		47.0%					53.0%		53.0%	53.0%	
Maximum Green (s)	22.1		22.1					25.7		25.7	25.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	11.1		11.1					21.3		21.3	21.3	
Actuated g/C Ratio	0.25		0.25					0.47		0.47	0.47	
v/c Ratio	0.53		0.44					0.79		0.21	0.45	
Control Delay (s/veh)	22.2		7.0					22.7		9.8	10.6	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	22.2		7.0					22.7		9.8	10.6	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		A					C		A	B	
Approach Delay (s/veh)		14.6						22.7			10.4	
Approach LOS		B						C			B	
Queue Length 50th (m)	13.1		0.0					27.7		2.3	14.8	
Queue Length 95th (m)	28.2		11.1					#86.0		9.2	36.8	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	691		642					767		347	918	
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	0.26		0.28					0.64		0.17	0.36	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 45

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay (s/veh): 16.5

Intersection LOS: B

Intersection Capacity Utilization 87.2%

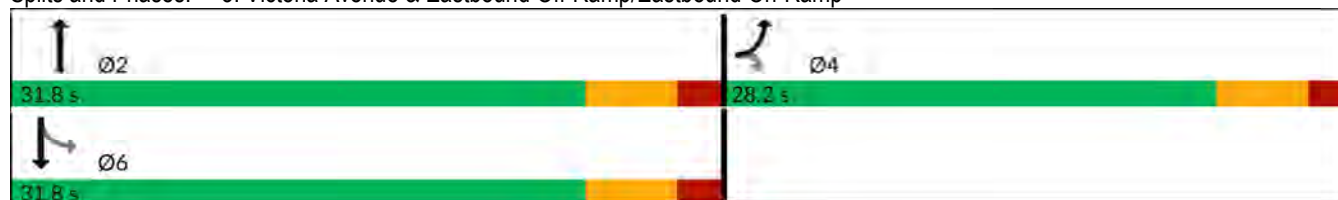
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	166	0	0	0	0	436	16	53	304	0
Future Volume (vph)	165	0	166	0	0	0	0	436	16	53	304	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1304		1329	1563	
Flt Permitted	0.95		1.00					1.00		0.42	1.00	
Satd. Flow (perm)	1368		1095					1304		594	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	0	180	0	0	0	0	474	17	58	330	0
RTOR Reduction (vph)	0	0	135	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	179	0	45	0	0	0	0	489	0	58	330	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	11.1		11.1					21.4		21.4	21.4	
Effective Green, g (s)	11.1		11.1					21.4		21.4	21.4	
Actuated g/C Ratio	0.25		0.25					0.48		0.48	0.48	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	339		271					624		284	748	
v/s Ratio Prot	c0.13							c0.37			0.21	
v/s Ratio Perm			0.04							0.10		
v/c Ratio	0.53		0.16					0.78		0.20	0.44	
Uniform Delay, d1	14.5		13.2					9.7		6.7	7.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.8		0.1					6.0		0.2	0.2	
Delay (s)	15.3		13.3					15.7		6.9	7.9	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		14.3			0.0			15.7			7.7	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			12.8									
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			44.7									
Intersection Capacity Utilization			87.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	38	27	15	413	416	54
Future Volume (vph)	38	27	15	413	416	54
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.943				0.985	
Flt Protected	0.972			0.998		
Satd. Flow (prot)	1313	0	0	1164	1306	0
Flt Permitted	0.972			0.998		
Satd. Flow (perm)	1313	0	0	1164	1306	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	40	29	16	439	443	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	0	0	455	500	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	67.5%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	27	15	413	416	54
Future Volume (Veh/h)	38	27	15	413	416	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	40	29	16	439	443	57
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.94	0.88	0.88			
vC, conflicting volume	989	522	546			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	695	390	418			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	95	98			
cM capacity (veh/h)	361	555	969			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	69	455	500			
Volume Left	40	16	0			
Volume Right	29	0	57			
cSH	423	969	1700			
Volume to Capacity	0.16	0.02	0.29			
Queue Length 95th (m)	4.3	0.4	0.0			
Control Delay (s/veh)	15.2	0.5	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	15.2	0.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization		67.5%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	166	261	137	180	263
Future Volume (vph)	113	166	261	137	180	263
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.97	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.490	
Satd. Flow (perm)	1339	1063	1563	1032	681	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		175		144		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	119	175	275	144	189	277
Shared Lane Traffic (%)						
Lane Group Flow (vph)	119	175	275	144	189	277
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	32.7	32.7	11.0	43.7
Total Split (%)	37.6%	37.6%	46.7%	46.7%	15.7%	62.4%
Maximum Green (s)	20.0	20.0	26.4	26.4	8.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.3	10.3	14.7	14.7	26.3	22.8
Actuated g/C Ratio	0.22	0.22	0.32	0.32	0.57	0.49
v/c Ratio	0.40	0.47	0.56	0.34	0.38	0.36

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	22.8	8.6	19.1	5.5	7.3	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	22.8	8.6	19.1	5.5	7.3	8.5
LOS	C	A	B	A	A	A
Approach Delay (s/veh)	14.4		14.4			8.0
Approach LOS	B		B			A
Queue Length 50th (m)	8.5	0.0	18.6	0.0	5.7	11.0
Queue Length 95th (m)	23.8	12.9	41.3	9.3	16.4	27.6
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	612	581	944	680	510	1252
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.30	0.29	0.21	0.37	0.22

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 46.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay (s/veh): 11.9

Intersection LOS: B

Intersection Capacity Utilization 57.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	166	261	137	180	263
Future Volume (vph)	113	166	261	137	180	263
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1353	1070	1563	1052	1353	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1353	1070	1563	1052	698	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	175	275	144	189	277
RTOR Reduction (vph)	0	136	0	98	0	0
Lane Group Flow (vph)	119	39	275	46	189	277
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.3	10.3	14.7	14.7	23.6	23.6
Effective Green, g (s)	10.3	10.3	14.7	14.7	23.6	23.6
Actuated g/C Ratio	0.22	0.22	0.32	0.32	0.51	0.51
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	299	237	494	332	437	793
v/s Ratio Prot			c0.18		c0.05	0.18
v/s Ratio Perm	c0.09	0.04		0.04	0.16	
v/c Ratio	0.40	0.16	0.56	0.14	0.43	0.35
Uniform Delay, d1	15.5	14.6	13.2	11.4	6.7	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2	1.5	0.2	0.7	0.3
Delay (s)	16.1	14.9	14.7	11.6	7.4	7.2
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	15.4		13.6			7.3
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			11.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			46.5		Sum of lost time (s)	15.6
Intersection Capacity Utilization			57.2%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	9	5	392	359	18
Future Volume (vph)	6	9	5	392	359	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919					0.850
Flt Protected	0.980			0.999		
Satd. Flow (prot)	1291	0	0	1165	1563	1106
Flt Permitted	0.980			0.999		
Satd. Flow (perm)	1291	0	0	1165	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	6	9	5	408	374	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	0	413	374	19
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	53.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	9	5	392	359	18
Future Volume (Veh/h)	6	9	5	392	359	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	6	9	5	408	374	19
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.90	0.89	0.89			
vC, conflicting volume	875	457	476			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	537	330	352			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	418	585	996			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	15	413	374	19		
Volume Left	6	5	0	0		
Volume Right	9	0	0	19		
cSH	505	996	1700	1700		
Volume to Capacity	0.03	0.00*	0.22	0.01		
Queue Length 95th (m)	0.7	0.1	0.0	0.0		
Control Delay (s/veh)	12.4	0.2	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	12.4	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			53.3%	ICU Level of Service		A
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	16	12	50	40	35	12	326	37	17	309	43
Future Volume (vph)	36	16	12	50	40	35	12	326	37	17	309	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.93			0.98			1.00	0.80
Frt		0.975			0.962			0.987				0.850
Flt Protected		0.973			0.980			0.998			0.997	
Satd. Flow (prot)	0	1282	0	0	1277	0	0	1374	0	0	1163	1024
Flt Permitted		0.751			0.839			0.981			0.965	
Satd. Flow (perm)	0	945	0	0	1048	0	0	1345	0	0	1121	818
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			34			12				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	39	17	13	54	43	38	13	351	40	18	332	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	135	0	0	404	0	0	350	46
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		10.7			10.7			18.7			18.7	18.7
Actuated g/C Ratio		0.24			0.24			0.42			0.42	0.42
v/c Ratio		0.29			0.48			0.70			0.74	0.12
Control Delay (s/veh)		16.9			19.3			17.5			21.2	2.5
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		16.9			19.3			17.5			21.2	2.5

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			C	A
Approach Delay (s/veh)		16.9			19.3			17.5			19.0	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		3.3			6.2			19.9			18.3	0.0
Queue Length 95th (m)		12.9			21.6			54.4			52.7	3.1
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		413			469			905			751	570
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		0.17			0.29			0.45			0.47	0.08

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 44.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay (s/veh): 18.3

Intersection LOS: B

Intersection Capacity Utilization 79.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	36	16	12	50	40	35	12	326	37	17	309	43
Future Volume (vph)	36	16	12	50	40	35	12	326	37	17	309	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.98			0.98			0.99			1.00	0.85
Flpb, ped/bikes		0.97			0.97			1.00			1.00	1.00
Frt		0.97			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1247			1249			1376			1160	869
Flt Permitted		0.75			0.84			0.98			0.96	1.00
Satd. Flow (perm)		962			1068			1352			1122	869
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	39	17	13	54	43	38	13	351	40	18	332	46
RTOR Reduction (vph)	0	10	0	0	26	0	0	7	0	0	0	26
Lane Group Flow (vph)	0	59	0	0	109	0	0	397	0	0	350	20
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		10.7			10.7			18.8			18.8	18.8
Effective Green, g (s)		10.7			10.7			18.8			18.8	18.8
Actuated g/C Ratio		0.25			0.25			0.43			0.43	0.43
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		237			263			585			486	376
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.10			0.29			0.31	0.02
v/c Ratio		0.25			0.42			0.68			0.72	0.05
Uniform Delay, d1		13.1			13.7			9.9			10.1	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.4			0.8			2.8			4.9	0.0
Delay (s)		13.5			14.5			12.7			15.0	7.2
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		13.5			14.5			12.7			14.1	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			13.6									
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			43.4									
Intersection Capacity Utilization			79.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	593	160	37	676	12	236	28	22	2	24	23
Future Volume (vph)	51	593	160	37	676	12	236	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.968			0.997			0.989			0.936	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1381	2875	0	1381	2961	0	0	1336	0	0	1295	0
Flt Permitted	0.281			0.242				0.727			0.988	
Satd. Flow (perm)	408	2875	0	352	2961	0	0	1006	0	0	1282	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			2			6			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	55	638	172	40	727	13	254	30	24	2	26	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	810	0	40	740	0	0	308	0	0	53	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	38.0		9.0	38.0		43.0	43.0		43.0	43.0	
Total Split (%)	10.0%	42.2%		10.0%	42.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	6.0	31.7		6.0	31.7		35.7	35.7		35.7	35.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	34.2	27.6		34.2	27.6			27.5			27.5	
Actuated g/C Ratio	0.46	0.37		0.46	0.37			0.37			0.37	
v/c Ratio	0.20	0.74		0.16	0.67			0.82			0.11	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	13.6	25.9		13.2	25.0			41.8			11.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	13.6	25.9		13.2	25.0			41.8			11.4	
LOS	B	C		B	C			D			B	
Approach Delay (s/veh)		25.1			24.4			41.8			11.4	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	4.2	56.0		3.0	51.8			43.7			2.9	
Queue Length 95th (m)	10.9	83.9		8.5	77.1			#85.9			9.9	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	272	1346		251	1364			524			676	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.20	0.60		0.16	0.54			0.59			0.08	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 74.3

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay (s/veh): 27.1

Intersection LOS: C

Intersection Capacity Utilization 73.3%

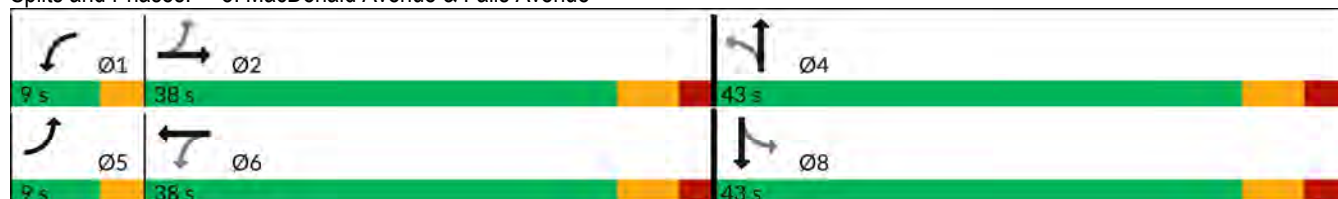
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	593	160	37	676	12	236	28	22	2	24	23
Future Volume (vph)	51	593	160	37	676	12	236	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2876		1381	2962			1331			1297	
Flt Permitted	0.28	1.00		0.24	1.00			0.73			0.99	
Satd. Flow (perm)	408	2876		351	2962			1007			1283	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	55	638	172	40	727	13	254	30	24	2	26	25
RTOR Reduction (vph)	0	26	0	0	1	0	0	4	0	0	16	0
Lane Group Flow (vph)	55	784	0	40	739	0	0	304	0	0	37	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	30.6	27.6		30.6	27.6			27.5			27.5	
Effective Green, g (s)	30.6	27.6		30.6	27.6			27.5			27.5	
Actuated g/C Ratio	0.41	0.37		0.41	0.37			0.37			0.37	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	206	1062		185	1094			370			472	
v/s Ratio Prot	c0.01	c0.27		0.01	0.25							
v/s Ratio Perm	0.10			0.08				c0.30			0.03	
v/c Ratio	0.27	0.74		0.22	0.68			0.82			0.08	
Uniform Delay, d1	13.9	20.4		13.9	19.8			21.4			15.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	3.3		0.4	2.2			13.4			0.2	
Delay (s)	14.4	23.7		14.3	22.0			34.8			15.5	
Level of Service	B	C		B	C			C			B	
Approach Delay (s/veh)		23.1			21.6			34.8			15.5	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			24.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			74.7			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			73.3%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Future Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.929			0.996			0.989	
Flt Protected		0.982			0.999			0.999			0.990	
Satd. Flow (prot)	0	1383	0	0	1330	0	0	1386	0	0	1393	0
Flt Permitted		0.982			0.999			0.999			0.990	
Satd. Flow (perm)	0	1383	0	0	1330	0	0	1386	0	0	1393	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	26	37	9	3	57	66	5	213	6	50	167	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	72	0	0	126	0	0	224	0	0	236	0
Sign Control	Stop				Stop				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.4%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Future Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	26	37	9	3	57	66	5	213	6	50	167	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	72	126	224	236								
Volume Left (vph)	26	3	5	50								
Volume Right (vph)	9	66	6	19								
Hadj (s)	0.00	-0.31	0.04	0.01								
Departure Headway (s)	5.2	4.8	4.7	4.7								
Degree Utilization, x	0.10	0.17	0.29	0.31								
Capacity (veh/h)	620	675	722	726								
Control Delay (s/veh)	8.8	8.8	9.7	9.8								
Approach Delay (s/veh)	8.8	8.8	9.7	9.8								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.5									
Level of Service			A									
Intersection Capacity Utilization			52.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	56	16	2	60	2	5	1	1	1	2	3
Future Volume (vph)	1	56	16	2	60	2	5	1	1	1	2	3
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.970			0.996			0.983			0.923	
Flt Protected		0.999			0.999			0.964			0.993	
Satd. Flow (prot)	0	1389	0	0	1426	0	0	1358	0	0	1313	0
Flt Permitted		0.999			0.999			0.964			0.993	
Satd. Flow (perm)	0	1389	0	0	1426	0	0	1358	0	0	1313	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			79.0			93.8			56.1	
Travel Time (s)		26.1			5.7			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	66	19	2	71	2	6	1	1	1	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	75	0	0	8	0	0	7	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	17.0%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

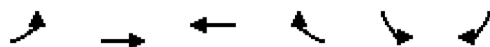
4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	56	16	2	60	2	5	1	1	1	2	3
Future Volume (Veh/h)	1	56	16	2	60	2	5	1	1	1	2	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	66	19	2	71	2	6	1	1	1	2	4
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	75			86			162	158	78	158	166	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	75			86			162	158	78	158	166	76
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 %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1534			1521			798	735	987	805	727	987
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	86	75	8	7								
Volume Left	1	2	6	1								
Volume Right	19	2	1	4								
cSH	1534	1521	809	870								
Volume to Capacity	0.00*	0.00*	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.2	0.2								
Control Delay (s/veh)	0.1	0.2	9.5	9.2								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.2	9.5	9.2								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			17.0%	ICU Level of Service					A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

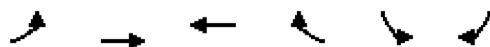
4873 and 4898 Kitchener Street TIS
Background PM (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	57	65	2	4	0
Future Volume (vph)	1	57	65	2	4	0
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.996					
Flt Protected	0.999		0.950			
Satd. Flow (prot)	0	1177	1333	0	1361	0
Flt Permitted	0.999		0.950			
Satd. Flow (perm)	0	1177	1333	0	1361	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	79.0		37.0		36.9	
Travel Time (s)	5.7		2.7		2.7	
Confl. Peds. (#/hr)	5	5				
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	64	73	2	4	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	65	75	0	4	0
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (Open)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	57	65	2	4	0
Future Volume (Veh/h)	1	57	65	2	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	64	73	2	4	0
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	80				145	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	80				145	79
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)	1523				847	982
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	65	75	4			
Volume Left	1	0	4			
Volume Right	0	2	0			
cSH	1523	1700	847			
Volume to Capacity	0.00*	0.04	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.1	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s/veh)	0.1	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			16.3%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	61	0	0	67	2	0	0	2	2	0	0
Future Volume (vph)	0	61	0	0	67	2	0	0	2	2	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.997					0.865		
Flt Protected											0.950	
Satd. Flow (prot)	0	1178	0	0	1334	0	0	1240	0	0	1361	0
Flt Permitted											0.950	
Satd. Flow (perm)	0	1178	0	0	1334	0	0	1240	0	0	1361	0
Link Speed (k/h)					50					50		
Link Distance (m)					37.0					57.8		
Travel Time (s)					2.7					4.2		
Confl. Peds. (#/hr)	7					7	1					1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	69	0	0	76	2	0	0	2	2	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	78	0	0	2	0	0	2	0
Sign Control	Free				Free				Stop			
Intersection Summary												
Area Type:	Other											
Control Type: Unsignalized												
Intersection Capacity Utilization 17.8%					ICU Level of Service A							
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	61	0	0	67	2	0	0	2	2	0	0
Future Volume (Veh/h)	0	61	0	0	67	2	0	0	2	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	69	0	0	76	2	0	0	2	2	0	0
Pedestrians		1			3						7	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.0			1.0						1.0	
Percent Blockage		0			0						1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	85			69			147	154	72	158	153	85
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	85			69			147	154	72	158	153	85
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1514			1545			821	736	993	799	737	972
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	78	2	2								
Volume Left	0	0	0	2								
Volume Right	0	2	2	0								
cSH	1514	1700	993	799								
Volume to Capacity	0.00	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.1								
Control Delay (s/veh)	0.0	0.0	8.6	9.5								
Lane LOS			A	A								
Approach Delay (s/veh)	0.0	0.0	8.6	9.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			17.8%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	148	450	333	196
Future Volume (vph)	0	0	148	450	333	196
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.950	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1259	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1259	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		5	63			63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	163	495	366	215
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	163	495	581	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	69.2%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	148	450	333	196
Future Volume (Veh/h)	0	0	148	450	333	196
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	163	495	366	215
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1358	542	644			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1358	542	644			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	83			
cM capacity (veh/h)	137	542	941			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	163	495	581			
Volume Left	163	0	0			
Volume Right	0	0	215			
cSH	941	1700	1700			
Volume to Capacity	0.17	0.29	0.34			
Queue Length 95th (m)	4.7	0.0	0.0			
Control Delay (s/veh)	9.6	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.4		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			69.2%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	41	558	0	0	333
Future Volume (vph)	53	41	558	0	0	333
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40	50		50		
Link Distance (m)	86.2	51.0		60.3		
Travel Time (s)	7.8	3.7		4.3		
Confl. Peds. (#/hr)	1		57		57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	55	43	581	0	0	347
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	0	581	0	0	347
Sign Control	Stop	Free		Free		
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	100.1%			ICU Level of Service G		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	41	558	0	0	333
Future Volume (Veh/h)	53	41	558	0	0	333
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	55	43	581	0	0	347
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.76	0.76			0.76	
vC, conflicting volume	985	639			638	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	823	368			367	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	91			100	
cM capacity (veh/h)	248	489			863	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	98	581	347			
Volume Left	55	0	0			
Volume Right	43	0	0			
cSH	317	1700	1700			
Volume to Capacity	0.31	0.34	0.20			
Queue Length 95th (m)	9.6	0.0	0.0			
Control Delay (s/veh)	21.4	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	21.4	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.0				
Intersection Capacity Utilization		100.1%		ICU Level of Service		G
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	292	0	0	0	0	402	15	73	313	0
Future Volume (vph)	156	0	292	0	0	0	0	402	15	73	313	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.93					1.00		0.96		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1313	0	1354	1563	0
Flt Permitted	0.950									0.467		
Satd. Flow (perm)	1364	0	1033	0	0	0	0	1313	0	636	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			239					4				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	163	0	304	0	0	0	0	419	16	76	326	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	0	304	0	0	0	0	435	0	76	326	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					31.8		31.8	31.8	
Total Split (%)	47.0%		47.0%					53.0%		53.0%	53.0%	
Maximum Green (s)	22.1		22.1					25.7		25.7	25.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	11.7		11.7					18.1		18.1	18.1	
Actuated g/C Ratio	0.27		0.27					0.42		0.42	0.42	
v/c Ratio	0.44		0.67					0.78		0.28	0.49	
Control Delay (s/veh)	18.0		12.4					23.4		12.3	12.5	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	18.0		12.4					23.4		12.3	12.5	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		B					C		B	B	
Approach Delay (s/veh)		14.4						23.4			12.5	
Approach LOS		B						C			B	
Queue Length 50th (m)	9.4		3.5					21.6		2.9	13.9	
Queue Length 95th (m)	25.0		23.5					#81.6		13.6	43.4	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	750		674					839		405	997	
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	0.22		0.45					0.52		0.19	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 42.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 16.8

Intersection LOS: B

Intersection Capacity Utilization 100.1%

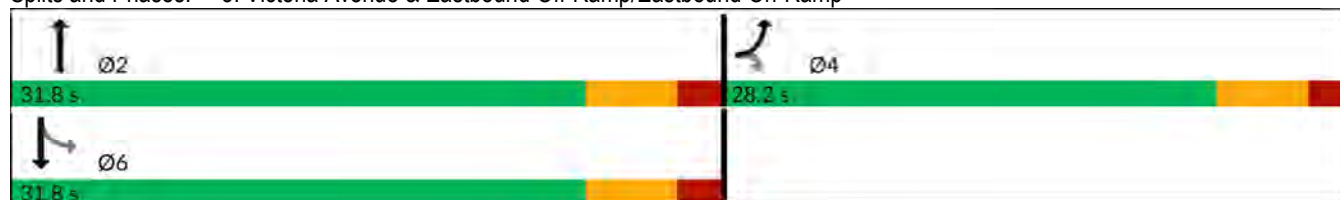
ICU Level of Service G

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	292	0	0	0	0	402	15	73	313	0
Future Volume (vph)	156	0	292	0	0	0	0	402	15	73	313	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.95					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.97	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1049					1315		1307	1563	
Flt Permitted	0.95		1.00					1.00		0.47	1.00	
Satd. Flow (perm)	1368		1049					1315		643	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	162	0	304	0	0	0	0	419	16	76	326	0
RTOR Reduction (vph)	0	0	172	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	163	0	132	0	0	0	0	433	0	76	326	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	11.7		11.7					18.1		18.1	18.1	
Effective Green, g (s)	11.7		11.7					18.1		18.1	18.1	
Actuated g/C Ratio	0.28		0.28					0.43		0.43	0.43	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	381		292					566		277	673	
v/s Ratio Prot	0.12							c0.33			0.21	
v/s Ratio Perm			c0.13							0.12		
v/c Ratio	0.43		0.45					0.76		0.27	0.48	
Uniform Delay, d1	12.4		12.5					10.1		7.7	8.6	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.3		0.5					5.6		0.2	0.2	
Delay (s)	12.7		13.0					15.7		7.9	8.8	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		12.9			0.0			15.7			8.7	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			12.5									
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			42.0									
Intersection Capacity Utilization			100.1%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	44	55	8	372	544	61
Future Volume (vph)	44	55	8	372	544	61
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.925				0.986	
Flt Protected	0.978			0.999		
Satd. Flow (prot)	1296	0	0	1165	1308	0
Flt Permitted	0.978			0.999		
Satd. Flow (perm)	1296	0	0	1165	1308	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	47	59	9	396	579	65
Shared Lane Traffic (%)						
Lane Group Flow (vph)	106	0	0	405	644	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	63.7%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			T	T	
Traffic Volume (veh/h)	44	55	8	372	544	61
Future Volume (Veh/h)	44	55	8	372	544	61
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	47	59	9	396	579	65
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.91	0.87	0.87			
vC, conflicting volume	1125	716	732			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	900	598	617			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	85	99			
cM capacity (veh/h)	252	395	772			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	106	405	644			
Volume Left	47	9	0			
Volume Right	59	0	65			
cSH	316	772	1700			
Volume to Capacity	0.34	0.01	0.38			
Queue Length 95th (m)	10.8	0.3	0.0			
Control Delay (s/veh)	22.1	0.4	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	22.1	0.4	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		63.7%		ICU Level of Service		B
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	164	216	231	285	314
Future Volume (vph)	119	164	216	231	285	314
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.85		0.85	0.90	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.509	
Satd. Flow (perm)	1322	943	1533	932	669	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		167		236		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	121	167	220	236	291	320
Shared Lane Traffic (%)						
Lane Group Flow (vph)	121	167	220	236	291	320
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	10.3	10.3	13.5	13.5	29.4	26.0
Actuated g/C Ratio	0.21	0.21	0.27	0.27	0.60	0.53
v/c Ratio	0.44	0.51	0.52	0.55	0.54	0.39

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	24.2	10.1	20.3	8.2	9.6	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	24.2	10.1	20.3	8.2	9.6	8.7
LOS	C	B	C	A	A	A
Approach Delay (s/veh)	16.0		14.0			9.1
Approach LOS	B		B			A
Queue Length 50th (m)	9.2	0.0	15.9	0.0	9.7	13.5
Queue Length 95th (m)	24.4	13.2	35.6	13.5	26.3	32.9
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	553	491	782	591	547	1222
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.34	0.28	0.40	0.53	0.26

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 49.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay (s/veh): 12.2

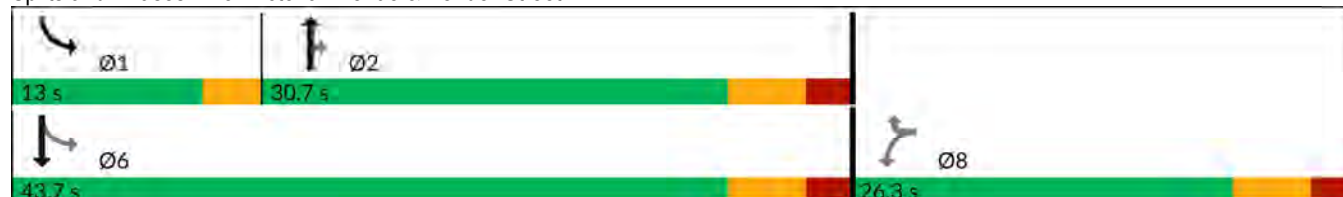
Intersection LOS: B

Intersection Capacity Utilization 70.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	164	216	231	285	314
Future Volume (vph)	119	164	216	231	285	314
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.89	1.00	0.89	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1340	986	1533	978	1337	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.51	1.00
Satd. Flow (perm)	1340	986	1533	978	716	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	121	167	220	236	291	320
RTOR Reduction (vph)	0	132	0	170	0	0
Lane Group Flow (vph)	121	35	220	66	291	320
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.3	10.3	13.6	13.6	25.9	25.9
Effective Green, g (s)	10.3	10.3	13.6	13.6	25.9	25.9
Actuated g/C Ratio	0.21	0.21	0.28	0.28	0.53	0.53
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	282	208	427	272	498	829
v/s Ratio Prot			0.14		c0.11	0.20
v/s Ratio Perm	c0.09	0.04		0.07	c0.20	
v/c Ratio	0.43	0.17	0.52	0.24	0.58	0.39
Uniform Delay, d1	16.7	15.8	14.8	13.6	7.0	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	1.2	0.5	1.8	0.4
Delay (s)	17.5	16.0	16.0	14.2	8.8	7.1
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	16.6		15.1			7.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			48.8		Sum of lost time (s)	15.6
Intersection Capacity Utilization			70.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	6	3	443	416	17
Future Volume (vph)	4	6	3	443	416	17
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919					0.850
Flt Protected	0.980					
Satd. Flow (prot)	1291	0	0	1166	1563	1106
Flt Permitted	0.980					
Satd. Flow (perm)	1291	0	0	1166	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	4	6	3	447	420	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	450	420	17
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	57.9%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	6	3	443	416	17
Future Volume (Veh/h)	4	6	3	443	416	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	4	6	3	447	420	17
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.92	0.87	0.87			
vC, conflicting volume	1077	623	640			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	711	488	507			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	293	403	737			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	10	450	420	17		
Volume Left	4	3	0	0		
Volume Right	6	0	0	17		
cSH	350	737	1700	1700		
Volume to Capacity	0.03	0.00*	0.25	0.01		
Queue Length 95th (m)	0.7	0.1	0.0	0.0		
Control Delay (s/veh)	15.6	0.1	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s/veh)	15.6	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			57.9%		ICU Level of Service	B
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	22	20	47	46	52	28	339	30	21	344	57
Future Volume (vph)	55	22	20	47	46	52	28	339	30	21	344	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.91			0.97			0.99	0.72
Frt		0.972			0.951			0.990				0.850
Flt Protected		0.972			0.984			0.997			0.997	
Satd. Flow (prot)	0	1280	0	0	1242	0	0	1366	0	0	1174	1063
Flt Permitted		0.741			0.853			0.951			0.960	
Satd. Flow (perm)	0	925	0	0	1034	0	0	1290	0	0	1121	767
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			49			9				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	58	23	21	49	48	55	29	357	32	22	362	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	152	0	0	418	0	0	384	60
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.1			11.1			20.4			20.4	20.4
Actuated g/C Ratio		0.24			0.24			0.44			0.44	0.44
v/c Ratio		0.43			0.53			0.73			0.78	0.16
Control Delay (s/veh)		20.0			19.9			19.3			24.3	3.6
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		20.0			19.9			19.3			24.3	3.6

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			C	A
Approach Delay (s/veh)		20.0			19.9			19.3			21.5	
Approach LOS		B			B			B			C	
Queue Length 50th (m)		5.5			7.2			22.4			21.6	0.0
Queue Length 95th (m)		17.8			23.1			#61.7			#71.6	4.7
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		392			453			829			718	515
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		0.26			0.34			0.50			0.53	0.12

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 46.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 20.3

Intersection LOS: C

Intersection Capacity Utilization 84.1%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	22	20	47	46	52	28	339	30	21	344	57
Future Volume (vph)	55	22	20	47	46	52	28	339	30	21	344	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.96			0.98			1.00	0.78
Flpb, ped/bikes		0.96			0.97			0.99			0.99	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1239			1217			1361			1167	834
Flt Permitted		0.74			0.85			0.95			0.96	1.00
Satd. Flow (perm)		944			1055			1299			1123	834
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	23	21	49	48	55	29	357	32	22	362	60
RTOR Reduction (vph)	0	16	0	0	37	0	0	5	0	0	0	33
Lane Group Flow (vph)	0	86	0	0	115	0	0	413	0	0	384	27
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.1			11.1			20.4			20.4	20.4
Effective Green, g (s)		11.1			11.1			20.4			20.4	20.4
Actuated g/C Ratio		0.24			0.24			0.45			0.45	0.45
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		230			257			583			504	374
v/s Ratio Prot												
v/s Ratio Perm		0.09			0.11			0.32			0.34	0.03
v/c Ratio		0.37			0.45			0.71			0.76	0.07
Uniform Delay, d1		14.3			14.5			10.1			10.5	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.7			0.9			3.7			6.4	0.1
Delay (s)		15.0			15.5			13.7			16.9	7.2
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		15.0			15.5			13.7			15.6	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		14.8										
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		45.4										
Intersection Capacity Utilization		84.1%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	802	233	31	598	7	239	20	20	6	24	22
Future Volume (vph)	38	802	233	31	598	7	239	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.966			0.998			0.990			0.942	
Flt Protected	0.950			0.950				0.959			0.994	
Satd. Flow (prot)	1381	2876	0	1381	2964	0	0	1349	0	0	1329	0
Flt Permitted	0.368			0.154				0.719			0.957	
Satd. Flow (perm)	534	2876	0	224	2964	0	0	1003	0	0	1280	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			1			5			23	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	39	827	240	32	616	7	246	21	21	6	25	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	1067	0	32	623	0	0	288	0	0	54	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.6		9.0	40.6		40.4	40.4		40.4	40.4	
Total Split (%)	10.0%	45.1%		10.0%	45.1%		44.9%	44.9%		44.9%	44.9%	
Maximum Green (s)	6.0	34.3		6.0	34.3		33.1	33.1		33.1	33.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	40.5	33.9		40.5	33.9			26.0			26.0	
Actuated g/C Ratio	0.51	0.43		0.51	0.43			0.33			0.33	
v/c Ratio	0.11	0.84		0.16	0.49			0.86			0.12	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	11.3	29.6		12.2	20.0			50.4			13.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	11.3	29.6		12.2	20.0			50.4			13.2	
LOS	B	C		B	B			D			B	
Approach Delay (s/veh)		29.0			19.6			50.4			13.2	
Approach LOS		C			B			D			B	
Queue Length 50th (m)	2.9	83.3		2.4	40.7			42.0			3.4	
Queue Length 95th (m)	7.9	#131.4		6.8	59.5			#83.3			10.8	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	341	1321		206	1335			438			569	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.11	0.81		0.16	0.47			0.66			0.09	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 78.7

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 28.6

Intersection LOS: C

Intersection Capacity Utilization 79.8%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	802	233	31	598	7	239	20	20	6	24	22
Future Volume (vph)	38	802	233	31	598	7	239	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2877		1381	2965			1339			1331	
Flt Permitted	0.37	1.00		0.15	1.00			0.72			0.96	
Satd. Flow (perm)	535	2877		223	2965			1004			1281	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	39	827	240	32	616	7	246	21	21	6	25	23
RTOR Reduction (vph)	0	28	0	0	1	0	0	3	0	0	15	0
Lane Group Flow (vph)	39	1039	0	32	622	0	0	285	0	0	39	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	37.1	33.9		37.1	33.9			26.0			26.0	
Effective Green, g (s)	37.1	33.9		37.1	33.9			26.0			26.0	
Actuated g/C Ratio	0.47	0.43		0.47	0.43			0.33			0.33	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	283	1223		150	1261			327			417	
v/s Ratio Prot	0.01	c0.36		c0.01	0.21							
v/s Ratio Perm	0.06			0.09				c0.28			0.03	
v/c Ratio	0.14	0.85		0.21	0.49			0.87			0.09	
Uniform Delay, d1	11.8	20.6		13.1	16.7			25.3			18.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	6.3		0.5	0.6			21.3			0.2	
Delay (s)	12.0	26.9		13.6	17.3			46.6			18.9	
Level of Service	B	C		B	B			D			B	
Approach Delay (s/veh)		26.4			17.1			46.6			18.9	
Approach LOS		C			B			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			26.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			79.7			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			79.8%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Future Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.933			0.998			0.987	
Flt Protected		0.984			0.995			0.999			0.988	
Satd. Flow (prot)	0	1397	0	0	1319	0	0	1429	0	0	1397	0
Flt Permitted		0.984			0.995			0.999			0.988	
Satd. Flow (perm)	0	1397	0	0	1319	0	0	1429	0	0	1397	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	29	57	6	13	57	69	3	195	3	73	201	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	0	0	139	0	0	201	0	0	303	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	57.1%					ICU Level of Service B						
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Future Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	57	6	13	57	69	3	195	3	73	201	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	92	139	201	303								
Volume Left (vph)	29	13	3	73								
Volume Right (vph)	6	69	3	29								
Hadj (s)	0.02	-0.27	-0.01	-0.01								
Departure Headway (s)	5.4	5.0	4.9	4.8								
Degree Utilization, x	0.14	0.19	0.27	0.40								
Capacity (veh/h)	595	643	689	716								
Control Delay (s/veh)	9.2	9.2	9.7	10.9								
Approach Delay (s/veh)	9.2	9.2	9.7	10.9								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay				10.1								
Level of Service				B								
Intersection Capacity Utilization				57.1%	ICU Level of Service	B						
Analysis Period (min)				15								

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	89	9	5	59	3	21	0	9	0	0	2
Future Volume (vph)	0	89	9	5	59	3	21	0	9	0	0	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.987				0.993				0.959		0.865	
Flt Protected					0.996				0.966			
Satd. Flow (prot)	0	1414	0	0	1417	0	0	1328	0	0	1240	0
Flt Permitted					0.996				0.966			
Satd. Flow (perm)	0	1414	0	0	1417	0	0	1328	0	0	1240	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	362.4				79.0				93.8		56.1	
Travel Time (s)	26.1				5.7				6.8		4.0	
Confl. Peds. (#/hr)	10	5		5	10		4		4			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	107	11	6	71	4	25	0	11	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	81	0	0	36	0	0	2	0
Sign Control	Free				Free				Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	27.1%				ICU Level of Service A							
Analysis Period (min)	15											

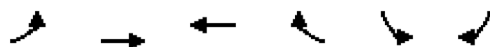
HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	89	9	5	59	3	21	0	9	0	0	2
Future Volume (Veh/h)	0	89	9	5	59	3	21	0	9	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	0	107	11	6	71	4	25	0	11	0	0	2
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	85			123			205	215	122	223	218	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	85			123			205	215	122	223	218	83
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 %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	1509			1469			742	674	927	708	671	972
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	118	81	36	2								
Volume Left	0	6	25	0								
Volume Right	11	4	11	2								
cSH	1509	1469	790	972								
Volume to Capacity	0.00	0.00*	0.05	0.00*								
Queue Length 95th (m)	0.0	0.1	1.1	0.0								
Control Delay (s/veh)	0.0	0.6	9.8	8.7								
Lane LOS		A	A	A								
Approach Delay (s/veh)	0.0	0.6	9.8	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			27.1%	ICU Level of Service				A				
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

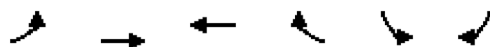
4873 and 4898 Kitchener Street TIS
Background Sat (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	92	67	1	3	1
Future Volume (vph)	7	92	67	1	3	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.973	
Flt Protected		0.996			0.962	
Satd. Flow (prot)	0	1173	1335	0	1341	0
Flt Permitted		0.996			0.962	
Satd. Flow (perm)	0	1173	1335	0	1341	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	114	83	1	4	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	123	84	0	5	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	26.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (Open)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	92	67	1	3	1
Future Volume (Veh/h)	7	92	67	1	3	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	9	114	83	1	4	1
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	95				227	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	95				227	98
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				99	100
cM capacity (veh/h)	1495				753	951
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	123	84	5			
Volume Left	9	0	4			
Volume Right	0	1	1			
cSH	1495	1700	786			
Volume to Capacity	0.00*	0.05	0.00*			
Queue Length 95th (m)	0.1	0.0	0.1			
Control Delay (s/veh)	0.6	0.0	9.6			
Lane LOS	A		A			
Approach Delay (s/veh)	0.6	0.0	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			26.1%		ICU Level of Service	
Analysis Period (min)			15		A	

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	94	0	0	63	6	3	1	0	5	0	1
Future Volume (vph)	1	94	0	0	63	6	3	1	0	5	0	1
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.988						0.981					
Flt Protected							0.964					
Satd. Flow (prot)	0	1178	0	0	1322	0	0	1381	0	0	1348	0
Flt Permitted							0.964					
Satd. Flow (perm)	0	1178	0	0	1322	0	0	1381	0	0	1348	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	37.0			57.8			32.6			36.9		
Travel Time (s)	2.7			4.2			2.3			2.7		
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	109	0	0	73	7	3	1	0	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	110	0	0	80	0	0	4	0	0	7	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.3%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	94	0	0	63	6	3	1	0	5	0	1
Future Volume (Veh/h)	1	94	0	0	63	6	3	1	0	5	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	1	109	0	0	73	7	3	1	0	6	0	1
Pedestrians		3			1			2			29	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	109			111			194	222	112	218	219	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	109			111			194	222	112	218	219	109
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 %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1451			1489			747	659	944	702	662	920
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	110	80	4	7								
Volume Left	1	0	3	6								
Volume Right	0	7	0	1								
cSH	1451	1700	723	727								
Volume to Capacity	0.00*	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.1	0.2								
Control Delay (s/veh)	0.1	0.0	10.0	10.0								
Lane LOS	A		B	B								
Approach Delay (s/veh)	0.1	0.0	10.0	10.0								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			21.3%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Appendix J

Opening Year Total Traffic Operations without Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	49	311	162	135
Future Volume (vph)	0	0	49	311	162	135
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.939	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1518	1212	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1518	1212	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	1		29			29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	57	362	188	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	57	362	345	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	49	311	162	135
Future Volume (Veh/h)	0	0	49	311	162	135
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	57	362	188	157
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	773	296	374			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	773	296	374			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	95			
cM capacity (veh/h)	352	749	1196			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	57	362	345			
Volume Left	57	0	0			
Volume Right	0	0	157			
cSH	1196	1700	1700			
Volume to Capacity	0.05	0.21	0.20			
Queue Length 95th (m)	1.1	0.0	0.0			
Control Delay (s/veh)	8.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	1.1		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			35.2%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	7	353	0	0	162
Future Volume (vph)	9	7	353	0	0	162
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50		50	
Link Distance (m)	86.2		51.0		60.3	
Travel Time (s)	7.8		3.7		4.3	
Confl. Peds. (#/hr)	2		10		10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	11	9	430	0	0	198
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	430	0	0	198
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type: Unsignalized						
Intersection Capacity Utilization 65.3%				ICU Level of Service C		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	7	353	0	0	162
Future Volume (Veh/h)	9	7	353	0	0	162
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	9	430	0	0	198
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	638	442			440	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	581	372			370	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	428	601			1114	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	430	198			
Volume Left	11	0	0			
Volume Right	9	0	0			
cSH	492	1700	1700			
Volume to Capacity	0.04	0.25	0.12			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s/veh)	12.6	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	12.6	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			65.3%	ICU Level of Service		C
Analysis Period (min)			15			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Future Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.98		
Frt			0.850					0.994				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1256	0	1381	1504	0
Flt Permitted	0.950									0.626		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1256	0	895	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			331					5				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	206	0	331	0	0	0	0	200	10	8	190	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	206	0	331	0	0	0	0	210	0	8	190	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	32.0		32.0					28.0		28.0	28.0	
Total Split (%)	53.3%		53.3%					46.7%		46.7%	46.7%	
Maximum Green (s)	25.9		25.9					21.9		21.9	21.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	10.5		10.5					10.7		10.7	10.7	
Actuated g/C Ratio	0.31		0.31					0.32		0.32	0.32	
v/c Ratio	0.48		0.59					0.53		0.03	0.40	
Control Delay (s/veh)	14.3		6.7					15.1		9.0	12.4	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	14.3		6.7					15.1		9.0	12.4	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		A	B	
Approach Delay (s/veh)		9.6						15.1			12.2	
Approach LOS		A						B			B	
Queue Length 50th (m)	8.0		0.0					8.3		0.3	7.3	
Queue Length 95th (m)	23.6		11.1					25.2		2.1	21.7	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1094		918					843		599	1007	
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	0.19		0.36					0.25		0.01	0.19	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 33.8

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 11.4

Intersection LOS: B

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Future Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1256		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.63	1.00	
Satd. Flow (perm)	1381		1072					1256		903	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	206	0	331	0	0	0	0	200	10	8	190	0
RTOR Reduction (vph)	0	0	227	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	206	0	104	0	0	0	0	207	0	8	190	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	10.5		10.5					10.7		10.7	10.7	
Effective Green, g (s)	10.5		10.5					10.7		10.7	10.7	
Actuated g/C Ratio	0.31		0.31					0.32		0.32	0.32	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	434		337					402		289	481	
v/s Ratio Prot	c0.15							c0.16			0.13	
v/s Ratio Perm			0.10							0.01		
v/c Ratio	0.47		0.31					0.51		0.03	0.40	
Uniform Delay, d1	9.2		8.7					9.2		7.8	8.8	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.4		0.2					0.5		0.0	0.2	
Delay (s)	9.6		8.9					9.8		7.8	9.1	
Level of Service	A		A					A		A	A	
Approach Delay (s/veh)		9.2			0.0			9.8			9.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			9.3									
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			33.4							12.2		
Intersection Capacity Utilization			65.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	35	20	133	378	75
Future Volume (vph)	50	35	20	133	378	75
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.944				0.978	
Flt Protected	0.971			0.993		
Satd. Flow (prot)	1314	0	0	1070	1277	0
Flt Permitted	0.971			0.993		
Satd. Flow (perm)	1314	0	0	1070	1277	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	60	42	24	158	450	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	182	539	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	54.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	50	35	20	133	378	75
Future Volume (Veh/h)	50	35	20	133	378	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	60	42	24	158	450	89
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	720	525	558			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	675	469	505			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	84	92	97			
cM capacity (veh/h)	381	549	884			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	102	182	539			
Volume Left	60	24	0			
Volume Right	42	0	89			
cSH	436	884	1700			
Volume to Capacity	0.23	0.03	0.32			
Queue Length 95th (m)	6.7	0.6	0.0			
Control Delay (s/veh)	15.7	1.5	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	15.7	1.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		54.1%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	39	114	81	271	141
Future Volume (vph)	43	39	114	81	271	141
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.517	
Satd. Flow (perm)	1310	1069	1449	1027	737	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		45		93		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	49	45	131	93	311	162
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	45	131	93	311	162
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.2	8.2	9.9	9.9	25.6	22.3
Actuated g/C Ratio	0.19	0.19	0.23	0.23	0.59	0.52
v/c Ratio	0.20	0.19	0.39	0.30	0.54	0.21

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	18.1	8.7	18.1	7.0	8.5	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	18.1	8.7	18.1	7.0	8.5	6.4
LOS	B	A	B	A	A	A
Approach Delay (s/veh)	13.6		13.5			7.8
Approach LOS	B		B			A
Queue Length 50th (m)	3.2	0.0	8.9	0.0	9.6	5.8
Queue Length 95th (m)	10.3	5.8	19.9	7.5	19.8	12.8
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	609	521	823	623	584	1297
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.09	0.16	0.15	0.53	0.12

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 43.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay (s/veh): 10.1

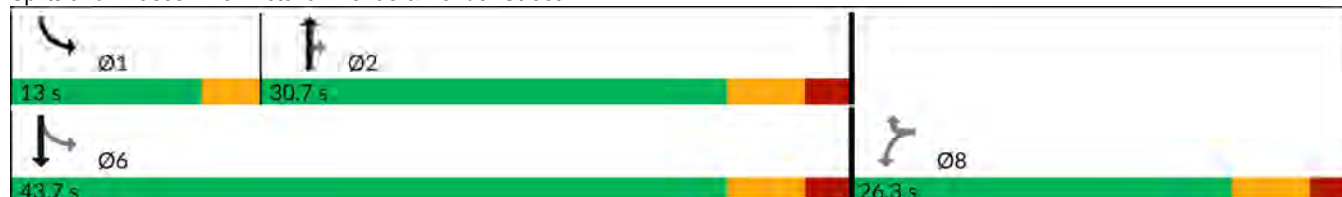
Intersection LOS: B

Intersection Capacity Utilization 45.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	39	114	81	271	141
Future Volume (vph)	43	39	114	81	271	141
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1074	1449	1032	1363	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1312	1074	1449	1032	741	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	49	45	131	93	311	162
RTOR Reduction (vph)	0	36	0	72	0	0
Lane Group Flow (vph)	49	9	131	21	311	162
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.2	8.2	9.9	9.9	22.3	22.3
Effective Green, g (s)	8.2	8.2	9.9	9.9	22.3	22.3
Actuated g/C Ratio	0.19	0.19	0.23	0.23	0.52	0.52
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	249	204	332	237	519	770
v/s Ratio Prot			0.09		0.13	0.11
v/s Ratio Perm	0.04	0.01		0.02	0.18	
v/c Ratio	0.20	0.04	0.39	0.09	0.60	0.21
Uniform Delay, d1	14.7	14.2	14.1	13.1	6.7	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.9	0.2	1.9	0.2
Delay (s)	15.0	14.3	15.0	13.3	8.5	5.8
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	14.6		14.3			7.6
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			10.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			43.1		Sum of lost time (s)	15.6
Intersection Capacity Utilization			45.8%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	11	8	192	182	2
Future Volume (vph)	3	11	8	192	182	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.897					0.850
Flt Protected	0.988			0.998		
Satd. Flow (prot)	1171	0	0	1092	1504	1106
Flt Permitted	0.988			0.998		
Satd. Flow (perm)	1171	0	0	1092	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	13	10	229	217	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	239	217	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	3	11	8	192	182	2		
Future Volume (Veh/h)	3	11	8	192	182	2		
Sign Control	Stop			Free	Free			
Grade	0%			0%	0%			
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84		
Hourly flow rate (vph)	4	13	10	229	217	2		
Pedestrians	22			1				
Lane Width (m)	3.6			3.6				
Walking Speed (m/s)	1.0			1.0				
Percent Blockage	2			0				
Right turn flare (veh)								
Median type				None	None			
Median storage veh								
Upstream signal (m)				75	59			
pX, platoon unblocked	0.97	0.98	0.98					
vC, conflicting volume	489	239	241					
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	412	210	212					
tC, single (s)	6.4	6.3	4.1					
tC, 2 stage (s)								
tF (s)	3.5	3.4	2.2					
p0 queue free %	99	98	99					
cM capacity (veh/h)	567	772	1310					
Direction, Lane #	EB 1	NB 1	SB 1	SB 2				
Volume Total	17	239	217	2				
Volume Left	4	10	0	0				
Volume Right	13	0	0	2				
cSH	712	1310	1700	1700				
Volume to Capacity	0.02	0.00*	0.13	0.00*				
Queue Length 95th (m)	0.5	0.2	0.0	0.0				
Control Delay (s/veh)	10.2	0.4	0.0	0.0				
Lane LOS	B	A						
Approach Delay (s/veh)	10.2	0.4	0.0					
Approach LOS	B							
Intersection Summary								
Average Delay	0.6							
Intersection Capacity Utilization	36.8%			ICU Level of Service	A			
Analysis Period (min)	15							

* Value less than 0.01.

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Future Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.97			1.00			1.00	0.95
Frt		0.966			0.950			0.993				0.850
Flt Protected		0.976			0.980						0.997	
Satd. Flow (prot)	0	1196	0	0	1254	0	0	1330	0	0	1122	851
Flt Permitted		0.816			0.852			0.996			0.965	
Satd. Flow (perm)	0	992	0	0	1077	0	0	1324	0	0	1083	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			19			6				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	16	8	8	21	11	19	2	201	11	14	200	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	51	0	0	214	0	0	214	12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.3			8.3			12.7			12.7	12.7
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
v/c Ratio		0.13			0.19			0.44			0.55	0.04
Control Delay (s/veh)		12.1			11.3			11.2			14.5	0.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		12.1			11.3			11.2			14.5	0.2

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			B	A
Approach Delay (s/veh)		12.1			11.3			11.2			13.8	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		1.0			1.3			8.7			9.2	0.0
Queue Length 95th (m)		5.8			7.5			18.8			20.8	0.0
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		528			578			1064			869	660
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		0.06			0.09			0.20			0.25	0.02

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 35

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay (s/veh): 12.4

Intersection LOS: B

Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Future Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		1.00			0.99			1.00			1.00	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1195			1248			1331			1120	817
Flt Permitted		0.82			0.85			1.00			0.96	1.00
Satd. Flow (perm)		999			1084			1326			1084	817
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	16	8	8	21	11	19	2	201	11	14	200	12
RTOR Reduction (vph)	0	6	0	0	14	0	0	4	0	0	0	8
Lane Group Flow (vph)	0	26	0	0	37	0	0	210	0	0	214	4
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		8.3			8.3			12.7			12.7	12.7
Effective Green, g (s)		8.3			8.3			12.7			12.7	12.7
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		237			257			482			394	297
v/s Ratio Prot												
v/s Ratio Perm		0.03			0.03			0.16			0.20	0.01
v/c Ratio		0.11			0.14			0.44			0.54	0.01
Uniform Delay, d1		10.4			10.5			8.4			8.8	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.2			0.5			1.2	0.0
Delay (s)		10.6			10.7			8.9			10.0	7.1
Level of Service		B			B			A			B	A
Approach Delay (s/veh)		10.6			10.7			8.9			9.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		9.6										
HCM 2000 Volume to Capacity ratio		0.38										
Actuated Cycle Length (s)		34.9										
Intersection Capacity Utilization		60.2%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Future Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.981			0.999			0.993			0.926	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1316	2914	0	1381	2938	0	0	1341	0	0	1309	0
Flt Permitted	0.553			0.297				0.729			0.983	
Satd. Flow (perm)	765	2914	0	432	2938	0	0	1011	0	0	1289	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20						3			22	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	26	698	101	4	283	1	190	21	11	2	16	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	799	0	4	284	0	0	222	0	0	40	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.0		9.0	40.0		41.0	41.0		41.0	41.0	
Total Split (%)	10.0%	44.4%		10.0%	44.4%		45.6%	45.6%		45.6%	45.6%	
Maximum Green (s)	6.0	33.7		6.0	33.7		33.7	33.7		33.7	33.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	30.4	26.0		29.9	24.4			19.2			19.2	
Actuated g/C Ratio	0.50	0.42		0.49	0.40			0.31			0.31	
v/c Ratio	0.06	0.64		0.01	0.24			0.69			0.10	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	9.8	17.9		9.8	15.3			32.2			11.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	9.8	17.9		9.8	15.3			32.2			11.0	
LOS	A	B		A	B			C			B	
Approach Delay (s/veh)		17.6			15.2			32.2			11.0	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	1.3	31.2		0.2	9.2			19.7			1.3	
Queue Length 95th (m)	6.2	80.8		1.9	26.9			52.9			8.1	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	438	1743		311	1749			603			776	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.46		0.01	0.16			0.37			0.05	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 61.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay (s/veh): 19.3

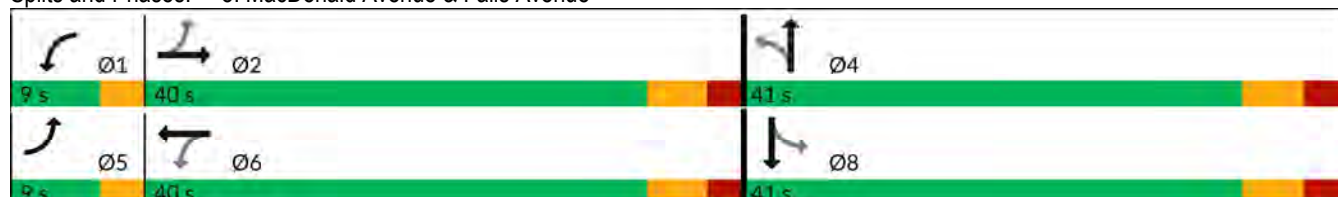
Intersection LOS: B

Intersection Capacity Utilization 60.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis 8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Future Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2914		1381	2940			1334			1310	
Flt Permitted	0.55	1.00		0.30	1.00			0.73			0.98	
Satd. Flow (perm)	766	2914		432	2940			1013			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	698	101	4	283	1	190	21	11	2	16	22
RTOR Reduction (vph)	0	12	0	0	0	0	0	2	0	0	15	0
Lane Group Flow (vph)	26	787	0	4	284	0	0	220	0	0	25	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	27.9	26.0		25.7	24.9			19.2			19.2	
Effective Green, g (s)	27.9	26.0		25.7	24.9			19.2			19.2	
Actuated g/C Ratio	0.45	0.42		0.41	0.40			0.31			0.31	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	358	1210		189	1169			310			395	
v/s Ratio Prot	c0.00	c0.27		0.00	0.10							
v/s Ratio Perm	0.03			0.01				c0.22			0.02	
v/c Ratio	0.07	0.65		0.02	0.24			0.71			0.06	
Uniform Delay, d1	9.8	14.7		11.0	12.6			19.2			15.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.7		0.0	0.2			6.7			0.1	
Delay (s)	9.9	16.4		11.1	12.8			26.0			15.5	
Level of Service	A	B		B	B			C			B	
Approach Delay (s/veh)		16.2			12.8			26.0			15.5	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			17.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			62.6			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			60.0%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Future Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.907			0.995			0.993	
Flt Protected		0.995			0.997						0.984	
Satd. Flow (prot)	0	1374	0	0	1225	0	0	1386	0	0	1383	0
Flt Permitted		0.995			0.997						0.984	
Satd. Flow (perm)	0	1374	0	0	1225	0	0	1386	0	0	1383	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	7	59	7	6	26	71	1	170	6	44	85	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	103	0	0	177	0	0	136	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	39.0%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Future Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	7	59	7	6	26	71	1	170	6	44	85	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	73	103	177	136								
Volume Left (vph)	7	6	1	44								
Volume Right (vph)	7	71	6	7								
Hadj (s)	0.00	-0.30	0.03	0.06								
Departure Headway (s)	4.8	4.4	4.5	4.6								
Degree Utilization, x	0.10	0.13	0.22	0.17								
Capacity (veh/h)	694	748	761	742								
Control Delay (s/veh)	8.3	8.1	8.8	8.5								
Approach Delay (s/veh)	8.3	8.1	8.8	8.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.5									
Level of Service			A									
Intersection Capacity Utilization			39.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	62	8	1	56	3	5	3	6	42	3	2
Future Volume (vph)	3	62	8	1	56	3	5	3	6	42	3	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.993			0.943			0.993	
Flt Protected		0.998			0.999			0.982			0.958	
Satd. Flow (prot)	0	1409	0	0	1330	0	0	1327	0	0	1363	0
Flt Permitted		0.998			0.999			0.982			0.958	
Satd. Flow (perm)	0	1409	0	0	1330	0	0	1327	0	0	1363	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	3		6	6		3			2	2		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	82	11	1	74	4	7	4	8	55	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	97	0	0	79	0	0	19	0	0	62	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.6%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

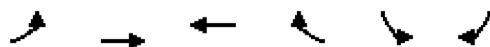
4873 and 4898 Kitchener Street TIS
Total AM (Open)

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	3	62	8	1	56	3	5	3	6	42	3	2		
Future Volume (Veh/h)	3	62	8	1	56	3	5	3	6	42	3	2		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76		
Hourly flow rate (vph)	4	82	11	1	74	4	7	4	8	55	4	3		
Pedestrians					2		6				3			
Lane Width (m)					3.6		3.6				3.6			
Walking Speed (m/s)					1.0		1.0				1.0			
Percent Blockage					0		1				0			
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	81				99				185	185	96	189	188	79
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	81				99				185	185	96	189	188	79
tC, single (s)	4.1				5.1				7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)														
tF (s)	2.2				3.1				3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100				100				99	99	99	93	99	100
cM capacity (veh/h)	1525				1047				763	704	959	755	701	984
Direction, Lane #	EB 1	WB 1	NB 1	SB 1										
Volume Total	97	79	19	62										
Volume Left	4	1	7	55										
Volume Right	11	4	8	3										
cSH	1525	1047	819	760										
Volume to Capacity	0.00*	0.00*	0.02	0.08										
Queue Length 95th (m)	0.1	0.0	0.5	2.0										
Control Delay (s/veh)	0.3	0.1	9.5	10.2										
Lane LOS	A	A	A	B										
Approach Delay (s/veh)	0.3	0.1	9.5	10.2										
Approach LOS				A	B									
Intersection Summary														
Average Delay				3.3										
Intersection Capacity Utilization				22.6%	ICU Level of Service			A						
Analysis Period (min)				15										

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	52	68	57	26	13	12
Future Volume (vph)	52	68	57	26	13	12
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.957		0.936	
Flt Protected		0.979			0.974	
Satd. Flow (prot)	0	1153	1230	0	888	0
Flt Permitted		0.979			0.974	
Satd. Flow (perm)	0	1153	1230	0	888	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	71	93	78	36	18	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	164	114	0	34	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 27.7%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	68	57	26	13	12
Future Volume (Veh/h)	52	68	57	26	13	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	71	93	78	36	18	16
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	118				335	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118				335	102
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	95				97	98
cM capacity (veh/h)	1477				630	737
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	164	114	34			
Volume Left	71	0	18			
Volume Right	0	36	16			
cSH	1477	1700	676			
Volume to Capacity	0.05	0.07	0.05			
Queue Length 95th (m)	1.1	0.0	1.2			
Control Delay (s/veh)	3.5	0.0	10.6			
Lane LOS	A		B			
Approach Delay (s/veh)	3.5	0.0	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		27.7%	ICU Level of Service	A		
Analysis Period (min)		15				

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	75	0	0	75	20	1	0	0	10	0	7
Future Volume (vph)	6	75	0	0	75	20	1	0	0	10	0	7
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.972						0.944					
Flt Protected	0.996						0.950					
Satd. Flow (prot)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Flt Permitted	0.996						0.950					
Satd. Flow (perm)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	3						3					
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	109	0	0	109	29	1	0	0	14	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	138	0	0	1	0	0	24	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.2%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	6	75	0	0	75	20	1	0	0	10	0	7	
Future Volume (Veh/h)	6	75	0	0	75	20	1	0	0	10	0	7	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	
Hourly flow rate (vph)	9	109	0	0	109	29	1	0	0	14	0	10	
Pedestrians						2							3
Lane Width (m)						3.6							3.6
Walking Speed (m/s)						1.0							1.0
Percent Blockage						0							0
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	141			109			261	268	111	256	254	127	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	141			109			261	268	111	256	254	127	
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			100			100	100	100	98	100	99	
cM capacity (veh/h)	1450			1494			684	636	946	693	647	926	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	118	138	1	24									
Volume Left	9	0	1	14									
Volume Right	0	29	0	10									
cSH	1450	1700	684	775									
Volume to Capacity	0.00*	0.08	0.00*	0.03									
Queue Length 95th (m)	0.1	0.0	0.0	0.7									
Control Delay (s/veh)	0.6	0.0	10.3	9.8									
Lane LOS	A		B	A									
Approach Delay (s/veh)	0.6	0.0	10.3	9.8									
Approach LOS			B	A									
Intersection Summary													
Average Delay				1.1									
Intersection Capacity Utilization				24.2%	ICU Level of Service				A				
Analysis Period (min)				15									
* Value less than 0.01.													

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	196	531	374	258
Future Volume (vph)	0	0	196	531	374	258
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.945	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1563	1240	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1563	1240	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	1		58			58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	206	559	394	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	206	559	666	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	80.0%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	196	531	374	258
Future Volume (Veh/h)	0	0	196	531	374	258
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	206	559	394	272
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1559	589	724			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1559	589	724			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	77			
cM capacity (veh/h)	96	511	888			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	206	559	666			
Volume Left	206	0	0			
Volume Right	0	0	272			
cSH	888	1700	1700			
Volume to Capacity	0.23	0.33	0.39			
Queue Length 95th (m)	6.7	0.0	0.0			
Control Delay (s/veh)	10.3	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.8		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			80.0%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	45	682	0	0	374
Future Volume (vph)	48	45	682	0	0	374
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	52	48	733	0	0	402
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	0	733	0	0	402
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	105.0%			ICU Level of Service G		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	48	45	682	0	0	374
Future Volume (Veh/h)	48	45	682	0	0	374
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	52	48	733	0	0	402
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.66	0.66			0.66	
vC, conflicting volume	1169	769			766	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	999	394			389	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	89			100	
cM capacity (veh/h)	174	420			754	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	100	733	402			
Volume Left	52	0	0			
Volume Right	48	0	0			
cSH	242	1700	1700			
Volume to Capacity	0.41	0.43	0.24			
Queue Length 95th (m)	14.3	0.0	0.0			
Control Delay (s/veh)	30.0	0.0	0.0			
Lane LOS	D					
Approach Delay (s/veh)	30.0	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization		105.0%		ICU Level of Service		G
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Future Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.98		
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1304	0	1354	1563	0
Flt Permitted	0.950									0.359		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1304	0	502	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			272					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	272	0	0	0	0	562	17	58	401	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	272	0	0	0	0	579	0	58	401	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					41.8		41.8	41.8	
Total Split (%)	40.3%		40.3%					59.7%		59.7%	59.7%	
Maximum Green (s)	22.1		22.1					35.7		35.7	35.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	12.3		12.3					28.1		28.1	28.1	
Actuated g/C Ratio	0.23		0.23					0.53		0.53	0.53	
v/c Ratio	0.56		0.59					0.84		0.22	0.49	
Control Delay (s/veh)	27.6		8.9					24.8		9.8	10.6	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	27.6		8.9					24.8		9.8	10.6	

No Background Development
PTSL (250550)

Synchro 12 Report
Page 5

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		A					C		A	B	
Approach Delay (s/veh)		16.3						24.8			10.5	
Approach LOS		B						C			B	
Queue Length 50th (m)	16.2		0.0					40.1		2.5	20.8	
Queue Length 95th (m)	34.9		16.3					#115.7		9.8	48.3	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	596		630					919		353	1101	
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	0.30		0.43					0.63		0.16	0.36	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 53.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 17.8

Intersection LOS: B

Intersection Capacity Utilization 105.0%

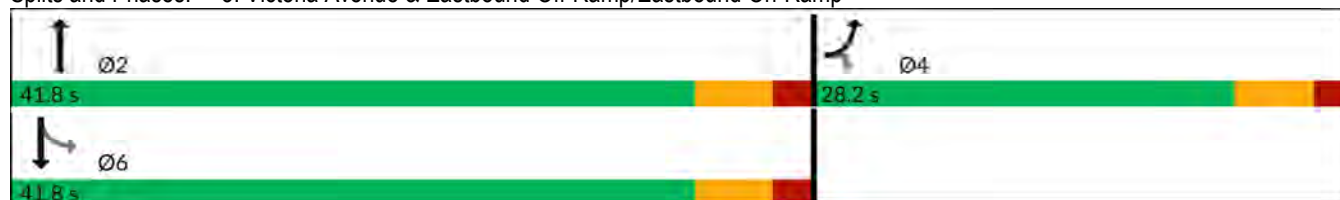
ICU Level of Service G

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Future Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1305		1330	1563	
Flt Permitted	0.95		1.00					1.00		0.36	1.00	
Satd. Flow (perm)	1368		1095					1305		502	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	0	272	0	0	0	0	562	17	58	401	0
RTOR Reduction (vph)	0	0	208	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	179	0	64	0	0	0	0	578	0	58	401	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	12.3		12.3					28.1		28.1	28.1	
Effective Green, g (s)	12.3		12.3					28.1		28.1	28.1	
Actuated g/C Ratio	0.23		0.23					0.53		0.53	0.53	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	319		256					697		268	834	
v/s Ratio Prot	c0.13							c0.44			0.26	
v/s Ratio Perm			0.06							0.12		
v/c Ratio	0.56		0.25					0.83		0.22	0.48	
Uniform Delay, d1	17.8		16.4					10.2		6.5	7.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	1.4		0.2					7.7		0.2	0.2	
Delay (s)	19.2		16.6					18.0		6.6	7.9	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		17.6			0.0			18.0			7.7	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.7					HCM 2000 Level of Service		B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			52.6					Sum of lost time (s)		12.2		
Intersection Capacity Utilization			105.0%					ICU Level of Service		G		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	126	83	87	406	408	211
Future Volume (vph)	126	83	87	406	408	211
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.946				0.954	
Flt Protected	0.971			0.991		
Satd. Flow (prot)	1316	0	0	1158	1268	0
Flt Permitted	0.971			0.991		
Satd. Flow (perm)	1316	0	0	1158	1268	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	134	88	93	432	434	224
Shared Lane Traffic (%)						
Lane Group Flow (vph)	222	0	0	525	658	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	118.4%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	126	83	87	406	408	211
Future Volume (Veh/h)	126	83	87	406	408	211
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	134	88	93	432	434	224
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.92	0.85	0.85			
vC, conflicting volume	1210	596	704			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	833	443	569			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	83	89			
cM capacity (veh/h)	267	503	827			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	222	525	658			
Volume Left	134	93	0			
Volume Right	88	0	224			
cSH	328	827	1700			
Volume to Capacity	0.68	0.11	0.39			
Queue Length 95th (m)	34.9	2.8	0.0			
Control Delay (s/veh)	36.1	3.0	0.0			
Lane LOS	E	A				
Approach Delay (s/veh)	36.1	3.0	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization		118.4%		ICU Level of Service		H
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	184	308	137	193	298
Future Volume (vph)	113	184	308	137	193	298
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.97	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.440	
Satd. Flow (perm)	1339	1063	1563	1032	614	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		194		144		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	119	194	324	144	203	314
Shared Lane Traffic (%)						
Lane Group Flow (vph)	119	194	324	144	203	314
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	10.4	10.4	16.5	16.5	31.6	28.2
Actuated g/C Ratio	0.20	0.20	0.32	0.32	0.61	0.55
v/c Ratio	0.44	0.53	0.65	0.34	0.41	0.37

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	25.7	9.8	22.3	5.5	7.4	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.7	9.8	22.3	5.5	7.4	8.2
LOS	C	A	C	A	A	A
Approach Delay (s/veh)	15.8		17.1			7.9
Approach LOS	B		B			A
Queue Length 50th (m)	9.6	0.0	24.1	0.0	6.5	13.4
Queue Length 95th (m)	25.1	14.3	52.3	9.7	17.6	31.6
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	536	542	763	577	526	1170
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.36	0.42	0.25	0.39	0.27

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 51.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 13.1

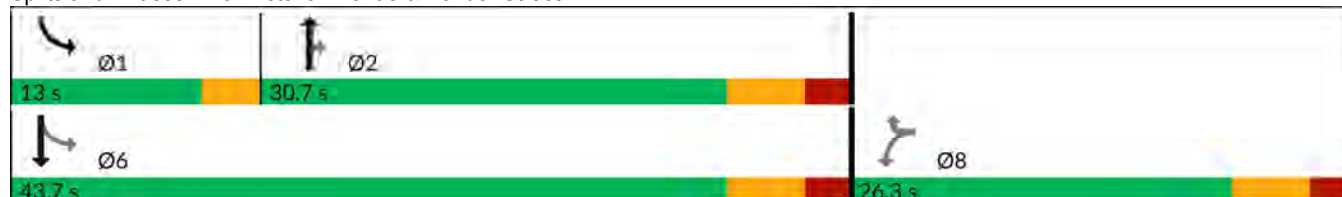
Intersection LOS: B

Intersection Capacity Utilization 58.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	184	308	137	193	298
Future Volume (vph)	113	184	308	137	193	298
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1351	1069	1563	1048	1354	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.44	1.00
Satd. Flow (perm)	1351	1069	1563	1048	627	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	194	324	144	203	314
RTOR Reduction (vph)	0	155	0	98	0	0
Lane Group Flow (vph)	119	39	324	46	203	314
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.4	10.4	16.5	16.5	28.1	28.1
Effective Green, g (s)	10.4	10.4	16.5	16.5	28.1	28.1
Actuated g/C Ratio	0.20	0.20	0.32	0.32	0.55	0.55
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	274	217	504	338	467	859
v/s Ratio Prot			c0.21		c0.07	0.20
v/s Ratio Perm	c0.09	0.04		0.04	0.17	
v/c Ratio	0.43	0.18	0.64	0.14	0.43	0.37
Uniform Delay, d1	17.8	16.8	14.8	12.3	6.3	6.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	2.9	0.2	0.7	0.3
Delay (s)	18.6	17.1	17.7	12.5	7.0	6.8
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	17.7		16.1			6.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			51.1		Sum of lost time (s)	15.6
Intersection Capacity Utilization			58.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	19	24	439	394	18
Future Volume (vph)	6	19	24	439	394	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.896					0.850
Flt Protected	0.989			0.997		
Satd. Flow (prot)	1270	0	0	1163	1563	1106
Flt Permitted	0.989			0.997		
Satd. Flow (perm)	1270	0	0	1163	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	6	20	25	457	410	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	0	0	482	410	19
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	77.7%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	19	24	439	394	18
Future Volume (Veh/h)	6	19	24	439	394	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	6	20	25	457	410	19
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.85	0.87	0.87			
vC, conflicting volume	1000	493	512			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	577	347	369			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	96	97			
cM capacity (veh/h)	366	561	962			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	26	482	410	19		
Volume Left	6	25	0	0		
Volume Right	20	0	0	19		
cSH	500	962	1700	1700		
Volume to Capacity	0.05	0.03	0.24	0.01		
Queue Length 95th (m)	1.2	0.6	0.0	0.0		
Control Delay (s/veh)	12.6	0.8	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	12.6	0.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay				0.7		
Intersection Capacity Utilization				77.7%	ICU Level of Service	D
Analysis Period (min)				15		

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Future Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.93			0.98			1.00	0.80
Frt		0.975			0.962			0.989				0.850
Flt Protected		0.973			0.980			0.999			0.998	
Satd. Flow (prot)	0	1282	0	0	1277	0	0	1381	0	0	1165	1024
Flt Permitted		0.751			0.839			0.983			0.967	
Satd. Flow (perm)	0	945	0	0	1048	0	0	1355	0	0	1124	818
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			34			10				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	39	17	13	54	43	38	13	422	40	18	381	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	135	0	0	475	0	0	399	46
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		10.9			10.9			21.4			21.4	21.4
Actuated g/C Ratio		0.23			0.23			0.46			0.46	0.46
v/c Ratio		0.30			0.50			0.76			0.78	0.11
Control Delay (s/veh)		18.0			20.8			20.3			23.8	2.4
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		18.0			20.8			20.3			23.8	2.4

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			C			C			C	A
Approach Delay (s/veh)		18.0			20.8			20.3			21.6	
Approach LOS		B			C			C			C	
Queue Length 50th (m)		3.9			7.4			26.5			23.1	0.0
Queue Length 95th (m)		12.9			21.6			#81.1			#74.1	3.1
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		387			441			853			705	538
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		0.18			0.31			0.56			0.57	0.09

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 46.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 20.7

Intersection LOS: C

Intersection Capacity Utilization 83.7%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Future Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.98			0.97			0.99			1.00	0.84
Flpb, ped/bikes		0.97			0.97			1.00			1.00	1.00
Frt		0.97			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1243			1245			1382			1161	861
Flt Permitted		0.75			0.84			0.98			0.97	1.00
Satd. Flow (perm)		959			1065			1361			1125	861
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	39	17	13	54	43	38	13	422	40	18	381	46
RTOR Reduction (vph)	0	10	0	0	26	0	0	5	0	0	0	25
Lane Group Flow (vph)	0	59	0	0	109	0	0	470	0	0	399	21
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		10.9			10.9			21.4			21.4	21.4
Effective Green, g (s)		10.9			10.9			21.4			21.4	21.4
Actuated g/C Ratio		0.24			0.24			0.46			0.46	0.46
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		226			251			630			521	398
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.10			0.35			0.35	0.02
v/c Ratio		0.26			0.43			0.75			0.77	0.05
Uniform Delay, d1		14.4			15.0			10.2			10.3	6.8
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.5			0.9			4.5			6.4	0.0
Delay (s)		14.8			15.9			14.7			16.7	6.9
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		14.8			15.9			14.7			15.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			15.2									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			46.2									
Intersection Capacity Utilization			83.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Future Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.962			0.998			0.991			0.936	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1381	2858	0	1381	2964	0	0	1337	0	0	1295	0
Flt Permitted	0.228			0.163				0.719			0.987	
Satd. Flow (perm)	331	2858	0	237	2964	0	0	996	0	0	1281	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56			2			4			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	55	728	244	40	776	13	327	30	24	2	26	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	972	0	40	789	0	0	381	0	0	53	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	38.0		9.0	38.0		43.0	43.0		43.0	43.0	
Total Split (%)	10.0%	42.2%		10.0%	42.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	6.0	31.7		6.0	31.7		35.7	35.7		35.7	35.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	39.6	32.9		39.0	31.1			34.5			34.5	
Actuated g/C Ratio	0.46	0.38		0.45	0.36			0.40			0.40	
v/c Ratio	0.24	0.87		0.21	0.74			0.95			0.10	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	15.2	34.3		15.0	29.7			62.5			11.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	15.2	34.3		15.0	29.7			62.5			11.3	
LOS	B	C		B	C			E			B	
Approach Delay (s/veh)		33.3			29.0			62.5			11.3	
Approach LOS		C			C			E			B	
Queue Length 50th (m)	4.8	79.8		3.4	61.9			61.4			2.9	
Queue Length 95th (m)	10.9	#119.5		8.5	83.6			#118.0			9.9	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	225	1140		187	1099			417			549	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.24	0.85		0.21	0.72			0.91			0.10	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 86.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay (s/veh): 36.1

Intersection LOS: D

Intersection Capacity Utilization 83.7%

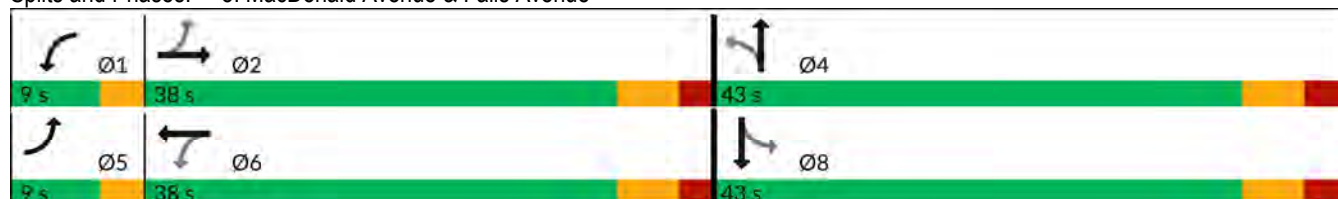
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Future Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.96		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2859		1381	2962			1329			1296	
Flt Permitted	0.23	1.00		0.16	1.00			0.72			0.99	
Satd. Flow (perm)	332	2859		237	2962			997			1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	55	728	244	40	776	13	327	30	24	2	26	25
RTOR Reduction (vph)	0	35	0	0	1	0	0	2	0	0	15	0
Lane Group Flow (vph)	55	937	0	40	788	0	0	379	0	0	38	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	37.4	32.8		35.0	31.6			34.5			34.5	
Effective Green, g (s)	37.4	32.8		35.0	31.6			34.5			34.5	
Actuated g/C Ratio	0.43	0.38		0.40	0.36			0.40			0.40	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	197	1074		139	1072			394			506	
v/s Ratio Prot	c0.01	c0.33		0.01	0.27							
v/s Ratio Perm	0.10			0.10				c0.38			0.03	
v/c Ratio	0.28	0.87		0.29	0.73			0.96			0.07	
Uniform Delay, d1	15.7	25.3		17.4	24.2			25.7			16.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	8.6		0.8	3.2			35.1			0.1	
Delay (s)	16.3	33.9		18.2	27.4			60.8			16.6	
Level of Service	B	C		B	C			E			B	
Approach Delay (s/veh)		33.0			27.0			60.8			16.6	
Approach LOS		C			C			E			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			35.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			87.3			Sum of lost time (s)				16.6		
Intersection Capacity Utilization			83.7%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Future Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.986			0.915			0.988			0.992	
Flt Protected		0.986			0.997			0.999			0.981	
Satd. Flow (prot)	0	1393	0	0	1307	0	0	1378	0	0	1387	0
Flt Permitted		0.986			0.997			0.999			0.981	
Satd. Flow (perm)	0	1393	0	0	1307	0	0	1378	0	0	1387	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	26	55	9	14	68	138	5	213	22	121	167	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	90	0	0	220	0	0	240	0	0	307	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.7%						ICU Level of Service B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Future Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	26	55	9	14	68	138	5	213	22	121	167	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	90	220	240	307								
Volume Left (vph)	26	14	5	121								
Volume Right (vph)	9	138	22	19								
Hadj (s)	0.00	-0.36	-0.01	0.05								
Departure Headway (s)	5.7	5.1	5.2	5.2								
Degree Utilization, x	0.14	0.31	0.35	0.44								
Capacity (veh/h)	547	635	635	657								
Control Delay (s/veh)	9.7	10.5	11.0	12.2								
Approach Delay (s/veh)	9.7	10.5	11.0	12.2								
Approach LOS	A	B	B	B								
Intersection Summary												
Delay				11.1								
Level of Service				B								
Intersection Capacity Utilization				63.7%	ICU Level of Service	B						
Analysis Period (min)				15								

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	146	16	2	141	10	5	16	5	46	12	10
Future Volume (vph)	10	146	16	2	141	10	5	16	5	46	12	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.991			0.974			0.980	
Flt Protected		0.997			0.999			0.990			0.967	
Satd. Flow (prot)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Flt Permitted		0.997			0.999			0.990			0.967	
Satd. Flow (perm)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	12	172	19	2	166	12	6	19	6	54	14	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	203	0	0	180	0	0	31	0	0	80	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	38.0%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

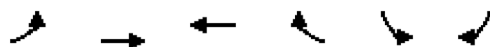
4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	146	16	2	141	10	5	16	5	46	12	10
Future Volume (Veh/h)	10	146	16	2	141	10	5	16	5	46	12	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	172	19	2	166	12	6	19	6	54	14	12
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	180			192			404	391	184	400	394	176
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			192			404	391	184	400	394	176
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			100			99	96	99	90	97	99
cM capacity (veh/h)	1405			1392			535	541	862	538	539	869
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	203	180	31	80								
Volume Left	12	2	6	54								
Volume Right	19	12	6	12								
cSH	1405	1392	582	571								
Volume to Capacity	0.00*	0.00*	0.05	0.14								
Queue Length 95th (m)	0.2	0.0	1.3	3.6								
Control Delay (s/veh)	0.5	0.1	11.5	12.3								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.5	0.1	11.5	12.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			38.0%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	84	120	123	109	61	38
Future Volume (vph)	84	120	123	109	61	38
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.937		0.948	
Flt Protected		0.980			0.970	
Satd. Flow (prot)	0	1154	1254	0	1318	0
Flt Permitted		0.980			0.970	
Satd. Flow (perm)	0	1154	1254	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	94	135	138	122	69	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	229	260	0	112	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 54.2% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	120	123	109	61	38
Future Volume (Veh/h)	84	120	123	109	61	38
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	94	135	138	122	69	43
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	265				527	204
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	265				527	204
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				85	95
cM capacity (veh/h)	1304				476	838
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	229	260	112			
Volume Left	94	0	69			
Volume Right	0	122	43			
cSH	1304	1700	570			
Volume to Capacity	0.07	0.15	0.20			
Queue Length 95th (m)	1.7	0.0	5.4			
Control Delay (s/veh)	3.6	0.0	12.9			
Lane LOS	A		B			
Approach Delay (s/veh)	3.6	0.0	12.9			
Approach LOS			B			
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization		54.2%		ICU Level of Service		A
Analysis Period (min)		15				

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	33	148	0	0	204	94	0	0	2	59	0	28	
Future Volume (vph)	33	148	0	0	204	94	0	0	2	59	0	28	
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor													
Frt					0.957				0.865				0.956
Flt Protected	0.991												0.967
Satd. Flow (prot)	0	1167	0	0	1280	0	0	1240	0	0	1325	0	
Flt Permitted	0.991												0.967
Satd. Flow (perm)	0	1167	0	0	1280	0	0	1240	0	0	1325	0	
Link Speed (k/h)	50						50						50
Link Distance (m)	58.7						57.8				32.6		33.2
Travel Time (s)	4.2						4.2				2.3		2.4
Confl. Peds. (#/hr)	7					7		1	3		3	1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	38	168	0	0	232	107	0	0	2	67	0	32	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	206	0	0	339	0	0	2	0	0	99	0	
Sign Control	Free						Free		Stop		Stop		
Intersection Summary													
Area Type:	Other												
Control Type:	Unsignalized												
Intersection Capacity Utilization	62.4%				ICU Level of Service B								
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	148	0	0	204	94	0	0	2	59	0	28
Future Volume (Veh/h)	33	148	0	0	204	94	0	0	2	59	0	28
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	38	168	0	0	232	107	0	0	2	67	0	32
Pedestrians	1			3			7			7		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.0			1.0			1.0			1.0		
Percent Blockage	0			0			1			1		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	346			168			563	590	171	542	537	294
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	346			168			563	590	171	542	537	294
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			100			100	100	100	85	100	96
cM capacity (veh/h)	1216			1422			409	407	875	436	436	745
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	206	339	2	99								
Volume Left	38	0	0	67								
Volume Right	0	107	2	32								
cSH	1216	1700	875	504								
Volume to Capacity	0.03	0.20	0.00*	0.20								
Queue Length 95th (m)	0.7	0.0	0.1	5.4								
Control Delay (s/veh)	1.7	0.0	9.1	13.9								
Lane LOS	A		A	B								
Approach Delay (s/veh)	1.7	0.0	9.1	13.9								
Approach LOS			A	B								
Intersection Summary												
Average Delay	2.7											
Intersection Capacity Utilization	62.4%			ICU Level of Service			B					
Analysis Period (min)	15											
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	174	474	390	196
Future Volume (vph)	0	0	174	474	390	196
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.955	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1265	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1265	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		5	63			63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	191	521	429	215
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	191	521	644	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	75.1%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	174	474	390	196
Future Volume (Veh/h)	0	0	174	474	390	196
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	191	521	429	215
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1503	605	707			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1503	605	707			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	79			
cM capacity (veh/h)	106	499	891			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	191	521	644			
Volume Left	191	0	0			
Volume Right	0	0	215			
cSH	891	1700	1700			
Volume to Capacity	0.21	0.31	0.38			
Queue Length 95th (m)	6.1	0.0	0.0			
Control Delay (s/veh)	10.1	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.7		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			75.1%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	41	608	0	0	390
Future Volume (vph)	53	41	608	0	0	390
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		1		57	57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	55	43	633	0	0	406
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	0	633	0	0	406
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	114.7%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	41	608	0	0	390
Future Volume (Veh/h)	53	41	608	0	0	390
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	55	43	633	0	0	406
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	1096	691			690	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	921	341			340	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	72	91			100	
cM capacity (veh/h)	199	464			810	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	98	633	406			
Volume Left	55	0	0			
Volume Right	43	0	0			
cSH	266	1700	1700			
Volume to Capacity	0.37	0.37	0.24			
Queue Length 95th (m)	12.2	0.0	0.0			
Control Delay (s/veh)	26.2	0.0	0.0			
Lane LOS	D					
Approach Delay (s/veh)	26.2	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		114.7%		ICU Level of Service		H
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Future Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.93					0.99		0.96		
Frt			0.850					0.993				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1308	0	1354	1563	0
Flt Permitted	0.950									0.385		
Satd. Flow (perm)	1364	0	1033	0	0	0	0	1308	0	528	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			200					6				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	163	0	377	0	0	0	0	471	26	76	385	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	0	377	0	0	0	0	497	0	76	385	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.1		28.1					31.9		31.9	31.9	
Total Split (%)	46.8%		46.8%					53.2%		53.2%	53.2%	
Maximum Green (s)	22.0		22.0					25.8		25.8	25.8	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	15.5		15.5					22.2		22.2	22.2	
Actuated g/C Ratio	0.31		0.31					0.44		0.44	0.44	
v/c Ratio	0.39		0.83					0.86		0.33	0.56	
Control Delay (s/veh)	17.3		25.8					32.2		15.7	15.4	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	17.3		25.8					32.2		15.7	15.4	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		C					C		B	B	
Approach Delay (s/veh)		23.2						32.2			15.4	
Approach LOS		C						C			B	
Queue Length 50th (m)	12.4		14.7					38.5		4.4	25.0	
Queue Length 95th (m)	25.1		#56.9					#99.6		14.7	53.4	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	625		581					704		283	838	
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	0.26		0.65					0.71		0.27	0.46	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 50.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 23.8

Intersection LOS: C

Intersection Capacity Utilization 114.7%

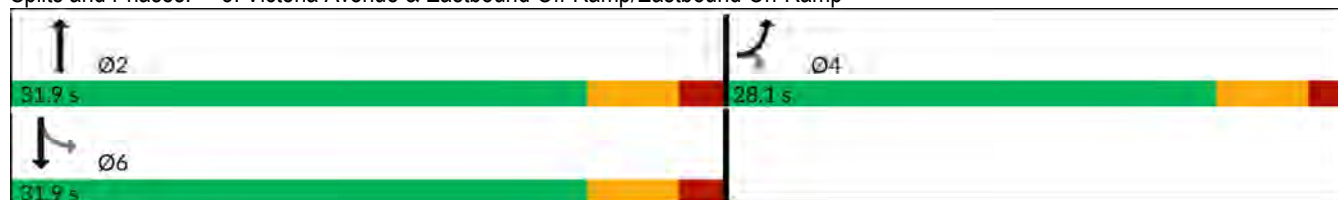
ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Future Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.94					0.99		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.97	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1042					1309		1307	1563	
Flt Permitted	0.95		1.00					1.00		0.38	1.00	
Satd. Flow (perm)	1368		1042					1309		529	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	162	0	377	0	0	0	0	471	26	76	385	0
RTOR Reduction (vph)	0	0	138	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	163	0	239	0	0	0	0	494	0	76	385	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	15.5		15.5					22.2		22.2	22.2	
Effective Green, g (s)	15.5		15.5					22.2		22.2	22.2	
Actuated g/C Ratio	0.31		0.31					0.44		0.44	0.44	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	424		323					582		235	695	
v/s Ratio Prot	0.12							c0.38			0.25	
v/s Ratio Perm			c0.23							0.14		
v/c Ratio	0.38		0.74					0.85		0.32	0.55	
Uniform Delay, d1	13.5		15.4					12.3		9.0	10.2	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.3		7.9					10.7		0.4	0.6	
Delay (s)	13.7		23.3					23.0		9.3	10.8	
Level of Service	B		C					C		A	B	
Approach Delay (s/veh)		20.4			0.0			23.0			10.6	
Approach LOS		C			A			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			18.2									
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			49.9									
Intersection Capacity Utilization			114.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	108	100	56	368	537	195
Future Volume (vph)	108	100	56	368	537	195
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935				0.964	
Flt Protected	0.975			0.993		
Satd. Flow (prot)	1306	0	0	1160	1280	0
Flt Permitted	0.975			0.993		
Satd. Flow (perm)	1306	0	0	1160	1280	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	115	106	60	391	571	207
Shared Lane Traffic (%)						
Lane Group Flow (vph)	221	0	0	451	778	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	121.5%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	108	100	56	368	537	195
Future Volume (Veh/h)	108	100	56	368	537	195
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	115	106	60	391	571	207
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.88	0.83	0.83			
vC, conflicting volume	1285	779	866			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1007	633	738			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	41	71	91			
cM capacity (veh/h)	195	361	666			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	221	451	778			
Volume Left	115	60	0			
Volume Right	106	0	207			
cSH	250	666	1700			
Volume to Capacity	0.88	0.09	0.46			
Queue Length 95th (m)	56.1	2.2	0.0			
Control Delay (s/veh)	73.5	2.6	0.0			
Lane LOS	F	A				
Approach Delay (s/veh)	73.5	2.6	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		12.0				
Intersection Capacity Utilization		121.5%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	179	245	231	294	343
Future Volume (vph)	119	179	245	231	294	343
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.85		0.85	0.91	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.503	
Satd. Flow (perm)	1322	943	1533	932	666	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		183		236		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	121	183	250	236	300	350
Shared Lane Traffic (%)						
Lane Group Flow (vph)	121	183	250	236	300	350
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.4	10.4	14.8	14.8	30.7	27.3
Actuated g/C Ratio	0.21	0.21	0.29	0.29	0.61	0.54
v/c Ratio	0.45	0.54	0.56	0.54	0.56	0.42

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	25.3	10.7	20.7	7.6	9.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.3	10.7	20.7	7.6	9.8	8.8
LOS	C	B	C	A	A	A
Approach Delay (s/veh)	16.5		14.4			9.3
Approach LOS	B		B			A
Queue Length 50th (m)	9.4	0.0	18.5	0.0	10.2	15.2
Queue Length 95th (m)	25.4	14.3	40.4	13.3	27.1	36.3
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	538	492	761	581	549	1189
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.37	0.33	0.41	0.55	0.29

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 50.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay (s/veh): 12.5

Intersection LOS: B

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	179	245	231	294	343
Future Volume (vph)	119	179	245	231	294	343
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.89	1.00	0.89	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1339	983	1533	974	1338	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.50	1.00
Satd. Flow (perm)	1339	983	1533	974	708	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	121	183	250	236	300	350
RTOR Reduction (vph)	0	145	0	166	0	0
Lane Group Flow (vph)	121	38	250	70	300	350
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.4	10.4	14.9	14.9	27.3	27.3
Effective Green, g (s)	10.4	10.4	14.9	14.9	27.3	27.3
Actuated g/C Ratio	0.21	0.21	0.30	0.30	0.54	0.54
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	276	203	454	288	501	848
v/s Ratio Prot			0.16		c0.11	0.22
v/s Ratio Perm	c0.09	0.04		0.07	c0.21	
v/c Ratio	0.44	0.19	0.55	0.24	0.60	0.41
Uniform Delay, d1	17.4	16.5	14.9	13.4	6.9	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	1.6	0.5	1.9	0.4
Delay (s)	18.2	16.8	16.5	13.9	8.8	7.2
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	17.4		15.2			7.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			50.3		Sum of lost time (s)	15.6
Intersection Capacity Utilization			71.1%		ICU Level of Service	C
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	12	16	472	445	17
Future Volume (vph)	4	12	16	472	445	17
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899					0.850
Flt Protected	0.988			0.998		
Satd. Flow (prot)	1273	0	0	1164	1563	1106
Flt Permitted	0.988			0.998		
Satd. Flow (perm)	1273	0	0	1164	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	4	12	16	477	449	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	493	449	17
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	70.9%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

								
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations								
Traffic Volume (veh/h)	4	12	16	472	445	17		
Future Volume (Veh/h)	4	12	16	472	445	17		
Sign Control	Stop			Free	Free			
Grade	0%			0%	0%			
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99		
Hourly flow rate (vph)	4	12	16	477	449	17		
Pedestrians	203				1			
Lane Width (m)	3.6				3.6			
Walking Speed (m/s)	1.0				1.0			
Percent Blockage	20				0			
Right turn flare (veh)								
Median type				None	None			
Median storage veh								
Upstream signal (m)				75	59			
pX, platoon unblocked	0.89	0.85	0.85					
vC, conflicting volume	1162	652	669					
vC1, stage 1 conf vol								
vC2, stage 2 conf vol								
vCu, unblocked vol	741	504	524					
tC, single (s)	6.4	6.2	4.1					
tC, 2 stage (s)								
tF (s)	3.5	3.3	2.2					
p0 queue free %	98	97	98					
cM capacity (veh/h)	266	388	714					
Direction, Lane #	EB 1	NB 1	SB 1	SB 2				
Volume Total	16	493	449	17				
Volume Left	4	16	0	0				
Volume Right	12	0	0	17				
cSH	348	714	1700	1700				
Volume to Capacity	0.05	0.02	0.26	0.01				
Queue Length 95th (m)	1.1	0.5	0.0	0.0				
Control Delay (s/veh)	15.8	0.6	0.0	0.0				
Lane LOS	C	A						
Approach Delay (s/veh)	15.8	0.6	0.0					
Approach LOS	C							
Intersection Summary								
Average Delay	0.6							
Intersection Capacity Utilization	70.9%			ICU Level of Service	C			
Analysis Period (min)	15							

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Future Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.91			0.97			0.99	0.72
Frt		0.972			0.951			0.991				0.850
Flt Protected		0.972			0.984			0.997			0.997	
Satd. Flow (prot)	0	1280	0	0	1242	0	0	1371	0	0	1174	1063
Flt Permitted		0.741			0.853			0.954			0.961	
Satd. Flow (perm)	0	925	0	0	1034	0	0	1300	0	0	1124	767
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			49			8				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	58	23	21	49	48	55	29	401	32	22	399	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	152	0	0	462	0	0	421	60
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.2			11.2			22.4			22.4	22.4
Actuated g/C Ratio		0.23			0.23			0.47			0.47	0.47
v/c Ratio		0.44			0.55			0.76			0.80	0.15
Control Delay (s/veh)		21.0			20.9			20.9			26.2	3.5
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		21.0			20.9			20.9			26.2	3.5

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			C			C			C	A
Approach Delay (s/veh)		21.0			20.9			20.9			23.3	
Approach LOS		C			C			C			C	
Queue Length 50th (m)		6.3			8.2			26.3			25.1	0.0
Queue Length 95th (m)		17.8			23.1			#83.0			#81.7	4.7
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		373			433			795			685	493
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		0.27			0.35			0.58			0.61	0.12

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 48

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay (s/veh): 21.9

Intersection LOS: C

Intersection Capacity Utilization 86.8%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Future Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.96			0.98			1.00	0.78
Flpb, ped/bikes		0.96			0.97			0.99			0.99	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1236			1213			1366			1168	824
Flt Permitted		0.74			0.85			0.95			0.96	1.00
Satd. Flow (perm)		941			1052			1307			1126	824
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	23	21	49	48	55	29	401	32	22	399	60
RTOR Reduction (vph)	0	16	0	0	37	0	0	4	0	0	0	32
Lane Group Flow (vph)	0	86	0	0	115	0	0	458	0	0	421	28
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.2			11.2			22.4			22.4	22.4
Effective Green, g (s)		11.2			11.2			22.4			22.4	22.4
Actuated g/C Ratio		0.24			0.24			0.47			0.47	0.47
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		221			248			616			530	388
v/s Ratio Prot												
v/s Ratio Perm		0.09			0.11			0.35			0.37	0.03
v/c Ratio		0.39			0.46			0.74			0.79	0.07
Uniform Delay, d1		15.3			15.6			10.2			10.6	6.9
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.8			1.0			4.6			7.8	0.1
Delay (s)		16.1			16.6			14.8			18.4	6.9
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		16.1			16.6			14.8			17.0	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			16.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			47.5			Sum of lost time (s)			13.9			
Intersection Capacity Utilization			86.8%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Future Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.961			0.998			0.992			0.942	
Flt Protected	0.950			0.950				0.958			0.994	
Satd. Flow (prot)	1381	2862	0	1381	2964	0	0	1350	0	0	1328	0
Flt Permitted	0.343			0.103				0.714			0.956	
Satd. Flow (perm)	498	2862	0	150	2964	0	0	996	0	0	1278	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		60			1			4			23	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	39	899	312	32	643	7	299	21	21	6	25	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	1211	0	32	650	0	0	341	0	0	54	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	48.6		9.0	48.6		42.4	42.4		42.4	42.4	
Total Split (%)	9.0%	48.6%		9.0%	48.6%		42.4%	42.4%		42.4%	42.4%	
Maximum Green (s)	6.0	42.3		6.0	42.3		35.1	35.1		35.1	35.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	49.2	42.4		49.2	42.4			34.4			34.4	
Actuated g/C Ratio	0.51	0.44		0.51	0.44			0.36			0.36	
v/c Ratio	0.13	0.93		0.21	0.49			0.94			0.11	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	11.8	38.7		13.9	21.3			67.7			15.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	11.8	38.7		13.9	21.3			67.7			15.1	
LOS	B	D		B	C			E			B	
Approach Delay (s/veh)		37.9			21.0			67.7			15.1	
Approach LOS		D			C			E			B	
Queue Length 50th (m)	3.3	113.5		2.7	47.4			62.8			3.9	
Queue Length 95th (m)	8.0	#161.7		6.9	63.8			#118.5			12.0	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	311	1303		154	1315			369			485	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.13	0.93		0.21	0.49			0.92			0.11	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 95.7

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay (s/veh): 36.8

Intersection LOS: D

Intersection Capacity Utilization 83.6%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Future Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.96		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2863		1381	2965			1337			1330	
Flt Permitted	0.34	1.00		0.10	1.00			0.71			0.96	
Satd. Flow (perm)	499	2863		150	2965			996			1279	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	39	899	312	32	643	7	299	21	21	6	25	23
RTOR Reduction (vph)	0	34	0	0	1	0	0	3	0	0	15	0
Lane Group Flow (vph)	39	1177	0	32	649	0	0	338	0	0	39	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	45.8	42.4		45.8	42.4			34.4			34.4	
Effective Green, g (s)	45.8	42.4		45.8	42.4			34.4			34.4	
Actuated g/C Ratio	0.47	0.44		0.47	0.44			0.36			0.36	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	267	1254		114	1298			353			454	
v/s Ratio Prot	0.01	c0.41		c0.01	0.22							
v/s Ratio Perm	0.06			0.12				c0.34			0.03	
v/c Ratio	0.15	0.94		0.28	0.50			0.96			0.09	
Uniform Delay, d1	14.1	26.0		16.9	19.6			30.5			20.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	13.7		1.0	0.6			36.6			0.2	
Delay (s)	14.2	39.6		17.9	20.2			67.2			20.9	
Level of Service	B	D		B	C			E			C	
Approach Delay (s/veh)		38.9			20.1			67.2			20.9	
Approach LOS		D			C			E			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			37.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			96.8			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			83.6%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Future Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.992			0.920			0.990			0.990	
Flt Protected		0.987			0.995			0.999			0.981	
Satd. Flow (prot)	0	1403	0	0	1304	0	0	1417	0	0	1392	0
Flt Permitted		0.987			0.995			0.999			0.981	
Satd. Flow (perm)	0	1403	0	0	1304	0	0	1417	0	0	1392	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	29	72	6	20	64	123	3	195	16	146	201	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	107	0	0	207	0	0	214	0	0	376	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	66.8%					ICU Level of Service C						
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Future Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	72	6	20	64	123	3	195	16	146	201	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	107	207	214	376								
Volume Left (vph)	29	20	3	146								
Volume Right (vph)	6	123	16	29								
Hadj (s)	0.02	-0.33	-0.04	0.03								
Departure Headway (s)	5.9	5.3	5.3	5.2								
Degree Utilization, x	0.17	0.31	0.32	0.54								
Capacity (veh/h)	524	605	616	663								
Control Delay (s/veh)	10.1	10.7	10.8	14.1								
Approach Delay (s/veh)	10.1	10.7	10.8	14.1								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay				12.0								
Level of Service				B								
Intersection Capacity Utilization				66.8%	ICU Level of Service		C					
Analysis Period (min)				15								

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	177	9	5	119	10	21	9	13	52	6	7
Future Volume (vph)	8	177	9	5	119	10	21	9	13	52	6	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.990			0.958			0.986	
Flt Protected		0.998			0.998			0.977			0.961	
Satd. Flow (prot)	0	1422	0	0	1416	0	0	1341	0	0	1358	0
Flt Permitted		0.998			0.998			0.977			0.961	
Satd. Flow (perm)	0	1422	0	0	1416	0	0	1341	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	10		5	5		10			4	4		
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	213	11	6	143	12	25	11	16	63	7	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	234	0	0	161	0	0	52	0	0	78	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	31.6%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	177	9	5	119	10	21	9	13	52	6	7
Future Volume (Veh/h)	8	177	9	5	119	10	21	9	13	52	6	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	10	213	11	6	143	12	25	11	16	63	7	8
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	165			229			416	421	228	435	420	159
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	165			229			416	421	228	435	420	159
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			100			95	98	98	87	99	99
cM capacity (veh/h)	1411			1344			526	513	809	498	514	883
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	234	161	52	78								
Volume Left	10	6	25	63								
Volume Right	11	12	16	8								
cSH	1411	1344	586	523								
Volume to Capacity	0.00*	0.00*	0.09	0.15								
Queue Length 95th (m)	0.2	0.1	2.2	3.9								
Control Delay (s/veh)	0.4	0.3	11.7	13.1								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.4	0.3	11.7	13.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			31.6%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	96	157	119	80	40	26
Future Volume (vph)	96	157	119	80	40	26
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.946		0.947	
Flt Protected		0.981			0.971	
Satd. Flow (prot)	0	1156	1266	0	1318	0
Flt Permitted		0.981			0.971	
Satd. Flow (perm)	0	1156	1266	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	119	194	147	99	49	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	313	246	0	81	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	54.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	96	157	119	80	40	26
Future Volume (Veh/h)	96	157	119	80	40	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	119	194	147	99	49	32
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	257				640	211
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257				640	211
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				88	96
cM capacity (veh/h)	1305				398	823
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	313	246	81			
Volume Left	119	0	49			
Volume Right	0	99	32			
cSH	1305	1700	500			
Volume to Capacity	0.09	0.14	0.16			
Queue Length 95th (m)	2.3	0.0	4.3			
Control Delay (s/veh)	3.6	0.0	13.6			
Lane LOS	A		B			
Approach Delay (s/veh)	3.6	0.0	13.6			
Approach LOS			B			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization		54.1%		ICU Level of Service		A
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	165	0	0	177	74	3	1	0	43	0	18
Future Volume (vph)	32	165	0	0	177	74	3	1	0	43	0	18
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.960						0.960					
Flt Protected	0.992						0.964					
Satd. Flow (prot)	0	1169	0	0	1284	0	0	1381	0	0	1329	0
Flt Permitted	0.992						0.964					
Satd. Flow (perm)	0	1169	0	0	1284	0	0	1381	0	0	1329	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	37	192	0	0	206	86	3	1	0	50	0	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	229	0	0	292	0	0	4	0	0	71	0
Sign Control	Free						Stop					
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	53.2%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	165	0	0	177	74	3	1	0	43	0	18
Future Volume (Veh/h)	32	165	0	0	177	74	3	1	0	43	0	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	37	192	0	0	206	86	3	1	0	50	0	21
Pedestrians		3			1			2			29	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	321			194			541	589	195	546	546	281
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	321			194			541	589	195	546	546	281
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			100			99	100	100	88	100	97
cM capacity (veh/h)	1214			1388			420	398	849	417	421	738
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	229	292	4	71								
Volume Left	37	0	3	50								
Volume Right	0	86	0	21								
cSH	1214	1700	414	479								
Volume to Capacity	0.03	0.17	0.00*	0.15								
Queue Length 95th (m)	0.7	0.0	0.2	3.9								
Control Delay (s/veh)	1.5	0.0	13.8	13.8								
Lane LOS	A		B	B								
Approach Delay (s/veh)	1.5	0.0	13.8	13.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			53.2%	ICU Level of Service					A			
Analysis Period (min)			15									
* Value less than 0.01.												

Appendix K

Five-Year Background Traffic Operations without Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	44	326	156	149
Future Volume (vph)	0	0	44	326	156	149
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.934	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1518	1207	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1518	1207	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	1		29			29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	51	379	181	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	51	379	354	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	44	326	156	149
Future Volume (Veh/h)	0	0	44	326	156	149
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	51	379	181	173
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	779	297	383			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	779	297	383			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	96			
cM capacity (veh/h)	351	748	1187			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	51	379	354			
Volume Left	51	0	0			
Volume Right	0	0	173			
cSH	1187	1700	1700			
Volume to Capacity	0.04	0.22	0.21			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s/veh)	8.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	1.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			35.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	8	362	0	0	156
Future Volume (vph)	10	8	362	0	0	156
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		2		10	10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	12	10	441	0	0	190
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	441	0	0	190
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	63.2%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	8	362	0	0	156
Future Volume (Veh/h)	10	8	362	0	0	156
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	10	441	0	0	190
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	641	453			451	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	391			389	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	97	98			100	
cM capacity (veh/h)	426	590			1103	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	22	441	190			
Volume Left	12	0	0			
Volume Right	10	0	0			
cSH	487	1700	1700			
Volume to Capacity	0.05	0.26	0.11			
Queue Length 95th (m)	1.1	0.0	0.0			
Control Delay (s/veh)	12.7	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	12.7	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			63.2%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	276	0	0	0	0	164	6	8	159	0
Future Volume (vph)	198	0	276	0	0	0	0	164	6	8	159	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.98		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1257	0	1381	1504	0
Flt Permitted	0.950									0.634		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1257	0	907	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			317					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	228	0	317	0	0	0	0	189	7	9	183	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	0	317	0	0	0	0	196	0	9	183	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	32.0		32.0					28.0		28.0	28.0	
Total Split (%)	53.3%		53.3%					46.7%		46.7%	46.7%	
Maximum Green (s)	25.9		25.9					21.9		21.9	21.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	10.9		10.9					10.5		10.5	10.5	
Actuated g/C Ratio	0.32		0.32					0.31		0.31	0.31	
v/c Ratio	0.52		0.57					0.50		0.03	0.39	
Control Delay (s/veh)	14.6		6.2					15.2		9.4	12.7	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	14.6		6.2					15.2		9.4	12.7	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		A	B	
Approach Delay (s/veh)		9.7						15.2			12.5	
Approach LOS		A						B			B	
Queue Length 50th (m)	8.9		0.0					8.0		0.3	7.3	
Queue Length 95th (m)	25.6		10.6					24.4		2.4	21.7	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1088		912					838		604	1002	
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	0.21		0.35					0.23		0.01	0.18	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 34

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay (s/veh): 11.5

Intersection LOS: B

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	276	0	0	0	0	164	6	8	159	0
Future Volume (vph)	198	0	276	0	0	0	0	164	6	8	159	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1257		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.63	1.00	
Satd. Flow (perm)	1381		1072					1257		914	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	228	0	317	0	0	0	0	189	7	9	183	0
RTOR Reduction (vph)	0	0	215	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	228	0	102	0	0	0	0	194	0	9	183	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	10.8		10.8					10.5		10.5	10.5	
Effective Green, g (s)	10.8		10.8					10.5		10.5	10.5	
Actuated g/C Ratio	0.32		0.32					0.31		0.31	0.31	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	445		345					393		286	471	
v/s Ratio Prot	c0.17							c0.15			0.12	
v/s Ratio Perm			0.10							0.01		
v/c Ratio	0.51		0.30					0.49		0.03	0.39	
Uniform Delay, d1	9.2		8.5					9.3		8.0	9.0	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.5		0.2					0.4		0.0	0.2	
Delay (s)	9.7		8.7					9.8		8.0	9.2	
Level of Service	A		A					A		A	A	
Approach Delay (s/veh)		9.1			0.0			9.8			9.2	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			9.3									
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			33.5									
Intersection Capacity Utilization			63.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	23	22	5	147	417	17
Future Volume (vph)	23	22	5	147	417	17
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934				0.995	
Flt Protected	0.975			0.998		
Satd. Flow (prot)	1305	0	0	1093	1294	0
Flt Permitted	0.975			0.998		
Satd. Flow (perm)	1305	0	0	1093	1294	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	27	26	6	175	496	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	53	0	0	181	516	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	22	5	147	417	17
Future Volume (Veh/h)	23	22	5	147	417	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	27	26	6	175	496	20
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	712	536	535			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	671	486	485			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	93	95	99			
cM capacity (veh/h)	393	540	903			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	53	181	516			
Volume Left	27	6	0			
Volume Right	26	0	20			
cSH	454	903	1700			
Volume to Capacity	0.12	0.00*	0.30			
Queue Length 95th (m)	3.0	0.2	0.0			
Control Delay (s/veh)	14.0	0.4	0.0			
Lane LOS	B	A				
Approach Delay (s/veh)	14.0	0.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		46.3%		ICU Level of Service		A
Analysis Period (min)		15				
* Value less than 0.01.						

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	37	115	90	295	144
Future Volume (vph)	47	37	115	90	295	144
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.517	
Satd. Flow (perm)	1310	1069	1449	1027	737	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		43		103		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	54	43	132	103	339	166
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	43	132	103	339	166
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.3	8.3	10.0	10.0	25.9	22.5
Actuated g/C Ratio	0.19	0.19	0.23	0.23	0.60	0.52
v/c Ratio	0.22	0.18	0.40	0.33	0.59	0.22

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	18.4	8.6	18.3	7.1	9.5	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	18.4	8.6	18.3	7.1	9.5	6.5
LOS	B	A	B	A	A	A
Approach Delay (s/veh)	14.1		13.4			8.5
Approach LOS	B		B			A
Queue Length 50th (m)	3.6	0.0	9.0	0.0	10.7	6.0
Queue Length 95th (m)	11.0	5.6	20.3	7.9	22.7	13.4
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	605	517	816	623	583	1287
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.08	0.16	0.17	0.58	0.13

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 43.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 10.5

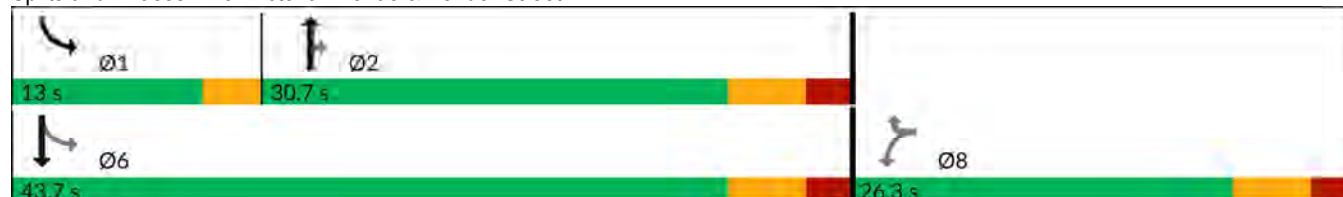
Intersection LOS: B

Intersection Capacity Utilization 47.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	37	115	90	295	144
Future Volume (vph)	47	37	115	90	295	144
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1074	1449	1032	1363	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1312	1074	1449	1032	742	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	54	43	132	103	339	166
RTOR Reduction (vph)	0	35	0	79	0	0
Lane Group Flow (vph)	54	8	132	24	339	166
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.3	8.3	10.0	10.0	22.5	22.5
Effective Green, g (s)	8.3	8.3	10.0	10.0	22.5	22.5
Actuated g/C Ratio	0.19	0.19	0.23	0.23	0.52	0.52
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	250	205	333	237	520	772
v/s Ratio Prot			0.09		c0.14	0.11
v/s Ratio Perm	c0.04	0.01		0.02	c0.19	
v/c Ratio	0.22	0.04	0.40	0.10	0.65	0.22
Uniform Delay, d1	14.8	14.3	14.1	13.2	6.9	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.9	0.2	2.9	0.2
Delay (s)	15.1	14.4	15.1	13.4	9.8	5.8
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	14.8		14.3			8.5
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			10.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			43.4		Sum of lost time (s)	15.6
Intersection Capacity Utilization			47.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	10	2	201	188	2
Future Volume (vph)	3	10	2	201	188	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899	0.850				
Flt Protected	0.988					
Satd. Flow (prot)	1176	0	0	1091	1504	1106
Flt Permitted	0.988					
Satd. Flow (perm)	1176	0	0	1091	1504	1106
Link Speed (k/h)	50	50				
Link Distance (m)	100.0	75.4 58.6				
Travel Time (s)	7.2	5.4 4.2				
Confl. Peds. (#/hr)	1	22 22				
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	12	2	239	224	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	241	224	2
Sign Control	Stop	Free Free				
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	10	2	201	188	2
Future Volume (Veh/h)	3	10	2	201	188	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	12	2	239	224	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	490	246	248			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	409	214	216			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	98	100			
cM capacity (veh/h)	574	767	1302			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	16	241	224	2		
Volume Left	4	2	0	0		
Volume Right	12	0	0	2		
cSH	707	1302	1700	1700		
Volume to Capacity	0.02	0.00*	0.13	0.00*		
Queue Length 95th (m)	0.5	0.0	0.0	0.0		
Control Delay (s/veh)	10.2	0.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	10.2	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay				0.4		
Intersection Capacity Utilization	32.4%			ICU Level of Service	A	
Analysis Period (min)	15					
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	8	8	20	10	17	2	171	10	14	173	11
Future Volume (vph)	15	8	8	20	10	17	2	171	10	14	173	11
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.97			1.00			1.00	0.95
Frt		0.966			0.952			0.992				0.850
Flt Protected		0.976			0.979						0.996	
Satd. Flow (prot)	0	1196	0	0	1254	0	0	1329	0	0	1121	851
Flt Permitted		0.813			0.845			0.996			0.960	
Satd. Flow (perm)	0	989	0	0	1068	0	0	1323	0	0	1078	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			20			7				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	18	9	9	24	12	20	2	201	12	16	204	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	56	0	0	215	0	0	220	13
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.4			8.4			12.9			12.9	12.9
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
v/c Ratio		0.15			0.21			0.44			0.56	0.04
Control Delay (s/veh)		12.4			11.7			11.2			14.9	0.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		12.4			11.7			11.2			14.9	0.2

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			B	A
Approach Delay (s/veh)		12.4			11.7			11.2			14.1	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		1.1			1.5			8.7			9.6	0.0
Queue Length 95th (m)		6.4			8.2			19.1			21.8	0.0
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		523			570			1056			859	656
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		0.07			0.10			0.20			0.26	0.02

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 35.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay (s/veh): 12.6

Intersection LOS: B

Intersection Capacity Utilization 60.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	8	8	20	10	17	2	171	10	14	173	11
Future Volume (vph)	15	8	8	20	10	17	2	171	10	14	173	11
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		1.00			0.99			1.00			1.00	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1195			1247			1330			1120	817
Flt Permitted		0.81			0.84			1.00			0.96	1.00
Satd. Flow (perm)		995			1076			1325			1079	817
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	18	9	9	24	12	20	2	201	12	16	204	13
RTOR Reduction (vph)	0	7	0	0	15	0	0	4	0	0	0	8
Lane Group Flow (vph)	0	29	0	0	41	0	0	211	0	0	220	5
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		8.4			8.4			12.9			12.9	12.9
Effective Green, g (s)		8.4			8.4			12.9			12.9	12.9
Actuated g/C Ratio		0.24			0.24			0.37			0.37	0.37
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		237			256			485			395	299
v/s Ratio Prot												
v/s Ratio Perm		0.03			0.04			0.16			0.20	0.01
v/c Ratio		0.12			0.16			0.43			0.56	0.02
Uniform Delay, d1		10.5			10.6			8.4			8.9	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.2			0.2			0.5			1.4	0.0
Delay (s)		10.7			10.8			8.9			10.2	7.1
Level of Service		B			B			A			B	A
Approach Delay (s/veh)		10.7			10.8			8.9			10.1	
Approach LOS		B			B			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		9.7										
HCM 2000 Volume to Capacity ratio		0.40										
Actuated Cycle Length (s)		35.2										
Intersection Capacity Utilization		60.3%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	667	85	5	277	1	159	21	11	2	16	22
Future Volume (vph)	26	667	85	5	277	1	159	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.983						0.992			0.925	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1316	2920	0	1381	2941	0	0	1341	0	0	1307	0
Flt Permitted	0.544			0.291				0.732			0.984	
Satd. Flow (perm)	752	2920	0	423	2941	0	0	1015	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						4			24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	28	725	92	5	301	1	173	23	12	2	17	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	817	0	5	302	0	0	208	0	0	43	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.6		9.0	40.6		40.4	40.4		40.4	40.4	
Total Split (%)	10.0%	45.1%		10.0%	45.1%		44.9%	44.9%		44.9%	44.9%	
Maximum Green (s)	6.0	34.3		6.0	34.3		33.1	33.1		33.1	33.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	30.6	26.3		30.1	24.7			18.4			18.4	
Actuated g/C Ratio	0.50	0.43		0.50	0.41			0.30			0.30	
v/c Ratio	0.06	0.64		0.02	0.25			0.67			0.11	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	9.3	17.4		9.2	14.7			31.3			11.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	9.3	17.4		9.2	14.7			31.3			11.3	
LOS	A	B		A	B			C			B	
Approach Delay (s/veh)		17.1			14.6			31.3			11.3	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	1.4	30.8		0.2	9.4			18.0			1.4	
Queue Length 95th (m)	6.4	81.6		2.0	28.0			49.4			8.6	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	440	1792		312	1798			600			770	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.46		0.02	0.17			0.35			0.06	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 60.6

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 18.5

Intersection LOS: B

Intersection Capacity Utilization 61.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	667	85	5	277	1	159	21	11	2	16	22
Future Volume (vph)	26	667	85	5	277	1	159	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2920		1381	2940			1334			1308	
Flt Permitted	0.54	1.00		0.29	1.00			0.73			0.98	
Satd. Flow (perm)	753	2920		423	2940			1018			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	725	92	5	301	1	173	23	12	2	17	24
RTOR Reduction (vph)	0	10	0	0	0	0	0	3	0	0	17	0
Lane Group Flow (vph)	28	807	0	5	302	0	0	205	0	0	26	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	28.2	26.3		26.0	25.2			18.4			18.4	
Effective Green, g (s)	28.2	26.3		26.0	25.2			18.4			18.4	
Actuated g/C Ratio	0.45	0.42		0.42	0.41			0.30			0.30	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	359	1236		189	1193			301			382	
v/s Ratio Prot	c0.00	c0.28		0.00	0.10							
v/s Ratio Perm	0.03			0.01				c0.20			0.02	
v/c Ratio	0.08	0.65		0.03	0.25			0.68			0.07	
Uniform Delay, d1	9.5	14.3		10.7	12.2			19.3			15.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.7		0.0	0.2			5.7			0.2	
Delay (s)	9.5	15.9		10.7	12.5			25.0			15.9	
Level of Service	A	B		B	B			C			B	
Approach Delay (s/veh)		15.7			12.4			25.0			15.9	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			16.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			62.1			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			61.3%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	46	7	1	18	30	1	154	1	22	77	7
Future Volume (vph)	7	46	7	1	18	30	1	154	1	22	77	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.917			0.999			0.991	
Flt Protected		0.994			0.999						0.990	
Satd. Flow (prot)	0	1370	0	0	1291	0	0	1390	0	0	1386	0
Flt Permitted		0.994			0.999						0.990	
Satd. Flow (perm)	0	1370	0	0	1291	0	0	1390	0	0	1386	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	9	56	9	1	22	37	1	188	1	27	94	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	74	0	0	60	0	0	190	0	0	130	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.1%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
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	46	7	1	18	30	1	154	1	22	77	7
Future Volume (vph)	7	46	7	1	18	30	1	154	1	22	77	7
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	9	56	9	1	22	37	1	188	1	27	94	9
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	74	60	190	130								
Volume Left (vph)	9	1	1	27								
Volume Right (vph)	9	37	1	9								
Hadj (s)	-0.01	-0.34	0.05	0.02								
Departure Headway (s)	4.7	4.4	4.4	4.5								
Degree Utilization, x	0.10	0.07	0.23	0.16								
Capacity (veh/h)	705	750	784	768								
Control Delay (s/veh)	8.2	7.7	8.8	8.3								
Approach Delay (s/veh)	8.2	7.7	8.8	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.4									
Level of Service			A									
Intersection Capacity Utilization			40.1%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	43	9	1	21	0	6	0	3	0	1	0
Future Volume (vph)	1	43	9	1	21	0	6	0	3	0	1	0
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.977						0.955					
Flt Protected	0.999			0.998			0.968					
Satd. Flow (prot)	0	1399	0	0	1309	0	0	1325	0	0	1433	0
Flt Permitted	0.999			0.998			0.968					
Satd. Flow (perm)	0	1399	0	0	1309	0	0	1325	0	0	1433	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	362.4			79.0			93.8			56.1		
Travel Time (s)	26.1			5.7			6.8			4.0		
Confl. Peds. (#/hr)	3			6	6			3			2	2
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	57	12	1	28	0	8	0	4	0	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	0	0	29	0	0	12	0	0	1	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.4%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

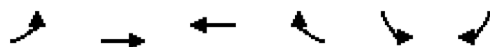
4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	1	43	9	1	21	0	6	0	3	0	1	0	
Future Volume (Veh/h)	1	43	9	1	21	0	6	0	3	0	1	0	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	
Hourly flow rate (vph)	1	57	12	1	28	0	8	0	4	0	1	0	
Pedestrians					2					6			
Lane Width (m)					3.6					3.6			
Walking Speed (m/s)					1.0					1.0			
Percent Blockage					0					1			
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	31			75			102	104	71	104	110	31	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	31			75			102	104	71	104	110	31	
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	100			100			99	100	100	100	100	100	
cM capacity (veh/h)	1590			1072			871	782	989	866	776	1046	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	70	29	12	1									
Volume Left	1	1	8	0									
Volume Right	12	0	4	0									
cSH	1590	1072	907	776									
Volume to Capacity	0.00*	0.00*	0.01	0.00*									
Queue Length 95th (m)	0.0	0.0	0.3	0.0									
Control Delay (s/veh)	0.1	0.3	9.0	9.6									
Lane LOS	A	A	A	A									
Approach Delay (s/veh)	0.1	0.3	9.0	9.6									
Approach LOS			A	A									
Intersection Summary													
Average Delay			1.2										
Intersection Capacity Utilization			20.4%	ICU Level of Service				A					
Analysis Period (min)			15										

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

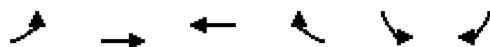
4873 and 4898 Kitchener Street TIS
Background AM (5-Year)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	44	21	0	1	1
Future Volume (vph)	2	44	21	0	1	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected		0.998			0.976	
Satd. Flow (prot)	0	1176	1262	0	869	0
Flt Permitted		0.998			0.976	
Satd. Flow (perm)	0	1176	1262	0	869	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	3	60	29	0	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	63	29	0	2	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	44	21	0	1	1
Future Volume (Veh/h)	2	44	21	0	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	3	60	29	0	1	1
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	33				99	35
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	33				99	35
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	100				100	100
cM capacity (veh/h)	1586				899	811
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	63	29	2			
Volume Left	3	0	1			
Volume Right	0	0	1			
cSH	1586	1700	853			
Volume to Capacity	0.00*	0.02	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.4	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s/veh)	0.4	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			17.0%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

12: Kitchener Street & East Parking Lot Access

Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	44	0	0	20	2	1	0	0	1	0	0
Future Volume (vph)	1	44	0	0	20	2	1	0	0	1	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.987											
Flt Protected	0.999								0.950		0.950	
Satd. Flow (prot)	0	1177	0	0	1242	0	0	1361	0	0	1361	0
Flt Permitted	0.999								0.950		0.950	
Satd. Flow (perm)	0	1177	0	0	1242	0	0	1361	0	0	1361	0
Link Speed (k/h)	50								50		50	
Link Distance (m)	37.0								32.6		36.9	
Travel Time (s)	2.7								2.3		2.7	
Confl. Peds. (#/hr)	3								2		2	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	64	0	0	29	3	1	0	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	0	0	32	0	0	1	0	0	1	0
Sign Control	Free		Free						Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	15.7%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	44	0	0	20	2	1	0	0	1	0	0
Future Volume (Veh/h)	1	44	0	0	20	2	1	0	0	1	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	1	64	0	0	29	3	1	0	0	1	0	0
Pedestrians					2						3	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.0						1.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	35			64			97	101	66	102	100	34
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	35			64			97	101	66	102	100	34
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1585			1551			888	790	1001	877	791	1043
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	65	32	1	1								
Volume Left	1	0	1	1								
Volume Right	0	3	0	0								
cSH	1585	1700	888	877								
Volume to Capacity	0.00*	0.02	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s/veh)	0.1	0.0	9.1	9.1								
Lane LOS	A		A	A								
Approach Delay (s/veh)	0.1	0.0	9.1	9.1								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			15.7%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	165	548	341	285
Future Volume (vph)	0	0	165	548	341	285
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.939	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1563	1232	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1563	1232	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		1	58			58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	174	577	359	300
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	174	577	659	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	77.8%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	165	548	341	285
Future Volume (Veh/h)	0	0	165	548	341	285
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	174	577	359	300
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1492	568	717			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1492	568	717			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	81			
cM capacity (veh/h)	111	526	893			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	174	577	659			
Volume Left	174	0	0			
Volume Right	0	0	300			
cSH	893	1700	1700			
Volume to Capacity	0.19	0.34	0.39			
Queue Length 95th (m)	5.4	0.0	0.0			
Control Delay (s/veh)	10.0	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.3		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			77.8%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	49	664	0	0	341
Future Volume (vph)	53	49	664	0	0	341
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	57	53	714	0	0	367
Shared Lane Traffic (%)						
Lane Group Flow (vph)	110	0	714	0	0	367
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	94.9%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	49	664	0	0	341
Future Volume (Veh/h)	53	49	664	0	0	341
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	57	53	714	0	0	367
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.68	0.68			0.68	
vC, conflicting volume	1115	750			747	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	937	402			398	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	71	88			100	
cM capacity (veh/h)	196	430			774	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	110	714	367			
Volume Left	57	0	0			
Volume Right	53	0	0			
cSH	265	1700	1700			
Volume to Capacity	0.41	0.42	0.22			
Queue Length 95th (m)	14.5	0.0	0.0			
Control Delay (s/veh)	27.9	0.0	0.0			
Lane LOS	D					
Approach Delay (s/veh)	27.9	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			94.9%	ICU Level of Service		F
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	184	0	0	0	0	481	17	59	335	0
Future Volume (vph)	183	0	184	0	0	0	0	481	17	59	335	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.98		
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1304	0	1354	1563	0
Flt Permitted	0.950									0.377		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1304	0	525	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			200					4				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	199	0	200	0	0	0	0	523	18	64	364	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	0	200	0	0	0	0	541	0	64	364	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					41.8		41.8	41.8	
Total Split (%)	40.3%		40.3%					59.7%		59.7%	59.7%	
Maximum Green (s)	22.1		22.1					35.7		35.7	35.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	13.0		13.0					25.5		25.5	25.5	
Actuated g/C Ratio	0.25		0.25					0.49		0.49	0.49	
v/c Ratio	0.58		0.47					0.84		0.25	0.47	
Control Delay (s/veh)	26.4		7.6					25.2		10.8	11.1	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	26.4		7.6					25.2		10.8	11.1	

No Background Development
PTSL (250550)

Synchro 12 Report
Page 5

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		A					C		B	B	
Approach Delay (s/veh)		16.9						25.2			11.1	
Approach LOS		B						C			B	
Queue Length 50th (m)	15.8		0.0					36.5		2.9	18.8	
Queue Length 95th (m)	38.3		13.2					#108.2		11.1	45.4	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	627		610					952		383	1140	
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	0.32		0.33					0.57		0.17	0.32	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 51.6

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 18.4

Intersection LOS: B

Intersection Capacity Utilization 94.9%

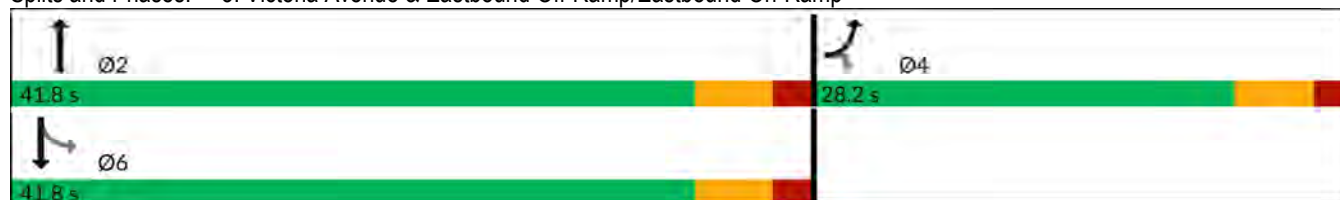
ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	184	0	0	0	0	481	17	59	335	0
Future Volume (vph)	183	0	184	0	0	0	0	481	17	59	335	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1304		1329	1563	
Flt Permitted	0.95		1.00					1.00		0.38	1.00	
Satd. Flow (perm)	1368		1095					1304		527	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	0	200	0	0	0	0	523	18	64	364	0
RTOR Reduction (vph)	0	0	149	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	199	0	51	0	0	0	0	539	0	64	364	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	13.0		13.0					25.5		25.5	25.5	
Effective Green, g (s)	13.0		13.0					25.5		25.5	25.5	
Actuated g/C Ratio	0.26		0.26					0.50		0.50	0.50	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	350		280					655		265	786	
v/s Ratio Prot	c0.15							c0.41			0.23	
v/s Ratio Perm			0.05							0.12		
v/c Ratio	0.57		0.18					0.82		0.24	0.46	
Uniform Delay, d1	16.4		14.7					10.7		7.1	8.2	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	1.4		0.1					7.9		0.2	0.2	
Delay (s)	17.8		14.8					18.6		7.3	8.4	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		16.3			0.0			18.6			8.2	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.7					HCM 2000 Level of Service		B		
HCM 2000 Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			50.7					Sum of lost time (s)		12.2		
Intersection Capacity Utilization			94.9%					ICU Level of Service		F		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	43	30	16	456	459	60
Future Volume (vph)	43	30	16	456	459	60
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.945				0.984	
Flt Protected	0.971			0.998		
Satd. Flow (prot)	1315	0	0	1164	1305	0
Flt Permitted	0.971			0.998		
Satd. Flow (perm)	1315	0	0	1164	1305	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	46	32	17	485	488	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	0	0	502	552	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	73.0%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	30	16	456	459	60
Future Volume (Veh/h)	43	30	16	456	459	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	46	32	17	485	488	64
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.93	0.87	0.87			
vC, conflicting volume	1085	570	598			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	733	427	459			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	94	98			
cM capacity (veh/h)	341	520	920			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	78	502	552			
Volume Left	46	17	0			
Volume Right	32	0	64			
cSH	397	920	1700			
Volume to Capacity	0.20	0.02	0.32			
Queue Length 95th (m)	5.4	0.4	0.0			
Control Delay (s/veh)	16.3	0.5	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	16.3	0.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			73.0%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	125	184	288	152	199	291
Future Volume (vph)	125	184	288	152	199	291
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.97	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.461	
Satd. Flow (perm)	1339	1063	1563	1032	642	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		194		160		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	132	194	303	160	209	306
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	194	303	160	209	306
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.8	10.8	16.0	16.0	31.2	27.8
Actuated g/C Ratio	0.21	0.21	0.31	0.31	0.60	0.54
v/c Ratio	0.47	0.52	0.63	0.37	0.41	0.36

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	26.0	9.4	22.2	5.8	7.7	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.0	9.4	22.2	5.8	7.7	8.5
LOS	C	A	C	A	A	A
Approach Delay (s/veh)	16.1		16.5			8.1
Approach LOS	B		B			A
Queue Length 50th (m)	10.7	0.0	22.7	0.0	6.9	13.4
Queue Length 95th (m)	27.4	14.2	49.7	10.4	19.1	32.0
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	536	542	764	586	533	1171
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.36	0.40	0.27	0.39	0.26

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 51.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay (s/veh): 13.1

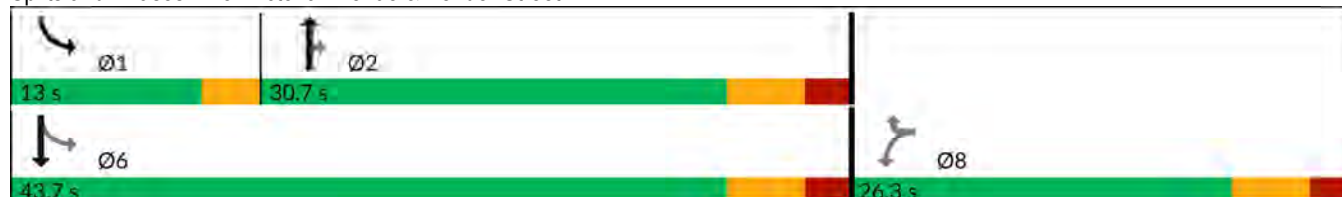
Intersection LOS: B

Intersection Capacity Utilization 59.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	125	184	288	152	199	291
Future Volume (vph)	125	184	288	152	199	291
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1351	1068	1563	1048	1353	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.46	1.00
Satd. Flow (perm)	1351	1068	1563	1048	656	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	132	194	303	160	209	306
RTOR Reduction (vph)	0	153	0	110	0	0
Lane Group Flow (vph)	132	41	303	50	209	306
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.8	10.8	16.1	16.1	27.8	27.8
Effective Green, g (s)	10.8	10.8	16.1	16.1	27.8	27.8
Actuated g/C Ratio	0.21	0.21	0.31	0.31	0.54	0.54
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	284	225	491	329	474	848
v/s Ratio Prot			c0.19		c0.07	0.20
v/s Ratio Perm	c0.10	0.04		0.05	0.16	
v/c Ratio	0.46	0.18	0.62	0.15	0.44	0.36
Uniform Delay, d1	17.7	16.6	14.9	12.6	6.5	6.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.3	2.4	0.3	0.7	0.3
Delay (s)	18.5	16.9	17.4	12.9	7.2	7.0
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	17.5		15.8			7.0
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			51.2		Sum of lost time (s)	15.6
Intersection Capacity Utilization			59.4%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	10	6	433	396	20
Future Volume (vph)	7	10	6	433	396	20
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.921					0.850
Flt Protected	0.980			0.999		
Satd. Flow (prot)	1293	0	0	1165	1563	1106
Flt Permitted	0.980			0.999		
Satd. Flow (perm)	1293	0	0	1165	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	7	10	6	451	413	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	457	413	21
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.9%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	10	6	433	396	20
Future Volume (Veh/h)	7	10	6	433	396	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	10	6	451	413	21
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.88	0.87	0.87			
vC, conflicting volume	959	496	517			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	546	342	366			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	99			
cM capacity (veh/h)	403	561	957			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	17	457	413	21		
Volume Left	7	6	0	0		
Volume Right	10	0	0	21		
cSH	483	957	1700	1700		
Volume to Capacity	0.04	0.00*	0.24	0.01		
Queue Length 95th (m)	0.8	0.1	0.0	0.0		
Control Delay (s/veh)	12.7	0.2	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	12.7	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			56.9%	ICU Level of Service		B
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	17	14	55	44	39	14	360	41	18	341	47
Future Volume (vph)	40	17	14	55	44	39	14	360	41	18	341	47
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.93			0.98			1.00	0.80
Frt		0.973			0.962			0.987				0.850
Flt Protected		0.972			0.980			0.998			0.998	
Satd. Flow (prot)	0	1277	0	0	1276	0	0	1374	0	0	1165	1024
Flt Permitted		0.744			0.836			0.979			0.965	
Satd. Flow (perm)	0	934	0	0	1045	0	0	1343	0	0	1121	818
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			34			12				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	43	18	15	59	47	42	15	387	44	19	367	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	148	0	0	446	0	0	386	51
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2		2			2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.4			11.4			20.7			20.7	20.7
Actuated g/C Ratio		0.24			0.24			0.44			0.44	0.44
v/c Ratio		0.32			0.53			0.74			0.78	0.13
Control Delay (s/veh)		17.8			21.5			19.7			24.4	2.9
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		17.8			21.5			19.7			24.4	2.9

No Background Development
PTSL (250550)

Synchro 12 Report
Page 15

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			C			B			C	A
Approach Delay (s/veh)		17.8			21.5			19.7			21.9	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		4.2			8.3			24.8			22.7	0.0
Queue Length 95th (m)		13.8			23.7			#68.0			#72.9	3.8
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		387			444			855			710	542
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		0.20			0.33			0.52			0.54	0.09

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 46.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 20.7

Intersection LOS: C

Intersection Capacity Utilization 82.1%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	17	14	55	44	39	14	360	41	18	341	47
Future Volume (vph)	40	17	14	55	44	39	14	360	41	18	341	47
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.98			0.97			0.99			1.00	0.84
Flpb, ped/bikes		0.97			0.97			1.00			1.00	1.00
Frt		0.97			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1241			1245			1375			1160	861
Flt Permitted		0.74			0.84			0.98			0.96	1.00
Satd. Flow (perm)		949			1062			1349			1122	861
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	43	18	15	59	47	42	15	387	44	19	367	51
RTOR Reduction (vph)	0	11	0	0	26	0	0	7	0	0	0	28
Lane Group Flow (vph)	0	65	0	0	122	0	0	439	0	0	386	23
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.4			11.4			20.7			20.7	20.7
Effective Green, g (s)		11.4			11.4			20.7			20.7	20.7
Actuated g/C Ratio		0.25			0.25			0.45			0.45	0.45
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		235			263			607			504	387
v/s Ratio Prot												
v/s Ratio Perm		0.07			c0.12			0.33			c0.34	0.03
v/c Ratio		0.28			0.47			0.72			0.77	0.06
Uniform Delay, d1		14.0			14.7			10.3			10.6	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.5			0.9			4.0			6.6	0.0
Delay (s)		14.4			15.7			14.3			17.2	7.2
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		14.4			15.7			14.3			16.0	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		15.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		46.0			Sum of lost time (s)			13.9				
Intersection Capacity Utilization		82.1%			ICU Level of Service			E				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	655	177	41	747	14	261	31	24	2	26	25
Future Volume (vph)	56	655	177	41	747	14	261	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.968			0.997			0.990			0.936	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1381	2875	0	1381	2961	0	0	1338	0	0	1295	0
Flt Permitted	0.221			0.208				0.724			0.989	
Satd. Flow (perm)	321	2875	0	302	2961	0	0	1003	0	0	1283	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			2			5			27	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	60	704	190	44	803	15	281	33	26	2	28	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	894	0	44	818	0	0	340	0	0	57	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	38.0		9.0	38.0		43.0	43.0		43.0	43.0	
Total Split (%)	10.0%	42.2%		10.0%	42.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	6.0	31.7		6.0	31.7		35.7	35.7		35.7	35.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	38.0	31.3		37.4	29.5			30.8			30.8	
Actuated g/C Ratio	0.47	0.39		0.46	0.36			0.38			0.38	
v/c Ratio	0.26	0.79		0.20	0.76			0.89			0.11	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	15.1	29.0		14.3	29.6			50.9			11.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	15.1	29.0		14.3	29.6			50.9			11.3	
LOS	B	C		B	C			D			B	
Approach Delay (s/veh)		28.2			28.8			50.9			11.3	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	5.2	71.0		3.8	65.1			51.0			3.1	
Queue Length 95th (m)	11.7	#105.0		9.2	87.7			#100.0			10.3	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	231	1239		222	1205			462			602	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.26	0.72		0.20	0.68			0.74			0.09	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 81.1

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay (s/veh): 31.5

Intersection LOS: C

Intersection Capacity Utilization 78.3%

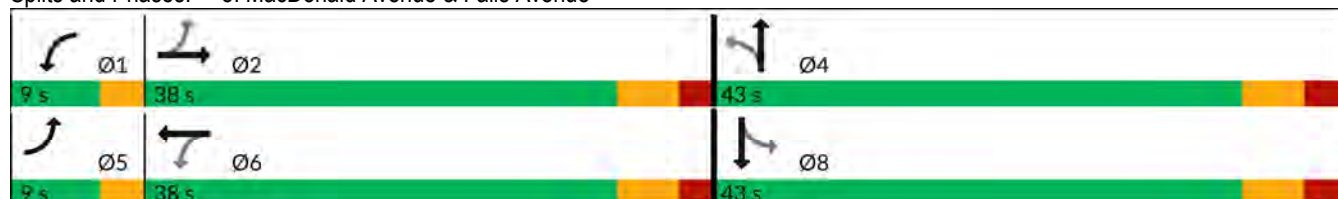
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	655	177	41	747	14	261	31	24	2	26	25
Future Volume (vph)	56	655	177	41	747	14	261	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2876		1381	2962			1330			1296	
Flt Permitted	0.22	1.00		0.21	1.00			0.72			0.99	
Satd. Flow (perm)	321	2876		303	2962			1003			1283	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	60	704	190	44	803	15	281	33	26	2	28	27
RTOR Reduction (vph)	0	26	0	0	1	0	0	3	0	0	17	0
Lane Group Flow (vph)	60	868	0	44	817	0	0	337	0	0	40	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	35.7	31.3		33.3	30.1			30.8			30.8	
Effective Green, g (s)	35.7	31.3		33.3	30.1			30.8			30.8	
Actuated g/C Ratio	0.44	0.38		0.41	0.37			0.38			0.38	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	196	1099		165	1088			377			482	
v/s Ratio Prot	c0.02	c0.30		0.01	0.28							
v/s Ratio Perm	0.12			0.10				c0.34			0.03	
v/c Ratio	0.31	0.79		0.27	0.75			0.89			0.08	
Uniform Delay, d1	14.5	22.4		15.6	22.6			24.0			16.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	4.5		0.6	3.5			22.4			0.2	
Delay (s)	15.1	26.9		16.3	26.1			46.4			16.6	
Level of Service	B	C		B	C			D			B	
Approach Delay (s/veh)		26.1			25.6			46.4			16.6	
Approach LOS		C			C			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			28.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			81.9			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			78.3%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Future Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.930			0.996			0.989	
Flt Protected		0.983			0.999			0.999			0.990	
Satd. Flow (prot)	0	1385	0	0	1331	0	0	1386	0	0	1393	0
Flt Permitted		0.983			0.999			0.999			0.990	
Satd. Flow (perm)	0	1385	0	0	1331	0	0	1386	0	0	1393	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	28	41	10	3	64	73	6	235	7	55	184	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	79	0	0	140	0	0	248	0	0	260	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.2%						ICU Level of Service B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Future Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	41	10	3	64	73	6	235	7	55	184	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	79	140	248	260								
Volume Left (vph)	28	3	6	55								
Volume Right (vph)	10	73	7	21								
Hadj (s)	-0.01	-0.31	0.04	0.01								
Departure Headway (s)	5.4	5.0	4.9	4.8								
Degree Utilization, x	0.12	0.19	0.33	0.35								
Capacity (veh/h)	595	651	704	708								
Control Delay (s/veh)	9.1	9.1	10.3	10.3								
Approach Delay (s/veh)	9.1	9.1	10.3	10.3								
Approach LOS	A	A	B	B								
Intersection Summary												
Delay			9.9									
Level of Service			A									
Intersection Capacity Utilization			63.2%	ICU Level of Service					B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	62	17	2	67	2	6	1	1	1	2	3
Future Volume (vph)	1	62	17	2	67	2	6	1	1	1	2	3
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.971			0.997			0.985			0.923	
Flt Protected		0.999			0.999			0.963			0.993	
Satd. Flow (prot)	0	1390	0	0	1427	0	0	1359	0	0	1313	0
Flt Permitted		0.999			0.999			0.963			0.993	
Satd. Flow (perm)	0	1390	0	0	1427	0	0	1359	0	0	1313	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			79.0			93.8			56.1	
Travel Time (s)		26.1			5.7			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	73	20	2	79	2	7	1	1	1	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	83	0	0	9	0	0	7	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	17.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

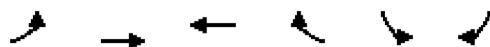
4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	62	17	2	67	2	6	1	1	1	2	3
Future Volume (Veh/h)	1	62	17	2	67	2	6	1	1	1	2	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	73	20	2	79	2	7	1	1	1	2	4
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	83			94			177	173	85	174	182	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	83			94			177	173	85	174	182	84
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 %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1524			1511			779	720	978	787	712	977
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	94	83	9	7								
Volume Left	1	2	7	1								
Volume Right	20	2	1	4								
cSH	1524	1511	790	856								
Volume to Capacity	0.00*	0.00*	0.01	0.00*								
Queue Length 95th (m)	0.0	0.0	0.3	0.2								
Control Delay (s/veh)	0.1	0.2	9.6	9.2								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.2	9.6	9.2								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			17.5%	ICU Level of Service				A				
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

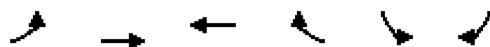
4873 and 4898 Kitchener Street TIS
Background PM (5-Year)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	63	71	2	4	0
Future Volume (vph)	1	63	71	2	4	0
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.997					
Flt Protected	0.999		0.950			
Satd. Flow (prot)	0	1177	1334	0	1361	0
Flt Permitted	0.999		0.950			
Satd. Flow (perm)	0	1177	1334	0	1361	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	79.0		37.0		36.9	
Travel Time (s)	5.7		2.7		2.7	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	71	80	2	4	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	72	82	0	4	0
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	63	71	2	4	0
Future Volume (Veh/h)	1	63	71	2	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	71	80	2	4	0
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	87				159	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87				159	86
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)	1514				832	973
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	72	82	4			
Volume Left	1	0	4			
Volume Right	0	2	0			
cSH	1514	1700	832			
Volume to Capacity	0.00*	0.05	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.1	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s/veh)	0.1	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			16.7%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	68	0	0	74	2	0	0	2	2	0	0
Future Volume (vph)	0	68	0	0	74	2	0	0	2	2	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.997					0.865		
Flt Protected									0.950			
Satd. Flow (prot)	0	1178	0	0	1334	0	0	1240	0	0	1361	0
Flt Permitted									0.950			
Satd. Flow (perm)	0	1178	0	0	1334	0	0	1240	0	0	1361	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	37.0				57.8				32.6			
Travel Time (s)	2.7				4.2				2.3			
Confl. Peds. (#/hr)	7					7	1					3
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	77	0	0	84	2	0	0	2	2	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	0	0	86	0	0	2	0	0	2	0
Sign Control	Free				Free				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	68	0	0	74	2	0	0	2	2	0	0
Future Volume (Veh/h)	0	68	0	0	74	2	0	0	2	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	77	0	0	84	2	0	0	2	2	0	0
Pedestrians		1			3						7	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.0			1.0						1.0	
Percent Blockage		0			0						1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	93			77			163	170	80	174	169	93
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			77			163	170	80	174	169	93
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1504			1535			801	722	983	780	722	962
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	77	86	2	2								
Volume Left	0	0	0	2								
Volume Right	0	2	2	0								
cSH	1504	1700	983	780								
Volume to Capacity	0.00	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.1								
Control Delay (s/veh)	0.0	0.0	8.7	9.6								
Lane LOS			A	A								
Approach Delay (s/veh)	0.0	0.0	8.7	9.6								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			18.3%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	163	497	368	216
Future Volume (vph)	0	0	163	497	368	216
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.950	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1259	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1259	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		5	63			63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	179	546	404	237
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	179	546	641	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	74.6%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	163	497	368	216
Future Volume (Veh/h)	0	0	163	497	368	216
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	179	546	404	237
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1490	591	704			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1490	591	704			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	80			
cM capacity (veh/h)	110	508	894			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	179	546	641			
Volume Left	179	0	0			
Volume Right	0	0	237			
cSH	894	1700	1700			
Volume to Capacity	0.20	0.32	0.38			
Queue Length 95th (m)	5.6	0.0	0.0			
Control Delay (s/veh)	10.0	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.5		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			74.6%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	59	45	616	0	0	368
Future Volume (vph)	59	45	616	0	0	368
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		1		57	57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	61	47	642	0	0	383
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	642	0	0	383
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	109.0%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	45	616	0	0	368
Future Volume (Veh/h)	59	45	616	0	0	368
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	47	642	0	0	383
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.72	0.72			0.72	
vC, conflicting volume	1082	700			699	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	922	393			392	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	90			100	
cM capacity (veh/h)	206	449			803	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	108	642	383			
Volume Left	61	0	0			
Volume Right	47	0	0			
cSH	270	1700	1700			
Volume to Capacity	0.40	0.38	0.23			
Queue Length 95th (m)	13.8	0.0	0.0			
Control Delay (s/veh)	27.0	0.0	0.0			
Lane LOS	D					
Approach Delay (s/veh)	27.0	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization		109.0%		ICU Level of Service		H
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	323	0	0	0	0	443	16	80	346	0
Future Volume (vph)	172	0	323	0	0	0	0	443	16	80	346	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.93					1.00		0.96		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1313	0	1354	1563	0
Flt Permitted	0.950									0.418		
Satd. Flow (perm)	1364	0	1033	0	0	0	0	1313	0	572	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			215					4				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	336	0	0	0	0	461	17	83	360	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	336	0	0	0	0	478	0	83	360	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					31.8		31.8	31.8	
Total Split (%)	47.0%		47.0%					53.0%		53.0%	53.0%	
Maximum Green (s)	22.1		22.1					25.7		25.7	25.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	12.9		12.9					20.6		20.6	20.6	
Actuated g/C Ratio	0.28		0.28					0.44		0.44	0.44	
v/c Ratio	0.47		0.76					0.82		0.33	0.52	
Control Delay (s/veh)	19.1		18.6					26.7		14.1	13.4	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	19.1		18.6					26.7		14.1	13.4	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		B					C		B	B	
Approach Delay (s/veh)		18.7						26.7			13.6	
Approach LOS		B						C			B	
Queue Length 50th (m)	12.5		8.3					27.9		3.7	17.5	
Queue Length 95th (m)	27.3		34.1					#94.6		15.7	49.4	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	684		624					766		333	910	
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	0.26		0.54					0.62		0.25	0.40	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 46.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay (s/veh): 19.8

Intersection LOS: B

Intersection Capacity Utilization 109.0%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	323	0	0	0	0	443	16	80	346	0
Future Volume (vph)	172	0	323	0	0	0	0	443	16	80	346	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.95					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.97	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1045					1315		1308	1563	
Flt Permitted	0.95		1.00					1.00		0.42	1.00	
Satd. Flow (perm)	1368		1045					1315		576	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	179	0	336	0	0	0	0	461	17	83	360	0
RTOR Reduction (vph)	0	0	154	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	179	0	182	0	0	0	0	476	0	83	360	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	13.0		13.0					20.6		20.6	20.6	
Effective Green, g (s)	13.0		13.0					20.6		20.6	20.6	
Actuated g/C Ratio	0.28		0.28					0.45		0.45	0.45	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	388		296					591		259	703	
v/s Ratio Prot	0.13							c0.36			0.23	
v/s Ratio Perm			c0.17							0.14		
v/c Ratio	0.46		0.61					0.81		0.32	0.51	
Uniform Delay, d1	13.5		14.2					10.9		8.1	9.0	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.4		2.8					7.5		0.3	0.3	
Delay (s)	13.9		17.0					18.3		8.4	9.3	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		15.9			0.0			18.3			9.1	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.6									
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			45.8									
Intersection Capacity Utilization			109.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	48	61	9	411	601	68
Future Volume (vph)	48	61	9	411	601	68
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.924				0.986	
Flt Protected	0.978			0.999		
Satd. Flow (prot)	1295	0	0	1165	1308	0
Flt Permitted	0.978			0.999		
Satd. Flow (perm)	1295	0	0	1165	1308	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	51	65	10	437	639	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	116	0	0	447	711	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	69.0%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	48	61	9	411	601	68
Future Volume (Veh/h)	48	61	9	411	601	68
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	51	65	10	437	639	72
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.90	0.85	0.85			
vC, conflicting volume	1231	779	799			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	965	654	677			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	82	99			
cM capacity (veh/h)	228	360	718			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	116	447	711			
Volume Left	51	10	0			
Volume Right	65	0	72			
cSH	287	718	1700			
Volume to Capacity	0.40	0.01	0.42			
Queue Length 95th (m)	14.0	0.3	0.0			
Control Delay (s/veh)	25.8	0.4	0.0			
Lane LOS	D	A				
Approach Delay (s/veh)	25.8	0.4	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			69.0%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	131	181	239	255	315	347
Future Volume (vph)	131	181	239	255	315	347
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.85		0.85	0.91	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.505	
Satd. Flow (perm)	1322	943	1533	932	667	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		185		260		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	134	185	244	260	321	354
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	185	244	260	321	354
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	10.8	10.8	14.7	14.7	30.8	27.4
Actuated g/C Ratio	0.21	0.21	0.29	0.29	0.60	0.54
v/c Ratio	0.48	0.54	0.56	0.58	0.60	0.42

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	25.9	10.4	21.1	8.1	11.1	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.9	10.4	21.1	8.1	11.1	9.2
LOS	C	B	C	A	B	A
Approach Delay (s/veh)	16.9		14.4			10.1
Approach LOS	B		B			B
Queue Length 50th (m)	10.5	0.0	18.3	0.0	11.6	15.9
Queue Length 95th (m)	27.7	14.3	40.4	14.6	31.0	38.5
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	533	490	754	590	545	1179
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.38	0.32	0.44	0.59	0.30

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 51.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay (s/veh): 13.0

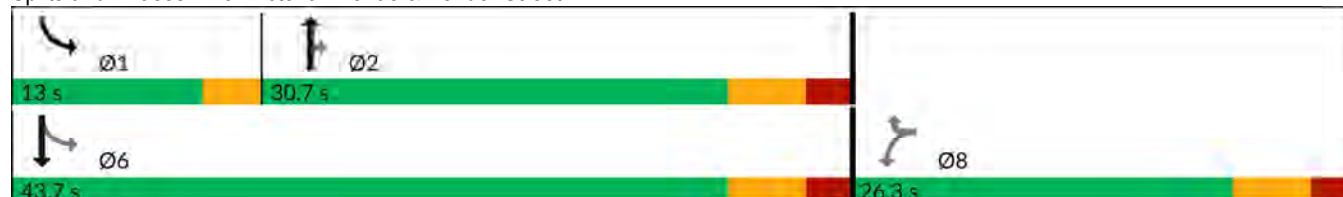
Intersection LOS: B

Intersection Capacity Utilization 72.7%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	131	181	239	255	315	347
Future Volume (vph)	131	181	239	255	315	347
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.89	1.00	0.89	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1338	982	1533	973	1337	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.50	1.00
Satd. Flow (perm)	1338	982	1533	973	711	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	134	185	244	260	321	354
RTOR Reduction (vph)	0	146	0	184	0	0
Lane Group Flow (vph)	134	39	244	76	321	354
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.8	10.8	14.8	14.8	27.4	27.4
Effective Green, g (s)	10.8	10.8	14.8	14.8	27.4	27.4
Actuated g/C Ratio	0.21	0.21	0.29	0.29	0.54	0.54
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	284	208	446	283	501	843
v/s Ratio Prot			0.16		c0.12	0.23
v/s Ratio Perm	c0.10	0.04		0.08	c0.22	
v/c Ratio	0.47	0.19	0.55	0.27	0.64	0.42
Uniform Delay, d1	17.5	16.4	15.2	13.8	7.2	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.3	1.5	0.6	2.8	0.4
Delay (s)	18.4	16.7	16.7	14.4	10.0	7.4
Level of Service	B	B	B	B	B	A
Approach Delay (s/veh)	17.4		15.5			8.6
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			50.8		Sum of lost time (s)	15.6
Intersection Capacity Utilization			72.7%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	7	3	489	459	18
Future Volume (vph)	5	7	3	489	459	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.921					0.850
Flt Protected	0.980					
Satd. Flow (prot)	1293	0	0	1166	1563	1106
Flt Permitted	0.980					
Satd. Flow (perm)	1293	0	0	1166	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	5	7	3	494	464	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	0	497	464	18
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	61.8%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	7	3	489	459	18
Future Volume (Veh/h)	5	7	3	489	459	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	7	3	494	464	18
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.90	0.84	0.84			
vC, conflicting volume	1168	667	685			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	726	507	529			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	100			
cM capacity (veh/h)	281	381	701			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	12	497	464	18		
Volume Left	5	3	0	0		
Volume Right	7	0	0	18		
cSH	331	701	1700	1700		
Volume to Capacity	0.04	0.00*	0.27	0.01		
Queue Length 95th (m)	0.8	0.1	0.0	0.0		
Control Delay (s/veh)	16.3	0.1	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s/veh)	16.3	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			61.8%	ICU Level of Service		B
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	24	22	52	51	57	31	374	33	23	380	63
Future Volume (vph)	61	24	22	52	51	57	31	374	33	23	380	63
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.92			0.97			0.99	0.72
Frt		0.972			0.952			0.990				0.850
Flt Protected		0.972			0.984			0.996			0.997	
Satd. Flow (prot)	0	1280	0	0	1244	0	0	1365	0	0	1174	1063
Flt Permitted		0.753			0.848			0.946			0.958	
Satd. Flow (perm)	0	942	0	0	1029	0	0	1284	0	0	1120	767
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			47			9				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	64	25	23	55	54	60	33	394	35	24	400	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	112	0	0	169	0	0	462	0	0	424	66
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2		2			2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.7			11.7			22.8			22.8	22.8
Actuated g/C Ratio		0.24			0.24			0.47			0.47	0.47
v/c Ratio		0.46			0.60			0.77			0.81	0.17
Control Delay (s/veh)		21.4			23.4			21.8			27.2	3.9
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		21.4			23.4			21.8			27.2	3.9

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			C			C			C	A
Approach Delay (s/veh)		21.4			23.4			21.8			24.1	
Approach LOS		C			C			C			C	
Queue Length 50th (m)		7.3			10.3			28.3			27.2	0.0
Queue Length 95th (m)		19.3			26.7			#84.4			#82.8	5.4
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		374			422			770			668	484
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		0.30			0.40			0.60			0.63	0.14

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 49

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay (s/veh): 22.9

Intersection LOS: C

Intersection Capacity Utilization 90.2%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	24	22	52	51	57	31	374	33	23	380	63
Future Volume (vph)	61	24	22	52	51	57	31	374	33	23	380	63
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.96			0.98			1.00	0.77
Flpb, ped/bikes		0.96			0.97			0.99			0.99	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1235			1214			1360			1167	820
Flt Permitted		0.75			0.85			0.95			0.96	1.00
Satd. Flow (perm)		957			1046			1291			1121	820
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	25	23	55	54	60	33	394	35	24	400	66
RTOR Reduction (vph)	0	17	0	0	36	0	0	5	0	0	0	35
Lane Group Flow (vph)	0	95	0	0	133	0	0	457	0	0	424	31
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.7			11.7			22.9			22.9	22.9
Effective Green, g (s)		11.7			11.7			22.9			22.9	22.9
Actuated g/C Ratio		0.24			0.24			0.47			0.47	0.47
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		230			252			609			529	387
v/s Ratio Prot												
v/s Ratio Perm		0.10			0.13			0.35			0.38	0.04
v/c Ratio		0.41			0.53			0.75			0.80	0.08
Uniform Delay, d1		15.5			16.0			10.5			10.9	7.0
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.9			1.5			4.9			8.3	0.1
Delay (s)		16.4			17.5			15.4			19.2	7.1
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		16.4			17.5			15.4			17.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		16.6										
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		48.5										
Intersection Capacity Utilization		90.2%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	886	257	34	660	8	264	22	22	7	26	24
Future Volume (vph)	43	886	257	34	660	8	264	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.966			0.998			0.990			0.943	
Flt Protected	0.950			0.950				0.959			0.994	
Satd. Flow (prot)	1381	2876	0	1381	2964	0	0	1349	0	0	1330	0
Flt Permitted	0.324			0.115				0.716			0.951	
Satd. Flow (perm)	471	2876	0	167	2964	0	0	999	0	0	1273	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			1			5			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	913	265	35	680	8	272	23	23	7	27	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	1178	0	35	688	0	0	318	0	0	59	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.6		9.0	40.6		40.4	40.4		40.4	40.4	
Total Split (%)	10.0%	45.1%		10.0%	45.1%		44.9%	44.9%		44.9%	44.9%	
Maximum Green (s)	6.0	34.3		6.0	34.3		33.1	33.1		33.1	33.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	41.5	34.9		41.5	34.9			28.6			28.6	
Actuated g/C Ratio	0.50	0.42		0.50	0.42			0.35			0.35	
v/c Ratio	0.14	0.95		0.20	0.55			0.91			0.13	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	12.0	40.8		13.5	21.6			57.0			13.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	12.0	40.8		13.5	21.6			57.0			13.2	
LOS	B	D		B	C			E			B	
Approach Delay (s/veh)		39.8			21.2			57.0			13.2	
Approach LOS		D			C			E			B	
Queue Length 50th (m)	3.5	~114.3		2.8	49.2			48.6			3.7	
Queue Length 95th (m)	8.6	#154.0		7.2	67.1			#96.4			11.5	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	305	1246		174	1257			411			535	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.14	0.95		0.20	0.55			0.77			0.11	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 82.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay (s/veh): 35.7

Intersection LOS: D

Intersection Capacity Utilization 87.4%

ICU Level of Service E

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	886	257	34	660	8	264	22	22	7	26	24
Future Volume (vph)	43	886	257	34	660	8	264	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2877		1381	2965			1339			1331	
Flt Permitted	0.32	1.00		0.11	1.00			0.72			0.95	
Satd. Flow (perm)	471	2877		167	2965			999			1274	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	44	913	265	35	680	8	272	23	23	7	27	25
RTOR Reduction (vph)	0	28	0	0	1	0	0	3	0	0	16	0
Lane Group Flow (vph)	44	1150	0	35	687	0	0	315	0	0	43	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	38.1	34.8		38.1	34.8			28.6			28.6	
Effective Green, g (s)	38.1	34.8		38.1	34.8			28.6			28.6	
Actuated g/C Ratio	0.46	0.42		0.46	0.42			0.34			0.34	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	251	1201		124	1238			342			437	
v/s Ratio Prot	0.01	c0.40		c0.01	0.23							
v/s Ratio Perm	0.07			0.12				c0.32			0.03	
v/c Ratio	0.18	0.96		0.28	0.56			0.92			0.10	
Uniform Delay, d1	12.9	23.5		15.0	18.4			26.3			18.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	17.0		0.9	0.9			29.2			0.2	
Delay (s)	13.1	40.5		15.9	19.3			55.5			18.8	
Level of Service	B	D		B	B			E			B	
Approach Delay (s/veh)		39.5			19.1			55.5			18.8	
Approach LOS		D			B			E			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			34.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			83.3			Sum of lost time (s)				16.6		
Intersection Capacity Utilization			87.4%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Future Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.933			0.998			0.987	
Flt Protected		0.984			0.995			0.999			0.988	
Satd. Flow (prot)	0	1397	0	0	1320	0	0	1429	0	0	1397	0
Flt Permitted		0.984			0.995			0.999			0.988	
Satd. Flow (perm)	0	1397	0	0	1320	0	0	1429	0	0	1397	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	33	63	7	15	63	76	3	215	3	80	222	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	0	0	154	0	0	221	0	0	335	0
Sign Control	Stop				Stop				Stop			
Intersection Summary												
Area Type:	Other											
Control Type: Unsignalized												
Intersection Capacity Utilization 63.9%												
ICU Level of Service B												
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Future Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	33	63	7	15	63	76	3	215	3	80	222	33
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	103	154	221	335								
Volume Left (vph)	33	15	3	80								
Volume Right (vph)	7	76	3	33								
Hadj (s)	0.02	-0.26	-0.01	-0.01								
Departure Headway (s)	5.6	5.2	5.1	4.9								
Degree Utilization, x	0.16	0.22	0.31	0.46								
Capacity (veh/h)	567	616	664	697								
Control Delay (s/veh)	9.7	9.7	10.4	12.0								
Approach Delay (s/veh)	9.7	9.7	10.4	12.0								
Approach LOS	A	A	B	B								
Intersection Summary												
Delay			10.8									
Level of Service			B									
Intersection Capacity Utilization			63.9%	ICU Level of Service					B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	99	10	6	65	3	23	0	10	0	0	2
Future Volume (vph)	0	99	10	6	65	3	23	0	10	0	0	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.988				0.994				0.959		0.865	
Flt Protected					0.996				0.966			
Satd. Flow (prot)	0	1416	0	0	1419	0	0	1328	0	0	1240	0
Flt Permitted					0.996				0.966			
Satd. Flow (perm)	0	1416	0	0	1419	0	0	1328	0	0	1240	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	362.4				79.0				93.8		56.1	
Travel Time (s)	26.1				5.7				6.8		4.0	
Confl. Peds. (#/hr)	10	5		5	10		4		4			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	119	12	7	78	4	28	0	12	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	131	0	0	89	0	0	40	0	0	2	0
Sign Control	Free				Free				Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	28.4%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

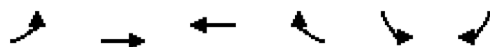
4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	0	99	10	6	65	3	23	0	10	0	0	2	
Future Volume (Veh/h)	0	99	10	6	65	3	23	0	10	0	0	2	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
Hourly flow rate (vph)	0	119	12	7	78	4	28	0	12	0	0	2	
Pedestrians					4					5			
Lane Width (m)					3.6					3.6			
Walking Speed (m/s)					1.0					1.0			
Percent Blockage					0					1			
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	92			136			226	236	134	245	240	90	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	92			136			226	236	134	245	240	90	
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 %	100			100			96	100	99	100	100	100	
cM capacity (veh/h)	1500			1453			718	655	912	683	652	964	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	131	89	40	2									
Volume Left	0	7	28	0									
Volume Right	12	4	12	2									
cSH	1500	1453	767	964									
Volume to Capacity	0.00	0.00*	0.05	0.00*									
Queue Length 95th (m)	0.0	0.1	1.2	0.0									
Control Delay (s/veh)	0.0	0.6	10.0	8.7									
Lane LOS	A		A	A									
Approach Delay (s/veh)	0.0	0.6	10.0	8.7									
Approach LOS			A	A									
Intersection Summary													
Average Delay			1.8										
Intersection Capacity Utilization			28.4%	ICU Level of Service				A					
Analysis Period (min)			15										

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

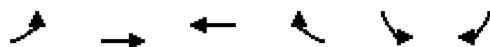
4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	101	74	1	3	1
Future Volume (vph)	7	101	74	1	3	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.973	
Flt Protected		0.997			0.962	
Satd. Flow (prot)	0	1174	1337	0	1341	0
Flt Permitted		0.997			0.962	
Satd. Flow (perm)	0	1174	1337	0	1341	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	125	91	1	4	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	134	92	0	5	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	26.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	101	74	1	3	1
Future Volume (Veh/h)	7	101	74	1	3	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	9	125	91	1	4	1
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	103				246	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	103				246	106
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				99	100
cM capacity (veh/h)	1485				735	941
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	134	92	5			
Volume Left	9	0	4			
Volume Right	0	1	1			
cSH	1485	1700	768			
Volume to Capacity	0.00*	0.05	0.00*			
Queue Length 95th (m)	0.1	0.0	0.1			
Control Delay (s/veh)	0.5	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s/veh)	0.5	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			26.8%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	103	0	0	70	6	3	1	0	5	0	1
Future Volume (vph)	1	103	0	0	70	6	3	1	0	5	0	1
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.989						0.981					
Flt Protected							0.964					
Satd. Flow (prot)	0	1178	0	0	1323	0	0	1381	0	0	1348	0
Flt Permitted							0.964					
Satd. Flow (perm)	0	1178	0	0	1323	0	0	1381	0	0	1348	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	37.0			57.8			32.6			36.9		
Travel Time (s)	2.7			4.2			2.3			2.7		
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	120	0	0	81	7	3	1	0	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	0	0	88	0	0	4	0	0	7	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	103	0	0	70	6	3	1	0	5	0	1
Future Volume (Veh/h)	1	103	0	0	70	6	3	1	0	5	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	1	120	0	0	81	7	3	1	0	6	0	1
Pedestrians		3			1			2			29	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	117			122			213	241	123	237	238	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			122			213	241	123	237	238	117
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 %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1441			1475			726	643	931	682	646	911
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	121	88	4	7								
Volume Left	1	0	3	6								
Volume Right	0	7	0	1								
cSH	1441	1700	703	708								
Volume to Capacity	0.00*	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.1	0.2								
Control Delay (s/veh)	0.1	0.0	10.1	10.1								
Lane LOS	A		B	B								
Approach Delay (s/veh)	0.1	0.0	10.1	10.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			21.5%	ICU Level of Service					A			
Analysis Period (min)			15									
* Value less than 0.01.												

Appendix L

Five-Year Total Traffic Operations Without Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	53	342	177	149
Future Volume (vph)	0	0	53	342	177	149
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.938					
Flt Protected	0.950					
Satd. Flow (prot)	0	0	1381	1518	1211	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	0	1381	1518	1211	0
Link Speed (k/h)	40	50				50
Link Distance (m)	75.7	60.3				168.1
Travel Time (s)	6.8	4.3				12.1
Confl. Peds. (#/hr)	1	29				29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	62	398	206	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	62	398	379	0
Sign Control	Stop	Free				Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	37.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	53	342	177	149
Future Volume (Veh/h)	0	0	53	342	177	149
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	62	398	206	173
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	845	322	408			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	845	322	408			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	95			
cM capacity (veh/h)	318	724	1162			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	62	398	379			
Volume Left	62	0	0			
Volume Right	0	0	173			
cSH	1162	1700	1700			
Volume to Capacity	0.05	0.23	0.22			
Queue Length 95th (m)	1.3	0.0	0.0			
Control Delay (s/veh)	8.3	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	1.1		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			37.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	8	387	0	0	177
Future Volume (vph)	10	8	387	0	0	177
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		2		10	10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	12	10	472	0	0	216
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	472	0	0	216
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	69.4%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	8	387	0	0	177
Future Volume (Veh/h)	10	8	387	0	0	177
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	10	472	0	0	216
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	698	484			482	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	629	397			395	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	97	98			100	
cM capacity (veh/h)	394	571			1071	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	22	472	216			
Volume Left	12	0	0			
Volume Right	10	0	0			
cSH	458	1700	1700			
Volume to Capacity	0.05	0.28	0.13			
Queue Length 95th (m)	1.1	0.0	0.0			
Control Delay (s/veh)	13.2	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	13.2	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		69.4%		ICU Level of Service		C
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	314	0	0	0	0	189	10	8	180	0
Future Volume (vph)	198	0	314	0	0	0	0	189	10	8	180	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.98		
Frt			0.850					0.993				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1254	0	1381	1504	0
Flt Permitted	0.950									0.616		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1254	0	882	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			361					5				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	228	0	361	0	0	0	0	217	11	9	207	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	0	361	0	0	0	0	228	0	9	207	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	32.0		32.0					28.0		28.0	28.0	
Total Split (%)	53.3%		53.3%					46.7%		46.7%	46.7%	
Maximum Green (s)	25.9		25.9					21.9		21.9	21.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	11.2		11.2					11.4		11.4	11.4	
Actuated g/C Ratio	0.32		0.32					0.32		0.32	0.32	
v/c Ratio	0.52		0.62					0.56		0.03	0.43	
Control Delay (s/veh)	15.4		6.9					16.3		9.4	13.0	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	15.4		6.9					16.3		9.4	13.0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		A	B	
Approach Delay (s/veh)		10.2						16.3			12.9	
Approach LOS		B						B			B	
Queue Length 50th (m)	9.4		0.0					9.7		0.3	8.5	
Queue Length 95th (m)	27.5		11.7					29.2		2.4	24.9	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1058		906					814		571	974	
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	0.22		0.40					0.28		0.02	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 35.3

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay (s/veh): 12.1

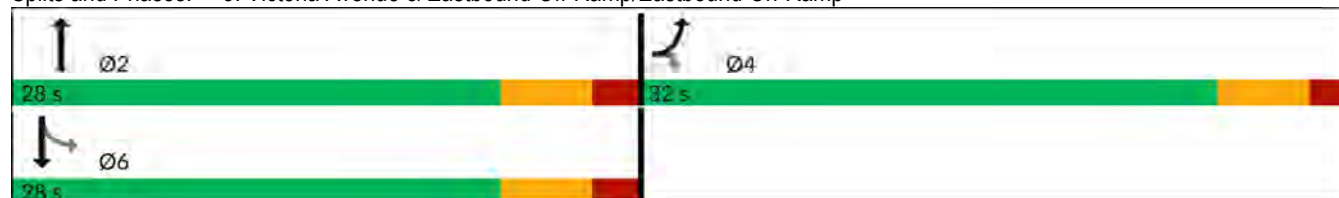
Intersection LOS: B

Intersection Capacity Utilization 69.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	314	0	0	0	0	189	10	8	180	0
Future Volume (vph)	198	0	314	0	0	0	0	189	10	8	180	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1256		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.62	1.00	
Satd. Flow (perm)	1381		1072					1256		888	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	228	0	361	0	0	0	0	217	11	9	207	0
RTOR Reduction (vph)	0	0	245	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	228	0	116	0	0	0	0	225	0	9	207	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	11.2		11.2					11.4		11.4	11.4	
Effective Green, g (s)	11.2		11.2					11.4		11.4	11.4	
Actuated g/C Ratio	0.32		0.32					0.33		0.33	0.33	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	444		345					411		290	492	
v/s Ratio Prot	c0.17							c0.18			0.14	
v/s Ratio Perm			0.11							0.01		
v/c Ratio	0.51		0.34					0.55		0.03	0.42	
Uniform Delay, d1	9.6		9.0					9.6		7.9	9.1	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.5		0.3					0.9		0.0	0.3	
Delay (s)	10.1		9.2					10.5		8.0	9.4	
Level of Service	B		A					B		A	A	
Approach Delay (s/veh)		9.6			0.0			10.5			9.3	
Approach LOS		A			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			9.7									
HCM 2000 Volume to Capacity ratio			0.53									
Actuated Cycle Length (s)			34.8									
Intersection Capacity Utilization			69.4%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	52	37	21	147	417	76
Future Volume (vph)	52	37	21	147	417	76
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.944				0.979	
Flt Protected	0.972			0.994		
Satd. Flow (prot)	1315	0	0	1072	1277	0
Flt Permitted	0.972			0.994		
Satd. Flow (perm)	1315	0	0	1072	1277	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	62	44	25	175	496	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	106	0	0	200	586	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.8%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	37	21	147	417	76
Future Volume (Veh/h)	52	37	21	147	417	76
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	62	44	25	175	496	90
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	785	571	605			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	727	504	541			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	82	91	97			
cM capacity (veh/h)	350	517	843			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	106	200	586			
Volume Left	62	25	0			
Volume Right	44	0	90			
cSH	405	843	1700			
Volume to Capacity	0.26	0.03	0.34			
Queue Length 95th (m)	7.8	0.7	0.0			
Control Delay (s/veh)	17.0	1.4	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	17.0	1.4	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			56.8%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	43	125	90	299	155
Future Volume (vph)	47	43	125	90	299	155
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.517	
Satd. Flow (perm)	1310	1069	1449	1027	737	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		49		103		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	54	49	144	103	344	178
Shared Lane Traffic (%)						
Lane Group Flow (vph)	54	49	144	103	344	178
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.3	8.3	10.5	10.5	26.4	23.1
Actuated g/C Ratio	0.19	0.19	0.24	0.24	0.60	0.52
v/c Ratio	0.22	0.20	0.42	0.32	0.60	0.23

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	18.9	8.8	18.4	6.8	9.6	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	18.9	8.8	18.4	6.8	9.6	6.5
LOS	B	A	B	A	A	A
Approach Delay (s/veh)	14.1		13.6			8.5
Approach LOS	B		B			A
Queue Length 50th (m)	3.6	0.0	9.9	0.0	11.0	6.4
Queue Length 95th (m)	11.4	6.1	21.8	7.7	23.1	14.3
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	598	514	806	617	585	1272
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.09	0.10	0.18	0.17	0.59	0.14

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 44.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay (s/veh): 10.6

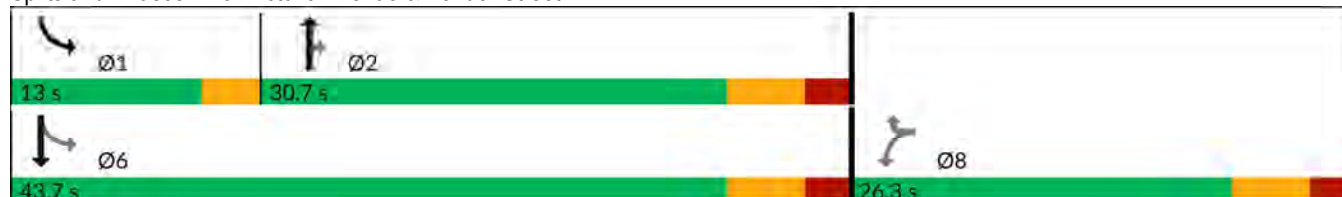
Intersection LOS: B

Intersection Capacity Utilization 57.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	43	125	90	299	155
Future Volume (vph)	47	43	125	90	299	155
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1074	1449	1032	1363	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1312	1074	1449	1032	743	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	54	49	144	103	344	178
RTOR Reduction (vph)	0	40	0	78	0	0
Lane Group Flow (vph)	54	9	144	25	344	178
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.3	8.3	10.5	10.5	23.1	23.1
Effective Green, g (s)	8.3	8.3	10.5	10.5	23.1	23.1
Actuated g/C Ratio	0.19	0.19	0.24	0.24	0.53	0.53
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	247	202	345	246	525	782
v/s Ratio Prot			0.10		c0.14	0.12
v/s Ratio Perm	c0.04	0.01		0.02	c0.20	
v/c Ratio	0.22	0.05	0.42	0.10	0.66	0.23
Uniform Delay, d1	15.1	14.6	14.2	13.1	6.8	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	1.0	0.2	2.9	0.2
Delay (s)	15.4	14.7	15.1	13.3	9.7	5.8
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	15.1		14.4			8.4
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			10.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			44.0		Sum of lost time (s)	15.6
Intersection Capacity Utilization			57.2%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	12	8	211	199	2
Future Volume (vph)	3	12	8	211	199	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.895					0.850
Flt Protected	0.989			0.998		
Satd. Flow (prot)	1168	0	0	1092	1504	1106
Flt Permitted	0.989			0.998		
Satd. Flow (perm)	1168	0	0	1092	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	14	10	251	237	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	261	237	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	38.4%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	12	8	211	199	2
Future Volume (Veh/h)	3	12	8	211	199	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	14	10	251	237	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.96	0.97	0.97			
vC, conflicting volume	531	259	261			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	422	220	222			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	553	756	1289			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	18	261	237	2		
Volume Left	4	10	0	0		
Volume Right	14	0	0	2		
cSH	699	1289	1700	1700		
Volume to Capacity	0.03	0.00*	0.14	0.00*		
Queue Length 95th (m)	0.6	0.2	0.0	0.0		
Control Delay (s/veh)	10.3	0.4	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	10.3	0.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	38.4%			ICU Level of Service	A	
Analysis Period (min)	15					
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	8	8	20	10	17	2	187	10	14	186	11
Future Volume (vph)	15	8	8	20	10	17	2	187	10	14	186	11
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.97			1.00			1.00	0.95
Frt		0.966			0.952			0.993				0.850
Flt Protected		0.976			0.979						0.997	
Satd. Flow (prot)	0	1196	0	0	1254	0	0	1330	0	0	1122	851
Flt Permitted		0.813			0.845			0.996			0.962	
Satd. Flow (perm)	0	989	0	0	1068	0	0	1324	0	0	1080	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			20			6				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	18	9	9	24	12	20	2	220	12	16	219	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	36	0	0	56	0	0	234	0	0	235	13
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.4			8.4			13.3			13.3	13.3
Actuated g/C Ratio		0.23			0.23			0.37			0.37	0.37
v/c Ratio		0.15			0.21			0.47			0.59	0.04
Control Delay (s/veh)		12.7			12.0			11.6			15.5	0.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		12.7			12.0			11.6			15.5	0.2

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			B	A
Approach Delay (s/veh)		12.7			12.0			11.6			14.7	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		1.1			1.5			9.7			10.4	0.0
Queue Length 95th (m)		6.5			8.3			21.1			23.5	0.0
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		517			564			1045			851	649
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		0.07			0.10			0.22			0.28	0.02

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 35.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 13.0

Intersection LOS: B

Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	8	8	20	10	17	2	187	10	14	186	11
Future Volume (vph)	15	8	8	20	10	17	2	187	10	14	186	11
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		1.00			0.99			1.00			1.00	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1194			1247			1331			1120	817
Flt Permitted		0.81			0.84			1.00			0.96	1.00
Satd. Flow (perm)		995			1076			1326			1081	817
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	18	9	9	24	12	20	2	220	12	16	219	13
RTOR Reduction (vph)	0	7	0	0	15	0	0	4	0	0	0	8
Lane Group Flow (vph)	0	29	0	0	41	0	0	230	0	0	235	5
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		8.4			8.4			13.3			13.3	13.3
Effective Green, g (s)		8.4			8.4			13.3			13.3	13.3
Actuated g/C Ratio		0.24			0.24			0.37			0.37	0.37
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		234			253			495			403	305
v/s Ratio Prot												
v/s Ratio Perm		0.03			0.04			0.17			0.22	0.01
v/c Ratio		0.12			0.16			0.47			0.58	0.02
Uniform Delay, d1		10.7			10.8			8.5			8.9	7.0
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.2			0.2			0.5			1.8	0.0
Delay (s)		10.9			11.0			9.0			10.7	7.0
Level of Service		B			B			A			B	A
Approach Delay (s/veh)		10.9			11.0			9.0			10.5	
Approach LOS		B			B			A			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		10.0										
HCM 2000 Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		35.6										
Intersection Capacity Utilization		60.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	705	101	5	286	1	190	21	11	2	16	22
Future Volume (vph)	26	705	101	5	286	1	190	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.981						0.993			0.925	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1316	2914	0	1381	2941	0	0	1341	0	0	1307	0
Flt Permitted	0.542			0.256				0.727			0.984	
Satd. Flow (perm)	750	2914	0	372	2941	0	0	1008	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20						3			24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	28	766	110	5	311	1	207	23	12	2	17	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	876	0	5	312	0	0	242	0	0	43	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.0		9.0	40.0		41.0	41.0		41.0	41.0	
Total Split (%)	10.0%	44.4%		10.0%	44.4%		45.6%	45.6%		45.6%	45.6%	
Maximum Green (s)	6.0	33.7		6.0	33.7		33.7	33.7		33.7	33.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	32.8	28.4		32.3	26.8			20.5			20.5	
Actuated g/C Ratio	0.51	0.44		0.50	0.41			0.32			0.32	
v/c Ratio	0.06	0.68		0.02	0.26			0.75			0.10	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	10.1	19.2		10.0	15.5			36.8			11.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	10.1	19.2		10.0	15.5			36.8			11.0	
LOS	B	B		A	B			D			B	
Approach Delay (s/veh)		18.9			15.4			36.8			11.0	
Approach LOS		B			B			D			B	
Queue Length 50th (m)	1.6	37.8		0.3	10.9			24.7			1.5	
Queue Length 95th (m)	6.6	91.5		2.0	29.5			59.1			8.5	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	436	1628		285	1634			561			726	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.54		0.02	0.19			0.43			0.06	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 64.7

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay (s/veh): 20.8

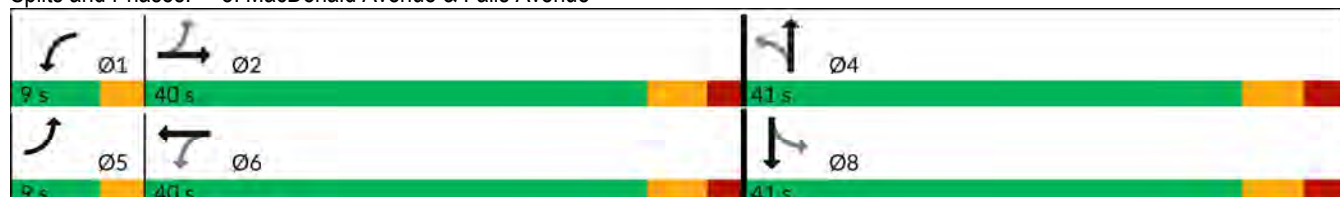
Intersection LOS: C

Intersection Capacity Utilization 63.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	705	101	5	286	1	190	21	11	2	16	22
Future Volume (vph)	26	705	101	5	286	1	190	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2914		1381	2940			1333			1308	
Flt Permitted	0.54	1.00		0.26	1.00			0.73			0.98	
Satd. Flow (perm)	751	2914		372	2940			1010			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	766	110	5	311	1	207	23	12	2	17	24
RTOR Reduction (vph)	0	11	0	0	0	0	0	2	0	0	17	0
Lane Group Flow (vph)	28	865	0	5	312	0	0	240	0	0	26	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	30.3	28.4		28.3	27.4			20.5			20.5	
Effective Green, g (s)	30.3	28.4		28.3	27.4			20.5			20.5	
Actuated g/C Ratio	0.46	0.43		0.43	0.41			0.31			0.31	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	358	1246		172	1213			311			398	
v/s Ratio Prot	c0.00	c0.30		0.00	0.11							
v/s Ratio Perm	0.03			0.01				c0.24			0.02	
v/c Ratio	0.08	0.69		0.03	0.26			0.77			0.07	
Uniform Delay, d1	10.0	15.5		11.2	12.8			20.8			16.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	2.2		0.1	0.2			10.8			0.1	
Delay (s)	10.1	17.6		11.3	13.0			31.6			16.3	
Level of Service	B	B		B	B			C			B	
Approach Delay (s/veh)		17.4			13.0			31.6			16.3	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		18.7			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		66.4			Sum of lost time (s)			16.6				
Intersection Capacity Utilization		63.3%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	52	7	5	22	61	1	154	5	38	77	7
Future Volume (vph)	7	52	7	5	22	61	1	154	5	38	77	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.907			0.996			0.992	
Flt Protected		0.994			0.997						0.985	
Satd. Flow (prot)	0	1371	0	0	1227	0	0	1387	0	0	1383	0
Flt Permitted		0.994			0.997						0.985	
Satd. Flow (perm)	0	1371	0	0	1227	0	0	1387	0	0	1383	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	9	63	9	6	27	74	1	188	6	46	94	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	81	0	0	107	0	0	195	0	0	149	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.5%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
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	52	7	5	22	61	1	154	5	38	77	7
Future Volume (vph)	7	52	7	5	22	61	1	154	5	38	77	7
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	9	63	9	6	27	74	1	188	6	46	94	9
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	81	107	195	149								
Volume Left (vph)	9	6	1	46								
Volume Right (vph)	9	74	6	9								
Hadj (s)	0.00	-0.31	0.03	0.05								
Departure Headway (s)	4.9	4.5	4.6	4.6								
Degree Utilization, x	0.11	0.13	0.25	0.19								
Capacity (veh/h)	679	730	751	732								
Control Delay (s/veh)	8.4	8.2	9.1	8.7								
Approach Delay (s/veh)	8.4	8.2	9.1	8.7								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.7									
Level of Service			A									
Intersection Capacity Utilization			40.5%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	67	9	1	58	3	6	3	6	42	3	2
Future Volume (vph)	3	67	9	1	58	3	6	3	6	42	3	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.993			0.946			0.993	
Flt Protected		0.998			0.999			0.980			0.958	
Satd. Flow (prot)	0	1407	0	0	1330	0	0	1329	0	0	1363	0
Flt Permitted		0.998			0.999			0.980			0.958	
Satd. Flow (perm)	0	1407	0	0	1330	0	0	1329	0	0	1363	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	3		6	6		3			2	2		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	88	12	1	76	4	8	4	8	55	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	104	0	0	81	0	0	20	0	0	62	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	67	9	1	58	3	6	3	6	42	3	2
Future Volume (Veh/h)	3	67	9	1	58	3	6	3	6	42	3	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	4	88	12	1	76	4	8	4	8	55	4	3
Pedestrians					2			6			3	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	83			106			193	193	102	197	197	81
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	83			106			193	193	102	197	197	81
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	99	93	99	100
cM capacity (veh/h)	1522			1039			753	697	951	746	693	982
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	104	81	20	62								
Volume Left	4	1	8	55								
Volume Right	12	4	8	3								
cSH	1522	1039	807	751								
Volume to Capacity	0.00*	0.00*	0.02	0.08								
Queue Length 95th (m)	0.1	0.0	0.6	2.0								
Control Delay (s/veh)	0.3	0.1	9.6	10.2								
Lane LOS	A	A	A	B								
Approach Delay (s/veh)	0.3	0.1	9.6	10.2								
Approach LOS			A	B								
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			22.3%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	52	72	59	26	13	12
Future Volume (vph)	52	72	59	26	13	12
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.958		0.936	
Flt Protected		0.980			0.974	
Satd. Flow (prot)	0	1154	1231	0	888	0
Flt Permitted		0.980			0.974	
Satd. Flow (perm)	0	1154	1231	0	888	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	71	99	81	36	18	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	170	117	0	34	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	28.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	72	59	26	13	12
Future Volume (Veh/h)	52	72	59	26	13	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	71	99	81	36	18	16
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	121				344	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				344	105
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	95				97	98
cM capacity (veh/h)	1473				622	734
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	170	117	34			
Volume Left	71	0	18			
Volume Right	0	36	16			
cSH	1473	1700	670			
Volume to Capacity	0.05	0.07	0.05			
Queue Length 95th (m)	1.1	0.0	1.2			
Control Delay (s/veh)	3.4	0.0	10.7			
Lane LOS	A		B			
Approach Delay (s/veh)	3.4	0.0	10.7			
Approach LOS			B			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			28.1%	ICU Level of Service		A
Analysis Period (min)			15			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	79	0	0	77	20	1	0	0	10	0	7
Future Volume (vph)	6	79	0	0	77	20	1	0	0	10	0	7
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.972						0.944					
Flt Protected	0.996						0.950					
Satd. Flow (prot)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Flt Permitted	0.996						0.950					
Satd. Flow (perm)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	3						3					
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	114	0	0	112	29	1	0	0	14	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	141	0	0	1	0	0	24	0
Sign Control	Free				Free				Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.6%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	79	0	0	77	20	1	0	0	10	0	7
Future Volume (Veh/h)	6	79	0	0	77	20	1	0	0	10	0	7
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	9	114	0	0	112	29	1	0	0	14	0	10
Pedestrians						2						3
Lane Width (m)						3.6						3.6
Walking Speed (m/s)						1.0						1.0
Percent Blockage						0						0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	144			114			269	276	116	264	262	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	144			114			269	276	116	264	262	130
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			100			100	100	100	98	100	99
cM capacity (veh/h)	1447			1488			676	629	940	685	641	923
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	123	141	1	24								
Volume Left	9	0	1	14								
Volume Right	0	29	0	10								
cSH	1447	1700	676	767								
Volume to Capacity	0.00*	0.08	0.00*	0.03								
Queue Length 95th (m)	0.1	0.0	0.0	0.7								
Control Delay (s/veh)	0.6	0.0	10.3	9.8								
Lane LOS	A		B	A								
Approach Delay (s/veh)	0.6	0.0	10.3	9.8								
Approach LOS			B	A								
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			24.6%	ICU Level of Service				A				
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	211	583	406	285
Future Volume (vph)	0	0	211	583	406	285
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.944					
Flt Protected	0.950					
Satd. Flow (prot)	0	0	1381	1563	1238	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	0	1381	1563	1238	0
Link Speed (k/h)	40	50				50
Link Distance (m)	75.7	60.3				168.1
Travel Time (s)	6.8	4.3				12.1
Confl. Peds. (#/hr)	1		58	58		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	222	614	427	300
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	222	614	727	0
Sign Control	Stop	Free				Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	85.8%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	211	583	406	285
Future Volume (Veh/h)	0	0	211	583	406	285
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	222	614	427	300
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1693	636	785			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1693	636	785			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	74			
cM capacity (veh/h)	76	481	843			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	222	614	727			
Volume Left	222	0	0			
Volume Right	0	0	300			
cSH	843	1700	1700			
Volume to Capacity	0.26	0.36	0.43			
Queue Length 95th (m)	7.9	0.0	0.0			
Control Delay (s/veh)	10.8	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.9		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			85.8%	ICU Level of Service		E
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	49	745	0	0	406
Future Volume (vph)	53	49	745	0	0	406
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	57	53	801	0	0	437
Shared Lane Traffic (%)						
Lane Group Flow (vph)	110	0	801	0	0	437
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	112.7%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	49	745	0	0	406
Future Volume (Veh/h)	53	49	745	0	0	406
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	57	53	801	0	0	437
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.62	0.62			0.62	
vC, conflicting volume	1272	837			834	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1130	423			418	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	58	86			100	
cM capacity (veh/h)	135	377			686	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	110	801	437			
Volume Left	57	0	0			
Volume Right	53	0	0			
cSH	196	1700	1700			
Volume to Capacity	0.56	0.47	0.26			
Queue Length 95th (m)	22.5	0.0	0.0			
Control Delay (s/veh)	44.7	0.0	0.0			
Lane LOS	E					
Approach Delay (s/veh)	44.7	0.0	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization		112.7%		ICU Level of Service		H
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	268	0	0	0	0	562	17	59	400	0
Future Volume (vph)	183	0	268	0	0	0	0	562	17	59	400	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.98		
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1304	0	1354	1563	0
Flt Permitted	0.950									0.322		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1304	0	450	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			291					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	199	0	291	0	0	0	0	611	18	64	435	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	0	291	0	0	0	0	629	0	64	435	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.4		28.4					51.6		51.6	51.6	
Total Split (%)	35.5%		35.5%					64.5%		64.5%	64.5%	
Maximum Green (s)	22.3		22.3					45.5		45.5	45.5	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	14.3		14.3					33.4		33.4	33.4	
Actuated g/C Ratio	0.23		0.23					0.55		0.55	0.55	
v/c Ratio	0.62		0.61					0.88		0.26	0.51	
Control Delay (s/veh)	32.7		9.4					28.2		11.0	11.2	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	32.7		9.4					28.2		11.0	11.2	

No Background Development
PTSL (250550)

Synchro 12 Report
Page 5

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		A					C		B	B	
Approach Delay (s/veh)		18.9						28.2			11.2	
Approach LOS		B						C			B	
Queue Length 50th (m)	20.7		0.0					52.7		3.3	26.1	
Queue Length 95th (m)	45.4		19.1					#143.3		11.9	58.2	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	542		609					1000		345	1198	
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		0.48					0.63		0.19	0.36	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 60.9

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay (s/veh): 20.1

Intersection LOS: C

Intersection Capacity Utilization 112.7%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	268	0	0	0	0	562	17	59	400	0
Future Volume (vph)	183	0	268	0	0	0	0	562	17	59	400	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1305		1331	1563	
Flt Permitted	0.95		1.00					1.00		0.32	1.00	
Satd. Flow (perm)	1368		1095					1305		452	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	0	291	0	0	0	0	611	18	64	435	0
RTOR Reduction (vph)	0	0	222	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	199	0	69	0	0	0	0	628	0	64	435	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	14.3		14.3					33.4		33.4	33.4	
Effective Green, g (s)	14.3		14.3					33.4		33.4	33.4	
Actuated g/C Ratio	0.24		0.24					0.56		0.56	0.56	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	326		261					727		252	871	
v/s Ratio Prot	c0.15							c0.48			0.28	
v/s Ratio Perm			0.06							0.14		
v/c Ratio	0.61		0.27					0.86		0.25	0.50	
Uniform Delay, d1	20.3		18.5					11.3		6.8	8.1	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	2.5		0.2					10.1		0.2	0.2	
Delay (s)	22.8		18.8					21.4		7.1	8.3	
Level of Service	C		B					C		A	A	
Approach Delay (s/veh)		20.4			0.0			21.4			8.2	
Approach LOS		C			A			C			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			17.0									
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			59.9									
Intersection Capacity Utilization			112.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	131	86	88	449	451	217
Future Volume (vph)	131	86	88	449	451	217
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.947				0.956	
Flt Protected	0.971				0.992	
Satd. Flow (prot)	1318	0	0	1159	1271	0
Flt Permitted	0.971				0.992	
Satd. Flow (perm)	1318	0	0	1159	1271	0
Link Speed (k/h)	50				50	50
Link Distance (m)	57.8				126.4	66.6
Travel Time (s)	4.2				9.1	4.8
Confl. Peds. (#/hr)		4	46			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	139	91	94	478	480	231
Shared Lane Traffic (%)						
Lane Group Flow (vph)	230	0	0	572	711	0
Sign Control	Stop				Free	Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	126.4%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	131	86	88	449	451	217
Future Volume (Veh/h)	131	86	88	449	451	217
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	139	91	94	478	480	231
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.91	0.84	0.84			
vC, conflicting volume	1308	646	757			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	899	485	617			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	42	81	88			
cM capacity (veh/h)	239	469	781			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	230	572	711			
Volume Left	139	94	0			
Volume Right	91	0	231			
cSH	296	781	1700			
Volume to Capacity	0.78	0.12	0.42			
Queue Length 95th (m)	45.2	3.1	0.0			
Control Delay (s/veh)	49.1	3.1	0.0			
Lane LOS	E	A				
Approach Delay (s/veh)	49.1	3.1	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay		8.6				
Intersection Capacity Utilization		126.4%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	125	202	335	152	212	326
Future Volume (vph)	125	202	335	152	212	326
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.97	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.412	
Satd. Flow (perm)	1339	1063	1563	1032	576	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		213		160		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	132	213	353	160	223	343
Shared Lane Traffic (%)						
Lane Group Flow (vph)	132	213	353	160	223	343
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	31.7	31.7	12.0	43.7
Total Split (%)	37.6%	37.6%	45.3%	45.3%	17.1%	62.4%
Maximum Green (s)	20.0	20.0	25.4	25.4	9.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.9	10.9	17.6	17.6	32.5	29.1
Actuated g/C Ratio	0.21	0.21	0.33	0.33	0.61	0.55
v/c Ratio	0.48	0.55	0.68	0.36	0.47	0.40

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	26.9	9.8	23.0	5.3	8.5	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.9	9.8	23.0	5.3	8.5	8.8
LOS	C	A	C	A	A	A
Approach Delay (s/veh)	16.3		17.5			8.6
Approach LOS	B		B			A
Queue Length 50th (m)	11.2	0.0	27.6	0.0	7.6	15.5
Queue Length 95th (m)	27.4	14.9	57.6	10.1	20.5	36.4
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	521	543	772	591	492	1138
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.39	0.46	0.27	0.45	0.30

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 53

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay (s/veh): 13.7

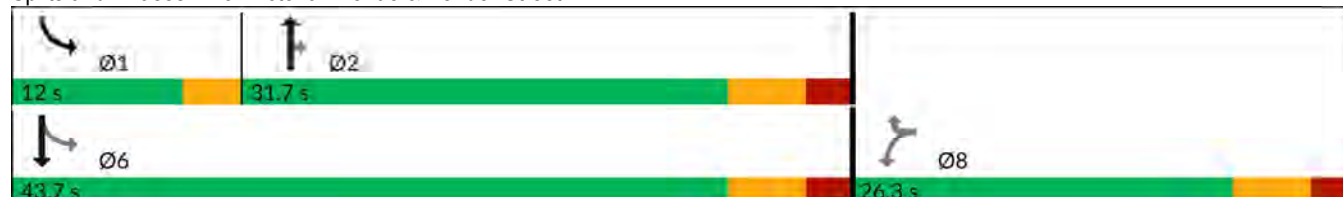
Intersection LOS: B

Intersection Capacity Utilization 61.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	125	202	335	152	212	326
Future Volume (vph)	125	202	335	152	212	326
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1350	1068	1563	1047	1356	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.41	1.00
Satd. Flow (perm)	1350	1068	1563	1047	588	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	132	213	353	160	223	343
RTOR Reduction (vph)	0	169	0	106	0	0
Lane Group Flow (vph)	132	44	353	54	223	343
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.9	10.9	17.8	17.8	29.2	29.2
Effective Green, g (s)	10.9	10.9	17.8	17.8	29.2	29.2
Actuated g/C Ratio	0.21	0.21	0.34	0.34	0.55	0.55
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	279	220	527	353	448	866
v/s Ratio Prot			c0.23		c0.08	0.22
v/s Ratio Perm	c0.10	0.04		0.05	0.20	
v/c Ratio	0.47	0.20	0.67	0.15	0.50	0.40
Uniform Delay, d1	18.4	17.3	14.9	12.2	6.6	6.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.3	3.4	0.2	0.9	0.4
Delay (s)	19.3	17.6	18.3	12.4	7.5	7.1
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	18.3		16.5			7.2
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			13.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			52.7		Sum of lost time (s)	15.6
Intersection Capacity Utilization			61.8%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	20	25	480	431	20
Future Volume (vph)	7	20	25	480	431	20
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899					0.850
Flt Protected	0.988			0.998		
Satd. Flow (prot)	1273	0	0	1165	1563	1106
Flt Permitted	0.988			0.998		
Satd. Flow (perm)	1273	0	0	1165	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	7	21	26	500	449	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	0	526	449	21
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	83.6%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	20	25	480	431	20
Future Volume (Veh/h)	7	20	25	480	431	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	21	26	500	449	21
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.83	0.85	0.85			
vC, conflicting volume	1084	532	553			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	360	384			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	96	97			
cM capacity (veh/h)	351	537	923			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	28	526	449	21		
Volume Left	7	26	0	0		
Volume Right	21	0	0	21		
cSH	474	923	1700	1700		
Volume to Capacity	0.06	0.03	0.26	0.01		
Queue Length 95th (m)	1.4	0.7	0.0	0.0		
Control Delay (s/veh)	13.1	0.8	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	13.1	0.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	83.6%			ICU Level of Service	E	
Analysis Period (min)	15					

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	17	14	55	44	39	14	426	41	18	386	47
Future Volume (vph)	40	17	14	55	44	39	14	426	41	18	386	47
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.93			0.98			1.00	0.80
Frt		0.973			0.962			0.989				0.850
Flt Protected		0.972			0.980			0.999			0.998	
Satd. Flow (prot)	0	1277	0	0	1276	0	0	1381	0	0	1165	1024
Flt Permitted		0.744			0.836			0.981			0.966	
Satd. Flow (perm)	0	934	0	0	1045	0	0	1352	0	0	1124	818
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			34			10				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	43	18	15	59	47	42	15	458	44	19	415	51
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	76	0	0	148	0	0	517	0	0	434	51
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.4			11.4			23.4			23.4	23.4
Actuated g/C Ratio		0.23			0.23			0.48			0.48	0.48
v/c Ratio		0.33			0.55			0.80			0.81	0.12
Control Delay (s/veh)		18.7			23.1			23.1			26.9	2.8
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		18.7			23.1			23.1			26.9	2.8

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			C			C			C	A
Approach Delay (s/veh)		18.7			23.1			23.1			24.4	
Approach LOS		B			C			C			C	
Queue Length 50th (m)		4.9			9.6			31.6			27.4	0.0
Queue Length 95th (m)		13.8			23.7			#95.8			#86.2	3.8
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		364			418			805			666	512
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		0.21			0.35			0.64			0.65	0.10

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 49.2

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay (s/veh): 23.3

Intersection LOS: C

Intersection Capacity Utilization 86.6%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	17	14	55	44	39	14	426	41	18	386	47
Future Volume (vph)	40	17	14	55	44	39	14	426	41	18	386	47
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.98			0.97			0.99			1.00	0.83
Flpb, ped/bikes		0.96			0.97			1.00			1.00	1.00
Frt		0.97			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1237			1241			1380			1161	853
Flt Permitted		0.74			0.84			0.98			0.97	1.00
Satd. Flow (perm)		946			1058			1356			1124	853
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	43	18	15	59	47	42	15	458	44	19	415	51
RTOR Reduction (vph)	0	11	0	0	26	0	0	5	0	0	0	26
Lane Group Flow (vph)	0	65	0	0	122	0	0	512	0	0	434	25
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.4			11.4			23.4			23.4	23.4
Effective Green, g (s)		11.4			11.4			23.4			23.4	23.4
Actuated g/C Ratio		0.23			0.23			0.48			0.48	0.48
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		221			247			651			540	409
v/s Ratio Prot												
v/s Ratio Perm		0.07			0.12			0.38			0.39	0.03
v/c Ratio		0.29			0.49			0.79			0.80	0.06
Uniform Delay, d1		15.3			16.2			10.6			10.7	6.8
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.5			1.1			6.0			8.2	0.0
Delay (s)		15.9			17.3			16.6			18.9	6.8
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		15.9			17.3			16.6			17.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			17.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			48.7			Sum of lost time (s)				13.9		
Intersection Capacity Utilization			86.6%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	739	244	41	793	14	329	31	24	2	26	25
Future Volume (vph)	56	739	244	41	793	14	329	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.963			0.997			0.992			0.936	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1381	2860	0	1381	2961	0	0	1338	0	0	1294	0
Flt Permitted	0.195			0.115				0.716			0.989	
Satd. Flow (perm)	283	2860	0	167	2961	0	0	991	0	0	1282	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			2			4			27	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	60	795	262	44	853	15	354	33	26	2	28	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	1057	0	44	868	0	0	413	0	0	57	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	47.4		9.0	47.4		53.6	53.6		53.6	53.6	
Total Split (%)	8.2%	43.1%		8.2%	43.1%		48.7%	48.7%		48.7%	48.7%	
Maximum Green (s)	6.0	41.1		6.0	41.1		46.3	46.3		46.3	46.3	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	49.2	41.2		49.2	41.2			45.9			45.9	
Actuated g/C Ratio	0.46	0.38		0.46	0.38			0.43			0.43	
v/c Ratio	0.32	0.94		0.31	0.77			0.97			0.10	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	19.9	48.1		20.9	35.1			69.8			12.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	19.9	48.1		20.9	35.1			69.8			12.4	
LOS	B	D		C	D			E			B	
Approach Delay (s/veh)		46.6			34.4			69.8			12.4	
Approach LOS		D			C			E			B	
Queue Length 50th (m)	6.6	110.8		4.8	85.3			84.3			3.7	
Queue Length 95th (m)	13.8	#155.9		10.8	109.7			#148.2			11.4	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	190	1121		143	1132			428			567	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.32	0.94		0.31	0.77			0.96			0.10	

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 107.8

Natural Cycle: 105

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 45.2

Intersection LOS: D

Intersection Capacity Utilization 88.6%

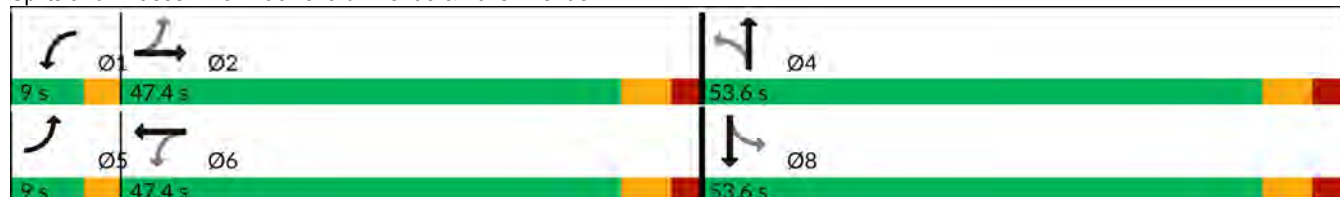
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	739	244	41	793	14	329	31	24	2	26	25
Future Volume (vph)	56	739	244	41	793	14	329	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.96		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2860		1381	2962			1327			1294	
Flt Permitted	0.20	1.00		0.11	1.00			0.72			0.99	
Satd. Flow (perm)	284	2860		167	2962			992			1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	60	795	262	44	853	15	354	33	26	2	28	27
RTOR Reduction (vph)	0	29	0	0	1	0	0	2	0	0	16	0
Lane Group Flow (vph)	60	1028	0	44	867	0	0	411	0	0	41	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	45.9	41.2		45.9	41.2			45.9			45.9	
Effective Green, g (s)	45.9	41.2		45.9	41.2			45.9			45.9	
Actuated g/C Ratio	0.42	0.38		0.42	0.38			0.42			0.42	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	167	1087		123	1125			420			542	
v/s Ratio Prot	c0.02	c0.36		0.02	0.29							
v/s Ratio Perm	0.14			0.14				c0.41			0.03	
v/c Ratio	0.36	0.95		0.36	0.77			0.98			0.08	
Uniform Delay, d1	20.3	32.5		21.5	29.5			30.7			18.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.0	16.3		1.3	3.9			37.7			0.1	
Delay (s)	21.2	48.8		22.8	33.3			68.4			18.7	
Level of Service	C	D		C	C			E			B	
Approach Delay (s/veh)		47.3			32.8			68.4			18.7	
Approach LOS		D			C			E			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			44.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			108.4			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			88.6%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Future Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.986			0.916			0.988			0.991	
Flt Protected		0.986			0.997			0.999			0.981	
Satd. Flow (prot)	0	1393	0	0	1309	0	0	1378	0	0	1385	0
Flt Permitted		0.986			0.997			0.999			0.981	
Satd. Flow (perm)	0	1393	0	0	1309	0	0	1378	0	0	1385	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	28	60	10	14	74	146	6	235	23	127	184	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	234	0	0	264	0	0	332	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	68.0%											
Analysis Period (min)	15											
	ICU Level of Service C											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Future Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	60	10	14	74	146	6	235	23	127	184	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	234	264	332								
Volume Left (vph)	28	14	6	127								
Volume Right (vph)	10	146	23	21								
Hadj (s)	0.00	-0.36	0.00	0.05								
Departure Headway (s)	6.0	5.3	5.4	5.3								
Degree Utilization, x	0.16	0.35	0.39	0.49								
Capacity (veh/h)	509	608	618	639								
Control Delay (s/veh)	10.1	11.1	11.8	13.3								
Approach Delay (s/veh)	10.1	11.1	11.8	13.3								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay				12.0								
Level of Service				B								
Intersection Capacity Utilization				68.0%	ICU Level of Service	C						
Analysis Period (min)				15								

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	152	17	2	148	10	6	16	5	46	12	10
Future Volume (vph)	10	152	17	2	148	10	6	16	5	46	12	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.991			0.975			0.980	
Flt Protected		0.997			0.999			0.989			0.967	
Satd. Flow (prot)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Flt Permitted		0.997			0.999			0.989			0.967	
Satd. Flow (perm)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	12	179	20	2	174	12	7	19	6	54	14	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	211	0	0	188	0	0	32	0	0	80	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	38.6%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

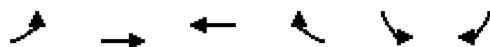
4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	152	17	2	148	10	6	16	5	46	12	10
Future Volume (Veh/h)	10	152	17	2	148	10	6	16	5	46	12	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	179	20	2	174	12	7	19	6	54	14	12
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	188			200			419	406	191	416	410	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188			200			419	406	191	416	410	184
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			100			99	96	99	90	97	99
cM capacity (veh/h)	1396			1383			523	530	854	525	528	860
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	211	188	32	80								
Volume Left	12	2	7	54								
Volume Right	20	12	6	12								
cSH	1396	1383	569	558								
Volume to Capacity	0.00*	0.00*	0.06	0.14								
Queue Length 95th (m)	0.2	0.0	1.3	3.7								
Control Delay (s/veh)	0.5	0.1	11.7	12.5								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.5	0.1	11.7	12.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			38.6%	ICU Level of Service				A				
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	84	126	129	109	61	38
Future Volume (vph)	84	126	129	109	61	38
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.938		0.948	
Flt Protected		0.980			0.970	
Satd. Flow (prot)	0	1154	1255	0	1318	0
Flt Permitted		0.980			0.970	
Satd. Flow (perm)	0	1154	1255	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	94	142	145	122	69	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	236	267	0	112	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	55.1%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	126	129	109	61	38
Future Volume (Veh/h)	84	126	129	109	61	38
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	94	142	145	122	69	43
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	272				541	211
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272				541	211
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				85	95
cM capacity (veh/h)	1296				467	830
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	236	267	112			
Volume Left	94	0	69			
Volume Right	0	122	43			
cSH	1296	1700	561			
Volume to Capacity	0.07	0.16	0.20			
Queue Length 95th (m)	1.8	0.0	5.5			
Control Delay (s/veh)	3.6	0.0	13.0			
Lane LOS	A		B			
Approach Delay (s/veh)	3.6	0.0	13.0			
Approach LOS			B			
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization		55.1%		ICU Level of Service		B
Analysis Period (min)		15				

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	33	155	0	0	211	94	0	0	2	59	0	28	
Future Volume (vph)	33	155	0	0	211	94	0	0	2	59	0	28	
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor													
Frt					0.958					0.865			0.956
Flt Protected	0.991												0.967
Satd. Flow (prot)	0	1167	0	0	1282	0	0	1240	0	0	1325	0	
Flt Permitted	0.991												0.967
Satd. Flow (perm)	0	1167	0	0	1282	0	0	1240	0	0	1325	0	
Link Speed (k/h)	50				50				50				50
Link Distance (m)	58.7				57.8				32.6				33.2
Travel Time (s)	4.2				4.2				2.3				2.4
Confl. Peds. (#/hr)	7					7	1			3	3	1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	38	176	0	0	240	107	0	0	2	67	0	32	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	214	0	0	347	0	0	2	0	0	99	0	
Sign Control	Free				Free				Stop		Stop		
Intersection Summary													
Area Type:	Other												
Control Type:	Unsignalized												
Intersection Capacity Utilization	63.5%				ICU Level of Service B								
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	155	0	0	211	94	0	0	2	59	0	28
Future Volume (Veh/h)	33	155	0	0	211	94	0	0	2	59	0	28
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	38	176	0	0	240	107	0	0	2	67	0	32
Pedestrians	1			3			7			7		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.0			1.0			1.0			1.0		
Percent Blockage	0			0			1			1		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	354			176			579	606	179	558	553	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354			176			579	606	179	558	553	302
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			100			100	100	100	84	100	96
cM capacity (veh/h)	1207			1412			399	398	866	425	427	737
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	214	347	2	99								
Volume Left	38	0	0	67								
Volume Right	0	107	2	32								
cSH	1207	1700	866	493								
Volume to Capacity	0.03	0.20	0.00*	0.20								
Queue Length 95th (m)	0.7	0.0	0.1	5.6								
Control Delay (s/veh)	1.7	0.0	9.2	14.1								
Lane LOS	A		A	B								
Approach Delay (s/veh)	1.7	0.0	9.2	14.1								
Approach LOS			A	B								
Intersection Summary												
Average Delay	2.7											
Intersection Capacity Utilization	63.5%			ICU Level of Service			B					
Analysis Period (min)	15											
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	189	521	425	216
Future Volume (vph)	0	0	189	521	425	216
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.955	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1265	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1265	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		5	63			63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	208	573	467	237
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	208	573	704	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	80.6%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	189	521	425	216
Future Volume (Veh/h)	0	0	189	521	425	216
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	208	573	467	237
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1638	654	767			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1638	654	767			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	75			
cM capacity (veh/h)	84	468	847			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	208	573	704			
Volume Left	208	0	0			
Volume Right	0	0	237			
cSH	847	1700	1700			
Volume to Capacity	0.25	0.34	0.41			
Queue Length 95th (m)	7.2	0.0	0.0			
Control Delay (s/veh)	10.6	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.8		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			80.6%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	59	45	666	0	0	425
Future Volume (vph)	59	45	666	0	0	425
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		1		57	57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	61	47	694	0	0	443
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	694	0	0	443
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	123.6%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	45	666	0	0	425
Future Volume (Veh/h)	59	45	666	0	0	425
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	47	694	0	0	443
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.66	0.66			0.66	
vC, conflicting volume	1194	752			751	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1039	373			371	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	62	89			100	
cM capacity (veh/h)	161	424			750	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	108	694	443			
Volume Left	61	0	0			
Volume Right	47	0	0			
cSH	221	1700	1700			
Volume to Capacity	0.49	0.41	0.26			
Queue Length 95th (m)	18.4	0.0	0.0			
Control Delay (s/veh)	36.0	0.0	0.0			
Lane LOS	E					
Approach Delay (s/veh)	36.0	0.0	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization		123.6%		ICU Level of Service		H
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	393	0	0	0	0	493	26	80	403	0
Future Volume (vph)	172	0	393	0	0	0	0	493	26	80	403	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.92					0.99		0.96		
Frt			0.850					0.993				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1307	0	1354	1563	0
Flt Permitted	0.950									0.343		
Satd. Flow (perm)	1363	0	1017	0	0	0	0	1307	0	469	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			222					5				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	409	0	0	0	0	514	27	83	420	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	409	0	0	0	0	541	0	83	420	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	35.0		35.0					45.0		45.0	45.0	
Total Split (%)	43.8%		43.8%					56.3%		56.3%	56.3%	
Maximum Green (s)	28.9		28.9					38.9		38.9	38.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	19.8		19.8					29.7		29.7	29.7	
Actuated g/C Ratio	0.31		0.31					0.47		0.47	0.47	
v/c Ratio	0.42		0.87					0.87		0.38	0.57	
Control Delay (s/veh)	21.6		30.8					33.5		18.3	16.6	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	21.6		30.8					33.5		18.3	16.6	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		C					C		B	B	
Approach Delay (s/veh)		28.0						33.5			16.9	
Approach LOS		C						C			B	
Queue Length 50th (m)	17.6		21.8					56.4		6.3	35.5	
Queue Length 95th (m)	35.5		#76.5					#127.7		19.2	68.3	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	693		624					865		309	1032	
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	0.26		0.66					0.63		0.27	0.41	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 63

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 26.4

Intersection LOS: C

Intersection Capacity Utilization 123.6%

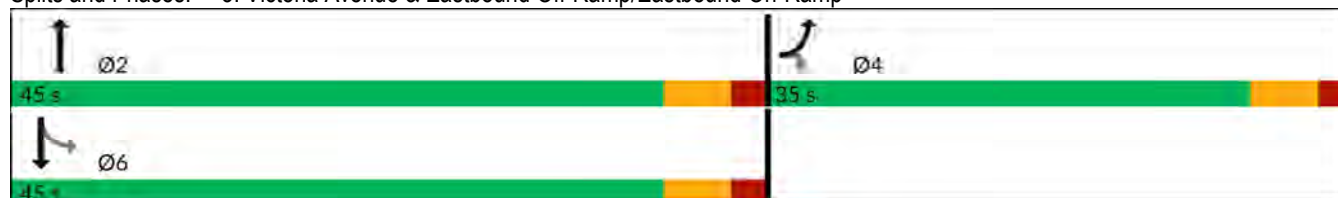
ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	393	0	0	0	0	493	26	80	403	0
Future Volume (vph)	172	0	393	0	0	0	0	493	26	80	403	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.93					0.99		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.96	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1032					1309		1305	1563	
Flt Permitted	0.95		1.00					1.00		0.34	1.00	
Satd. Flow (perm)	1368		1032					1309		472	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	179	0	409	0	0	0	0	514	27	83	420	0
RTOR Reduction (vph)	0	0	151	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	179	0	258	0	0	0	0	538	0	83	420	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	19.8		19.8					29.7		29.7	29.7	
Effective Green, g (s)	19.8		19.8					29.7		29.7	29.7	
Actuated g/C Ratio	0.32		0.32					0.48		0.48	0.48	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	439		331					630		227	752	
v/s Ratio Prot	0.13							c0.41			0.27	
v/s Ratio Perm			c0.25							0.18		
v/c Ratio	0.41		0.78					0.85		0.37	0.56	
Uniform Delay, d1	16.4		19.0					14.1		10.1	11.3	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.3		10.6					10.6		0.4	0.6	
Delay (s)	16.6		29.5					24.7		10.5	11.9	
Level of Service	B		C					C		B	B	
Approach Delay (s/veh)		25.6			0.0			24.7			11.7	
Approach LOS		C			A			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			21.0					HCM 2000 Level of Service		C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			61.7					Sum of lost time (s)		12.2		
Intersection Capacity Utilization			123.6%					ICU Level of Service		H		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	112	106	57	407	594	202
Future Volume (vph)	112	106	57	407	594	202
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934				0.966	
Flt Protected	0.975			0.994		
Satd. Flow (prot)	1305	0	0	1161	1283	0
Flt Permitted	0.975			0.994		
Satd. Flow (perm)	1305	0	0	1161	1283	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	119	113	61	433	632	215
Shared Lane Traffic (%)						
Lane Group Flow (vph)	232	0	0	494	847	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	130.5%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	106	57	407	594	202
Future Volume (Veh/h)	112	106	57	407	594	202
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	119	113	61	433	632	215
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.88	0.82	0.82			
vC, conflicting volume	1394	844	935			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1082	699	811			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	31	65	90			
cM capacity (veh/h)	173	326	616			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	232	494	847			
Volume Left	119	61	0			
Volume Right	113	0	215			
cSH	224	616	1700			
Volume to Capacity	1.03	0.10	0.50			
Queue Length 95th (m)	73.6	2.5	0.0			
Control Delay (s/veh)	115.3	2.8	0.0			
Lane LOS	F	A				
Approach Delay (s/veh)	115.3	2.8	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay	17.9					
Intersection Capacity Utilization	130.5%			ICU Level of Service		H
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	131	196	268	255	324	376
Future Volume (vph)	131	196	268	255	324	376
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.85		0.85	0.91	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.490	
Satd. Flow (perm)	1322	943	1533	932	651	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		200		260		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	134	200	273	260	331	384
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	200	273	260	331	384
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.9	10.9	15.6	15.6	31.8	28.4
Actuated g/C Ratio	0.21	0.21	0.30	0.30	0.61	0.54
v/c Ratio	0.49	0.56	0.60	0.57	0.62	0.45

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	26.5	10.8	22.0	7.8	11.7	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	26.5	10.8	22.0	7.8	11.7	9.5
LOS	C	B	C	A	B	A
Approach Delay (s/veh)	17.1		15.1			10.6
Approach LOS	B		B			B
Queue Length 50th (m)	10.9	0.0	21.1	0.0	12.2	17.9
Queue Length 95th (m)	27.8	15.3	45.6	14.6	32.2	42.4
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	521	493	737	583	540	1151
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.41	0.37	0.45	0.61	0.33

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 52.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay (s/veh): 13.5

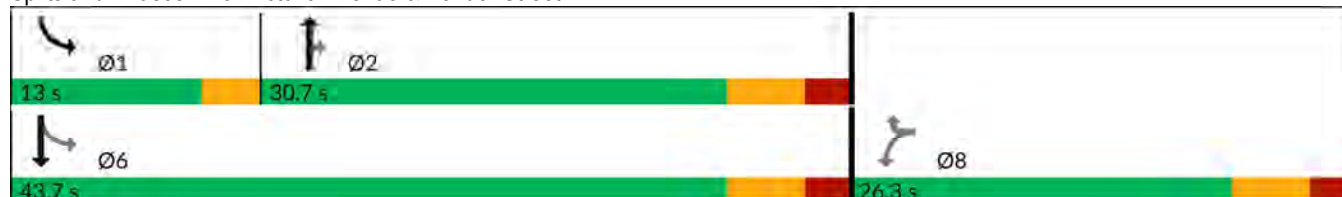
Intersection LOS: B

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	131	196	268	255	324	376
Future Volume (vph)	131	196	268	255	324	376
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.89	1.00	0.89	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1337	980	1533	971	1339	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1337	980	1533	971	691	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	134	200	273	260	331	384
RTOR Reduction (vph)	0	158	0	182	0	0
Lane Group Flow (vph)	134	42	273	78	331	384
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.9	10.9	15.6	15.6	28.4	28.4
Effective Green, g (s)	10.9	10.9	15.6	15.6	28.4	28.4
Actuated g/C Ratio	0.21	0.21	0.30	0.30	0.55	0.55
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	280	205	460	291	500	855
v/s Ratio Prot			0.18		c0.12	0.25
v/s Ratio Perm	c0.10	0.04		0.08	c0.24	
v/c Ratio	0.48	0.20	0.59	0.27	0.66	0.45
Uniform Delay, d1	18.0	16.9	15.5	13.8	7.2	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.4	2.2	0.6	3.3	0.4
Delay (s)	18.9	17.3	17.6	14.4	10.5	7.5
Level of Service	B	B	B	B	B	A
Approach Delay (s/veh)	18.0		16.1			8.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			13.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			51.9		Sum of lost time (s)	15.6
Intersection Capacity Utilization			73.3%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	13	16	518	488	18
Future Volume (vph)	5	13	16	518	488	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.902					0.850
Flt Protected	0.986			0.999		
Satd. Flow (prot)	1274	0	0	1166	1563	1106
Flt Permitted	0.986			0.999		
Satd. Flow (perm)	1274	0	0	1166	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	5	13	16	523	493	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	539	493	18
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	74.8%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	13	16	518	488	18
Future Volume (Veh/h)	5	13	16	518	488	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	13	16	523	493	18
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.87	0.82	0.82			
vC, conflicting volume	1252	696	714			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	756	524	546			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	96	98			
cM capacity (veh/h)	255	366	679			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	18	539	493	18		
Volume Left	5	16	0	0		
Volume Right	13	0	0	18		
cSH	327	679	1700	1700		
Volume to Capacity	0.06	0.02	0.29	0.01		
Queue Length 95th (m)	1.3	0.5	0.0	0.0		
Control Delay (s/veh)	16.7	0.7	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s/veh)	16.7	0.7	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	74.8%			ICU Level of Service	D	
Analysis Period (min)	15					

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	24	22	52	51	57	31	416	33	23	415	63
Future Volume (vph)	61	24	22	52	51	57	31	416	33	23	415	63
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.92			0.97			0.99	0.72
Frt		0.972			0.952			0.991				0.850
Flt Protected		0.972			0.984			0.997			0.997	
Satd. Flow (prot)	0	1280	0	0	1244	0	0	1371	0	0	1174	1063
Flt Permitted		0.772			0.848			0.949			0.959	
Satd. Flow (perm)	0	966	0	0	1029	0	0	1294	0	0	1122	767
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			47			8				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	64	25	23	55	54	60	33	438	35	24	437	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	112	0	0	169	0	0	506	0	0	461	66
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2		2			2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.7			11.7			24.9			24.9	24.9
Actuated g/C Ratio		0.23			0.23			0.49			0.49	0.49
v/c Ratio		0.47			0.62			0.79			0.84	0.16
Control Delay (s/veh)		21.7			24.5			23.6			29.5	3.8
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		21.7			24.5			23.6			29.5	3.8

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			C			C			C	A
Approach Delay (s/veh)		21.7			24.5			23.6			26.3	
Approach LOS		C			C			C			C	
Queue Length 50th (m)		7.5			10.6			32.7			31.3	0.0
Queue Length 95th (m)		19.2			26.7			#96.6			#93.3	5.4
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		364			403			735			635	463
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			0.42			0.69			0.73	0.14

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 50.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 24.6

Intersection LOS: C

Intersection Capacity Utilization 92.9%

ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	24	22	52	51	57	31	416	33	23	415	63
Future Volume (vph)	61	24	22	52	51	57	31	416	33	23	415	63
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.96			0.98			1.00	0.76
Flpb, ped/bikes		0.96			0.97			0.99			0.99	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1232			1210			1364			1168	811
Flt Permitted		0.77			0.85			0.95			0.96	1.00
Satd. Flow (perm)		979			1043			1299			1123	811
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	25	23	55	54	60	33	438	35	24	437	66
RTOR Reduction (vph)	0	17	0	0	36	0	0	4	0	0	0	33
Lane Group Flow (vph)	0	95	0	0	133	0	0	502	0	0	461	33
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.7			11.7			24.9			24.9	24.9
Effective Green, g (s)		11.7			11.7			24.9			24.9	24.9
Actuated g/C Ratio		0.23			0.23			0.49			0.49	0.49
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		226			241			640			553	399
v/s Ratio Prot												
v/s Ratio Perm		0.10			c0.13			0.39			c0.41	0.04
v/c Ratio		0.42			0.55			0.78			0.83	0.08
Uniform Delay, d1		16.5			17.1			10.6			11.0	6.8
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.9			2.2			6.0			10.2	0.1
Delay (s)		17.4			19.3			16.6			21.3	6.8
Level of Service		B			B			B			C	A
Approach Delay (s/veh)		17.4			19.3			16.6			19.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		18.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.74										
Actuated Cycle Length (s)		50.5			Sum of lost time (s)			13.9				
Intersection Capacity Utilization		92.9%			ICU Level of Service			F				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	956	327	34	686	8	315	22	22	7	26	24
Future Volume (vph)	43	956	327	34	686	8	315	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.962			0.998			0.992			0.943	
Flt Protected	0.950			0.950				0.958			0.994	
Satd. Flow (prot)	1381	2865	0	1381	2964	0	0	1350	0	0	1328	0
Flt Permitted	0.293			0.078				0.711			0.951	
Satd. Flow (perm)	425	2865	0	113	2964	0	0	990	0	0	1271	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		51			1			3			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	986	337	35	707	8	325	23	23	7	27	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	1323	0	35	715	0	0	371	0	0	59	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	60.0		9.0	60.0		51.0	51.0		51.0	51.0	
Total Split (%)	7.5%	50.0%		7.5%	50.0%		42.5%	42.5%		42.5%	42.5%	
Maximum Green (s)	6.0	53.7		6.0	53.7		43.7	43.7		43.7	43.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	60.6	53.8		59.9	51.9			43.8			43.8	
Actuated g/C Ratio	0.52	0.46		0.51	0.45			0.38			0.38	
v/c Ratio	0.16	0.98		0.28	0.54			0.99			0.12	

No Background Development
PTSL (250550)

Synchro 12 Report
Page 18

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	14.2	50.6		18.6	25.7			82.4			16.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	14.2	50.6		18.6	25.7			82.4			16.9	
LOS	B	D		B	C			F			B	
Approach Delay (s/veh)		49.4			25.4			82.4			16.9	
Approach LOS		D			C			F			B	
Queue Length 50th (m)	4.5	~160.2		3.6	62.7			~91.4			5.1	
Queue Length 95th (m)	10.1	#210.2		8.4	80.6			#150.4			14.2	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	270	1351		123	1369			374			493	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.16	0.98		0.28	0.52			0.99			0.12	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 116.4

Natural Cycle: 135

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.99

Intersection Signal Delay (s/veh): 46.4

Intersection LOS: D

Intersection Capacity Utilization 91.1%

ICU Level of Service F

Analysis Period (min) 15

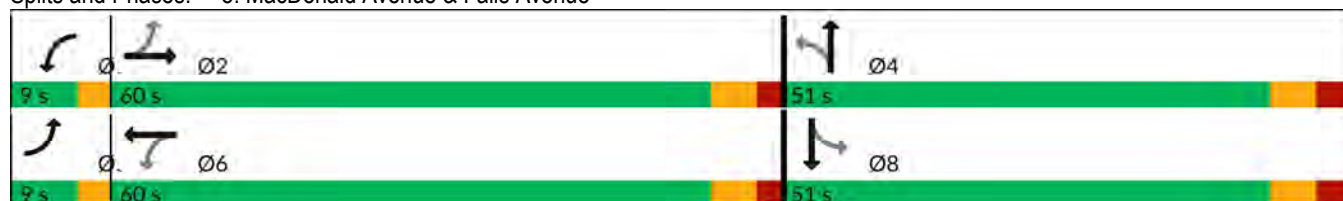
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	956	327	34	686	8	315	22	22	7	26	24
Future Volume (vph)	43	956	327	34	686	8	315	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.96		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2864		1381	2965			1334			1328	
Flt Permitted	0.29	1.00		0.08	1.00			0.71			0.95	
Satd. Flow (perm)	427	2864		114	2965			990			1271	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	44	986	337	35	707	8	325	23	23	7	27	25
RTOR Reduction (vph)	0	28	0	0	1	0	0	2	0	0	16	0
Lane Group Flow (vph)	44	1295	0	35	714	0	0	369	0	0	43	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	58.6	53.8		56.0	52.5			43.8			43.8	
Effective Green, g (s)	58.6	53.8		56.0	52.5			43.8			43.8	
Actuated g/C Ratio	0.50	0.46		0.48	0.45			0.37			0.37	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	251	1309		91	1322			368			472	
v/s Ratio Prot	c0.01	c0.45		c0.01	0.24							
v/s Ratio Perm	0.08			0.17				c0.37			0.03	
v/c Ratio	0.18	0.99		0.38	0.54			1.00			0.09	
Uniform Delay, d1	16.0	31.7		21.7	23.8			37.0			24.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	22.3		2.0	0.8			47.7			0.2	
Delay (s)	16.3	53.9		23.7	24.6			84.6			24.2	
Level of Service	B	D		C	C			F			C	
Approach Delay (s/veh)		52.7			24.6			84.6			24.2	
Approach LOS		D			C			F			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			48.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			117.7			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			91.1%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Future Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.992			0.922			0.991			0.989	
Flt Protected		0.986			0.995			0.999			0.982	
Satd. Flow (prot)	0	1402	0	0	1306	0	0	1419	0	0	1392	0
Flt Permitted		0.986			0.995			0.999			0.982	
Satd. Flow (perm)	0	1402	0	0	1306	0	0	1419	0	0	1392	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	33	78	7	22	71	129	3	215	16	154	222	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	222	0	0	234	0	0	409	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	71.5%											
Analysis Period (min)	15											
	ICU Level of Service C											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Future Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	33	78	7	22	71	129	3	215	16	154	222	33
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	118	222	234	409								
Volume Left (vph)	33	22	3	154								
Volume Right (vph)	7	129	16	33								
Hadj (s)	0.02	-0.32	-0.04	0.03								
Departure Headway (s)	6.1	5.6	5.5	5.3								
Degree Utilization, x	0.20	0.34	0.36	0.61								
Capacity (veh/h)	498	577	593	644								
Control Delay (s/veh)	10.7	11.5	11.6	16.2								
Approach Delay (s/veh)	10.7	11.5	11.6	16.2								
Approach LOS	B	B	B	C								
Intersection Summary												
Delay				13.4								
Level of Service				B								
Intersection Capacity Utilization				71.5%	ICU Level of Service		C					
Analysis Period (min)				15								

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	187	10	6	125	10	23	9	14	52	6	7
Future Volume (vph)	8	187	10	6	125	10	23	9	14	52	6	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.990			0.959			0.986	
Flt Protected		0.998			0.998			0.976			0.961	
Satd. Flow (prot)	0	1420	0	0	1416	0	0	1341	0	0	1358	0
Flt Permitted		0.998			0.998			0.976			0.961	
Satd. Flow (perm)	0	1420	0	0	1416	0	0	1341	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	10		5	5		10			4	4		
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	225	12	7	151	12	28	11	17	63	7	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	247	0	0	170	0	0	56	0	0	78	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	31.9%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	187	10	6	125	10	23	9	14	52	6	7
Future Volume (Veh/h)	8	187	10	6	125	10	23	9	14	52	6	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	10	225	12	7	151	12	28	11	17	63	7	8
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	173			242			439	443	240	459	443	167
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			242			439	443	240	459	443	167
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			99			94	98	98	87	99	99
cM capacity (veh/h)	1402			1330			508	498	797	480	498	874
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	247	170	56	78								
Volume Left	10	7	28	63								
Volume Right	12	12	17	8								
cSH	1402	1330	568	505								
Volume to Capacity	0.00*	0.00*	0.10	0.15								
Queue Length 95th (m)	0.2	0.1	2.4	4.1								
Control Delay (s/veh)	0.4	0.4	12.0	13.4								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.4	0.4	12.0	13.4								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			31.9%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	96	166	126	80	40	26
Future Volume (vph)	96	166	126	80	40	26
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.948		0.947	
Flt Protected		0.982			0.971	
Satd. Flow (prot)	0	1157	1268	0	1318	0
Flt Permitted		0.982			0.971	
Satd. Flow (perm)	0	1157	1268	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	119	205	156	99	49	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	324	255	0	81	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	55.4%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	96	166	126	80	40	26
Future Volume (Veh/h)	96	166	126	80	40	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	119	205	156	99	49	32
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	266				660	220
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266				660	220
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				87	96
cM capacity (veh/h)	1295				387	814
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	324	255	81			
Volume Left	119	0	49			
Volume Right	0	99	32			
cSH	1295	1700	489			
Volume to Capacity	0.09	0.15	0.17			
Queue Length 95th (m)	2.3	0.0	4.4			
Control Delay (s/veh)	3.5	0.0	13.8			
Lane LOS	A		B			
Approach Delay (s/veh)	3.5	0.0	13.8			
Approach LOS			B			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			55.4%	ICU Level of Service		B
Analysis Period (min)			15			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	174	0	0	184	74	3	1	0	43	0	18
Future Volume (vph)	32	174	0	0	184	74	3	1	0	43	0	18
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.961						0.960					
Flt Protected	0.992						0.964					
Satd. Flow (prot)	0	1169	0	0	1286	0	0	1381	0	0	1329	0
Flt Permitted	0.992						0.964					
Satd. Flow (perm)	0	1169	0	0	1286	0	0	1381	0	0	1329	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	37	202	0	0	214	86	3	1	0	50	0	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	239	0	0	300	0	0	4	0	0	71	0
Sign Control	Free						Stop					
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	54.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	174	0	0	184	74	3	1	0	43	0	18
Future Volume (Veh/h)	32	174	0	0	184	74	3	1	0	43	0	18
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	37	202	0	0	214	86	3	1	0	50	0	21
Pedestrians	3			1			2			29		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.0			1.0			1.0			1.0		
Percent Blockage	0			0			0			3		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	329			204			559	607	205	564	564	289
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	329			204			559	607	205	564	564	289
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			100			99	100	100	88	100	97
cM capacity (veh/h)	1206			1377			408	388	838	406	411	731
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	239	300	4	71								
Volume Left	37	0	3	50								
Volume Right	0	86	0	21								
cSH	1206	1700	403	467								
Volume to Capacity	0.03	0.18	0.00*	0.15								
Queue Length 95th (m)	0.7	0.0	0.2	4.0								
Control Delay (s/veh)	1.5	0.0	14.0	14.1								
Lane LOS	A		B	B								
Approach Delay (s/veh)	1.5	0.0	14.0	14.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay				2.3								
Intersection Capacity Utilization				54.5%	ICU Level of Service				A			
Analysis Period (min)				15								

* Value less than 0.01.

Appendix M

Opening Year Background Traffic Operations with Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	43	304	159	135
Future Volume (vph)	0	0	43	304	159	135
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.938	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1518	1211	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1518	1211	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	1		29			29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	50	353	185	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	50	353	342	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	34.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	43	304	159	135
Future Volume (Veh/h)	0	0	43	304	159	135
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	50	353	185	157
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	747	293	371			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	747	293	371			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	96			
cM capacity (veh/h)	367	752	1199			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	50	353	342			
Volume Left	50	0	0			
Volume Right	0	0	157			
cSH	1199	1700	1700			
Volume to Capacity	0.04	0.21	0.20			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s/veh)	8.1	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	1.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			34.8%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	7	340	0	0	159
Future Volume (vph)	9	7	340	0	0	159
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		2		10	10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	11	9	415	0	0	194
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	415	0	0	194
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	62.7%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	7	340	0	0	159
Future Volume (Veh/h)	9	7	340	0	0	159
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	9	415	0	0	194
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.95	0.95			0.95	
vC, conflicting volume	619	427			425	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	571	369			367	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	439	610			1130	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	415	194			
Volume Left	11	0	0			
Volume Right	9	0	0			
cSH	502	1700	1700			
Volume to Capacity	0.04	0.24	0.11			
Queue Length 95th (m)	0.9	0.0	0.0			
Control Delay (s/veh)	12.5	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	12.5	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			62.7%	ICU Level of Service		B
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	271	0	0	0	0	161	5	7	162	0
Future Volume (vph)	179	0	271	0	0	0	0	161	5	7	162	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.98		
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1258	0	1381	1504	0
Flt Permitted	0.950									0.637		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1258	0	911	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			311					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	206	0	311	0	0	0	0	185	6	8	186	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	206	0	311	0	0	0	0	191	0	8	186	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	32.0		32.0					28.0		28.0	28.0	
Total Split (%)	53.3%		53.3%					46.7%		46.7%	46.7%	
Maximum Green (s)	25.9		25.9					21.9		21.9	21.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	10.3		10.3					10.2		10.2	10.2	
Actuated g/C Ratio	0.31		0.31					0.31		0.31	0.31	
v/c Ratio	0.48		0.57					0.49		0.03	0.40	
Control Delay (s/veh)	13.9		6.3					14.5		9.0	12.4	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	13.9		6.3					14.5		9.0	12.4	

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		A	B	
Approach Delay (s/veh)		9.4						14.5			12.3	
Approach LOS		A						B			B	
Queue Length 50th (m)	7.7		0.0					7.5		0.3	7.1	
Queue Length 95th (m)	22.7		10.5					22.7		2.1	20.9	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1110		923					856		619	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	0.19		0.34					0.22		0.01	0.18	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 33.1

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay (s/veh): 11.1

Intersection LOS: B

Intersection Capacity Utilization 62.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	271	0	0	0	0	161	5	7	162	0
Future Volume (vph)	179	0	271	0	0	0	0	161	5	7	162	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1258		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.64	1.00	
Satd. Flow (perm)	1381		1072					1258		918	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	206	0	311	0	0	0	0	185	6	8	186	0
RTOR Reduction (vph)	0	0	213	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	206	0	98	0	0	0	0	189	0	8	186	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	10.3		10.3					10.2		10.2	10.2	
Effective Green, g (s)	10.3		10.3					10.2		10.2	10.2	
Actuated g/C Ratio	0.31		0.31					0.31		0.31	0.31	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	434		337					392		286	469	
v/s Ratio Prot	c0.15							c0.15			0.12	
v/s Ratio Perm			0.09							0.01		
v/c Ratio	0.47		0.29					0.48		0.03	0.40	
Uniform Delay, d1	9.0		8.4					9.1		7.8	8.8	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.4		0.2					0.4		0.0	0.2	
Delay (s)	9.4		8.7					9.5		7.8	9.1	
Level of Service	A		A					A		A	A	
Approach Delay (s/veh)		8.9			0.0			9.5			9.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			9.1									
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			32.7									
Intersection Capacity Utilization			62.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	20	4	145	417	16
Future Volume (vph)	21	20	4	145	417	16
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934				0.995	
Flt Protected	0.975			0.999		
Satd. Flow (prot)	1305	0	0	1095	1294	0
Flt Permitted	0.975			0.999		
Satd. Flow (perm)	1305	0	0	1095	1294	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	25	24	5	173	496	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	0	0	178	515	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	45.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	20	4	145	417	16
Future Volume (Veh/h)	21	20	4	145	417	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	25	24	5	173	496	19
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	708	536	534			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	665	484	483			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	94	96	99			
cM capacity (veh/h)	396	541	904			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	49	178	515			
Volume Left	25	5	0			
Volume Right	24	0	19			
cSH	456	904	1700			
Volume to Capacity	0.11	0.00*	0.30			
Queue Length 95th (m)	2.7	0.1	0.0			
Control Delay (s/veh)	13.8	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s/veh)	13.8	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			45.9%	ICU Level of Service		A
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	45	104	98	306	130
Future Volume (vph)	54	45	104	98	306	130
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.519	
Satd. Flow (perm)	1310	1069	1449	1027	739	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		52		113		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	62	52	120	113	352	149
Shared Lane Traffic (%)						
Lane Group Flow (vph)	62	52	120	113	352	149
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.4	8.4	9.7	9.7	25.6	22.3
Actuated g/C Ratio	0.19	0.19	0.22	0.22	0.59	0.52
v/c Ratio	0.25	0.21	0.37	0.36	0.61	0.19

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	18.5	8.4	18.1	7.4	10.2	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	18.5	8.4	18.1	7.4	10.2	6.4
LOS	B	A	B	A	B	A
Approach Delay (s/veh)	13.9		12.9			9.1
Approach LOS	B		B			A
Queue Length 50th (m)	4.1	0.0	8.1	0.0	11.3	5.3
Queue Length 95th (m)	12.1	6.1	18.8	8.4	24.5	12.4
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	607	523	819	630	583	1292
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.10	0.15	0.18	0.60	0.12

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 43.3

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay (s/veh): 10.8

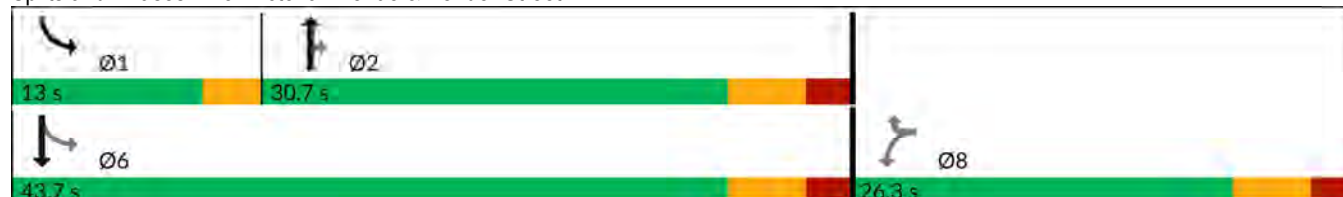
Intersection LOS: B

Intersection Capacity Utilization 48.3%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	54	45	104	98	306	130
Future Volume (vph)	54	45	104	98	306	130
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1074	1449	1032	1363	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1312	1074	1449	1032	745	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	62	52	120	113	352	149
RTOR Reduction (vph)	0	42	0	88	0	0
Lane Group Flow (vph)	62	10	120	25	352	149
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.4	8.4	9.7	9.7	22.3	22.3
Effective Green, g (s)	8.4	8.4	9.7	9.7	22.3	22.3
Actuated g/C Ratio	0.19	0.19	0.22	0.22	0.52	0.52
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	254	208	324	231	520	767
v/s Ratio Prot			0.08		0.15	0.10
v/s Ratio Perm	0.05	0.01		0.02	0.20	
v/c Ratio	0.24	0.05	0.37	0.11	0.68	0.19
Uniform Delay, d1	14.8	14.2	14.2	13.4	7.0	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	0.8	0.2	3.5	0.1
Delay (s)	15.1	14.3	15.1	13.6	10.5	5.8
Level of Service	B	B	B	B	B	A
Approach Delay (s/veh)	14.7		14.4			9.1
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			11.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			43.3		Sum of lost time (s)	15.6
Intersection Capacity Utilization			48.3%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	9	2	199	182	2
Future Volume (vph)	3	9	2	199	182	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.901					0.850
Flt Protected	0.987					
Satd. Flow (prot)	1179	0	0	1091	1504	1106
Flt Permitted	0.987					
Satd. Flow (perm)	1179	0	0	1091	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	11	2	237	217	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	0	239	217	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	9	2	199	182	2
Future Volume (Veh/h)	3	9	2	199	182	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	11	2	237	217	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.97	0.98	0.98			
vC, conflicting volume	481	239	241			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	414	219	221			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	567	769	1309			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	15	239	217	2		
Volume Left	4	2	0	0		
Volume Right	11	0	0	2		
cSH	702	1309	1700	1700		
Volume to Capacity	0.02	0.00*	0.13	0.00*		
Queue Length 95th (m)	0.5	0.0	0.0	0.0		
Control Delay (s/veh)	10.2	0.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	10.2	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		32.3%		ICU Level of Service		A
Analysis Period (min)		15				
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	7	7	18	9	16	2	172	9	12	168	10
Future Volume (vph)	14	7	7	18	9	16	2	172	9	12	168	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.97			1.00			1.00	0.95
Frt		0.966			0.950			0.993				0.850
Flt Protected		0.976			0.980						0.997	
Satd. Flow (prot)	0	1196	0	0	1254	0	0	1330	0	0	1122	851
Flt Permitted		0.816			0.852			0.996			0.964	
Satd. Flow (perm)	0	992	0	0	1077	0	0	1324	0	0	1082	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			19			6				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	16	8	8	21	11	19	2	202	11	14	198	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	51	0	0	215	0	0	212	12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.3			8.3			12.6			12.6	12.6
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
v/c Ratio		0.13			0.19			0.45			0.54	0.04
Control Delay (s/veh)		12.1			11.3			11.3			14.5	0.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		12.1			11.3			11.3			14.5	0.2

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			B	A
Approach Delay (s/veh)		12.1			11.3			11.3			13.7	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		1.0			1.3			8.7			9.1	0.0
Queue Length 95th (m)		5.8			7.4			19.0			20.6	0.0
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		528			579			1066			869	661
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		0.06			0.09			0.20			0.24	0.02

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 35

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay (s/veh): 12.4

Intersection LOS: B

Intersection Capacity Utilization 60.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	7	7	18	9	16	2	172	9	12	168	10
Future Volume (vph)	14	7	7	18	9	16	2	172	9	12	168	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		1.00			0.99			1.00			1.00	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1195			1248			1331			1120	817
Flt Permitted		0.82			0.85			1.00			0.96	1.00
Satd. Flow (perm)		999			1084			1326			1083	817
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	16	8	8	21	11	19	2	202	11	14	198	12
RTOR Reduction (vph)	0	6	0	0	14	0	0	4	0	0	0	8
Lane Group Flow (vph)	0	26	0	0	37	0	0	211	0	0	212	4
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		8.3			8.3			12.6			12.6	12.6
Effective Green, g (s)		8.3			8.3			12.6			12.6	12.6
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		238			258			480			392	295
v/s Ratio Prot												
v/s Ratio Perm		0.03			c0.03			0.16			c0.20	0.01
v/c Ratio		0.11			0.14			0.44			0.54	0.01
Uniform Delay, d1		10.4			10.4			8.4			8.8	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.2			0.5			1.2	0.0
Delay (s)		10.5			10.6			8.9			10.0	7.1
Level of Service		B			B			A			B	A
Approach Delay (s/veh)		10.5			10.6			8.9			9.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		9.6			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.38										
Actuated Cycle Length (s)		34.8			Sum of lost time (s)			13.9				
Intersection Capacity Utilization		60.3%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	625	77	4	254	1	144	19	10	2	15	20
Future Volume (vph)	24	625	77	4	254	1	144	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.983			0.999			0.992			0.926	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1316	2920	0	1381	2938	0	0	1341	0	0	1309	0
Flt Permitted	0.555			0.324				0.734			0.983	
Satd. Flow (perm)	768	2920	0	471	2938	0	0	1017	0	0	1289	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17						4			22	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	26	679	84	4	276	1	157	21	11	2	16	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	763	0	4	277	0	0	189	0	0	40	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.6		9.0	40.6		40.4	40.4		40.4	40.4	
Total Split (%)	10.0%	45.1%		10.0%	45.1%		44.9%	44.9%		44.9%	44.9%	
Maximum Green (s)	6.0	34.3		6.0	34.3		33.1	33.1		33.1	33.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	28.6	24.3		28.1	22.6			16.9			16.9	
Actuated g/C Ratio	0.50	0.43		0.49	0.40			0.30			0.30	
v/c Ratio	0.06	0.61		0.01	0.24			0.62			0.10	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	8.6	16.1		8.5	14.0			28.9			11.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	8.6	16.1		8.5	14.0			28.9			11.5	
LOS	A	B		A	B			C			B	
Approach Delay (s/veh)		15.8			14.0			28.9			11.5	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	1.2	25.7		0.2	7.9			14.6			1.2	
Queue Length 95th (m)	5.6	70.3		1.7	24.4			44.9			8.3	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	447	1903		335	1909			639			816	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.40		0.01	0.15			0.30			0.05	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 57

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.62

Intersection Signal Delay (s/veh): 17.2

Intersection LOS: B

Intersection Capacity Utilization 58.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis 8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	625	77	4	254	1	144	19	10	2	15	20
Future Volume (vph)	24	625	77	4	254	1	144	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2921		1381	2940			1335			1310	
Flt Permitted	0.56	1.00		0.32	1.00			0.73			0.98	
Satd. Flow (perm)	768	2921		471	2940			1021			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	679	84	4	276	1	157	21	11	2	16	22
RTOR Reduction (vph)	0	10	0	0	0	0	0	3	0	0	16	0
Lane Group Flow (vph)	26	753	0	4	277	0	0	186	0	0	24	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	26.2	24.3		24.0	23.2			16.9			16.9	
Effective Green, g (s)	26.2	24.3		24.0	23.2			16.9			16.9	
Actuated g/C Ratio	0.45	0.41		0.41	0.40			0.29			0.29	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	361	1211		205	1163			294			372	
v/s Ratio Prot	c0.00	c0.26		0.00	0.09							
v/s Ratio Perm	0.03			0.01				c0.18			0.02	
v/c Ratio	0.07	0.62		0.02	0.24			0.63			0.07	
Uniform Delay, d1	9.1	13.5		10.3	11.8			18.2			15.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.4		0.0	0.2			3.9			0.2	
Delay (s)	9.2	14.9		10.3	12.0			22.0			15.3	
Level of Service	A	B		B	B			C			B	
Approach Delay (s/veh)		14.8			12.0			22.0			15.3	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			15.2			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			58.6			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			58.0%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Future Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.919			0.999			0.992	
Flt Protected		0.995			0.999						0.990	
Satd. Flow (prot)	0	1372	0	0	1292	0	0	1390	0	0	1387	0
Flt Permitted		0.995			0.999						0.990	
Satd. Flow (perm)	0	1372	0	0	1292	0	0	1390	0	0	1387	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	7	51	7	1	21	33	1	170	1	24	85	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	0	0	55	0	0	172	0	0	116	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	37.6%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Future Volume (vph)	6	42	6	1	17	27	1	139	1	20	70	6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	7	51	7	1	21	33	1	170	1	24	85	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	65	55	172	116								
Volume Left (vph)	7	1	1	24								
Volume Right (vph)	7	33	1	7								
Hadj (s)	0.00	-0.33	0.05	0.03								
Departure Headway (s)	4.6	4.3	4.4	4.4								
Degree Utilization, x	0.08	0.07	0.21	0.14								
Capacity (veh/h)	721	768	796	779								
Control Delay (s/veh)	8.0	7.6	8.5	8.1								
Approach Delay (s/veh)	8.0	7.6	8.5	8.1								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.2									
Level of Service			A									
Intersection Capacity Utilization			37.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	38	8	1	19	0	5	0	3	0	1	0
Future Volume (vph)	1	38	8	1	19	0	5	0	3	0	1	0
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.976				0.951							
Flt Protected	0.999				0.998				0.969			
Satd. Flow (prot)	0	1397	0	0	1305	0	0	1321	0	0	1433	0
Flt Permitted	0.999				0.998				0.969			
Satd. Flow (perm)	0	1397	0	0	1305	0	0	1321	0	0	1433	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	362.4				79.0				93.8			
Travel Time (s)	26.1				5.7				6.8			
Confl. Peds. (#/hr)	3	6		6	3		2		2			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	50	11	1	25	0	7	0	4	0	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	62	0	0	26	0	0	11	0	0	1	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	19.2%				ICU Level of Service A							
Analysis Period (min)	15											

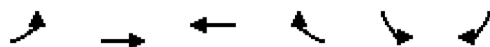
HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	38	8	1	19	0	5	0	3	0	1	0
Future Volume (Veh/h)	1	38	8	1	19	0	5	0	3	0	1	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	1	50	11	1	25	0	7	0	4	0	1	0
Pedestrians					2		6				3	
Lane Width (m)					3.6		3.6				3.6	
Walking Speed (m/s)					1.0		1.0				1.0	
Percent Blockage					0		1				0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	28			67			91	94	64	94	99	28
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			67			91	94	64	94	99	28
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1594			1080			885	792	999	880	786	1050
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	62	26	11	1								
Volume Left	1	1	7	0								
Volume Right	11	0	4	0								
cSH	1594	1080	923	786								
Volume to Capacity	0.00*	0.00*	0.01	0.00*								
Queue Length 95th (m)	0.0	0.0	0.3	0.0								
Control Delay (s/veh)	0.1	0.3	8.9	9.6								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.3	8.9	9.6								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			19.2%	ICU Level of Service					A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

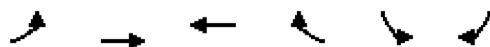
4873 and 4898 Kitchener Street TIS
Background AM (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	40	19	0	1	1
Future Volume (vph)	2	40	19	0	1	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected		0.997			0.976	
Satd. Flow (prot)	0	1174	1262	0	869	0
Flt Permitted		0.997			0.976	
Satd. Flow (perm)	0	1174	1262	0	869	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	3	55	26	0	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	58	26	0	2	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (Open)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	40	19	0	1	1
Future Volume (Veh/h)	2	40	19	0	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	3	55	26	0	1	1
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	30				91	32
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	30				91	32
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	100				100	100
cM capacity (veh/h)	1590				909	814
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	58	26	2			
Volume Left	3	0	1			
Volume Right	0	0	1			
cSH	1590	1700	859			
Volume to Capacity	0.00*	0.02	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.4	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s/veh)	0.4	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			16.7%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	40	0	0	18	2	1	0	0	1	0	0
Future Volume (vph)	1	40	0	0	18	2	1	0	0	1	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.986											
Flt Protected	0.999								0.950		0.950	
Satd. Flow (prot)	0	1177	0	0	1241	0	0	1361	0	0	1361	0
Flt Permitted	0.999								0.950		0.950	
Satd. Flow (perm)	0	1177	0	0	1241	0	0	1361	0	0	1361	0
Link Speed (k/h)	50								50		50	
Link Distance (m)	37.0								32.6		36.9	
Travel Time (s)	2.7								2.3		2.7	
Confl. Peds. (#/hr)	3								2		2	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	58	0	0	26	3	1	0	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	29	0	0	1	0	0	1	0
Sign Control	Free		Free						Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	15.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	40	0	0	18	2	1	0	0	1	0	0
Future Volume (Veh/h)	1	40	0	0	18	2	1	0	0	1	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	1	58	0	0	26	3	1	0	0	1	0	0
Pedestrians				2						3		
Lane Width (m)				3.6						3.6		
Walking Speed (m/s)				1.0						1.0		
Percent Blockage				0						0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	32			58			88	92	60	93	91	31
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	32			58			88	92	60	93	91	31
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1588			1559			900	799	1009	889	800	1046
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	59	29	1	1								
Volume Left	1	0	1	1								
Volume Right	0	3	0	0								
cSH	1588	1700	900	889								
Volume to Capacity	0.00*	0.02	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s/veh)	0.1	0.0	9.0	9.1								
Lane LOS	A		A	A								
Approach Delay (s/veh)	0.1	0.0	9.0	9.1								
Approach LOS			A	A								
Intersection Summary												
Average Delay				0.3								
Intersection Capacity Utilization				15.3%	ICU Level of Service				A			
Analysis Period (min)				15								
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	158	525	323	258
Future Volume (vph)	0	0	158	525	323	258
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.940	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1563	1233	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1563	1233	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		1	58			58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	166	553	340	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	166	553	612	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	73.6%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	158	525	323	258
Future Volume (Veh/h)	0	0	158	525	323	258
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	166	553	340	272
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1419	535	670			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1419	535	670			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	82			
cM capacity (veh/h)	125	549	930			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	166	553	612			
Volume Left	166	0	0			
Volume Right	0	0	272			
cSH	930	1700	1700			
Volume to Capacity	0.18	0.33	0.36			
Queue Length 95th (m)	4.9	0.0	0.0			
Control Delay (s/veh)	9.7	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.2		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.2			
Intersection Capacity Utilization			73.6%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	45	638	0	0	323
Future Volume (vph)	48	45	638	0	0	323
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	52	48	686	0	0	347
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	0	686	0	0	347
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	91.9%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	48	45	638	0	0	323
Future Volume (Veh/h)	48	45	638	0	0	323
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	52	48	686	0	0	347
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	1067	722			719	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	877	381			377	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	76	89			100	
cM capacity (veh/h)	216	449			802	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	100	686	347			
Volume Left	52	0	0			
Volume Right	48	0	0			
cSH	288	1700	1700			
Volume to Capacity	0.35	0.40	0.20			
Queue Length 95th (m)	11.3	0.0	0.0			
Control Delay (s/veh)	24.0	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	24.0	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			91.9%	ICU Level of Service		F
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	177	0	0	0	0	473	16	53	318	0
Future Volume (vph)	165	0	177	0	0	0	0	473	16	53	318	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.98		
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1304	0	1354	1563	0
Flt Permitted	0.950									0.389		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1304	0	542	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			192					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	192	0	0	0	0	514	17	58	346	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	192	0	0	0	0	531	0	58	346	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.4		28.4					41.6		41.6	41.6	
Total Split (%)	40.6%		40.6%					59.4%		59.4%	59.4%	
Maximum Green (s)	22.3		22.3					35.5		35.5	35.5	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	12.1		12.1					24.6		24.6	24.6	
Actuated g/C Ratio	0.24		0.24					0.49		0.49	0.49	
v/c Ratio	0.54		0.47					0.82		0.22	0.45	
Control Delay (s/veh)	25.2		7.8					23.4		9.8	10.3	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	25.2		7.8					23.4		9.8	10.3	

With Background Development
PTSL (250550)

Synchro 12 Report
Page 5

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		A					C		A	B	
Approach Delay (s/veh)		16.2						23.4			10.3	
Approach LOS		B						C			B	
Queue Length 50th (m)	13.4		0.0					33.3		2.4	16.5	
Queue Length 95th (m)	34.7		13.2					#100.8		9.6	40.2	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	654		623					977		406	1171	
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	0.27		0.31					0.54		0.14	0.30	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 49.8

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay (s/veh): 17.3

Intersection LOS: B

Intersection Capacity Utilization 91.9%

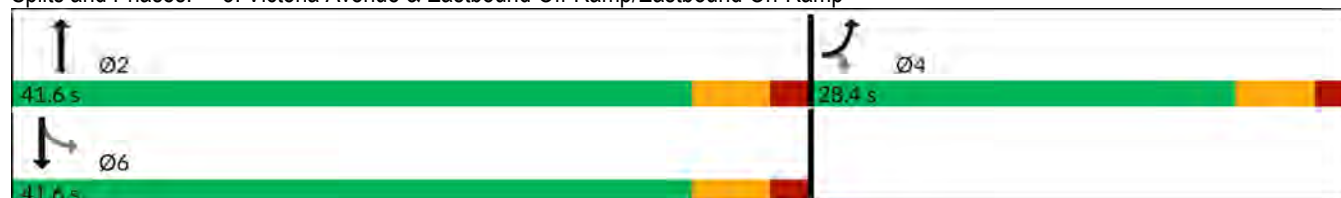
ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	177	0	0	0	0	473	16	53	318	0
Future Volume (vph)	165	0	177	0	0	0	0	473	16	53	318	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1304		1329	1563	
Flt Permitted	0.95		1.00					1.00		0.39	1.00	
Satd. Flow (perm)	1368		1095					1304		545	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	0	192	0	0	0	0	514	17	58	346	0
RTOR Reduction (vph)	0	0	144	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	179	0	48	0	0	0	0	530	0	58	346	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	12.1		12.1					24.6		24.6	24.6	
Effective Green, g (s)	12.1		12.1					24.6		24.6	24.6	
Actuated g/C Ratio	0.25		0.25					0.50		0.50	0.50	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	338		270					656		274	786	
v/s Ratio Prot	c0.13							c0.41			0.22	
v/s Ratio Perm			0.04							0.11		
v/c Ratio	0.53		0.18					0.81		0.21	0.44	
Uniform Delay, d1	15.9		14.5					10.2		6.8	7.8	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.8		0.1					6.9		0.2	0.2	
Delay (s)	16.7		14.6					17.0		6.9	7.9	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		15.6			0.0			17.0			7.8	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			13.8					HCM 2000 Level of Service		B		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			48.9					Sum of lost time (s)		12.2		
Intersection Capacity Utilization			91.9%					ICU Level of Service		F		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	38	27	15	450	441	54
Future Volume (vph)	38	27	15	450	441	54
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.943				0.985	
Flt Protected	0.972			0.998		
Satd. Flow (prot)	1313	0	0	1164	1306	0
Flt Permitted	0.972			0.998		
Satd. Flow (perm)	1313	0	0	1164	1306	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	40	29	16	479	469	57
Shared Lane Traffic (%)						
Lane Group Flow (vph)	69	0	0	495	526	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	70.6%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	27	15	450	441	54
Future Volume (Veh/h)	38	27	15	450	441	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	40	29	16	479	469	57
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.94	0.88	0.88			
vC, conflicting volume	1055	548	572			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	747	415	443			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	95	98			
cM capacity (veh/h)	336	535	945			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	69	495	526			
Volume Left	40	16	0			
Volume Right	29	0	57			
cSH	399	945	1700			
Volume to Capacity	0.17	0.02	0.31			
Queue Length 95th (m)	4.6	0.4	0.0			
Control Delay (s/veh)	15.9	0.5	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	15.9	0.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		70.6%		ICU Level of Service		C
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	203	261	158	205	263
Future Volume (vph)	129	203	261	158	205	263
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.97	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.491	
Satd. Flow (perm)	1339	1063	1563	1032	683	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		214		166		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	136	214	275	166	216	277
Shared Lane Traffic (%)						
Lane Group Flow (vph)	136	214	275	166	216	277
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.9	10.9	15.3	15.3	30.6	27.2
Actuated g/C Ratio	0.21	0.21	0.30	0.30	0.60	0.53
v/c Ratio	0.48	0.54	0.59	0.39	0.41	0.33

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	25.7	9.4	21.4	6.0	7.7	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.7	9.4	21.4	6.0	7.7	8.3
LOS	C	A	C	A	A	A
Approach Delay (s/veh)	15.8		15.6			8.0
Approach LOS	B		B			A
Queue Length 50th (m)	10.8	0.0	20.3	0.0	7.2	11.8
Queue Length 95th (m)	28.1	14.9	44.9	10.6	20.0	29.0
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	543	558	774	595	548	1186
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.38	0.36	0.28	0.39	0.23

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 51.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 12.7

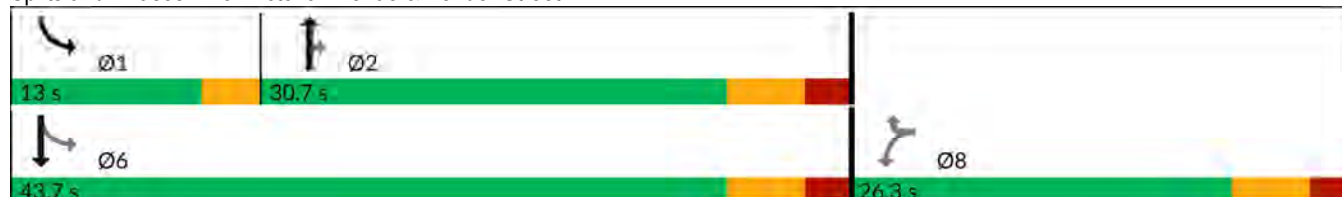
Intersection LOS: B

Intersection Capacity Utilization 59.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	129	203	261	158	205	263
Future Volume (vph)	129	203	261	158	205	263
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1351	1069	1563	1049	1351	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1351	1069	1563	1049	699	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	136	214	275	166	216	277
RTOR Reduction (vph)	0	168	0	116	0	0
Lane Group Flow (vph)	136	46	275	50	216	277
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.9	10.9	15.3	15.3	27.1	27.1
Effective Green, g (s)	10.9	10.9	15.3	15.3	27.1	27.1
Actuated g/C Ratio	0.22	0.22	0.30	0.30	0.54	0.54
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	291	230	472	317	487	837
v/s Ratio Prot			c0.18		c0.08	0.18
v/s Ratio Perm	c0.10	0.04		0.05	0.16	
v/c Ratio	0.47	0.20	0.58	0.16	0.44	0.33
Uniform Delay, d1	17.3	16.3	14.9	12.9	6.6	6.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.3	2.0	0.3	0.6	0.3
Delay (s)	18.2	16.6	16.9	13.2	7.3	6.9
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	17.2		15.5			7.1
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.51			
Actuated Cycle Length (s)			50.6		Sum of lost time (s)	15.6
Intersection Capacity Utilization			59.9%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	9	5	413	375	18
Future Volume (vph)	6	9	5	413	375	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919					0.850
Flt Protected	0.980			0.999		
Satd. Flow (prot)	1291	0	0	1165	1563	1106
Flt Permitted	0.980			0.999		
Satd. Flow (perm)	1291	0	0	1165	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	6	9	5	430	391	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	0	0	435	391	19
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	55.1%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	9	5	413	375	18
Future Volume (Veh/h)	6	9	5	413	375	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	6	9	5	430	391	19
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.89	0.88	0.88			
vC, conflicting volume	914	474	493			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	330	351			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	417	576	980			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	15	435	391	19		
Volume Left	6	5	0	0		
Volume Right	9	0	0	19		
cSH	500	980	1700	1700		
Volume to Capacity	0.03	0.00*	0.23	0.01		
Queue Length 95th (m)	0.7	0.1	0.0	0.0		
Control Delay (s/veh)	12.4	0.2	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	12.4	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			55.1%	ICU Level of Service		B
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	16	12	50	40	35	12	347	37	17	325	43
Future Volume (vph)	36	16	12	50	40	35	12	347	37	17	325	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.93			0.98			1.00	0.80
Frt		0.975			0.962			0.987				0.850
Flt Protected		0.973			0.980			0.998			0.998	
Satd. Flow (prot)	0	1282	0	0	1277	0	0	1375	0	0	1165	1024
Flt Permitted		0.751			0.839			0.982			0.966	
Satd. Flow (perm)	0	945	0	0	1048	0	0	1348	0	0	1122	818
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			34			12				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	39	17	13	54	43	38	13	373	40	18	349	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	135	0	0	426	0	0	367	46
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		10.8			10.8			19.6			19.6	19.6
Actuated g/C Ratio		0.24			0.24			0.43			0.43	0.43
v/c Ratio		0.29			0.49			0.72			0.75	0.12
Control Delay (s/veh)		17.4			20.0			18.0			22.1	2.4
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		17.4			20.0			18.0			22.1	2.4

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			C	A
Approach Delay (s/veh)		17.4			20.0			18.0			20.0	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		3.5			6.5			21.8			19.9	0.0
Queue Length 95th (m)		12.9			21.6			58.7			#60.1	3.1
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		405			460			889			737	560
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		0.17			0.29			0.48			0.50	0.08

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 45.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay (s/veh): 19.0

Intersection LOS: B

Intersection Capacity Utilization 80.6%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	16	12	50	40	35	12	347	37	17	325	43
Future Volume (vph)	36	16	12	50	40	35	12	347	37	17	325	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.98			0.97			0.99			1.00	0.85
Flpb, ped/bikes		0.97			0.97			1.00			1.00	1.00
Frt		0.97			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1245			1247			1378			1160	866
Flt Permitted		0.75			0.84			0.98			0.97	1.00
Satd. Flow (perm)		961			1067			1355			1123	866
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	39	17	13	54	43	38	13	373	40	18	349	46
RTOR Reduction (vph)	0	10	0	0	26	0	0	7	0	0	0	26
Lane Group Flow (vph)	0	59	0	0	109	0	0	419	0	0	367	20
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		10.8			10.8			19.6			19.6	19.6
Effective Green, g (s)		10.8			10.8			19.6			19.6	19.6
Actuated g/C Ratio		0.24			0.24			0.44			0.44	0.44
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		234			260			599			496	383
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.10			0.31			0.33	0.02
v/c Ratio		0.25			0.42			0.70			0.74	0.05
Uniform Delay, d1		13.5			14.1			10.0			10.2	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.4			0.8			3.4			5.4	0.0
Delay (s)		13.9			14.9			13.4			15.6	7.1
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		13.9			14.9			13.4			14.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		14.1										
HCM 2000 Volume to Capacity ratio		0.63										
Actuated Cycle Length (s)		44.3										
Intersection Capacity Utilization		80.6%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	604	160	37	684	12	236	28	22	2	24	23
Future Volume (vph)	51	604	160	37	684	12	236	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.969			0.997			0.989			0.936	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1381	2878	0	1381	2961	0	0	1336	0	0	1295	0
Flt Permitted	0.276			0.236				0.727			0.988	
Satd. Flow (perm)	401	2878	0	343	2961	0	0	1006	0	0	1282	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			2			6			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	55	649	172	40	735	13	254	30	24	2	26	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	821	0	40	748	0	0	308	0	0	53	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	38.0		9.0	38.0		43.0	43.0		43.0	43.0	
Total Split (%)	10.0%	42.2%		10.0%	42.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	6.0	31.7		6.0	31.7		35.7	35.7		35.7	35.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	34.3	27.7		34.3	27.7			27.5			27.5	
Actuated g/C Ratio	0.46	0.37		0.46	0.37			0.37			0.37	
v/c Ratio	0.20	0.75		0.16	0.68			0.82			0.11	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	13.7	26.2		13.3	25.2			42.0			11.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	13.7	26.2		13.3	25.2			42.0			11.4	
LOS	B	C		B	C			D			B	
Approach Delay (s/veh)		25.5			24.6			42.0			11.4	
Approach LOS		C			C			D			B	
Queue Length 50th (m)	4.2	57.1		3.0	52.6			43.7			2.9	
Queue Length 95th (m)	10.9	85.4		8.5	78.2			#85.9			9.9	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	270	1343		248	1360			522			674	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.20	0.61		0.16	0.55			0.59			0.08	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 74.4

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay (s/veh): 27.3

Intersection LOS: C

Intersection Capacity Utilization 73.7%

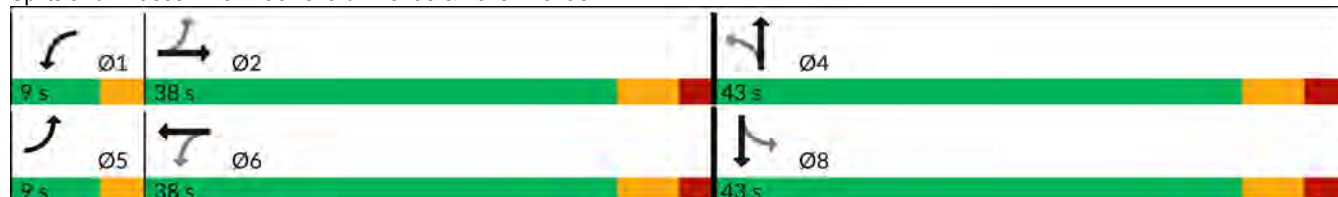
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	604	160	37	684	12	236	28	22	2	24	23
Future Volume (vph)	51	604	160	37	684	12	236	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2877		1381	2962			1331			1297	
Flt Permitted	0.28	1.00		0.24	1.00			0.73			0.99	
Satd. Flow (perm)	402	2877		343	2962			1007			1283	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	55	649	172	40	735	13	254	30	24	2	26	25
RTOR Reduction (vph)	0	26	0	0	1	0	0	4	0	0	16	0
Lane Group Flow (vph)	55	795	0	40	747	0	0	304	0	0	37	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	30.7	27.7		30.7	27.7			27.5			27.5	
Effective Green, g (s)	30.7	27.7		30.7	27.7			27.5			27.5	
Actuated g/C Ratio	0.41	0.37		0.41	0.37			0.37			0.37	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	204	1065		182	1096			370			471	
v/s Ratio Prot	c0.01	c0.28		0.01	0.25							
v/s Ratio Perm	0.10			0.08				c0.30			0.03	
v/c Ratio	0.27	0.75		0.22	0.68			0.82			0.08	
Uniform Delay, d1	13.9	20.5		13.9	19.8			21.4			15.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.5	3.5		0.4	2.3			13.4			0.2	
Delay (s)	14.4	24.0		14.4	22.1			34.8			15.6	
Level of Service	B	C		B	C			C			B	
Approach Delay (s/veh)		23.4			21.7			34.8			15.6	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			24.3			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			74.8			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			73.7%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Future Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.929			0.996			0.989	
Flt Protected		0.982			0.999			0.999			0.990	
Satd. Flow (prot)	0	1383	0	0	1330	0	0	1386	0	0	1393	0
Flt Permitted		0.982			0.999			0.999			0.990	
Satd. Flow (perm)	0	1383	0	0	1330	0	0	1386	0	0	1393	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	26	37	9	3	57	66	5	213	6	50	167	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	72	0	0	126	0	0	224	0	0	236	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.4%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Future Volume (vph)	24	35	8	3	54	62	5	200	6	47	157	18
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	26	37	9	3	57	66	5	213	6	50	167	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	72	126	224	236								
Volume Left (vph)	26	3	5	50								
Volume Right (vph)	9	66	6	19								
Hadj (s)	0.00	-0.31	0.04	0.01								
Departure Headway (s)	5.2	4.8	4.7	4.7								
Degree Utilization, x	0.10	0.17	0.29	0.31								
Capacity (veh/h)	620	675	722	726								
Control Delay (s/veh)	8.8	8.8	9.7	9.8								
Approach Delay (s/veh)	8.8	8.8	9.7	9.8								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.5									
Level of Service			A									
Intersection Capacity Utilization			52.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	56	16	2	60	2	5	1	1	1	2	3
Future Volume (vph)	1	56	16	2	60	2	5	1	1	1	2	3
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.970			0.996			0.983			0.923	
Flt Protected		0.999			0.999			0.964			0.993	
Satd. Flow (prot)	0	1389	0	0	1426	0	0	1358	0	0	1313	0
Flt Permitted		0.999			0.999			0.964			0.993	
Satd. Flow (perm)	0	1389	0	0	1426	0	0	1358	0	0	1313	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			79.0			93.8			56.1	
Travel Time (s)		26.1			5.7			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	66	19	2	71	2	6	1	1	1	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	86	0	0	75	0	0	8	0	0	7	0
Sign Control	Free				Free				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	17.0%				ICU Level of Service A							
Analysis Period (min)	15											

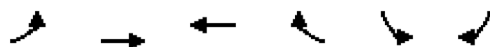
HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	56	16	2	60	2	5	1	1	1	2	3
Future Volume (Veh/h)	1	56	16	2	60	2	5	1	1	1	2	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	66	19	2	71	2	6	1	1	1	2	4
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	75			86			162	158	78	158	166	76
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	75			86			162	158	78	158	166	76
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 %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1534			1521			798	735	987	805	727	987
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	86	75	8	7								
Volume Left	1	2	6	1								
Volume Right	19	2	1	4								
cSH	1534	1521	809	870								
Volume to Capacity	0.00*	0.00*	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.2	0.2								
Control Delay (s/veh)	0.1	0.2	9.5	9.2								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.2	9.5	9.2								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			17.0%	ICU Level of Service					A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	57	65	2	4	0
Future Volume (vph)	1	57	65	2	4	0
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.996			
Flt Protected		0.999			0.950	
Satd. Flow (prot)	0	1177	1333	0	1361	0
Flt Permitted		0.999			0.950	
Satd. Flow (perm)	0	1177	1333	0	1361	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	64	73	2	4	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	65	75	0	4	0
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

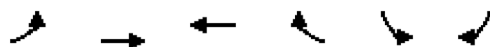
Control Type: Unsignalized

Intersection Capacity Utilization 16.3% ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (Open)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	57	65	2	4	0
Future Volume (Veh/h)	1	57	65	2	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	64	73	2	4	0
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	80				145	79
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	80				145	79
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)	1523				847	982
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	65	75	4			
Volume Left	1	0	4			
Volume Right	0	2	0			
cSH	1523	1700	847			
Volume to Capacity	0.00*	0.04	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.1	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s/veh)	0.1	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			16.3%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (Open)

														
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	0	61	0	0	67	2	0	0	2	2	0	0		
Future Volume (vph)	0	61	0	0	67	2	0	0	2	2	0	0		
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor														
Frt					0.997					0.865				
Flt Protected									0.950					
Satd. Flow (prot)	0	1178	0	0	1334	0	0	1240	0	0	1361	0		
Flt Permitted									0.950					
Satd. Flow (perm)	0	1178	0	0	1334	0	0	1240	0	0	1361	0		
Link Speed (k/h)	50				50				50					
Link Distance (m)	37.0				57.8				32.6					
Travel Time (s)	2.7				4.2				2.3					
Confl. Peds. (#/hr)	7					7	1					3	3	1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Adj. Flow (vph)	0	69	0	0	76	2	0	0	2	2	0	0		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	69	0	0	78	0	0	2	0	0	2	0		
Sign Control	Free				Free				Stop					
Intersection Summary														
Area Type:	Other													
Control Type:	Unsignalized													
Intersection Capacity Utilization	17.8%				ICU Level of Service A									
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	61	0	0	67	2	0	0	2	2	0	0
Future Volume (Veh/h)	0	61	0	0	67	2	0	0	2	2	0	0
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	69	0	0	76	2	0	0	2	2	0	0
Pedestrians	1			3			7			7		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.0			1.0			1.0			1.0		
Percent Blockage	0			0			1			1		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	85			69			147	154	72	158	153	85
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	85			69			147	154	72	158	153	85
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1514			1545			821	736	993	799	737	972
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	69	78	2	2								
Volume Left	0	0	0	2								
Volume Right	0	2	2	0								
cSH	1514	1700	993	799								
Volume to Capacity	0.00	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.1								
Control Delay (s/veh)	0.0	0.0	8.6	9.5								
Lane LOS			A	A								
Approach Delay (s/veh)	0.0	0.0	8.6	9.5								
Approach LOS			A	A								
Intersection Summary												
Average Delay				0.2								
Intersection Capacity Utilization				17.8%	ICU Level of Service				A			
Analysis Period (min)				15								
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	157	470	354	196
Future Volume (vph)	0	0	157	470	354	196
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.952					
Flt Protected	0.950					
Satd. Flow (prot)	0	0	1354	1563	1261	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	0	1354	1563	1261	0
Link Speed (k/h)	40	50				50
Link Distance (m)	75.7	60.3				168.1
Travel Time (s)	6.8	4.3				12.1
Confl. Peds. (#/hr)	5		63	63		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	173	516	389	215
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	173	516	604	0
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	71.3%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	157	470	354	196
Future Volume (Veh/h)	0	0	157	470	354	196
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	173	516	389	215
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1422	565	667			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1422	565	667			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	81			
cM capacity (veh/h)	123	526	923			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	173	516	604			
Volume Left	173	0	0			
Volume Right	0	0	215			
cSH	923	1700	1700			
Volume to Capacity	0.19	0.30	0.36			
Queue Length 95th (m)	5.2	0.0	0.0			
Control Delay (s/veh)	9.8	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.5		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			71.3%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	41	587	0	0	354
Future Volume (vph)	53	41	587	0	0	354
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40	50		50		
Link Distance (m)	86.2	51.0		60.3		
Travel Time (s)	7.8	3.7		4.3		
Confl. Peds. (#/hr)	1		57		57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	55	43	611	0	0	369
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	0	611	0	0	369
Sign Control	Stop	Free		Free		
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	105.3%			ICU Level of Service G		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	41	587	0	0	354
Future Volume (Veh/h)	53	41	587	0	0	354
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	55	43	611	0	0	369
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.74	0.74			0.74	
vC, conflicting volume	1037	669			668	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	870	370			369	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	76	91			100	
cM capacity (veh/h)	225	471			833	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	98	611	369			
Volume Left	55	0	0			
Volume Right	43	0	0			
cSH	292	1700	1700			
Volume to Capacity	0.34	0.36	0.22			
Queue Length 95th (m)	10.7	0.0	0.0			
Control Delay (s/veh)	23.4	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	23.4	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.1				
Intersection Capacity Utilization		105.3%		ICU Level of Service		G
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	311	0	0	0	0	431	15	73	334	0
Future Volume (vph)	156	0	311	0	0	0	0	431	15	73	334	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.93					1.00		0.96		
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1313	0	1354	1563	0
Flt Permitted	0.950									0.435		
Satd. Flow (perm)	1364	0	1033	0	0	0	0	1313	0	594	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			223					4				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	163	0	324	0	0	0	0	449	16	76	348	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	0	324	0	0	0	0	465	0	76	348	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					31.8		31.8	31.8	
Total Split (%)	47.0%		47.0%					53.0%		53.0%	53.0%	
Maximum Green (s)	22.1		22.1					25.7		25.7	25.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	12.3		12.3					19.7		19.7	19.7	
Actuated g/C Ratio	0.27		0.27					0.44		0.44	0.44	
v/c Ratio	0.44		0.73					0.80		0.29	0.51	
Control Delay (s/veh)	18.3		16.3					25.4		13.0	13.0	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	18.3		16.3					25.4		13.0	13.0	

With Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		B					C		B	B	
Approach Delay (s/veh)		17.0						25.4			13.0	
Approach LOS		B						C			B	
Queue Length 50th (m)	10.4		6.3					24.7		3.0	15.5	
Queue Length 95th (m)	25.0		29.9					#90.9		14.0	47.3	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	710		643					794		358	943	
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	0.23		0.50					0.59		0.21	0.37	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 44.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay (s/veh): 18.6

Intersection LOS: B

Intersection Capacity Utilization 105.3%

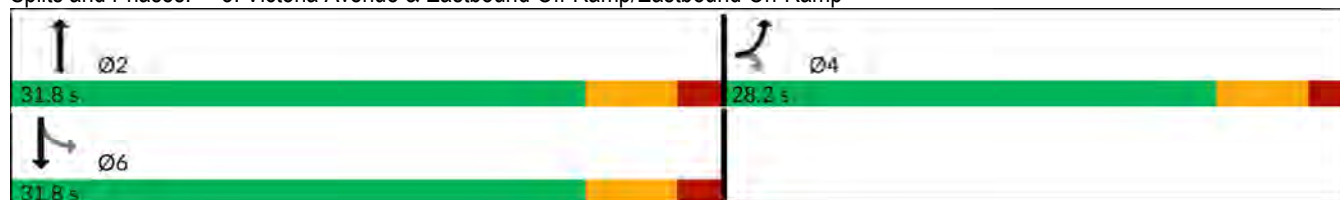
ICU Level of Service G

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	311	0	0	0	0	431	15	73	334	0
Future Volume (vph)	156	0	311	0	0	0	0	431	15	73	334	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.95					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.97	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1047					1315		1308	1563	
Flt Permitted	0.95		1.00					1.00		0.43	1.00	
Satd. Flow (perm)	1368		1047					1315		598	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	162	0	324	0	0	0	0	449	16	76	348	0
RTOR Reduction (vph)	0	0	161	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	163	0	163	0	0	0	0	463	0	76	348	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	12.3		12.3					19.7		19.7	19.7	
Effective Green, g (s)	12.3		12.3					19.7		19.7	19.7	
Actuated g/C Ratio	0.28		0.28					0.45		0.45	0.45	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	380		291					586		266	696	
v/s Ratio Prot	0.12							c0.35			0.22	
v/s Ratio Perm			c0.16							0.13		
v/c Ratio	0.43		0.56					0.79		0.29	0.50	
Uniform Delay, d1	13.1		13.6					10.5		7.8	8.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.3		1.6					6.5		0.3	0.2	
Delay (s)	13.4		15.2					17.0		8.0	9.0	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		14.6			0.0			17.0			8.8	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			13.6					HCM 2000 Level of Service		B		
HCM 2000 Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			44.2					Sum of lost time (s)		12.2		
Intersection Capacity Utilization			105.3%					ICU Level of Service		G		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	44	55	8	401	584	61
Future Volume (vph)	44	55	8	401	584	61
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.925				0.987	
Flt Protected	0.978			0.999		
Satd. Flow (prot)	1296	0	0	1165	1309	0
Flt Permitted	0.978			0.999		
Satd. Flow (perm)	1296	0	0	1165	1309	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	47	59	9	427	621	65
Shared Lane Traffic (%)						
Lane Group Flow (vph)	106	0	0	436	686	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	66.6%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	44	55	8	401	584	61
Future Volume (Veh/h)	44	55	8	401	584	61
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	47	59	9	427	621	65
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.90	0.86	0.86			
vC, conflicting volume	1198	758	774			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	973	635	655			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	84	99			
cM capacity (veh/h)	225	371	738			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	106	436	686			
Volume Left	47	9	0			
Volume Right	59	0	65			
cSH	288	738	1700			
Volume to Capacity	0.37	0.01	0.40			
Queue Length 95th (m)	12.2	0.3	0.0			
Control Delay (s/veh)	24.6	0.4	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	24.6	0.4	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay	2.2					
Intersection Capacity Utilization	66.6%			ICU Level of Service	C	
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	138	193	216	251	325	314
Future Volume (vph)	138	193	216	251	325	314
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.85		0.85	0.90	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.510	
Satd. Flow (perm)	1322	943	1533	932	670	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		197		256		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	141	197	220	256	332	320
Shared Lane Traffic (%)						
Lane Group Flow (vph)	141	197	220	256	332	320
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	31.7	31.7	12.0	43.7
Total Split (%)	37.6%	37.6%	45.3%	45.3%	17.1%	62.4%
Maximum Green (s)	20.0	20.0	25.4	25.4	9.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	10.8	10.8	13.8	13.8	29.2	25.8
Actuated g/C Ratio	0.22	0.22	0.28	0.28	0.59	0.52
v/c Ratio	0.49	0.55	0.52	0.58	0.64	0.39

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	24.7	10.0	20.1	8.4	12.9	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	24.7	10.0	20.1	8.4	12.9	9.2
LOS	C	B	C	A	B	A
Approach Delay (s/veh)	16.2		13.8			11.1
Approach LOS	B		B			B
Queue Length 50th (m)	10.5	0.0	15.7	0.0	12.2	14.1
Queue Length 95th (m)	27.5	14.3	36.0	14.5	#33.7	34.6
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	548	506	808	612	527	1213
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.39	0.27	0.42	0.63	0.26

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 49.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay (s/veh): 13.2

Intersection LOS: B

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	138	193	216	251	325	314
Future Volume (vph)	138	193	216	251	325	314
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.89	1.00	0.89	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1340	985	1533	977	1336	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.51	1.00
Satd. Flow (perm)	1340	985	1533	977	717	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	141	197	220	256	332	320
RTOR Reduction (vph)	0	154	0	184	0	0
Lane Group Flow (vph)	141	43	220	72	332	320
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.8	10.8	13.8	13.8	25.8	25.8
Effective Green, g (s)	10.8	10.8	13.8	13.8	25.8	25.8
Actuated g/C Ratio	0.22	0.22	0.28	0.28	0.52	0.52
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	294	216	429	274	489	819
v/s Ratio Prot			0.14		c0.12	0.20
v/s Ratio Perm	c0.11	0.04		0.07	c0.23	
v/c Ratio	0.48	0.20	0.51	0.26	0.68	0.39
Uniform Delay, d1	16.7	15.7	14.9	13.7	7.6	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.3	1.2	0.6	3.7	0.4
Delay (s)	17.6	16.0	16.1	14.4	11.3	7.4
Level of Service	B	B	B	B	B	A
Approach Delay (s/veh)	16.7		15.1			9.4
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			49.2		Sum of lost time (s)	15.6
Intersection Capacity Utilization			73.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	6	3	463	435	17
Future Volume (vph)	4	6	3	463	435	17
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.919					0.850
Flt Protected	0.980					
Satd. Flow (prot)	1291	0	0	1166	1563	1106
Flt Permitted	0.980					
Satd. Flow (perm)	1291	0	0	1166	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	4	6	3	468	439	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	10	0	0	471	439	17
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	59.6%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	6	3	463	435	17
Future Volume (Veh/h)	4	6	3	463	435	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	4	6	3	468	439	17
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.91	0.85	0.85			
vC, conflicting volume	1117	642	659			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	703	490	510			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	98	100			
cM capacity (veh/h)	292	394	721			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	10	471	439	17		
Volume Left	4	3	0	0		
Volume Right	6	0	0	17		
cSH	346	721	1700	1700		
Volume to Capacity	0.03	0.00*	0.26	0.01		
Queue Length 95th (m)	0.7	0.1	0.0	0.0		
Control Delay (s/veh)	15.7	0.1	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s/veh)	15.7	0.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			59.6%	ICU Level of Service		B
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	22	20	47	46	52	28	359	30	21	363	57
Future Volume (vph)	55	22	20	47	46	52	28	359	30	21	363	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.91			0.97			0.99	0.72
Frt		0.972			0.951			0.990				0.850
Flt Protected		0.972			0.984			0.997			0.997	
Satd. Flow (prot)	0	1280	0	0	1242	0	0	1368	0	0	1174	1063
Flt Permitted		0.741			0.853			0.952			0.961	
Satd. Flow (perm)	0	925	0	0	1034	0	0	1294	0	0	1123	767
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			49			9				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	58	23	21	49	48	55	29	378	32	22	382	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	152	0	0	439	0	0	404	60
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.2			11.2			21.4			21.4	21.4
Actuated g/C Ratio		0.24			0.24			0.45			0.45	0.45
v/c Ratio		0.43			0.54			0.74			0.79	0.16
Control Delay (s/veh)		20.5			20.4			20.0			25.4	3.5
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		20.5			20.4			20.0			25.4	3.5

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			C			C			C	A
Approach Delay (s/veh)		20.5			20.4			20.0			22.5	
Approach LOS		C			C			C			C	
Queue Length 50th (m)		6.0			7.8			24.4			23.6	0.0
Queue Length 95th (m)		17.8			23.1			#76.7			#77.1	4.7
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		382			442			811			700	504
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		0.27			0.34			0.54			0.58	0.12

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 47.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay (s/veh): 21.1

Intersection LOS: C

Intersection Capacity Utilization 85.4%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	22	20	47	46	52	28	359	30	21	363	57
Future Volume (vph)	55	22	20	47	46	52	28	359	30	21	363	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.96			0.98			1.00	0.78
Flpb, ped/bikes		0.96			0.97			0.99			0.99	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1238			1215			1364			1168	829
Flt Permitted		0.74			0.85			0.95			0.96	1.00
Satd. Flow (perm)		943			1054			1303			1125	829
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	23	21	49	48	55	29	378	32	22	382	60
RTOR Reduction (vph)	0	16	0	0	37	0	0	5	0	0	0	32
Lane Group Flow (vph)	0	86	0	0	115	0	0	434	0	0	404	28
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.2			11.2			21.4			21.4	21.4
Effective Green, g (s)		11.2			11.2			21.4			21.4	21.4
Actuated g/C Ratio		0.24			0.24			0.46			0.46	0.46
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		227			253			599			517	381
v/s Ratio Prot												
v/s Ratio Perm		0.09			0.11			0.33			0.36	0.03
v/c Ratio		0.38			0.45			0.72			0.78	0.07
Uniform Delay, d1		14.7			15.0			10.2			10.6	7.0
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.8			0.9			4.1			7.3	0.1
Delay (s)		15.5			16.0			14.2			17.9	7.1
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		15.5			16.0			14.2			16.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		15.5										
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		46.5										
Intersection Capacity Utilization		85.4%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	821	233	31	607	7	239	20	20	6	24	22
Future Volume (vph)	38	821	233	31	607	7	239	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.967			0.998			0.990			0.942	
Flt Protected	0.950			0.950				0.959			0.994	
Satd. Flow (prot)	1381	2879	0	1381	2964	0	0	1349	0	0	1329	0
Flt Permitted	0.362			0.148				0.719			0.957	
Satd. Flow (perm)	526	2879	0	215	2964	0	0	1003	0	0	1280	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		47			1			5			23	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	39	846	240	32	626	7	246	21	21	6	25	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	1086	0	32	633	0	0	288	0	0	54	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.6		9.0	40.6		40.4	40.4		40.4	40.4	
Total Split (%)	10.0%	45.1%		10.0%	45.1%		44.9%	44.9%		44.9%	44.9%	
Maximum Green (s)	6.0	34.3		6.0	34.3		33.1	33.1		33.1	33.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	40.8	34.2		40.8	34.2			26.0			26.0	
Actuated g/C Ratio	0.52	0.43		0.52	0.43			0.33			0.33	
v/c Ratio	0.12	0.85		0.16	0.49			0.86			0.12	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	11.3	30.3		12.2	20.0			51.0			13.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	11.3	30.3		12.2	20.0			51.0			13.2	
LOS	B	C		B	C			D			B	
Approach Delay (s/veh)		29.6			19.6			51.0			13.2	
Approach LOS		C			B			D			B	
Queue Length 50th (m)	2.9	85.7		2.4	41.6			42.0			3.4	
Queue Length 95th (m)	7.9	#135.3		6.8	60.7			#83.3			10.8	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	338	1312		201	1325			435			565	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.12	0.83		0.16	0.48			0.66			0.10	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 79

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 29.0

Intersection LOS: C

Intersection Capacity Utilization 79.8%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	821	233	31	607	7	239	20	20	6	24	22
Future Volume (vph)	38	821	233	31	607	7	239	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2878		1381	2965			1339			1331	
Flt Permitted	0.36	1.00		0.15	1.00			0.72			0.96	
Satd. Flow (perm)	527	2878		215	2965			1004			1281	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	39	846	240	32	626	7	246	21	21	6	25	23
RTOR Reduction (vph)	0	27	0	0	1	0	0	3	0	0	16	0
Lane Group Flow (vph)	39	1059	0	32	632	0	0	285	0	0	38	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	37.4	34.2		37.4	34.2			26.0			26.0	
Effective Green, g (s)	37.4	34.2		37.4	34.2			26.0			26.0	
Actuated g/C Ratio	0.47	0.43		0.47	0.43			0.33			0.33	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	280	1230		147	1267			326			416	
v/s Ratio Prot	0.01	c0.37		c0.01	0.21							
v/s Ratio Perm	0.06			0.09				c0.28			0.03	
v/c Ratio	0.14	0.86		0.22	0.50			0.87			0.09	
Uniform Delay, d1	11.8	20.7		13.1	16.7			25.4			18.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	7.0		0.5	0.6			21.6			0.2	
Delay (s)	12.0	27.7		13.7	17.3			47.1			19.0	
Level of Service	B	C		B	B			D			B	
Approach Delay (s/veh)		27.2			17.1			47.1			19.0	
Approach LOS		C			B			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			26.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			79.8%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Future Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.933			0.998			0.987	
Flt Protected		0.984			0.995			0.999			0.988	
Satd. Flow (prot)	0	1397	0	0	1319	0	0	1429	0	0	1397	0
Flt Permitted		0.984			0.995			0.999			0.988	
Satd. Flow (perm)	0	1397	0	0	1319	0	0	1429	0	0	1397	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	29	57	6	13	57	69	3	195	3	73	201	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	92	0	0	139	0	0	201	0	0	303	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	57.1%					ICU Level of Service B						
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Future Volume (vph)	28	54	6	12	54	66	3	185	3	69	191	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	57	6	13	57	69	3	195	3	73	201	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	92	139	201	303								
Volume Left (vph)	29	13	3	73								
Volume Right (vph)	6	69	3	29								
Hadj (s)	0.02	-0.27	-0.01	-0.01								
Departure Headway (s)	5.4	5.0	4.9	4.8								
Degree Utilization, x	0.14	0.19	0.27	0.40								
Capacity (veh/h)	595	643	689	716								
Control Delay (s/veh)	9.2	9.2	9.7	10.9								
Approach Delay (s/veh)	9.2	9.2	9.7	10.9								
Approach LOS	A	A	A	B								
Intersection Summary												
Delay			10.1									
Level of Service			B									
Intersection Capacity Utilization			57.1%	ICU Level of Service					B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	89	9	5	59	3	21	0	9	0	0	2
Future Volume (vph)	0	89	9	5	59	3	21	0	9	0	0	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.987				0.993				0.959		0.865	
Flt Protected					0.996				0.966			
Satd. Flow (prot)	0	1414	0	0	1417	0	0	1328	0	0	1240	0
Flt Permitted					0.996				0.966			
Satd. Flow (perm)	0	1414	0	0	1417	0	0	1328	0	0	1240	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	362.4				79.0				93.8			
Travel Time (s)	26.1				5.7				6.8			
Confl. Peds. (#/hr)	10	5		5	10		4		4			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	107	11	6	71	4	25	0	11	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	81	0	0	36	0	0	2	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	27.1%				ICU Level of Service A							
Analysis Period (min)	15											

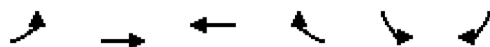
HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	89	9	5	59	3	21	0	9	0	0	2
Future Volume (Veh/h)	0	89	9	5	59	3	21	0	9	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	0	107	11	6	71	4	25	0	11	0	0	2
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	85			123			205	215	122	223	218	83
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	85			123			205	215	122	223	218	83
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 %	100			100			97	100	99	100	100	100
cM capacity (veh/h)	1509			1469			742	674	927	708	671	972
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	118	81	36	2								
Volume Left	0	6	25	0								
Volume Right	11	4	11	2								
cSH	1509	1469	790	972								
Volume to Capacity	0.00	0.00*	0.05	0.00*								
Queue Length 95th (m)	0.0	0.1	1.1	0.0								
Control Delay (s/veh)	0.0	0.6	9.8	8.7								
Lane LOS		A	A	A								
Approach Delay (s/veh)	0.0	0.6	9.8	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			27.1%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

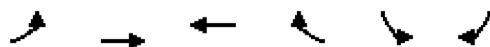
4873 and 4898 Kitchener Street TIS
Background Sat (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	92	67	1	3	1
Future Volume (vph)	7	92	67	1	3	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.998		0.973	
Flt Protected		0.996			0.962	
Satd. Flow (prot)	0	1173	1335	0	1341	0
Flt Permitted		0.996			0.962	
Satd. Flow (perm)	0	1173	1335	0	1341	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	114	83	1	4	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	123	84	0	5	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	26.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (Open)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	92	67	1	3	1
Future Volume (Veh/h)	7	92	67	1	3	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	9	114	83	1	4	1
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	95				227	98
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	95				227	98
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				99	100
cM capacity (veh/h)	1495				753	951
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	123	84	5			
Volume Left	9	0	4			
Volume Right	0	1	1			
cSH	1495	1700	786			
Volume to Capacity	0.00*	0.05	0.00*			
Queue Length 95th (m)	0.1	0.0	0.1			
Control Delay (s/veh)	0.6	0.0	9.6			
Lane LOS	A		A			
Approach Delay (s/veh)	0.6	0.0	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			26.1%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	94	0	0	63	6	3	1	0	5	0	1
Future Volume (vph)	1	94	0	0	63	6	3	1	0	5	0	1
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.988						0.981					
Flt Protected							0.964					
Satd. Flow (prot)	0	1178	0	0	1322	0	0	1381	0	0	1348	0
Flt Permitted							0.964					
Satd. Flow (perm)	0	1178	0	0	1322	0	0	1381	0	0	1348	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	37.0			57.8			32.6			36.9		
Travel Time (s)	2.7			4.2			2.3			2.7		
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	109	0	0	73	7	3	1	0	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	110	0	0	80	0	0	4	0	0	7	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.3%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	94	0	0	63	6	3	1	0	5	0	1
Future Volume (Veh/h)	1	94	0	0	63	6	3	1	0	5	0	1
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	1	109	0	0	73	7	3	1	0	6	0	1
Pedestrians	3			1			2			29		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.0			1.0			1.0			1.0		
Percent Blockage	0			0			0			3		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	109			111			194	222	112	218	219	109
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	109			111			194	222	112	218	219	109
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 %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1451			1489			747	659	944	702	662	920
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	110	80	4	7								
Volume Left	1	0	3	6								
Volume Right	0	7	0	1								
cSH	1451	1700	723	727								
Volume to Capacity	0.00*	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.1	0.2								
Control Delay (s/veh)	0.1	0.0	10.0	10.0								
Lane LOS	A		B	B								
Approach Delay (s/veh)	0.1	0.0	10.0	10.0								
Approach LOS			B	B								
Intersection Summary												
Average Delay				0.6								
Intersection Capacity Utilization				21.3%	ICU Level of Service				A			
Analysis Period (min)				15								

* Value less than 0.01.

Appendix N

Opening Year Total Traffic Operations with Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	49	311	162	135
Future Volume (vph)	0	0	49	311	162	135
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.939
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1518	1212	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1518	1212	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	1	29		29		
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	57	362	188	157
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	57	362	345	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	49	311	162	135
Future Volume (Veh/h)	0	0	49	311	162	135
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	57	362	188	157
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	773	296	374			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	773	296	374			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	95			
cM capacity (veh/h)	352	749	1196			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	57	362	345			
Volume Left	57	0	0			
Volume Right	0	0	157			
cSH	1196	1700	1700			
Volume to Capacity	0.05	0.21	0.20			
Queue Length 95th (m)	1.1	0.0	0.0			
Control Delay (s/veh)	8.2	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	1.1		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			35.2%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	7	353	0	0	162
Future Volume (vph)	9	7	353	0	0	162
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40	50				50
Link Distance (m)	86.2	51.0				60.3
Travel Time (s)	7.8	3.7				4.3
Confl. Peds. (#/hr)	2		10		10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	11	9	430	0	0	198
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	430	0	0	198
Sign Control	Stop	Free		Free		
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	65.3%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	7	353	0	0	162
Future Volume (Veh/h)	9	7	353	0	0	162
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	9	430	0	0	198
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	638	442			440	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	581	372			370	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	97	99			100	
cM capacity (veh/h)	428	601			1114	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	20	430	198			
Volume Left	11	0	0			
Volume Right	9	0	0			
cSH	492	1700	1700			
Volume to Capacity	0.04	0.25	0.12			
Queue Length 95th (m)	1.0	0.0	0.0			
Control Delay (s/veh)	12.6	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	12.6	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			65.3%	ICU Level of Service		C
Analysis Period (min)			15			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Future Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.98		
Frt			0.850					0.994				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1256	0	1381	1504	0
Flt Permitted	0.950									0.626		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1256	0	895	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			331					5				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	206	0	331	0	0	0	0	200	10	8	190	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	206	0	331	0	0	0	0	210	0	8	190	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	32.0		32.0					28.0		28.0	28.0	
Total Split (%)	53.3%		53.3%					46.7%		46.7%	46.7%	
Maximum Green (s)	25.9		25.9					21.9		21.9	21.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	10.5		10.5					10.7		10.7	10.7	
Actuated g/C Ratio	0.31		0.31					0.32		0.32	0.32	
v/c Ratio	0.48		0.59					0.53		0.03	0.40	
Control Delay (s/veh)	14.3		6.7					15.1		9.0	12.4	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	14.3		6.7					15.1		9.0	12.4	

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					B		A	B	
Approach Delay (s/veh)		9.6						15.1			12.2	
Approach LOS		A						B			B	
Queue Length 50th (m)	8.0		0.0					8.3		0.3	7.3	
Queue Length 95th (m)	23.6		11.1					25.2		2.1	21.7	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	1094		918					843		599	1007	
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	0.19		0.36					0.25		0.01	0.19	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 33.8

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 11.4

Intersection LOS: B

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Future Volume (vph)	179	0	288	0	0	0	0	174	9	7	165	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1256		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.63	1.00	
Satd. Flow (perm)	1381		1072					1256		903	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	206	0	331	0	0	0	0	200	10	8	190	0
RTOR Reduction (vph)	0	0	227	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	206	0	104	0	0	0	0	207	0	8	190	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	10.5		10.5					10.7		10.7	10.7	
Effective Green, g (s)	10.5		10.5					10.7		10.7	10.7	
Actuated g/C Ratio	0.31		0.31					0.32		0.32	0.32	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	434		337					402		289	481	
v/s Ratio Prot	c0.15							c0.16			0.13	
v/s Ratio Perm			0.10							0.01		
v/c Ratio	0.47		0.31					0.51		0.03	0.40	
Uniform Delay, d1	9.2		8.7					9.2		7.8	8.8	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.4		0.2					0.5		0.0	0.2	
Delay (s)	9.6		8.9					9.8		7.8	9.1	
Level of Service	A		A					A		A	A	
Approach Delay (s/veh)		9.2			0.0			9.8			9.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			9.3									
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			33.4									
Intersection Capacity Utilization			65.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	50	35	20	133	378	75
Future Volume (vph)	50	35	20	133	378	75
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.944				0.978	
Flt Protected	0.971			0.993		
Satd. Flow (prot)	1314	0	0	1070	1277	0
Flt Permitted	0.971			0.993		
Satd. Flow (perm)	1314	0	0	1070	1277	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	60	42	24	158	450	89
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	182	539	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	54.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	50	35	20	133	378	75
Future Volume (Veh/h)	50	35	20	133	378	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	60	42	24	158	450	89
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	720	525	558			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	675	469	505			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	84	92	97			
cM capacity (veh/h)	381	549	884			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	102	182	539			
Volume Left	60	24	0			
Volume Right	42	0	89			
cSH	436	884	1700			
Volume to Capacity	0.23	0.03	0.32			
Queue Length 95th (m)	6.7	0.6	0.0			
Control Delay (s/veh)	15.7	1.5	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	15.7	1.5	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			54.1%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	39	114	81	271	141
Future Volume (vph)	43	39	114	81	271	141
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.517	
Satd. Flow (perm)	1310	1069	1449	1027	737	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		45		93		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	49	45	131	93	311	162
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	45	131	93	311	162
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.2	8.2	9.9	9.9	25.6	22.3
Actuated g/C Ratio	0.19	0.19	0.23	0.23	0.59	0.52
v/c Ratio	0.20	0.19	0.39	0.30	0.54	0.21

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	18.1	8.7	18.1	7.0	8.5	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	18.1	8.7	18.1	7.0	8.5	6.4
LOS	B	A	B	A	A	A
Approach Delay (s/veh)	13.6		13.5			7.8
Approach LOS	B		B			A
Queue Length 50th (m)	3.2	0.0	8.9	0.0	9.6	5.8
Queue Length 95th (m)	10.3	5.8	19.9	7.5	19.8	12.8
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	609	521	823	623	584	1297
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.09	0.16	0.15	0.53	0.12

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 43.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay (s/veh): 10.1

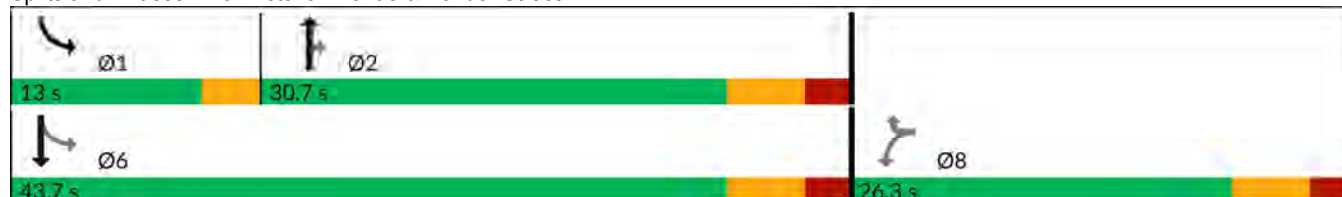
Intersection LOS: B

Intersection Capacity Utilization 45.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	39	114	81	271	141
Future Volume (vph)	43	39	114	81	271	141
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1074	1449	1032	1363	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.52	1.00
Satd. Flow (perm)	1312	1074	1449	1032	741	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	49	45	131	93	311	162
RTOR Reduction (vph)	0	36	0	72	0	0
Lane Group Flow (vph)	49	9	131	21	311	162
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.2	8.2	9.9	9.9	22.3	22.3
Effective Green, g (s)	8.2	8.2	9.9	9.9	22.3	22.3
Actuated g/C Ratio	0.19	0.19	0.23	0.23	0.52	0.52
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	249	204	332	237	519	770
v/s Ratio Prot			0.09		0.13	0.11
v/s Ratio Perm	0.04	0.01		0.02	0.18	
v/c Ratio	0.20	0.04	0.39	0.09	0.60	0.21
Uniform Delay, d1	14.7	14.2	14.1	13.1	6.7	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.1	0.9	0.2	1.9	0.2
Delay (s)	15.0	14.3	15.0	13.3	8.5	5.8
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	14.6		14.3			7.6
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			10.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			43.1		Sum of lost time (s)	15.6
Intersection Capacity Utilization			45.8%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	11	8	192	182	2
Future Volume (vph)	3	11	8	192	182	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.897					0.850
Flt Protected	0.988			0.998		
Satd. Flow (prot)	1171	0	0	1092	1504	1106
Flt Permitted	0.988			0.998		
Satd. Flow (perm)	1171	0	0	1092	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	13	10	229	217	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	239	217	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	11	8	192	182	2
Future Volume (Veh/h)	3	11	8	192	182	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	13	10	229	217	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.97	0.98	0.98			
vC, conflicting volume	489	239	241			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	412	210	212			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	567	772	1310			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	17	239	217	2		
Volume Left	4	10	0	0		
Volume Right	13	0	0	2		
cSH	712	1310	1700	1700		
Volume to Capacity	0.02	0.00*	0.13	0.00*		
Queue Length 95th (m)	0.5	0.2	0.0	0.0		
Control Delay (s/veh)	10.2	0.4	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	10.2	0.4	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	36.8%			ICU Level of Service	A	
Analysis Period (min)	15					

* Value less than 0.01.

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Future Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			0.97			1.00			1.00	0.95
Frt		0.966			0.950			0.993				0.850
Flt Protected		0.976			0.980						0.997	
Satd. Flow (prot)	0	1196	0	0	1254	0	0	1330	0	0	1122	851
Flt Permitted		0.816			0.852			0.996			0.965	
Satd. Flow (perm)	0	992	0	0	1077	0	0	1324	0	0	1083	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			19			6				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	16	8	8	21	11	19	2	201	11	14	200	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	51	0	0	214	0	0	214	12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		8.3			8.3			12.7			12.7	12.7
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
v/c Ratio		0.13			0.19			0.44			0.55	0.04
Control Delay (s/veh)		12.1			11.3			11.2			14.5	0.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		12.1			11.3			11.2			14.5	0.2

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			B			B			B	A
Approach Delay (s/veh)		12.1			11.3			11.2			13.8	
Approach LOS		B			B			B			B	
Queue Length 50th (m)		1.0			1.3			8.7			9.2	0.0
Queue Length 95th (m)		5.8			7.5			18.8			20.8	0.0
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		528			578			1064			869	660
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		0.06			0.09			0.20			0.25	0.02

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 35

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay (s/veh): 12.4

Intersection LOS: B

Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Future Volume (vph)	14	7	7	18	9	16	2	171	9	12	170	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		1.00			0.99			1.00			1.00	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.98			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1195			1248			1331			1120	817
Flt Permitted		0.82			0.85			1.00			0.96	1.00
Satd. Flow (perm)		999			1084			1326			1084	817
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	16	8	8	21	11	19	2	201	11	14	200	12
RTOR Reduction (vph)	0	6	0	0	14	0	0	4	0	0	0	8
Lane Group Flow (vph)	0	26	0	0	37	0	0	210	0	0	214	4
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		8.3			8.3			12.7			12.7	12.7
Effective Green, g (s)		8.3			8.3			12.7			12.7	12.7
Actuated g/C Ratio		0.24			0.24			0.36			0.36	0.36
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		237			257			482			394	297
v/s Ratio Prot												
v/s Ratio Perm		0.03			0.03			0.16			0.20	0.01
v/c Ratio		0.11			0.14			0.44			0.54	0.01
Uniform Delay, d1		10.4			10.5			8.4			8.8	7.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.1			0.2			0.5			1.2	0.0
Delay (s)		10.6			10.7			8.9			10.0	7.1
Level of Service		B			B			A			B	A
Approach Delay (s/veh)		10.6			10.7			8.9			9.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		9.6										
HCM 2000 Volume to Capacity ratio		0.38										
Actuated Cycle Length (s)		34.9										
Intersection Capacity Utilization		60.2%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Future Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.981			0.999			0.993			0.926	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1316	2914	0	1381	2938	0	0	1341	0	0	1309	0
Flt Permitted	0.553			0.297				0.729			0.983	
Satd. Flow (perm)	765	2914	0	432	2938	0	0	1011	0	0	1289	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20						3			22	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	26	698	101	4	283	1	190	21	11	2	16	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	799	0	4	284	0	0	222	0	0	40	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.0		9.0	40.0		41.0	41.0		41.0	41.0	
Total Split (%)	10.0%	44.4%		10.0%	44.4%		45.6%	45.6%		45.6%	45.6%	
Maximum Green (s)	6.0	33.7		6.0	33.7		33.7	33.7		33.7	33.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	30.4	26.0		29.9	24.4			19.2			19.2	
Actuated g/C Ratio	0.50	0.42		0.49	0.40			0.31			0.31	
v/c Ratio	0.06	0.64		0.01	0.24			0.69			0.10	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	9.8	17.9		9.8	15.3			32.2			11.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	9.8	17.9		9.8	15.3			32.2			11.0	
LOS	A	B		A	B			C			B	
Approach Delay (s/veh)		17.6			15.2			32.2			11.0	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	1.3	31.2		0.2	9.2			19.7			1.3	
Queue Length 95th (m)	6.2	80.8		1.9	26.9			52.9			8.1	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	438	1743		311	1749			603			776	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.46		0.01	0.16			0.37			0.05	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 61.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay (s/veh): 19.3

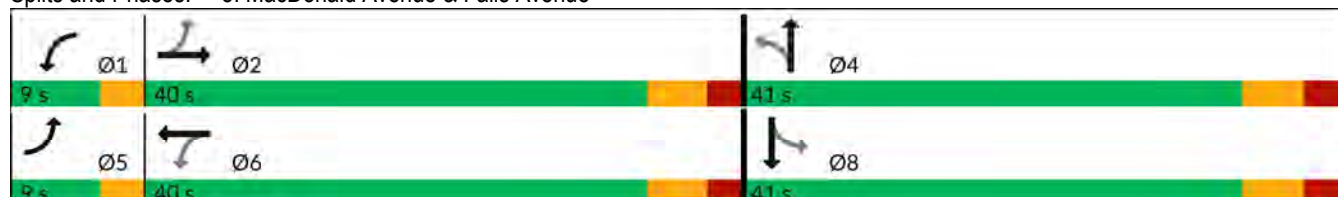
Intersection LOS: B

Intersection Capacity Utilization 60.0%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis 8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Future Volume (vph)	24	642	93	4	260	1	175	19	10	2	15	20
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2914		1381	2940			1334			1310	
Flt Permitted	0.55	1.00		0.30	1.00			0.73			0.98	
Satd. Flow (perm)	766	2914		432	2940			1013			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	698	101	4	283	1	190	21	11	2	16	22
RTOR Reduction (vph)	0	12	0	0	0	0	0	2	0	0	15	0
Lane Group Flow (vph)	26	787	0	4	284	0	0	220	0	0	25	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	27.9	26.0		25.7	24.9			19.2			19.2	
Effective Green, g (s)	27.9	26.0		25.7	24.9			19.2			19.2	
Actuated g/C Ratio	0.45	0.42		0.41	0.40			0.31			0.31	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	358	1210		189	1169			310			395	
v/s Ratio Prot	c0.00	c0.27		0.00	0.10							
v/s Ratio Perm	0.03			0.01				c0.22			0.02	
v/c Ratio	0.07	0.65		0.02	0.24			0.71			0.06	
Uniform Delay, d1	9.8	14.7		11.0	12.6			19.2			15.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	1.7		0.0	0.2			6.7			0.1	
Delay (s)	9.9	16.4		11.1	12.8			26.0			15.5	
Level of Service	A	B		B	B			C			B	
Approach Delay (s/veh)		16.2			12.8			26.0			15.5	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			17.0			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			62.6			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			60.0%			ICU Level of Service			B			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Future Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.907			0.995			0.993	
Flt Protected		0.995			0.997						0.984	
Satd. Flow (prot)	0	1374	0	0	1225	0	0	1386	0	0	1383	0
Flt Permitted		0.995			0.997						0.984	
Satd. Flow (perm)	0	1374	0	0	1225	0	0	1386	0	0	1383	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	7	59	7	6	26	71	1	170	6	44	85	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	73	0	0	103	0	0	177	0	0	136	0
Sign Control	Stop				Stop				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	39.0%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Future Volume (vph)	6	48	6	5	21	58	1	139	5	36	70	6
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	7	59	7	6	26	71	1	170	6	44	85	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	73	103	177	136								
Volume Left (vph)	7	6	1	44								
Volume Right (vph)	7	71	6	7								
Hadj (s)	0.00	-0.30	0.03	0.06								
Departure Headway (s)	4.8	4.4	4.5	4.6								
Degree Utilization, x	0.10	0.13	0.22	0.17								
Capacity (veh/h)	694	748	761	742								
Control Delay (s/veh)	8.3	8.1	8.8	8.5								
Approach Delay (s/veh)	8.3	8.1	8.8	8.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.5									
Level of Service			A									
Intersection Capacity Utilization			39.0%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	62	8	1	56	3	5	3	6	42	3	2
Future Volume (vph)	3	62	8	1	56	3	5	3	6	42	3	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.993			0.943			0.993	
Flt Protected		0.998			0.999			0.982			0.958	
Satd. Flow (prot)	0	1409	0	0	1330	0	0	1327	0	0	1363	0
Flt Permitted		0.998			0.999			0.982			0.958	
Satd. Flow (perm)	0	1409	0	0	1330	0	0	1327	0	0	1363	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	3		6	6		3			2	2		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	82	11	1	74	4	7	4	8	55	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	97	0	0	79	0	0	19	0	0	62	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.6%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	62	8	1	56	3	5	3	6	42	3	2
Future Volume (Veh/h)	3	62	8	1	56	3	5	3	6	42	3	2
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	4	82	11	1	74	4	7	4	8	55	4	3
Pedestrians					2		6				3	
Lane Width (m)					3.6		3.6				3.6	
Walking Speed (m/s)					1.0		1.0				1.0	
Percent Blockage					0		1				0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	81			99			185	185	96	189	188	79
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	81			99			185	185	96	189	188	79
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	99	93	99	100
cM capacity (veh/h)	1525			1047			763	704	959	755	701	984
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	97	79	19	62								
Volume Left	4	1	7	55								
Volume Right	11	4	8	3								
cSH	1525	1047	819	760								
Volume to Capacity	0.00*	0.00*	0.02	0.08								
Queue Length 95th (m)	0.1	0.0	0.5	2.0								
Control Delay (s/veh)	0.3	0.1	9.5	10.2								
Lane LOS	A	A	A	B								
Approach Delay (s/veh)	0.3	0.1	9.5	10.2								
Approach LOS			A	B								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			22.6%	ICU Level of Service				A				
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	52	68	57	26	13	12
Future Volume (vph)	52	68	57	26	13	12
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.957		0.936	
Flt Protected		0.979			0.974	
Satd. Flow (prot)	0	1153	1230	0	888	0
Flt Permitted		0.979			0.974	
Satd. Flow (perm)	0	1153	1230	0	888	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	71	93	78	36	18	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	164	114	0	34	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	27.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	68	57	26	13	12
Future Volume (Veh/h)	52	68	57	26	13	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	71	93	78	36	18	16
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	118				335	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	118				335	102
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	95				97	98
cM capacity (veh/h)	1477				630	737
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	164	114	34			
Volume Left	71	0	18			
Volume Right	0	36	16			
cSH	1477	1700	676			
Volume to Capacity	0.05	0.07	0.05			
Queue Length 95th (m)	1.1	0.0	1.2			
Control Delay (s/veh)	3.5	0.0	10.6			
Lane LOS	A		B			
Approach Delay (s/veh)	3.5	0.0	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization		27.7%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	75	0	0	75	20	1	0	0	10	0	7
Future Volume (vph)	6	75	0	0	75	20	1	0	0	10	0	7
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.972						0.944					
Flt Protected	0.996						0.950					
Satd. Flow (prot)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Flt Permitted	0.996						0.950					
Satd. Flow (perm)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	3						3					
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	109	0	0	109	29	1	0	0	14	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	138	0	0	1	0	0	24	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.2%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	75	0	0	75	20	1	0	0	10	0	7
Future Volume (Veh/h)	6	75	0	0	75	20	1	0	0	10	0	7
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	9	109	0	0	109	29	1	0	0	14	0	10
Pedestrians						2						3
Lane Width (m)						3.6						3.6
Walking Speed (m/s)						1.0						1.0
Percent Blockage						0						0
Right turn flare (veh)												
Median type	None			None								
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	141			109			261	268	111	256	254	127
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	141			109			261	268	111	256	254	127
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			100			100	100	100	98	100	99
cM capacity (veh/h)	1450			1494			684	636	946	693	647	926
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	118	138	1	24								
Volume Left	9	0	1	14								
Volume Right	0	29	0	10								
cSH	1450	1700	684	775								
Volume to Capacity	0.00*	0.08	0.00*	0.03								
Queue Length 95th (m)	0.1	0.0	0.0	0.7								
Control Delay (s/veh)	0.6	0.0	10.3	9.8								
Lane LOS	A		B	A								
Approach Delay (s/veh)	0.6	0.0	10.3	9.8								
Approach LOS			B	A								
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			24.2%	ICU Level of Service					A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	196	531	374	258
Future Volume (vph)	0	0	196	531	374	258
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.945	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1563	1240	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1563	1240	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		1	58			58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	206	559	394	272
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	206	559	666	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	80.0%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	196	531	374	258
Future Volume (Veh/h)	0	0	196	531	374	258
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	206	559	394	272
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1559	589	724			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1559	589	724			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	77			
cM capacity (veh/h)	96	511	888			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	206	559	666			
Volume Left	206	0	0			
Volume Right	0	0	272			
cSH	888	1700	1700			
Volume to Capacity	0.23	0.33	0.39			
Queue Length 95th (m)	6.7	0.0	0.0			
Control Delay (s/veh)	10.3	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.8		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			80.0%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	48	45	682	0	0	374
Future Volume (vph)	48	45	682	0	0	374
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	52	48	733	0	0	402
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	0	733	0	0	402
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	105.0%			ICU Level of Service G		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	48	45	682	0	0	374
Future Volume (Veh/h)	48	45	682	0	0	374
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	52	48	733	0	0	402
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.66	0.66			0.66	
vC, conflicting volume	1169	769			766	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	999	394			389	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	89			100	
cM capacity (veh/h)	174	420			754	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	100	733	402			
Volume Left	52	0	0			
Volume Right	48	0	0			
cSH	242	1700	1700			
Volume to Capacity	0.41	0.43	0.24			
Queue Length 95th (m)	14.3	0.0	0.0			
Control Delay (s/veh)	30.0	0.0	0.0			
Lane LOS	D					
Approach Delay (s/veh)	30.0	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization		105.0%		ICU Level of Service		G
Analysis Period (min)			15			

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Future Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.98		
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1304	0	1354	1563	0
Flt Permitted	0.950									0.359		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1304	0	502	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			272					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	272	0	0	0	0	562	17	58	401	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	272	0	0	0	0	579	0	58	401	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					41.8		41.8	41.8	
Total Split (%)	40.3%		40.3%					59.7%		59.7%	59.7%	
Maximum Green (s)	22.1		22.1					35.7		35.7	35.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	12.3		12.3					28.1		28.1	28.1	
Actuated g/C Ratio	0.23		0.23					0.53		0.53	0.53	
v/c Ratio	0.56		0.59					0.84		0.22	0.49	
Control Delay (s/veh)	27.6		8.9					24.8		9.8	10.6	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	27.6		8.9					24.8		9.8	10.6	

No Background Development
PTSL (250550)

Synchro 12 Report
Page 5

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		A					C		A	B	
Approach Delay (s/veh)		16.3						24.8			10.5	
Approach LOS		B						C			B	
Queue Length 50th (m)	16.2		0.0					40.1		2.5	20.8	
Queue Length 95th (m)	34.9		16.3					#115.7		9.8	48.3	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	596		630					919		353	1101	
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	0.30		0.43					0.63		0.16	0.36	

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 53.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 17.8

Intersection LOS: B

Intersection Capacity Utilization 105.0%

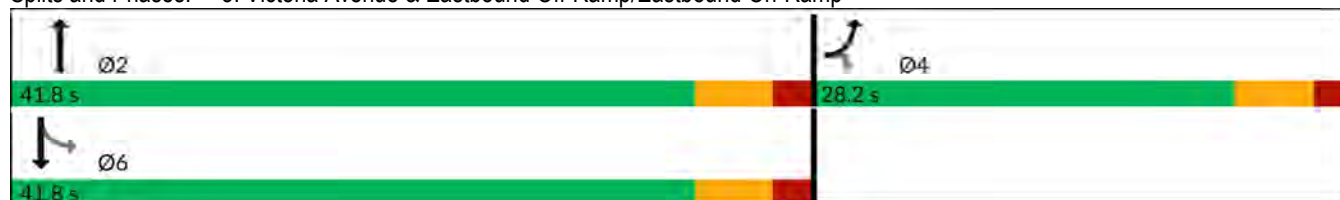
ICU Level of Service G

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Future Volume (vph)	165	0	250	0	0	0	0	517	16	53	369	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1305		1330	1563	
Flt Permitted	0.95		1.00					1.00		0.36	1.00	
Satd. Flow (perm)	1368		1095					1305		502	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	0	272	0	0	0	0	562	17	58	401	0
RTOR Reduction (vph)	0	0	208	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	179	0	64	0	0	0	0	578	0	58	401	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	12.3		12.3					28.1		28.1	28.1	
Effective Green, g (s)	12.3		12.3					28.1		28.1	28.1	
Actuated g/C Ratio	0.23		0.23					0.53		0.53	0.53	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	319		256					697		268	834	
v/s Ratio Prot	c0.13							c0.44			0.26	
v/s Ratio Perm			0.06							0.12		
v/c Ratio	0.56		0.25					0.83		0.22	0.48	
Uniform Delay, d1	17.8		16.4					10.2		6.5	7.7	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	1.4		0.2					7.7		0.2	0.2	
Delay (s)	19.2		16.6					18.0		6.6	7.9	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		17.6			0.0			18.0			7.7	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			14.7									
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			52.6									
Intersection Capacity Utilization			105.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	126	83	87	406	408	211
Future Volume (vph)	126	83	87	406	408	211
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.946				0.954	
Flt Protected	0.971			0.991		
Satd. Flow (prot)	1316	0	0	1158	1268	0
Flt Permitted	0.971			0.991		
Satd. Flow (perm)	1316	0	0	1158	1268	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	134	88	93	432	434	224
Shared Lane Traffic (%)						
Lane Group Flow (vph)	222	0	0	525	658	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	118.4%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	126	83	87	406	408	211
Future Volume (Veh/h)	126	83	87	406	408	211
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	134	88	93	432	434	224
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.92	0.85	0.85			
vC, conflicting volume	1210	596	704			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	833	443	569			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	83	89			
cM capacity (veh/h)	267	503	827			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	222	525	658			
Volume Left	134	93	0			
Volume Right	88	0	224			
cSH	328	827	1700			
Volume to Capacity	0.68	0.11	0.39			
Queue Length 95th (m)	34.9	2.8	0.0			
Control Delay (s/veh)	36.1	3.0	0.0			
Lane LOS	E	A				
Approach Delay (s/veh)	36.1	3.0	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			6.8			
Intersection Capacity Utilization		118.4%		ICU Level of Service		H
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	184	308	137	193	298
Future Volume (vph)	113	184	308	137	193	298
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.97	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.440	
Satd. Flow (perm)	1339	1063	1563	1032	614	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		194		144		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	119	194	324	144	203	314
Shared Lane Traffic (%)						
Lane Group Flow (vph)	119	194	324	144	203	314
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.4	10.4	16.5	16.5	31.6	28.2
Actuated g/C Ratio	0.20	0.20	0.32	0.32	0.61	0.55
v/c Ratio	0.44	0.53	0.65	0.34	0.41	0.37

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	25.7	9.8	22.3	5.5	7.4	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.7	9.8	22.3	5.5	7.4	8.2
LOS	C	A	C	A	A	A
Approach Delay (s/veh)	15.8		17.1			7.9
Approach LOS	B		B			A
Queue Length 50th (m)	9.6	0.0	24.1	0.0	6.5	13.4
Queue Length 95th (m)	25.1	14.3	52.3	9.7	17.6	31.6
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	536	542	763	577	526	1170
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.36	0.42	0.25	0.39	0.27

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 51.6

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 13.1

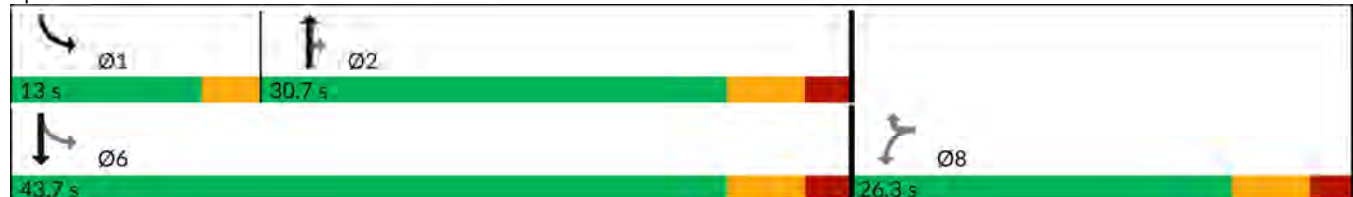
Intersection LOS: B

Intersection Capacity Utilization 58.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	184	308	137	193	298
Future Volume (vph)	113	184	308	137	193	298
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.95	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1351	1069	1563	1048	1354	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.44	1.00
Satd. Flow (perm)	1351	1069	1563	1048	627	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	119	194	324	144	203	314
RTOR Reduction (vph)	0	155	0	98	0	0
Lane Group Flow (vph)	119	39	324	46	203	314
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.4	10.4	16.5	16.5	28.1	28.1
Effective Green, g (s)	10.4	10.4	16.5	16.5	28.1	28.1
Actuated g/C Ratio	0.20	0.20	0.32	0.32	0.55	0.55
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	274	217	504	338	467	859
v/s Ratio Prot			c0.21		c0.07	0.20
v/s Ratio Perm	c0.09	0.04		0.04	0.17	
v/c Ratio	0.43	0.18	0.64	0.14	0.43	0.37
Uniform Delay, d1	17.8	16.8	14.8	12.3	6.3	6.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	2.9	0.2	0.7	0.3
Delay (s)	18.6	17.1	17.7	12.5	7.0	6.8
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	17.7		16.1			6.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			51.1		Sum of lost time (s)	15.6
Intersection Capacity Utilization			58.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	6	19	24	439	394	18
Future Volume (vph)	6	19	24	439	394	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.896					0.850
Flt Protected	0.989			0.997		
Satd. Flow (prot)	1270	0	0	1163	1563	1106
Flt Permitted	0.989			0.997		
Satd. Flow (perm)	1270	0	0	1163	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	6	20	25	457	410	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	0	0	482	410	19
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	77.7%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	6	19	24	439	394	18
Future Volume (Veh/h)	6	19	24	439	394	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	6	20	25	457	410	19
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.85	0.87	0.87			
vC, conflicting volume	1000	493	512			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	577	347	369			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	96	97			
cM capacity (veh/h)	366	561	962			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	26	482	410	19		
Volume Left	6	25	0	0		
Volume Right	20	0	0	19		
cSH	500	962	1700	1700		
Volume to Capacity	0.05	0.03	0.24	0.01		
Queue Length 95th (m)	1.2	0.6	0.0	0.0		
Control Delay (s/veh)	12.6	0.8	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	12.6	0.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay				0.7		
Intersection Capacity Utilization				77.7%	ICU Level of Service	D
Analysis Period (min)				15		

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Future Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.93			0.93			0.98			1.00	0.80
Frt		0.975			0.962			0.989				0.850
Flt Protected		0.973			0.980			0.999			0.998	
Satd. Flow (prot)	0	1282	0	0	1277	0	0	1381	0	0	1165	1024
Flt Permitted		0.751			0.839			0.983			0.967	
Satd. Flow (perm)	0	945	0	0	1048	0	0	1355	0	0	1124	818
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			34			10				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	39	17	13	54	43	38	13	422	40	18	381	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	69	0	0	135	0	0	475	0	0	399	46
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		10.9			10.9			21.4			21.4	21.4
Actuated g/C Ratio		0.23			0.23			0.46			0.46	0.46
v/c Ratio		0.30			0.50			0.76			0.78	0.11
Control Delay (s/veh)		18.0			20.8			20.3			23.8	2.4
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		18.0			20.8			20.3			23.8	2.4

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		B			C			C			C	A
Approach Delay (s/veh)		18.0			20.8			20.3			21.6	
Approach LOS		B			C			C			C	
Queue Length 50th (m)		3.9			7.4			26.5			23.1	0.0
Queue Length 95th (m)		12.9			21.6			#81.1			#74.1	3.1
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		387			441			853			705	538
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		0.18			0.31			0.56			0.57	0.09

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 46.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 20.7

Intersection LOS: C

Intersection Capacity Utilization 83.7%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Future Volume (vph)	36	16	12	50	40	35	12	392	37	17	354	43
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.98			0.97			0.99			1.00	0.84
Flpb, ped/bikes		0.97			0.97			1.00			1.00	1.00
Frt		0.97			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1243			1245			1382			1161	861
Flt Permitted		0.75			0.84			0.98			0.97	1.00
Satd. Flow (perm)		959			1065			1361			1125	861
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	39	17	13	54	43	38	13	422	40	18	381	46
RTOR Reduction (vph)	0	10	0	0	26	0	0	5	0	0	0	25
Lane Group Flow (vph)	0	59	0	0	109	0	0	470	0	0	399	21
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		10.9			10.9			21.4			21.4	21.4
Effective Green, g (s)		10.9			10.9			21.4			21.4	21.4
Actuated g/C Ratio		0.24			0.24			0.46			0.46	0.46
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		226			251			630			521	398
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.10			0.35			0.35	0.02
v/c Ratio		0.26			0.43			0.75			0.77	0.05
Uniform Delay, d1		14.4			15.0			10.2			10.3	6.8
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.5			0.9			4.5			6.4	0.0
Delay (s)		14.8			15.9			14.7			16.7	6.9
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		14.8			15.9			14.7			15.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		15.2										
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		46.2										
Intersection Capacity Utilization		83.7%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Future Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.962			0.998			0.991			0.936	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1381	2858	0	1381	2964	0	0	1337	0	0	1295	0
Flt Permitted	0.228			0.163				0.719			0.987	
Satd. Flow (perm)	331	2858	0	237	2964	0	0	996	0	0	1281	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56			2			4			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	55	728	244	40	776	13	327	30	24	2	26	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	972	0	40	789	0	0	381	0	0	53	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	38.0		9.0	38.0		43.0	43.0		43.0	43.0	
Total Split (%)	10.0%	42.2%		10.0%	42.2%		47.8%	47.8%		47.8%	47.8%	
Maximum Green (s)	6.0	31.7		6.0	31.7		35.7	35.7		35.7	35.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	39.6	32.9		39.0	31.1			34.5			34.5	
Actuated g/C Ratio	0.46	0.38		0.45	0.36			0.40			0.40	
v/c Ratio	0.24	0.87		0.21	0.74			0.95			0.10	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	15.2	34.3		15.0	29.7			62.5			11.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	15.2	34.3		15.0	29.7			62.5			11.3	
LOS	B	C		B	C			E			B	
Approach Delay (s/veh)		33.3			29.0			62.5			11.3	
Approach LOS		C			C			E			B	
Queue Length 50th (m)	4.8	79.8		3.4	61.9			61.4			2.9	
Queue Length 95th (m)	10.9	#119.5		8.5	83.6			#118.0			9.9	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	225	1140		187	1099			417			549	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.24	0.85		0.21	0.72			0.91			0.10	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 86.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay (s/veh): 36.1

Intersection LOS: D

Intersection Capacity Utilization 83.7%

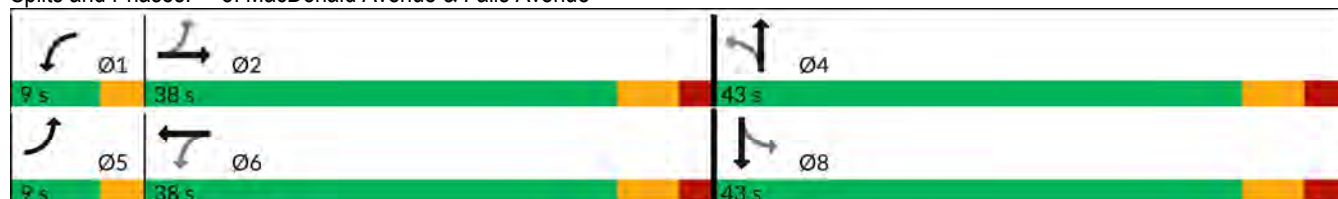
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Future Volume (vph)	51	677	227	37	722	12	304	28	22	2	24	23
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.96		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2859		1381	2962			1329			1296	
Flt Permitted	0.23	1.00		0.16	1.00			0.72			0.99	
Satd. Flow (perm)	332	2859		237	2962			997			1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	55	728	244	40	776	13	327	30	24	2	26	25
RTOR Reduction (vph)	0	35	0	0	1	0	0	2	0	0	15	0
Lane Group Flow (vph)	55	937	0	40	788	0	0	379	0	0	38	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	37.4	32.8		35.0	31.6			34.5			34.5	
Effective Green, g (s)	37.4	32.8		35.0	31.6			34.5			34.5	
Actuated g/C Ratio	0.43	0.38		0.40	0.36			0.40			0.40	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	197	1074		139	1072			394			506	
v/s Ratio Prot	c0.01	c0.33		0.01	0.27							
v/s Ratio Perm	0.10			0.10				c0.38			0.03	
v/c Ratio	0.28	0.87		0.29	0.73			0.96			0.07	
Uniform Delay, d1	15.7	25.3		17.4	24.2			25.7			16.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.6	8.6		0.8	3.2			35.1			0.1	
Delay (s)	16.3	33.9		18.2	27.4			60.8			16.6	
Level of Service	B	C		B	C			E			B	
Approach Delay (s/veh)		33.0			27.0			60.8			16.6	
Approach LOS		C			C			E			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			35.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			87.3			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			83.7%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Future Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.986			0.915			0.988			0.992	
Flt Protected		0.986			0.997			0.999			0.981	
Satd. Flow (prot)	0	1393	0	0	1307	0	0	1378	0	0	1387	0
Flt Permitted		0.986			0.997			0.999			0.981	
Satd. Flow (perm)	0	1393	0	0	1307	0	0	1378	0	0	1387	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	26	55	9	14	68	138	5	213	22	121	167	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	90	0	0	220	0	0	240	0	0	307	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.7%						ICU Level of Service B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Future Volume (vph)	24	52	8	13	64	130	5	200	21	114	157	18
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	26	55	9	14	68	138	5	213	22	121	167	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	90	220	240	307								
Volume Left (vph)	26	14	5	121								
Volume Right (vph)	9	138	22	19								
Hadj (s)	0.00	-0.36	-0.01	0.05								
Departure Headway (s)	5.7	5.1	5.2	5.2								
Degree Utilization, x	0.14	0.31	0.35	0.44								
Capacity (veh/h)	547	635	635	657								
Control Delay (s/veh)	9.7	10.5	11.0	12.2								
Approach Delay (s/veh)	9.7	10.5	11.0	12.2								
Approach LOS	A	B	B	B								
Intersection Summary												
Delay			11.1									
Level of Service			B									
Intersection Capacity Utilization			63.7%	ICU Level of Service					B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	146	16	2	141	10	5	16	5	46	12	10
Future Volume (vph)	10	146	16	2	141	10	5	16	5	46	12	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.991			0.974			0.980	
Flt Protected		0.997			0.999			0.990			0.967	
Satd. Flow (prot)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Flt Permitted		0.997			0.999			0.990			0.967	
Satd. Flow (perm)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	12	172	19	2	166	12	6	19	6	54	14	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	203	0	0	180	0	0	31	0	0	80	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	38.0%						ICU Level of Service A					
Analysis Period (min)	15											

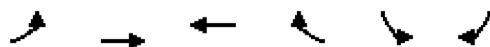
HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	146	16	2	141	10	5	16	5	46	12	10
Future Volume (Veh/h)	10	146	16	2	141	10	5	16	5	46	12	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	172	19	2	166	12	6	19	6	54	14	12
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	180			192			404	391	184	400	394	176
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			192			404	391	184	400	394	176
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			100			99	96	99	90	97	99
cM capacity (veh/h)	1405			1392			535	541	862	538	539	869
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	203	180	31	80								
Volume Left	12	2	6	54								
Volume Right	19	12	6	12								
cSH	1405	1392	582	571								
Volume to Capacity	0.00*	0.00*	0.05	0.14								
Queue Length 95th (m)	0.2	0.0	1.3	3.6								
Control Delay (s/veh)	0.5	0.1	11.5	12.3								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.5	0.1	11.5	12.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.0									
Intersection Capacity Utilization			38.0%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (Open)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	84	120	123	109	61	38
Future Volume (vph)	84	120	123	109	61	38
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.937		0.948	
Flt Protected		0.980			0.970	
Satd. Flow (prot)	0	1154	1254	0	1318	0
Flt Permitted		0.980			0.970	
Satd. Flow (perm)	0	1154	1254	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	94	135	138	122	69	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	229	260	0	112	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	54.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (Open)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	120	123	109	61	38
Future Volume (Veh/h)	84	120	123	109	61	38
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	94	135	138	122	69	43
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	265				527	204
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	265				527	204
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				85	95
cM capacity (veh/h)	1304				476	838
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	229	260	112			
Volume Left	94	0	69			
Volume Right	0	122	43			
cSH	1304	1700	570			
Volume to Capacity	0.07	0.15	0.20			
Queue Length 95th (m)	1.7	0.0	5.4			
Control Delay (s/veh)	3.6	0.0	12.9			
Lane LOS	A		B			
Approach Delay (s/veh)	3.6	0.0	12.9			
Approach LOS			B			
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization		54.2%		ICU Level of Service		A
Analysis Period (min)		15				

														
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (vph)	33	148	0	0	204	94	0	0	2	59	0	28		
Future Volume (vph)	33	148	0	0	204	94	0	0	2	59	0	28		
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Ped Bike Factor														
Frt					0.957				0.865				0.956	
Flt Protected	0.991												0.967	
Satd. Flow (prot)	0	1167	0	0	1280	0	0	1240	0	0	1325	0		
Flt Permitted	0.991												0.967	
Satd. Flow (perm)	0	1167	0	0	1280	0	0	1240	0	0	1325	0		
Link Speed (k/h)	50												50	
Link Distance (m)	58.7												33.2	
Travel Time (s)	4.2												2.4	
Confl. Peds. (#/hr)	7					7	1			3	3			1
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
Adj. Flow (vph)	38	168	0	0	232	107	0	0	2	67	0	32		
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	206	0	0	339	0	0	2	0	0	99	0		
Sign Control	Free						Free		Stop				Stop	
Intersection Summary														
Area Type:	Other													
Control Type:	Unsignalized													
Intersection Capacity Utilization	62.4%				ICU Level of Service B									
Analysis Period (min)	15													

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	148	0	0	204	94	0	0	2	59	0	28
Future Volume (Veh/h)	33	148	0	0	204	94	0	0	2	59	0	28
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	38	168	0	0	232	107	0	0	2	67	0	32
Pedestrians	1			3			7			7		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.0			1.0			1.0			1.0		
Percent Blockage	0			0			1			1		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	346			168			563	590	171	542	537	294
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	346			168			563	590	171	542	537	294
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			100			100	100	100	85	100	96
cM capacity (veh/h)	1216			1422			409	407	875	436	436	745
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	206	339	2	99								
Volume Left	38	0	0	67								
Volume Right	0	107	2	32								
cSH	1216	1700	875	504								
Volume to Capacity	0.03	0.20	0.00*	0.20								
Queue Length 95th (m)	0.7	0.0	0.1	5.4								
Control Delay (s/veh)	1.7	0.0	9.1	13.9								
Lane LOS	A		A	B								
Approach Delay (s/veh)	1.7	0.0	9.1	13.9								
Approach LOS			A	B								
Intersection Summary												
Average Delay				2.7								
Intersection Capacity Utilization				62.4%	ICU Level of Service				B			
Analysis Period (min)				15								
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	174	474	390	196
Future Volume (vph)	0	0	174	474	390	196
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt						0.955
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1265	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1265	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	5		63	63		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	191	521	429	215
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	191	521	644	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	75.1%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	174	474	390	196
Future Volume (Veh/h)	0	0	174	474	390	196
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	191	521	429	215
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1503	605	707			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1503	605	707			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	79			
cM capacity (veh/h)	106	499	891			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	191	521	644			
Volume Left	191	0	0			
Volume Right	0	0	215			
cSH	891	1700	1700			
Volume to Capacity	0.21	0.31	0.38			
Queue Length 95th (m)	6.1	0.0	0.0			
Control Delay (s/veh)	10.1	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	2.7		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			75.1%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	41	608	0	0	390
Future Volume (vph)	53	41	608	0	0	390
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		1		57	57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	55	43	633	0	0	406
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	0	633	0	0	406
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	114.7%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	41	608	0	0	390
Future Volume (Veh/h)	53	41	608	0	0	390
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	55	43	633	0	0	406
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	1096	691			690	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	921	341			340	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	72	91			100	
cM capacity (veh/h)	199	464			810	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	98	633	406			
Volume Left	55	0	0			
Volume Right	43	0	0			
cSH	266	1700	1700			
Volume to Capacity	0.37	0.37	0.24			
Queue Length 95th (m)	12.2	0.0	0.0			
Control Delay (s/veh)	26.2	0.0	0.0			
Lane LOS	D					
Approach Delay (s/veh)	26.2	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		114.7%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Future Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.93					0.99		0.96		
Frt			0.850					0.993				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1308	0	1354	1563	0
Flt Permitted	0.950									0.385		
Satd. Flow (perm)	1364	0	1033	0	0	0	0	1308	0	528	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			200					6				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	163	0	377	0	0	0	0	471	26	76	385	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	0	377	0	0	0	0	497	0	76	385	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.1		28.1					31.9		31.9	31.9	
Total Split (%)	46.8%		46.8%					53.2%		53.2%	53.2%	
Maximum Green (s)	22.0		22.0					25.8		25.8	25.8	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	15.5		15.5					22.2		22.2	22.2	
Actuated g/C Ratio	0.31		0.31					0.44		0.44	0.44	
v/c Ratio	0.39		0.83					0.86		0.33	0.56	
Control Delay (s/veh)	17.3		25.8					32.2		15.7	15.4	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	17.3		25.8					32.2		15.7	15.4	

No Background Development
PTSL (250550)

Synchro 12 Report
Page 5

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		C					C		B	B	
Approach Delay (s/veh)		23.2						32.2			15.4	
Approach LOS		C						C			B	
Queue Length 50th (m)	12.4		14.7					38.5		4.4	25.0	
Queue Length 95th (m)	25.1		#56.9					#99.6		14.7	53.4	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	625		581					704		283	838	
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	0.26		0.65					0.71		0.27	0.46	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 50.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay (s/veh): 23.8

Intersection LOS: C

Intersection Capacity Utilization 114.7%

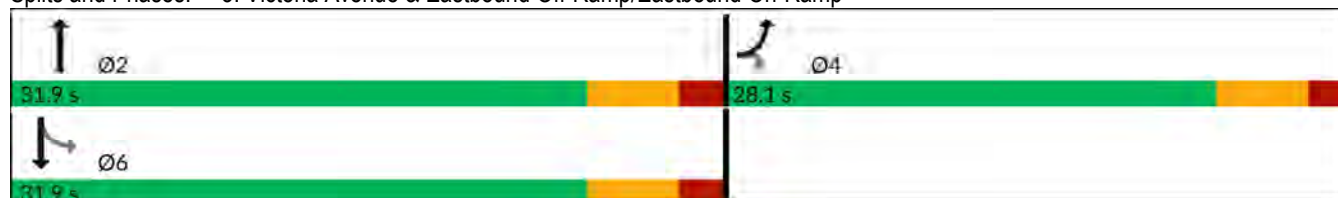
ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Future Volume (vph)	156	0	362	0	0	0	0	452	25	73	370	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.94					0.99		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.97	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1042					1309		1307	1563	
Flt Permitted	0.95		1.00					1.00		0.38	1.00	
Satd. Flow (perm)	1368		1042					1309		529	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	162	0	377	0	0	0	0	471	26	76	385	0
RTOR Reduction (vph)	0	0	138	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	163	0	239	0	0	0	0	494	0	76	385	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	15.5		15.5					22.2		22.2	22.2	
Effective Green, g (s)	15.5		15.5					22.2		22.2	22.2	
Actuated g/C Ratio	0.31		0.31					0.44		0.44	0.44	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	424		323					582		235	695	
v/s Ratio Prot	0.12							c0.38			0.25	
v/s Ratio Perm			c0.23							0.14		
v/c Ratio	0.38		0.74					0.85		0.32	0.55	
Uniform Delay, d1	13.5		15.4					12.3		9.0	10.2	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.3		7.9					10.7		0.4	0.6	
Delay (s)	13.7		23.3					23.0		9.3	10.8	
Level of Service	B		C					C		A	B	
Approach Delay (s/veh)		20.4			0.0			23.0			10.6	
Approach LOS		C			A			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			18.2									
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			49.9									
Intersection Capacity Utilization			114.7%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	108	100	56	368	537	195
Future Volume (vph)	108	100	56	368	537	195
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935				0.964	
Flt Protected	0.975			0.993		
Satd. Flow (prot)	1306	0	0	1160	1280	0
Flt Permitted	0.975			0.993		
Satd. Flow (perm)	1306	0	0	1160	1280	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	115	106	60	391	571	207
Shared Lane Traffic (%)						
Lane Group Flow (vph)	221	0	0	451	778	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	121.5%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	108	100	56	368	537	195
Future Volume (Veh/h)	108	100	56	368	537	195
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	115	106	60	391	571	207
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.88	0.83	0.83			
vC, conflicting volume	1285	779	866			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1007	633	738			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	41	71	91			
cM capacity (veh/h)	195	361	666			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	221	451	778			
Volume Left	115	60	0			
Volume Right	106	0	207			
cSH	250	666	1700			
Volume to Capacity	0.88	0.09	0.46			
Queue Length 95th (m)	56.1	2.2	0.0			
Control Delay (s/veh)	73.5	2.6	0.0			
Lane LOS	F	A				
Approach Delay (s/veh)	73.5	2.6	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		12.0				
Intersection Capacity Utilization		121.5%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	179	245	231	294	343
Future Volume (vph)	119	179	245	231	294	343
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.85		0.85	0.91	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.503	
Satd. Flow (perm)	1322	943	1533	932	666	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		183		236		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	121	183	250	236	300	350
Shared Lane Traffic (%)						
Lane Group Flow (vph)	121	183	250	236	300	350
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	10.4	10.4	14.8	14.8	30.7	27.3
Actuated g/C Ratio	0.21	0.21	0.29	0.29	0.61	0.54
v/c Ratio	0.45	0.54	0.56	0.54	0.56	0.42

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	25.3	10.7	20.7	7.6	9.8	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	25.3	10.7	20.7	7.6	9.8	8.8
LOS	C	B	C	A	A	A
Approach Delay (s/veh)	16.5		14.4			9.3
Approach LOS	B		B			A
Queue Length 50th (m)	9.4	0.0	18.5	0.0	10.2	15.2
Queue Length 95th (m)	25.4	14.3	40.4	13.3	27.1	36.3
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	538	492	761	581	549	1189
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.37	0.33	0.41	0.55	0.29

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 50.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay (s/veh): 12.5

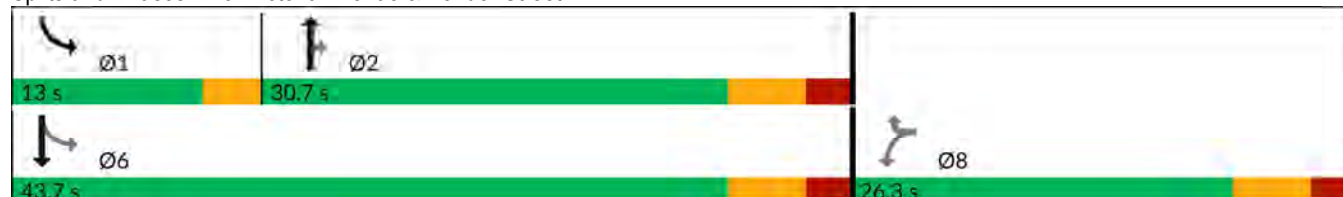
Intersection LOS: B

Intersection Capacity Utilization 71.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	179	245	231	294	343
Future Volume (vph)	119	179	245	231	294	343
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.89	1.00	0.89	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1339	983	1533	974	1338	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.50	1.00
Satd. Flow (perm)	1339	983	1533	974	708	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	121	183	250	236	300	350
RTOR Reduction (vph)	0	145	0	166	0	0
Lane Group Flow (vph)	121	38	250	70	300	350
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	10.4	10.4	14.9	14.9	27.3	27.3
Effective Green, g (s)	10.4	10.4	14.9	14.9	27.3	27.3
Actuated g/C Ratio	0.21	0.21	0.30	0.30	0.54	0.54
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	276	203	454	288	501	848
v/s Ratio Prot			0.16		c0.11	0.22
v/s Ratio Perm	c0.09	0.04		0.07	c0.21	
v/c Ratio	0.44	0.19	0.55	0.24	0.60	0.41
Uniform Delay, d1	17.4	16.5	14.9	13.4	6.9	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.3	1.6	0.5	1.9	0.4
Delay (s)	18.2	16.8	16.5	13.9	8.8	7.2
Level of Service	B	B	B	B	A	A
Approach Delay (s/veh)	17.4		15.2			7.9
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.60			
Actuated Cycle Length (s)			50.3		Sum of lost time (s)	15.6
Intersection Capacity Utilization			71.1%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	4	12	16	472	445	17
Future Volume (vph)	4	12	16	472	445	17
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899					0.850
Flt Protected	0.988			0.998		
Satd. Flow (prot)	1273	0	0	1164	1563	1106
Flt Permitted	0.988			0.998		
Satd. Flow (perm)	1273	0	0	1164	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	4	12	16	477	449	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	493	449	17
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	70.9%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

											
Movement	EBL	EBR	NBL	NBT	SBT	SBR					
Lane Configurations											
Traffic Volume (veh/h)	4	12	16	472	445	17					
Future Volume (Veh/h)	4	12	16	472	445	17					
Sign Control	Stop			Free	Free						
Grade	0%			0%	0%						
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99					
Hourly flow rate (vph)	4	12	16	477	449	17					
Pedestrians	203				1						
Lane Width (m)	3.6				3.6						
Walking Speed (m/s)	1.0				1.0						
Percent Blockage	20				0						
Right turn flare (veh)											
Median type				None	None						
Median storage veh											
Upstream signal (m)				75	59						
pX, platoon unblocked	0.89	0.85	0.85								
vC, conflicting volume	1162	652	669								
vC1, stage 1 conf vol											
vC2, stage 2 conf vol											
vCu, unblocked vol	741	504	524								
tC, single (s)	6.4	6.2	4.1								
tC, 2 stage (s)											
tF (s)	3.5	3.3	2.2								
p0 queue free %	98	97	98								
cM capacity (veh/h)	266	388	714								
Direction, Lane #	EB 1	NB 1	SB 1	SB 2							
Volume Total	16	493	449	17							
Volume Left	4	16	0	0							
Volume Right	12	0	0	17							
cSH	348	714	1700	1700							
Volume to Capacity	0.05	0.02	0.26	0.01							
Queue Length 95th (m)	1.1	0.5	0.0	0.0							
Control Delay (s/veh)	15.8	0.6	0.0	0.0							
Lane LOS	C	A									
Approach Delay (s/veh)	15.8	0.6	0.0								
Approach LOS	C										
Intersection Summary											
Average Delay				0.6							
Intersection Capacity Utilization				70.9%	ICU Level of Service	C					
Analysis Period (min)				15							

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Future Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.92			0.91			0.97			0.99	0.72
Frt		0.972			0.951			0.991				0.850
Flt Protected		0.972			0.984			0.997			0.997	
Satd. Flow (prot)	0	1280	0	0	1242	0	0	1371	0	0	1174	1063
Flt Permitted		0.741			0.853			0.954			0.961	
Satd. Flow (perm)	0	925	0	0	1034	0	0	1300	0	0	1124	767
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			49			8				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	58	23	21	49	48	55	29	401	32	22	399	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	152	0	0	462	0	0	421	60
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		35.3	35.3		35.3	35.3	35.3
Total Split (%)	41.2%	41.2%		41.2%	41.2%		58.8%	58.8%		58.8%	58.8%	58.8%
Maximum Green (s)	18.0	18.0		18.0	18.0		28.1	28.1		28.1	28.1	28.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		11.2			11.2			22.4			22.4	22.4
Actuated g/C Ratio		0.23			0.23			0.47			0.47	0.47
v/c Ratio		0.44			0.55			0.76			0.80	0.15
Control Delay (s/veh)		21.0			20.9			20.9			26.2	3.5
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		21.0			20.9			20.9			26.2	3.5

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			C			C			C	A
Approach Delay (s/veh)		21.0			20.9			20.9			23.3	
Approach LOS		C			C			C			C	
Queue Length 50th (m)		6.3			8.2			26.3			25.1	0.0
Queue Length 95th (m)		17.8			23.1			#83.0			#81.7	4.7
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		373			433			795			685	493
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		0.27			0.35			0.58			0.61	0.12

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 48

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay (s/veh): 21.9

Intersection LOS: C

Intersection Capacity Utilization 86.8%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Traffic Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Future Volume (vph)	55	22	20	47	46	52	28	381	30	21	379	57
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.96			0.98			1.00	0.78
Flpb, ped/bikes		0.96			0.97			0.99			0.99	1.00
Frt		0.97			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1236			1213			1366			1168	824
Flt Permitted		0.74			0.85			0.95			0.96	1.00
Satd. Flow (perm)		941			1052			1307			1126	824
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	58	23	21	49	48	55	29	401	32	22	399	60
RTOR Reduction (vph)	0	16	0	0	37	0	0	4	0	0	0	32
Lane Group Flow (vph)	0	86	0	0	115	0	0	458	0	0	421	28
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		11.2			11.2			22.4			22.4	22.4
Effective Green, g (s)		11.2			11.2			22.4			22.4	22.4
Actuated g/C Ratio		0.24			0.24			0.47			0.47	0.47
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		221			248			616			530	388
v/s Ratio Prot												
v/s Ratio Perm		0.09			0.11			0.35			0.37	0.03
v/c Ratio		0.39			0.46			0.74			0.79	0.07
Uniform Delay, d1		15.3			15.6			10.2			10.6	6.9
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		0.8			1.0			4.6			7.8	0.1
Delay (s)		16.1			16.6			14.8			18.4	6.9
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		16.1			16.6			14.8			17.0	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		16.0										
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		47.5										
Intersection Capacity Utilization		86.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Future Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.961			0.998			0.992			0.942	
Flt Protected	0.950			0.950				0.958			0.994	
Satd. Flow (prot)	1381	2862	0	1381	2964	0	0	1350	0	0	1328	0
Flt Permitted	0.343			0.103				0.714			0.956	
Satd. Flow (perm)	498	2862	0	150	2964	0	0	996	0	0	1278	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		60			1			4			23	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	39	899	312	32	643	7	299	21	21	6	25	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	1211	0	32	650	0	0	341	0	0	54	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	48.6		9.0	48.6		42.4	42.4		42.4	42.4	
Total Split (%)	9.0%	48.6%		9.0%	48.6%		42.4%	42.4%		42.4%	42.4%	
Maximum Green (s)	6.0	42.3		6.0	42.3		35.1	35.1		35.1	35.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	49.2	42.4		49.2	42.4			34.4			34.4	
Actuated g/C Ratio	0.51	0.44		0.51	0.44			0.36			0.36	
v/c Ratio	0.13	0.93		0.21	0.49			0.94			0.11	

No Background Development
PTSL (250550)

Synchro 12 Report
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Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	11.8	38.7		13.9	21.3			67.7			15.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	11.8	38.7		13.9	21.3			67.7			15.1	
LOS	B	D		B	C			E			B	
Approach Delay (s/veh)		37.9			21.0			67.7			15.1	
Approach LOS		D			C			E			B	
Queue Length 50th (m)	3.3	113.5		2.7	47.4			62.8			3.9	
Queue Length 95th (m)	8.0	#161.7		6.9	63.8			#118.5			12.0	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	311	1303		154	1315			369			485	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.13	0.93		0.21	0.49			0.92			0.11	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 95.7

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay (s/veh): 36.8

Intersection LOS: D

Intersection Capacity Utilization 83.6%

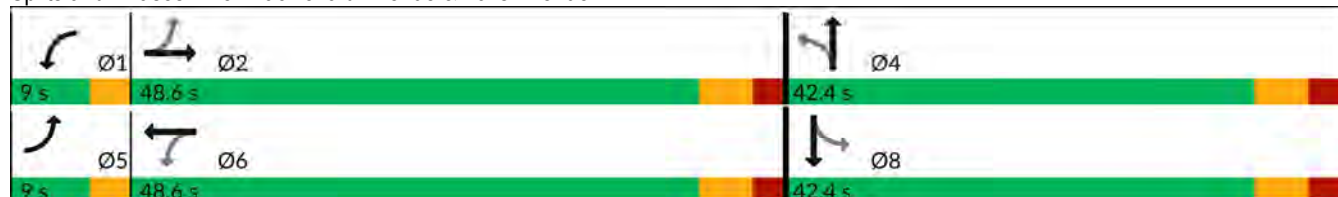
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Future Volume (vph)	38	872	303	31	624	7	290	20	20	6	24	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.96		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2863		1381	2965			1337			1330	
Flt Permitted	0.34	1.00		0.10	1.00			0.71			0.96	
Satd. Flow (perm)	499	2863		150	2965			996			1279	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	39	899	312	32	643	7	299	21	21	6	25	23
RTOR Reduction (vph)	0	34	0	0	1	0	0	3	0	0	15	0
Lane Group Flow (vph)	39	1177	0	32	649	0	0	338	0	0	39	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	45.8	42.4		45.8	42.4			34.4			34.4	
Effective Green, g (s)	45.8	42.4		45.8	42.4			34.4			34.4	
Actuated g/C Ratio	0.47	0.44		0.47	0.44			0.36			0.36	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	267	1254		114	1298			353			454	
v/s Ratio Prot	0.01	c0.41		c0.01	0.22							
v/s Ratio Perm	0.06			0.12				c0.34			0.03	
v/c Ratio	0.15	0.94		0.28	0.50			0.96			0.09	
Uniform Delay, d1	14.1	26.0		16.9	19.6			30.5			20.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.2	13.7		1.0	0.6			36.6			0.2	
Delay (s)	14.2	39.6		17.9	20.2			67.2			20.9	
Level of Service	B	D		B	C			E			C	
Approach Delay (s/veh)		38.9			20.1			67.2			20.9	
Approach LOS		D			C			E			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			37.1			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.92									
Actuated Cycle Length (s)			96.8			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			83.6%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Future Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.992			0.920			0.990			0.990	
Flt Protected		0.987			0.995			0.999			0.981	
Satd. Flow (prot)	0	1403	0	0	1304	0	0	1417	0	0	1392	0
Flt Permitted		0.987			0.995			0.999			0.981	
Satd. Flow (perm)	0	1403	0	0	1304	0	0	1417	0	0	1392	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	29	72	6	20	64	123	3	195	16	146	201	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	107	0	0	207	0	0	214	0	0	376	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	66.8%					ICU Level of Service C						
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Future Volume (vph)	28	68	6	19	61	117	3	185	15	139	191	28
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	29	72	6	20	64	123	3	195	16	146	201	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	107	207	214	376								
Volume Left (vph)	29	20	3	146								
Volume Right (vph)	6	123	16	29								
Hadj (s)	0.02	-0.33	-0.04	0.03								
Departure Headway (s)	5.9	5.3	5.3	5.2								
Degree Utilization, x	0.17	0.31	0.32	0.54								
Capacity (veh/h)	524	605	616	663								
Control Delay (s/veh)	10.1	10.7	10.8	14.1								
Approach Delay (s/veh)	10.1	10.7	10.8	14.1								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay				12.0								
Level of Service				B								
Intersection Capacity Utilization				66.8%	ICU Level of Service				C			
Analysis Period (min)				15								

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	177	9	5	119	10	21	9	13	52	6	7
Future Volume (vph)	8	177	9	5	119	10	21	9	13	52	6	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.994			0.990			0.958			0.986	
Flt Protected		0.998			0.998			0.977			0.961	
Satd. Flow (prot)	0	1422	0	0	1416	0	0	1341	0	0	1358	0
Flt Permitted		0.998			0.998			0.977			0.961	
Satd. Flow (perm)	0	1422	0	0	1416	0	0	1341	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	10		5	5		10			4	4		
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	213	11	6	143	12	25	11	16	63	7	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	234	0	0	161	0	0	52	0	0	78	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	31.6%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	177	9	5	119	10	21	9	13	52	6	7
Future Volume (Veh/h)	8	177	9	5	119	10	21	9	13	52	6	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	10	213	11	6	143	12	25	11	16	63	7	8
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	165			229			416	421	228	435	420	159
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	165			229			416	421	228	435	420	159
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			100			95	98	98	87	99	99
cM capacity (veh/h)	1411			1344			526	513	809	498	514	883
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	234	161	52	78								
Volume Left	10	6	25	63								
Volume Right	11	12	16	8								
cSH	1411	1344	586	523								
Volume to Capacity	0.00*	0.00*	0.09	0.15								
Queue Length 95th (m)	0.2	0.1	2.2	3.9								
Control Delay (s/veh)	0.4	0.3	11.7	13.1								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.4	0.3	11.7	13.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			31.6%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	96	157	119	80	40	26
Future Volume (vph)	96	157	119	80	40	26
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.946		0.947	
Flt Protected		0.981			0.971	
Satd. Flow (prot)	0	1156	1266	0	1318	0
Flt Permitted		0.981			0.971	
Satd. Flow (perm)	0	1156	1266	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	119	194	147	99	49	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	313	246	0	81	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	54.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	96	157	119	80	40	26
Future Volume (Veh/h)	96	157	119	80	40	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	119	194	147	99	49	32
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	257				640	211
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257				640	211
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				88	96
cM capacity (veh/h)	1305				398	823
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	313	246	81			
Volume Left	119	0	49			
Volume Right	0	99	32			
cSH	1305	1700	500			
Volume to Capacity	0.09	0.14	0.16			
Queue Length 95th (m)	2.3	0.0	4.3			
Control Delay (s/veh)	3.6	0.0	13.6			
Lane LOS	A		B			
Approach Delay (s/veh)	3.6	0.0	13.6			
Approach LOS			B			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization		54.1%		ICU Level of Service		A
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	165	0	0	177	74	3	1	0	43	0	18
Future Volume (vph)	32	165	0	0	177	74	3	1	0	43	0	18
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.960						0.960					
Flt Protected	0.992						0.964					
Satd. Flow (prot)	0	1169	0	0	1284	0	0	1381	0	0	1329	0
Flt Permitted	0.992						0.964					
Satd. Flow (perm)	0	1169	0	0	1284	0	0	1381	0	0	1329	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	37	192	0	0	206	86	3	1	0	50	0	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	229	0	0	292	0	0	4	0	0	71	0
Sign Control	Free						Stop					
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	53.2%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (Open)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	165	0	0	177	74	3	1	0	43	0	18
Future Volume (Veh/h)	32	165	0	0	177	74	3	1	0	43	0	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	37	192	0	0	206	86	3	1	0	50	0	21
Pedestrians		3			1			2			29	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	321			194			541	589	195	546	546	281
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	321			194			541	589	195	546	546	281
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			100			99	100	100	88	100	97
cM capacity (veh/h)	1214			1388			420	398	849	417	421	738
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	229	292	4	71								
Volume Left	37	0	3	50								
Volume Right	0	86	0	21								
cSH	1214	1700	414	479								
Volume to Capacity	0.03	0.17	0.00*	0.15								
Queue Length 95th (m)	0.7	0.0	0.2	3.9								
Control Delay (s/veh)	1.5	0.0	13.8	13.8								
Lane LOS	A		B	B								
Approach Delay (s/veh)	1.5	0.0	13.8	13.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			53.2%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Appendix O

Five-Year Background Traffic Operations with Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	127	371	201	149
Future Volume (vph)	0	0	127	371	201	149
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.943					
Flt Protected	0.950					
Satd. Flow (prot)	0	0	1381	1518	1216	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	0	1381	1518	1216	0
Link Speed (k/h)	40	50				50
Link Distance (m)	75.7	60.3				168.1
Travel Time (s)	6.8	4.3				12.1
Confl. Peds. (#/hr)	1	29				29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	148	431	234	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	148	431	407	0
Sign Control	Stop	Free				Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	127	371	201	149
Future Volume (Veh/h)	0	0	127	371	201	149
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	148	431	234	173
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1078	350	436			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1078	350	436			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	87			
cM capacity (veh/h)	212	698	1134			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	148	431	407			
Volume Left	148	0	0			
Volume Right	0	0	173			
cSH	1134	1700	1700			
Volume to Capacity	0.13	0.25	0.24			
Queue Length 95th (m)	3.4	0.0	0.0			
Control Delay (s/veh)	8.6	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.2		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			44.9%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	8	490	0	0	201
Future Volume (vph)	10	8	490	0	0	201
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		2		10	10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	12	10	598	0	0	245
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	598	0	0	245
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	82.8%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	8	490	0	0	201
Future Volume (Veh/h)	10	8	490	0	0	201
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	10	598	0	0	245
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.82	0.82			0.82	
vC, conflicting volume	853	610			608	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	710	414			411	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	96	98			100	
cM capacity (veh/h)	314	497			940	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	22	598	245			
Volume Left	12	0	0			
Volume Right	10	0	0			
cSH	377	1700	1700			
Volume to Capacity	0.06	0.35	0.14			
Queue Length 95th (m)	1.4	0.0	0.0			
Control Delay (s/veh)	15.1	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	15.1	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		82.8%		ICU Level of Service		E
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	364	0	0	0	0	292	6	8	204	0
Future Volume (vph)	198	0	364	0	0	0	0	292	6	8	204	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.99		
Frt			0.850					0.997				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1259	0	1381	1504	0
Flt Permitted	0.950									0.555		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1259	0	797	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			418					2				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	228	0	418	0	0	0	0	336	7	9	234	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	0	418	0	0	0	0	343	0	9	234	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	29.0		29.0					31.0		31.0	31.0	
Total Split (%)	48.3%		48.3%					51.7%		51.7%	51.7%	
Maximum Green (s)	22.9		22.9					24.9		24.9	24.9	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	12.6		12.6					15.2		15.2	15.2	
Actuated g/C Ratio	0.31		0.31					0.37		0.37	0.37	
v/c Ratio	0.54		0.68					0.73		0.03	0.42	
Control Delay (s/veh)	17.9		8.0					22.2		9.6	12.8	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	17.9		8.0					22.2		9.6	12.8	

With Background Development
PTSL (250550)

Synchro 12 Report
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		A					C		A	B	
Approach Delay (s/veh)		11.5						22.2			12.7	
Approach LOS		B						C			B	
Queue Length 50th (m)	11.9		0.0					17.7		0.3	10.4	
Queue Length 95th (m)	32.2		13.5					53.3		2.6	31.3	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	831		811					824		521	984	
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	0.27		0.52					0.42		0.02	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 40.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay (s/veh): 14.7

Intersection LOS: B

Intersection Capacity Utilization 82.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	364	0	0	0	0	292	6	8	204	0
Future Volume (vph)	198	0	364	0	0	0	0	292	6	8	204	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1259		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.55	1.00	
Satd. Flow (perm)	1381		1072					1259		799	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	228	0	418	0	0	0	0	336	7	9	234	0
RTOR Reduction (vph)	0	0	286	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	228	0	132	0	0	0	0	342	0	9	234	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	12.6		12.6					15.2		15.2	15.2	
Effective Green, g (s)	12.6		12.6					15.2		15.2	15.2	
Actuated g/C Ratio	0.32		0.32					0.38		0.38	0.38	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	435		337					478		303	571	
v/s Ratio Prot	c0.17							c0.27			0.16	
v/s Ratio Perm			0.12							0.01		
v/c Ratio	0.52		0.39					0.71		0.03	0.41	
Uniform Delay, d1	11.2		10.7					10.6		7.8	9.1	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.6		0.3					4.3		0.0	0.2	
Delay (s)	11.8		11.0					14.9		7.8	9.3	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		11.3			0.0			14.9			9.3	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			11.9					HCM 2000 Level of Service		B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			40.0					Sum of lost time (s)		12.2		
Intersection Capacity Utilization			82.8%					ICU Level of Service		E		
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	23	22	5	275	550	17
Future Volume (vph)	23	22	5	275	550	17
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934				0.996	
Flt Protected	0.975			0.999		
Satd. Flow (prot)	1305	0	0	1097	1295	0
Flt Permitted	0.975			0.999		
Satd. Flow (perm)	1305	0	0	1097	1295	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	27	26	6	327	655	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	53	0	0	333	675	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	56.2%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	22	5	275	550	17
Future Volume (Veh/h)	23	22	5	275	550	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	27	26	6	327	655	20
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.93	0.92	0.92			
vC, conflicting volume	1023	695	694			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	790	622	621			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	92	94	99			
cM capacity (veh/h)	329	436	772			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	53	333	675			
Volume Left	27	6	0			
Volume Right	26	0	20			
cSH	374	772	1700			
Volume to Capacity	0.14	0.00*	0.40			
Queue Length 95th (m)	3.7	0.2	0.0			
Control Delay (s/veh)	16.2	0.3	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	16.2	0.3	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		56.2%		ICU Level of Service		B
Analysis Period (min)		15				
* Value less than 0.01.						

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	49	231	107	334	238
Future Volume (vph)	58	49	231	107	334	238
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.496	
Satd. Flow (perm)	1310	1069	1449	1027	708	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		56		123		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	67	56	266	123	384	274
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	56	266	123	384	274
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.8	8.8	15.0	15.0	31.4	28.0
Actuated g/C Ratio	0.18	0.18	0.30	0.30	0.63	0.56
v/c Ratio	0.29	0.24	0.61	0.31	0.66	0.33

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	23.2	9.8	21.2	5.3	11.2	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.2	9.8	21.2	5.3	11.2	6.9
LOS	C	A	C	A	B	A
Approach Delay (s/veh)	17.1		16.2			9.4
Approach LOS	B		B			A
Queue Length 50th (m)	5.2	0.0	20.2	0.0	12.7	10.8
Queue Length 95th (m)	15.8	7.3	39.9	7.9	28.3	23.1
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	535	470	723	574	582	1140
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.12	0.37	0.21	0.66	0.24

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 49.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay (s/veh): 12.5

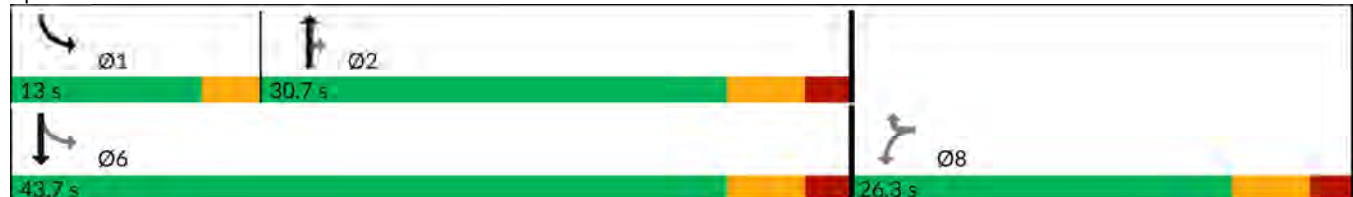
Intersection LOS: B

Intersection Capacity Utilization 63.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	49	231	107	334	238
Future Volume (vph)	58	49	231	107	334	238
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1073	1449	1031	1364	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.50	1.00
Satd. Flow (perm)	1312	1073	1449	1031	712	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	67	56	266	123	384	274
RTOR Reduction (vph)	0	46	0	86	0	0
Lane Group Flow (vph)	67	10	266	37	384	274
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.8	8.8	15.0	15.0	28.0	28.0
Effective Green, g (s)	8.8	8.8	15.0	15.0	28.0	28.0
Actuated g/C Ratio	0.18	0.18	0.30	0.30	0.57	0.57
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	233	191	439	313	535	844
v/s Ratio Prot			0.18		0.15	0.18
v/s Ratio Perm	0.05	0.01		0.04	0.26	
v/c Ratio	0.29	0.05	0.61	0.12	0.72	0.32
Uniform Delay, d1	17.6	16.8	14.7	12.4	6.6	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	2.5	0.2	4.6	0.3
Delay (s)	18.1	16.9	17.2	12.6	11.2	5.9
Level of Service	B	B	B	B	B	A
Approach Delay (s/veh)	17.6		15.7			9.0
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			49.4		Sum of lost time (s)	15.6
Intersection Capacity Utilization			63.8%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	10	2	334	293	2
Future Volume (vph)	3	10	2	334	293	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899					0.850
Flt Protected	0.988					
Satd. Flow (prot)	1176	0	0	1091	1504	1106
Flt Permitted	0.988					
Satd. Flow (perm)	1176	0	0	1091	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	12	2	398	349	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	400	349	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	43.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	10	2	334	293	2
Future Volume (Veh/h)	3	10	2	334	293	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	12	2	398	349	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.95	0.93	0.93			
vC, conflicting volume	774	371	373			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563	280	282			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	98	100			
cM capacity (veh/h)	457	668	1169			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	16	400	349	2		
Volume Left	4	2	0	0		
Volume Right	12	0	0	2		
cSH	599	1169	1700	1700		
Volume to Capacity	0.03	0.00*	0.21	0.00*		
Queue Length 95th (m)	0.6	0.0	0.0	0.0		
Control Delay (s/veh)	11.2	0.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	11.2	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			43.7%	ICU Level of Service		A
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	8	50	20	10	17	37	223	10	14	235	54
Future Volume (vph)	96	8	50	20	10	17	37	223	10	14	235	54
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.98			0.99			1.00	0.95
Frt		0.956			0.952			0.995				0.850
Flt Protected		0.970			0.979			0.993			0.997	
Satd. Flow (prot)	0	1143	0	0	1254	0	0	1335	0	0	1121	851
Flt Permitted		0.777			0.808			0.909			0.968	
Satd. Flow (perm)	0	907	0	0	1024	0	0	1218	0	0	1087	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			20			4				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	113	9	59	24	12	20	44	262	12	16	276	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	181	0	0	56	0	0	318	0	0	292	64
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2		2			2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		12.4			12.4			17.5			17.5	17.5
Actuated g/C Ratio		0.28			0.28			0.39			0.39	0.39
v/c Ratio		0.64			0.19			0.67			0.69	0.18
Control Delay (s/veh)		24.6			12.1			19.0			21.1	4.2
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		24.6			12.1			19.0			21.1	4.2

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			B			B			C	A
Approach Delay (s/veh)		24.6			12.1			19.0			18.1	
Approach LOS		C			B			B			B	
Queue Length 50th (m)		8.5			1.9			18.5			17.2	0.0
Queue Length 95th (m)		27.8			9.0			42.7			41.1	5.6
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		419			457			807			719	556
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		0.43			0.12			0.39			0.41	0.12

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 44.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay (s/veh): 19.3

Intersection LOS: B

Intersection Capacity Utilization 77.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	8	50	20	10	17	37	223	10	14	235	54
Future Volume (vph)	96	8	50	20	10	17	37	223	10	14	235	54
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		0.99			0.99			1.00			1.00	1.00
Frt		0.96			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			0.99			1.00	1.00
Satd. Flow (prot)		1138			1246			1333			1120	813
Flt Permitted		0.78			0.81			0.91			0.97	1.00
Satd. Flow (perm)		911			1028			1219			1087	813
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	113	9	59	24	12	20	44	262	12	16	276	64
RTOR Reduction (vph)	0	30	0	0	14	0	0	2	0	0	0	39
Lane Group Flow (vph)	0	151	0	0	42	0	0	316	0	0	292	25
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		12.4			12.4			17.4			17.4	17.4
Effective Green, g (s)		12.4			12.4			17.4			17.4	17.4
Actuated g/C Ratio		0.28			0.28			0.40			0.40	0.40
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		258			291			485			432	323
v/s Ratio Prot												
v/s Ratio Perm		c0.17			0.04			0.26			c0.27	0.03
v/c Ratio		0.58			0.14			0.65			0.68	0.08
Uniform Delay, d1		13.4			11.7			10.7			10.8	8.2
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		2.8			0.2			2.8			3.8	0.1
Delay (s)		16.2			11.8			13.5			14.6	8.2
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		16.2			11.8			13.5			13.5	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		13.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		43.7			Sum of lost time (s)			13.9				
Intersection Capacity Utilization		77.0%			ICU Level of Service			D				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	755	85	5	360	1	159	21	11	2	16	22
Future Volume (vph)	26	755	85	5	360	1	159	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.985						0.992			0.925	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1316	2926	0	1381	2941	0	0	1341	0	0	1307	0
Flt Permitted	0.501			0.249				0.732			0.984	
Satd. Flow (perm)	693	2926	0	362	2941	0	0	1015	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15						4			24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	28	821	92	5	391	1	173	23	12	2	17	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	913	0	5	392	0	0	208	0	0	43	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.6		9.0	40.6		40.4	40.4		40.4	40.4	
Total Split (%)	10.0%	45.1%		10.0%	45.1%		44.9%	44.9%		44.9%	44.9%	
Maximum Green (s)	6.0	34.3		6.0	34.3		33.1	33.1		33.1	33.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	33.3	28.9		32.7	27.3			18.5			18.5	
Actuated g/C Ratio	0.53	0.46		0.52	0.43			0.29			0.29	
v/c Ratio	0.07	0.68		0.02	0.31			0.69			0.11	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	9.2	18.2		9.2	14.8			33.9			11.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	9.2	18.2		9.2	14.8			33.9			11.6	
LOS	A	B		A	B			C			B	
Approach Delay (s/veh)		18.0			14.7			33.9			11.6	
Approach LOS		B			B			C			B	
Queue Length 50th (m)	1.4	36.3		0.2	12.7			20.6			1.6	
Queue Length 95th (m)	6.4	95.1		2.0	36.2			49.4			8.6	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	427	1700		290	1702			568			730	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.07	0.54		0.02	0.23			0.37			0.06	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 63.2

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay (s/veh): 19.1

Intersection LOS: B

Intersection Capacity Utilization 61.5%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	755	85	5	360	1	159	21	11	2	16	22
Future Volume (vph)	26	755	85	5	360	1	159	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2925		1381	2940			1334			1308	
Flt Permitted	0.50	1.00		0.25	1.00			0.73			0.98	
Satd. Flow (perm)	693	2925		362	2940			1017			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	821	92	5	391	1	173	23	12	2	17	24
RTOR Reduction (vph)	0	8	0	0	0	0	0	3	0	0	17	0
Lane Group Flow (vph)	28	905	0	5	392	0	0	205	0	0	26	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	30.8	28.9		28.6	27.8			18.5			18.5	
Effective Green, g (s)	30.8	28.9		28.6	27.8			18.5			18.5	
Actuated g/C Ratio	0.48	0.45		0.44	0.43			0.29			0.29	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	347	1304		172	1261			290			368	
v/s Ratio Prot	c0.00	c0.31		0.00	0.13							
v/s Ratio Perm	0.04			0.01				c0.20			0.02	
v/c Ratio	0.08	0.69		0.03	0.31			0.71			0.07	
Uniform Delay, d1	9.1	14.4		10.4	12.2			20.7			16.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	2.1		0.1	0.3			7.1			0.2	
Delay (s)	9.2	16.5		10.4	12.5			27.8			17.0	
Level of Service	A	B		B	B			C			B	
Approach Delay (s/veh)		16.2			12.5			27.8			17.0	
Approach LOS		B			B			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		16.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		64.8			Sum of lost time (s)			16.6				
Intersection Capacity Utilization		61.5%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	46	7	1	18	30	1	154	1	22	77	7
Future Volume (vph)	7	46	7	1	18	30	1	154	1	22	77	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.917			0.999			0.991	
Flt Protected		0.994			0.999						0.990	
Satd. Flow (prot)	0	1370	0	0	1291	0	0	1390	0	0	1386	0
Flt Permitted		0.994			0.999						0.990	
Satd. Flow (perm)	0	1370	0	0	1291	0	0	1390	0	0	1386	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	9	56	9	1	22	37	1	188	1	27	94	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	74	0	0	60	0	0	190	0	0	130	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.1%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
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	46	7	1	18	30	1	154	1	22	77	7
Future Volume (vph)	7	46	7	1	18	30	1	154	1	22	77	7
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	9	56	9	1	22	37	1	188	1	27	94	9
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	74	60	190	130								
Volume Left (vph)	9	1	1	27								
Volume Right (vph)	9	37	1	9								
Hadj (s)	-0.01	-0.34	0.05	0.02								
Departure Headway (s)	4.7	4.4	4.4	4.5								
Degree Utilization, x	0.10	0.07	0.23	0.16								
Capacity (veh/h)	705	750	784	768								
Control Delay (s/veh)	8.2	7.7	8.8	8.3								
Approach Delay (s/veh)	8.2	7.7	8.8	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.4									
Level of Service			A									
Intersection Capacity Utilization			40.1%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	43	9	1	21	0	6	0	3	0	1	0
Future Volume (vph)	1	43	9	1	21	0	6	0	3	0	1	0
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.977						0.955					
Flt Protected	0.999			0.998			0.968					
Satd. Flow (prot)	0	1399	0	0	1309	0	0	1325	0	0	1433	0
Flt Permitted	0.999			0.998			0.968					
Satd. Flow (perm)	0	1399	0	0	1309	0	0	1325	0	0	1433	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	362.4			79.0			93.8			56.1		
Travel Time (s)	26.1			5.7			6.8			4.0		
Confl. Peds. (#/hr)	3			6	6			3			2	2
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	57	12	1	28	0	8	0	4	0	1	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	0	0	29	0	0	12	0	0	1	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	20.4%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

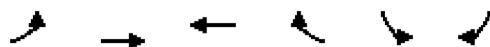
4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	1	43	9	1	21	0	6	0	3	0	1	0	
Future Volume (Veh/h)	1	43	9	1	21	0	6	0	3	0	1	0	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	
Hourly flow rate (vph)	1	57	12	1	28	0	8	0	4	0	1	0	
Pedestrians					2					6			3
Lane Width (m)					3.6					3.6			3.6
Walking Speed (m/s)					1.0					1.0			1.0
Percent Blockage					0					1			0
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	31			75			102	104	71	104	110	31	
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	31			75			102	104	71	104	110	31	
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2	
tC, 2 stage (s)													
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3	
p0 queue free %	100			100			99	100	100	100	100	100	
cM capacity (veh/h)	1590			1072			871	782	989	866	776	1046	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	70	29	12	1									
Volume Left	1	1	8	0									
Volume Right	12	0	4	0									
cSH	1590	1072	907	776									
Volume to Capacity	0.00*	0.00*	0.01	0.00*									
Queue Length 95th (m)	0.0	0.0	0.3	0.0									
Control Delay (s/veh)	0.1	0.3	9.0	9.6									
Lane LOS	A	A	A	A									
Approach Delay (s/veh)	0.1	0.3	9.0	9.6									
Approach LOS			A	A									
Intersection Summary													
Average Delay			1.2										
Intersection Capacity Utilization			20.4%	ICU Level of Service				A					
Analysis Period (min)			15										

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

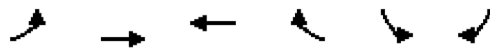
4873 and 4898 Kitchener Street TIS
Background AM (5-Year)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	44	21	0	1	1
Future Volume (vph)	2	44	21	0	1	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.932	
Flt Protected		0.998			0.976	
Satd. Flow (prot)	0	1176	1262	0	869	0
Flt Permitted		0.998			0.976	
Satd. Flow (perm)	0	1176	1262	0	869	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	3	60	29	0	1	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	63	29	0	2	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.0%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	44	21	0	1	1
Future Volume (Veh/h)	2	44	21	0	1	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	3	60	29	0	1	1
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	33				99	35
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	33				99	35
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	100				100	100
cM capacity (veh/h)	1586				899	811
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	63	29	2			
Volume Left	3	0	1			
Volume Right	0	0	1			
cSH	1586	1700	853			
Volume to Capacity	0.00*	0.02	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.4	0.0	9.2			
Lane LOS	A		A			
Approach Delay (s/veh)	0.4	0.0	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			17.0%		ICU Level of Service	
Analysis Period (min)			15		A	

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	44	0	0	20	2	1	0	0	1	0	0
Future Volume (vph)	1	44	0	0	20	2	1	0	0	1	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.987											
Flt Protected	0.999								0.950		0.950	
Satd. Flow (prot)	0	1177	0	0	1242	0	0	1361	0	0	1361	0
Flt Permitted	0.999								0.950		0.950	
Satd. Flow (perm)	0	1177	0	0	1242	0	0	1361	0	0	1361	0
Link Speed (k/h)	50								50		50	
Link Distance (m)	37.0								32.6		36.9	
Travel Time (s)	2.7								2.3		2.7	
Confl. Peds. (#/hr)	3								2		2	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	64	0	0	29	3	1	0	0	1	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	65	0	0	32	0	0	1	0	0	1	0
Sign Control	Free		Free						Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	15.7%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	44	0	0	20	2	1	0	0	1	0	0
Future Volume (Veh/h)	1	44	0	0	20	2	1	0	0	1	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	1	64	0	0	29	3	1	0	0	1	0	0
Pedestrians					2						3	
Lane Width (m)					3.6						3.6	
Walking Speed (m/s)					1.0						1.0	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	35			64			97	101	66	102	100	34
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	35			64			97	101	66	102	100	34
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1585			1551			888	790	1001	877	791	1043
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	65	32	1	1								
Volume Left	1	0	1	1								
Volume Right	0	3	0	0								
cSH	1585	1700	888	877								
Volume to Capacity	0.00*	0.02	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.0								
Control Delay (s/veh)	0.1	0.0	9.1	9.1								
Lane LOS	A		A	A								
Approach Delay (s/veh)	0.1	0.0	9.1	9.1								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			15.7%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	260	603	398	285
Future Volume (vph)	0	0	260	603	398	285
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.944	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1563	1238	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1563	1238	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		1	58			58
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	274	635	419	300
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	274	635	719	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	88.8%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	260	603	398	285
Future Volume (Veh/h)	0	0	260	603	398	285
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	274	635	419	300
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1810	628	777			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1810	628	777			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	68			
cM capacity (veh/h)	59	486	848			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	274	635	719			
Volume Left	274	0	0			
Volume Right	0	0	300			
cSH	848	1700	1700			
Volume to Capacity	0.32	0.37	0.42			
Queue Length 95th (m)	10.5	0.0	0.0			
Control Delay (s/veh)	11.3	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	3.4		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			88.8%	ICU Level of Service		E
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	49	814	0	0	398
Future Volume (vph)	53	49	814	0	0	398
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	57	53	875	0	0	428
Shared Lane Traffic (%)						
Lane Group Flow (vph)	110	0	875	0	0	428
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	119.6%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	49	814	0	0	398
Future Volume (Veh/h)	53	49	814	0	0	398
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	57	53	875	0	0	428
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.56	0.56			0.56	
vC, conflicting volume	1337	911			908	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1210	451			445	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	48	84			100	
cM capacity (veh/h)	110	332			611	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	110	875	428			
Volume Left	57	0	0			
Volume Right	53	0	0			
cSH	163	1700	1700			
Volume to Capacity	0.68	0.51	0.25			
Queue Length 95th (m)	29.4	0.0	0.0			
Control Delay (s/veh)	64.0	0.0	0.0			
Lane LOS	F					
Approach Delay (s/veh)	64.0	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		5.0				
Intersection Capacity Utilization		119.6%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	293	0	0	0	0	631	17	59	392	0
Future Volume (vph)	183	0	293	0	0	0	0	631	17	59	392	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00		0.98		
Frt			0.850					0.997				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1305	0	1354	1563	0
Flt Permitted	0.950									0.289		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1305	0	405	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			318					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	199	0	318	0	0	0	0	686	18	64	426	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	0	318	0	0	0	0	704	0	64	426	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.4		28.4					61.6		61.6	61.6	
Total Split (%)	31.6%		31.6%					68.4%		68.4%	68.4%	
Maximum Green (s)	22.3		22.3					55.5		55.5	55.5	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	15.3		15.3					42.4		42.4	42.4	
Actuated g/C Ratio	0.22		0.22					0.60		0.60	0.60	
v/c Ratio	0.68		0.66					0.90		0.26	0.46	
Control Delay (s/veh)	40.8		10.9					29.7		10.6	9.8	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	40.8		10.9					29.7		10.6	9.8	

With Background Development
PTSL (250550)

Synchro 12 Report
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D		B					C		B	A	
Approach Delay (s/veh)		22.4						29.7			9.9	
Approach LOS		C						C			A	
Queue Length 50th (m)	26.0		0.0					72.4		3.6	27.6	
Queue Length 95th (m)	52.2		23.3					#175.0		11.8	54.9	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	464		581					1025		318	1228	
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	0.43		0.55					0.69		0.20	0.35	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 70.9

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay (s/veh): 21.9

Intersection LOS: C

Intersection Capacity Utilization 119.6%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	293	0	0	0	0	631	17	59	392	0
Future Volume (vph)	183	0	293	0	0	0	0	631	17	59	392	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.98	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1305		1333	1563	
Flt Permitted	0.95		1.00					1.00		0.29	1.00	
Satd. Flow (perm)	1368		1095					1305		406	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	0	318	0	0	0	0	686	18	64	426	0
RTOR Reduction (vph)	0	0	248	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	199	0	70	0	0	0	0	703	0	64	426	0
Confl. Peds. (#/hr)								57		32	32	57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	15.3		15.3					42.5		42.5	42.5	
Effective Green, g (s)	15.3		15.3					42.5		42.5	42.5	
Actuated g/C Ratio	0.22		0.22					0.61		0.61	0.61	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	299		239					792		246	948	
v/s Ratio Prot	c0.15							c0.54			0.27	
v/s Ratio Perm			0.06							0.16		
v/c Ratio	0.67		0.29					0.89		0.26	0.45	
Uniform Delay, d1	25.0		22.8					11.7		6.4	7.4	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	4.4		0.3					11.5		0.2	0.1	
Delay (s)	29.4		23.1					23.2		6.7	7.6	
Level of Service	C		C					C		A	A	
Approach Delay (s/veh)		25.5			0.0			23.2			7.5	
Approach LOS		C			A			C			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			19.4									
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			70.0									
Intersection Capacity Utilization			119.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	43	30	16	606	625	60
Future Volume (vph)	43	30	16	606	625	60
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.945				0.988	
Flt Protected	0.971			0.999		
Satd. Flow (prot)	1315	0	0	1165	1310	0
Flt Permitted	0.971			0.999		
Satd. Flow (perm)	1315	0	0	1165	1310	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	46	32	17	645	665	64
Shared Lane Traffic (%)						
Lane Group Flow (vph)	78	0	0	662	729	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	85.6%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	30	16	606	625	60
Future Volume (Veh/h)	43	30	16	606	625	60
Sign Control	Stop			Free		Free
Grade	0%			0%		0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	46	32	17	645	665	64
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.85	0.86	0.86			
vC, conflicting volume	1422	747	775			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1050	628	661			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	92	98			
cM capacity (veh/h)	202	399	772			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	78	662	729			
Volume Left	46	17	0			
Volume Right	32	0	64			
cSH	254	772	1700			
Volume to Capacity	0.31	0.02	0.43			
Queue Length 95th (m)	9.4	0.5	0.0			
Control Delay (s/veh)	25.4	0.6	0.0			
Lane LOS	D	A				
Approach Delay (s/veh)	25.4	0.6	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization		85.6%		ICU Level of Service		E
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	221	401	173	224	432
Future Volume (vph)	141	221	401	173	224	432
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.352	
Satd. Flow (perm)	1339	1063	1563	1032	494	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		233		182		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	148	233	422	182	236	455
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	233	422	182	236	455
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	32.7	32.7	11.0	43.7
Total Split (%)	37.6%	37.6%	46.7%	46.7%	15.7%	62.4%
Maximum Green (s)	20.0	20.0	26.4	26.4	8.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	11.7	11.7	20.5	20.5	34.9	31.5
Actuated g/C Ratio	0.21	0.21	0.37	0.37	0.62	0.56
v/c Ratio	0.53	0.58	0.74	0.37	0.55	0.52

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	28.9	9.8	24.8	5.0	10.8	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	28.9	9.8	24.8	5.0	10.8	10.6
LOS	C	A	C	A	B	B
Approach Delay (s/veh)	17.2		18.8			10.7
Approach LOS	B		B			B
Queue Length 50th (m)	13.8	0.0	35.2	0.0	8.8	24.2
Queue Length 95th (m)	30.3	15.5	72.5	10.7	23.0	55.2
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	491	537	756	593	435	1071
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.43	0.56	0.31	0.54	0.42

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 56.1

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.74

Intersection Signal Delay (s/veh): 15.1

Intersection LOS: B

Intersection Capacity Utilization 67.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	221	401	173	224	432
Future Volume (vph)	141	221	401	173	224	432
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96	1.00	0.94	1.00	1.00
Flpb, ped/bikes	0.98	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1348	1067	1563	1044	1358	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.35	1.00
Satd. Flow (perm)	1348	1067	1563	1044	504	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	148	233	422	182	236	455
RTOR Reduction (vph)	0	184	0	115	0	0
Lane Group Flow (vph)	148	49	422	67	236	455
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	11.7	11.7	20.6	20.6	31.5	31.5
Effective Green, g (s)	11.7	11.7	20.6	20.6	31.5	31.5
Actuated g/C Ratio	0.21	0.21	0.37	0.37	0.56	0.56
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	282	223	577	385	405	882
v/s Ratio Prot			c0.27		c0.08	0.29
v/s Ratio Perm	c0.11	0.05		0.06	0.25	
v/c Ratio	0.52	0.22	0.73	0.17	0.58	0.52
Uniform Delay, d1	19.6	18.3	15.2	11.9	7.1	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.4	4.9	0.3	2.1	0.6
Delay (s)	20.9	18.6	20.1	12.1	9.3	8.1
Level of Service	C	B	C	B	A	A
Approach Delay (s/veh)	19.5		17.7			8.5
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			14.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			55.8		Sum of lost time (s)	15.6
Intersection Capacity Utilization			67.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	10	6	567	553	20
Future Volume (vph)	7	10	6	567	553	20
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.921					0.850
Flt Protected	0.980			0.999		
Satd. Flow (prot)	1293	0	0	1165	1563	1106
Flt Permitted	0.980			0.999		
Satd. Flow (perm)	1293	0	0	1165	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	7	10	6	591	576	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	17	0	0	597	576	21
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	68.3%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	10	6	567	553	20
Future Volume (Veh/h)	7	10	6	567	553	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	10	6	591	576	21
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.85	0.77	0.77			
vC, conflicting volume	1262	659	680			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	624	414	441			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	99			
cM capacity (veh/h)	350	456	802			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	17	597	576	21		
Volume Left	7	6	0	0		
Volume Right	10	0	0	21		
cSH	406	802	1700	1700		
Volume to Capacity	0.04	0.00*	0.34	0.01		
Queue Length 95th (m)	1.0	0.2	0.0	0.0		
Control Delay (s/veh)	14.3	0.2	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	14.3	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			68.3%	ICU Level of Service		C
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	17	40	55	44	39	40	443	41	18	423	122
Future Volume (vph)	91	17	40	55	44	39	40	443	41	18	423	122
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.91			0.92			0.98			1.00	0.77
Frt		0.963			0.962			0.989				0.850
Flt Protected		0.970			0.980			0.996			0.998	
Satd. Flow (prot)	0	1239	0	0	1271	0	0	1376	0	0	1164	1024
Flt Permitted		0.764			0.827			0.937			0.969	
Satd. Flow (perm)	0	922	0	0	1029	0	0	1285	0	0	1127	787
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			27			10				131
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	98	18	43	59	47	42	43	476	44	19	455	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	159	0	0	148	0	0	563	0	0	474	131
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	24.7	24.7		24.7	24.7		45.3	45.3		45.3	45.3	45.3
Total Split (%)	35.3%	35.3%		35.3%	35.3%		64.7%	64.7%		64.7%	64.7%	64.7%
Maximum Green (s)	18.0	18.0		18.0	18.0		38.1	38.1		38.1	38.1	38.1
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		13.6			13.6			30.1			30.1	30.1
Actuated g/C Ratio		0.23			0.23			0.52			0.52	0.52
v/c Ratio		0.68			0.57			0.84			0.82	0.28
Control Delay (s/veh)		35.9			28.2			26.1			25.8	3.5
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		35.9			28.2			26.1			25.8	3.5

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D			C			C			C	A
Approach Delay (s/veh)		35.9			28.2			26.1			21.0	
Approach LOS		D			C			C			C	
Queue Length 50th (m)		14.3			12.5			47.0			39.3	0.0
Queue Length 95th (m)		#38.3			30.0			#112.7			#97.5	7.2
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		318			353			889			777	583
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		0.50			0.42			0.63			0.61	0.22

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 58.4

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay (s/veh): 25.3

Intersection LOS: C

Intersection Capacity Utilization 109.5%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	17	40	55	44	39	40	443	41	18	423	122
Future Volume (vph)	91	17	40	55	44	39	40	443	41	18	423	122
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.97			0.97			0.99			1.00	0.81
Flpb, ped/bikes		0.95			0.97			0.99			1.00	1.00
Frt		0.96			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1190			1235			1372			1161	825
Flt Permitted		0.76			0.83			0.94			0.97	1.00
Satd. Flow (perm)		937			1041			1290			1127	825
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	98	18	43	59	47	42	43	476	44	19	455	131
RTOR Reduction (vph)	0	20	0	0	21	0	0	5	0	0	0	63
Lane Group Flow (vph)	0	139	0	0	127	0	0	558	0	0	474	68
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		13.6			13.6			30.1			30.1	30.1
Effective Green, g (s)		13.6			13.6			30.1			30.1	30.1
Actuated g/C Ratio		0.24			0.24			0.52			0.52	0.52
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		221			245			674			588	431
v/s Ratio Prot												
v/s Ratio Perm		c0.15			0.12			c0.43			0.42	0.08
v/c Ratio		0.63			0.52			0.83			0.81	0.16
Uniform Delay, d1		19.7			19.2			11.6			11.3	7.2
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		4.8			1.4			8.1			7.7	0.1
Delay (s)		24.5			20.5			19.7			19.1	7.3
Level of Service		C			C			B			B	A
Approach Delay (s/veh)		24.5			20.5			19.7			16.5	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		19.0			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.77										
Actuated Cycle Length (s)		57.6			Sum of lost time (s)			13.9				
Intersection Capacity Utilization		109.5%			ICU Level of Service			H				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	764	177	41	842	14	261	31	24	2	26	25
Future Volume (vph)	56	764	177	41	842	14	261	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.972			0.998			0.990			0.936	
Flt Protected	0.950			0.950				0.960			0.998	
Satd. Flow (prot)	1381	2887	0	1381	2964	0	0	1338	0	0	1295	0
Flt Permitted	0.184			0.163				0.724			0.988	
Satd. Flow (perm)	267	2887	0	237	2964	0	0	1003	0	0	1282	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			2			5			27	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	60	822	190	44	905	15	281	33	26	2	28	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	1012	0	44	920	0	0	340	0	0	57	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.0		9.0	40.0		41.0	41.0		41.0	41.0	
Total Split (%)	10.0%	44.4%		10.0%	44.4%		45.6%	45.6%		45.6%	45.6%	
Maximum Green (s)	6.0	33.7		6.0	33.7		33.7	33.7		33.7	33.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	41.2	34.4		40.6	32.7			31.1			31.1	
Actuated g/C Ratio	0.49	0.41		0.48	0.39			0.37			0.37	
v/c Ratio	0.29	0.85		0.22	0.80			0.91			0.12	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	14.9	31.6		14.0	30.6			57.6			12.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	14.9	31.6		14.0	30.6			57.6			12.2	
LOS	B	C		B	C			E			B	
Approach Delay (s/veh)		30.7			29.9			57.6			12.2	
Approach LOS		C			C			E			B	
Queue Length 50th (m)	5.0	83.3		3.6	74.0			53.1			3.2	
Queue Length 95th (m)	11.1	#123.4		8.7	#99.0			#104.1			10.8	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	210	1253		196	1208			411			537	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.29	0.81		0.22	0.76			0.83			0.11	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 84.5

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay (s/veh): 33.7

Intersection LOS: C

Intersection Capacity Utilization 81.9%

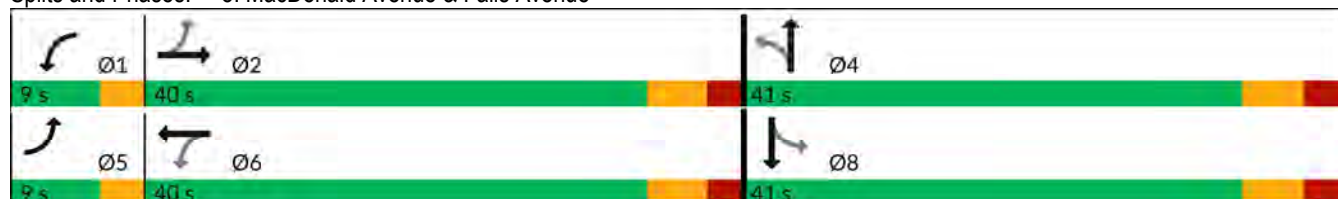
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	764	177	41	842	14	261	31	24	2	26	25
Future Volume (vph)	56	764	177	41	842	14	261	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2887		1381	2962			1330			1296	
Flt Permitted	0.18	1.00		0.16	1.00			0.72			0.99	
Satd. Flow (perm)	267	2887		238	2962			1002			1283	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	60	822	190	44	905	15	281	33	26	2	28	27
RTOR Reduction (vph)	0	21	0	0	1	0	0	3	0	0	17	0
Lane Group Flow (vph)	60	991	0	44	919	0	0	337	0	0	40	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	38.9	34.4		36.7	33.3			31.1			31.1	
Effective Green, g (s)	38.9	34.4		36.7	33.3			31.1			31.1	
Actuated g/C Ratio	0.45	0.40		0.43	0.39			0.36			0.36	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	180	1161		147	1153			364			466	
v/s Ratio Prot	c0.02	c0.34		0.01	0.31							
v/s Ratio Perm	0.13			0.12				c0.34			0.03	
v/c Ratio	0.33	0.85		0.30	0.80			0.93			0.09	
Uniform Delay, d1	14.6	23.3		15.7	23.1			26.1			17.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.8	6.9		0.8	4.5			28.8			0.2	
Delay (s)	15.4	30.1		16.5	27.6			54.9			18.0	
Level of Service	B	C		B	C			D			B	
Approach Delay (s/veh)		29.3			27.1			54.9			18.0	
Approach LOS		C			C			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			31.7			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			85.5			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			81.9%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Future Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.983			0.930			0.996			0.989	
Flt Protected		0.983			0.999			0.999			0.990	
Satd. Flow (prot)	0	1385	0	0	1331	0	0	1386	0	0	1393	0
Flt Permitted		0.983			0.999			0.999			0.990	
Satd. Flow (perm)	0	1385	0	0	1331	0	0	1386	0	0	1393	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	28	41	10	3	64	73	6	235	7	55	184	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	79	0	0	140	0	0	248	0	0	260	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.2%						ICU Level of Service B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Future Volume (vph)	26	39	9	3	60	69	6	221	7	52	173	20
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	41	10	3	64	73	6	235	7	55	184	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	79	140	248	260								
Volume Left (vph)	28	3	6	55								
Volume Right (vph)	10	73	7	21								
Hadj (s)	-0.01	-0.31	0.04	0.01								
Departure Headway (s)	5.4	5.0	4.9	4.8								
Degree Utilization, x	0.12	0.19	0.33	0.35								
Capacity (veh/h)	595	651	704	708								
Control Delay (s/veh)	9.1	9.1	10.3	10.3								
Approach Delay (s/veh)	9.1	9.1	10.3	10.3								
Approach LOS	A	A	B	B								
Intersection Summary												
Delay			9.9									
Level of Service			A									
Intersection Capacity Utilization			63.2%	ICU Level of Service					B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	62	17	2	67	2	6	1	1	1	2	3
Future Volume (vph)	1	62	17	2	67	2	6	1	1	1	2	3
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.971			0.997			0.985			0.923	
Flt Protected		0.999			0.999			0.963			0.993	
Satd. Flow (prot)	0	1390	0	0	1427	0	0	1359	0	0	1313	0
Flt Permitted		0.999			0.999			0.963			0.993	
Satd. Flow (perm)	0	1390	0	0	1427	0	0	1359	0	0	1313	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			79.0			93.8			56.1	
Travel Time (s)		26.1			5.7			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	73	20	2	79	2	7	1	1	1	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	94	0	0	83	0	0	9	0	0	7	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	17.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

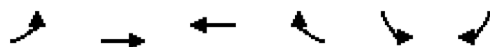
4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	62	17	2	67	2	6	1	1	1	2	3
Future Volume (Veh/h)	1	62	17	2	67	2	6	1	1	1	2	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	1	73	20	2	79	2	7	1	1	1	2	4
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	83			94			177	173	85	174	182	84
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	83			94			177	173	85	174	182	84
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 %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1524			1511			779	720	978	787	712	977
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	94	83	9	7								
Volume Left	1	2	7	1								
Volume Right	20	2	1	4								
cSH	1524	1511	790	856								
Volume to Capacity	0.00*	0.00*	0.01	0.00*								
Queue Length 95th (m)	0.0	0.0	0.3	0.2								
Control Delay (s/veh)	0.1	0.2	9.6	9.2								
Lane LOS	A	A	A	A								
Approach Delay (s/veh)	0.1	0.2	9.6	9.2								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			17.5%	ICU Level of Service				A				
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

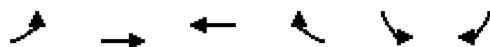
4873 and 4898 Kitchener Street TIS
Background PM (5-Year)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	1	63	71	2	4	0
Future Volume (vph)	1	63	71	2	4	0
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.997					
Flt Protected	0.999		0.950			
Satd. Flow (prot)	0	1177	1334	0	1361	0
Flt Permitted	0.999		0.950			
Satd. Flow (perm)	0	1177	1334	0	1361	0
Link Speed (k/h)	50		50		50	
Link Distance (m)	79.0		37.0		36.9	
Travel Time (s)	5.7		2.7		2.7	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	71	80	2	4	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	72	82	0	4	0
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	16.7%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	63	71	2	4	0
Future Volume (Veh/h)	1	63	71	2	4	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	1	71	80	2	4	0
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	87				159	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	87				159	86
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)	1514				832	973
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	72	82	4			
Volume Left	1	0	4			
Volume Right	0	2	0			
cSH	1514	1700	832			
Volume to Capacity	0.00*	0.05	0.00*			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s/veh)	0.1	0.0	9.3			
Lane LOS	A		A			
Approach Delay (s/veh)	0.1	0.0	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			16.7%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	68	0	0	74	2	0	0	2	2	0	0
Future Volume (vph)	0	68	0	0	74	2	0	0	2	2	0	0
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt					0.997					0.865		
Flt Protected									0.950			
Satd. Flow (prot)	0	1178	0	0	1334	0	0	1240	0	0	1361	0
Flt Permitted									0.950			
Satd. Flow (perm)	0	1178	0	0	1334	0	0	1240	0	0	1361	0
Link Speed (k/h)	50				50				50			
Link Distance (m)	37.0				57.8				32.6			
Travel Time (s)	2.7				4.2				2.3			
Confl. Peds. (#/hr)	7					7	1					3
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	77	0	0	84	2	0	0	2	2	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	77	0	0	86	0	0	2	0	0	2	0
Sign Control	Free				Free				Stop			
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	18.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	68	0	0	74	2	0	0	2	2	0	0
Future Volume (Veh/h)	0	68	0	0	74	2	0	0	2	2	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	77	0	0	84	2	0	0	2	2	0	0
Pedestrians		1			3						7	
Lane Width (m)		3.6			3.6						3.6	
Walking Speed (m/s)		1.0			1.0						1.0	
Percent Blockage		0			0						1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	93			77			163	170	80	174	169	93
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	93			77			163	170	80	174	169	93
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 %	100			100			100	100	100	100	100	100
cM capacity (veh/h)	1504			1535			801	722	983	780	722	962
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	77	86	2	2								
Volume Left	0	0	0	2								
Volume Right	0	2	2	0								
cSH	1504	1700	983	780								
Volume to Capacity	0.00	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.0	0.1								
Control Delay (s/veh)	0.0	0.0	8.7	9.6								
Lane LOS			A	A								
Approach Delay (s/veh)	0.0	0.0	8.7	9.6								
Approach LOS			A	A								
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			18.3%		ICU Level of Service				A			
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	268	549	436	216
Future Volume (vph)	0	0	268	549	436	216
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.955	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1265	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1265	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)		5	63			63
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	295	603	479	237
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	295	603	716	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	87.1%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	268	549	436	216
Future Volume (Veh/h)	0	0	268	549	436	216
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	295	603	479	237
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1854	666	779			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1854	666	779			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	65			
cM capacity (veh/h)	53	461	838			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	295	603	716			
Volume Left	295	0	0			
Volume Right	0	0	237			
cSH	838	1700	1700			
Volume to Capacity	0.35	0.35	0.42			
Queue Length 95th (m)	11.9	0.0	0.0			
Control Delay (s/veh)	11.6	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	3.8		0.0			
Approach LOS						
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			87.1%	ICU Level of Service		E
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	59	45	773	0	0	436
Future Volume (vph)	59	45	773	0	0	436
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40	50		50		
Link Distance (m)	86.2	51.0		60.3		
Travel Time (s)	7.8	3.7		4.3		
Confl. Peds. (#/hr)	1		57		57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	61	47	805	0	0	454
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	805	0	0	454
Sign Control	Stop	Free		Free		
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	137.3%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	45	773	0	0	436
Future Volume (Veh/h)	59	45	773	0	0	436
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	47	805	0	0	454
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.55	0.55			0.55	
vC, conflicting volume	1316	863			862	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1164	336			334	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	46	87			100	
cM capacity (veh/h)	112	366			638	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	108	805	454			
Volume Left	61	0	0			
Volume Right	47	0	0			
cSH	160	1700	1700			
Volume to Capacity	0.67	0.47	0.27			
Queue Length 95th (m)	29.1	0.0	0.0			
Control Delay (s/veh)	64.3	0.0	0.0			
Lane LOS	F					
Approach Delay (s/veh)	64.3	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		5.1				
Intersection Capacity Utilization		137.3%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	459	0	0	0	0	600	16	80	414	0
Future Volume (vph)	172	0	459	0	0	0	0	600	16	80	414	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.91					1.00				
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1314	0	1354	1563	0
Flt Permitted	0.950									0.255		
Satd. Flow (perm)	1362	0	1008	0	0	0	0	1314	0	364	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			230					2				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	478	0	0	0	0	625	17	83	431	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	478	0	0	0	0	642	0	83	431	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	38.4		38.4					51.6		51.6	51.6	
Total Split (%)	42.7%		42.7%					57.3%		57.3%	57.3%	
Maximum Green (s)	32.3		32.3					45.5		45.5	45.5	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	29.6		29.6					43.2		43.2	43.2	
Actuated g/C Ratio	0.35		0.35					0.51		0.51	0.51	
v/c Ratio	0.38		0.96					0.96		0.45	0.54	
Control Delay (s/veh)	24.1		47.0					49.9		24.3	18.0	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	24.1		47.0					49.9		24.3	18.0	

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		D					D		C	B	
Approach Delay (s/veh)		40.8						49.9			19.0	
Approach LOS		D						D			B	
Queue Length 50th (m)	22.4		45.4					101.2		8.8	48.1	
Queue Length 95th (m)	39.3		#109.8					#175.4		23.3	75.1	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	526		529					713		197	848	
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	0.34		0.90					0.90		0.42	0.51	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 85.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay (s/veh): 37.9

Intersection LOS: D

Intersection Capacity Utilization 137.3%

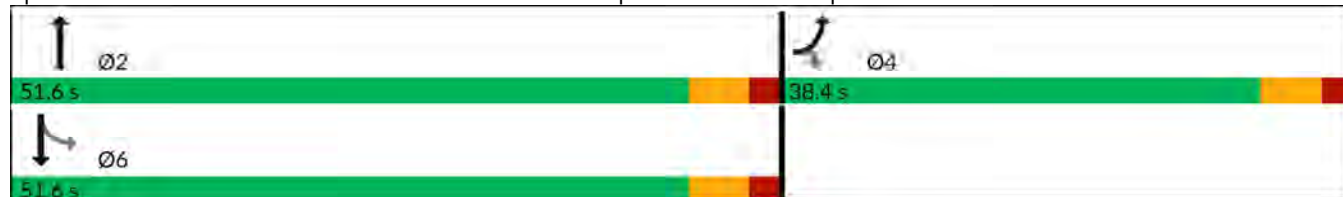
ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	459	0	0	0	0	600	16	80	414	0
Future Volume (vph)	172	0	459	0	0	0	0	600	16	80	414	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.92					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.97	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1013					1315		1315	1563	
Flt Permitted	0.95		1.00					1.00		0.25	1.00	
Satd. Flow (perm)	1368		1013					1315		352	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	179	0	478	0	0	0	0	625	17	83	431	0
RTOR Reduction (vph)	0	0	150	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	179	0	328	0	0	0	0	641	0	83	431	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	29.6		29.6					43.2		43.2	43.2	
Effective Green, g (s)	29.6		29.6					43.2		43.2	43.2	
Actuated g/C Ratio	0.35		0.35					0.51		0.51	0.51	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	476		352					668		178	794	
v/s Ratio Prot	0.13							c0.49			0.28	
v/s Ratio Perm			c0.32							0.24		
v/c Ratio	0.38		0.93					0.96		0.47	0.54	
Uniform Delay, d1	20.8		26.7					20.1		13.5	14.2	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.2		30.7					24.7		0.8	0.4	
Delay (s)	21.0		57.4					44.8		14.3	14.6	
Level of Service	C		E					D		B	B	
Approach Delay (s/veh)		47.5			0.0			44.8			14.6	
Approach LOS		D			A			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			37.2									
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			85.0									
Intersection Capacity Utilization			137.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	48	61	9	568	805	68
Future Volume (vph)	48	61	9	568	805	68
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.924				0.990	
Flt Protected	0.978			0.999		
Satd. Flow (prot)	1295	0	0	1165	1313	0
Flt Permitted	0.978			0.999		
Satd. Flow (perm)	1295	0	0	1165	1313	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	51	65	10	604	856	72
Shared Lane Traffic (%)						
Lane Group Flow (vph)	116	0	0	614	928	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	84.1%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W			W	W	
Traffic Volume (veh/h)	48	61	9	568	805	68
Future Volume (Veh/h)	48	61	9	568	805	68
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	51	65	10	604	856	72
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.90	0.82	0.82			
vC, conflicting volume	1615	996	1016			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1178	885	910			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	75	98			
cM capacity (veh/h)	170	255	566			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	116	614	928			
Volume Left	51	10	0			
Volume Right	65	0	72			
cSH	209	566	1700			
Volume to Capacity	0.55	0.02	0.55			
Queue Length 95th (m)	22.3	0.4	0.0			
Control Delay (s/veh)	41.8	0.5	0.0			
Lane LOS	E	A				
Approach Delay (s/veh)	41.8	0.5	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			84.1%	ICU Level of Service		E
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	210	367	275	355	511
Future Volume (vph)	150	210	367	275	355	511
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.96	0.85		0.85	0.93	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.379	
Satd. Flow (perm)	1322	943	1533	932	514	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		214		281		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	153	214	374	281	362	521
Shared Lane Traffic (%)						
Lane Group Flow (vph)	153	214	374	281	362	521
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	12.0	12.0	19.2	19.2	35.9	32.5
Actuated g/C Ratio	0.21	0.21	0.33	0.33	0.63	0.57
v/c Ratio	0.55	0.58	0.73	0.56	0.76	0.59

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	29.7	10.8	26.6	7.3	20.5	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	29.7	10.8	26.6	7.3	20.5	12.0
LOS	C	B	C	A	C	B
Approach Delay (s/veh)	18.7		18.4			15.5
Approach LOS	B		B			B
Queue Length 50th (m)	14.7	0.0	33.1	0.0	15.4	30.0
Queue Length 95th (m)	31.3	15.6	68.2	16.0	#55.9	68.7
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	471	473	666	563	475	1041
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.45	0.56	0.50	0.76	0.50

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 57.4

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay (s/veh): 17.1

Intersection LOS: B

Intersection Capacity Utilization 79.0%

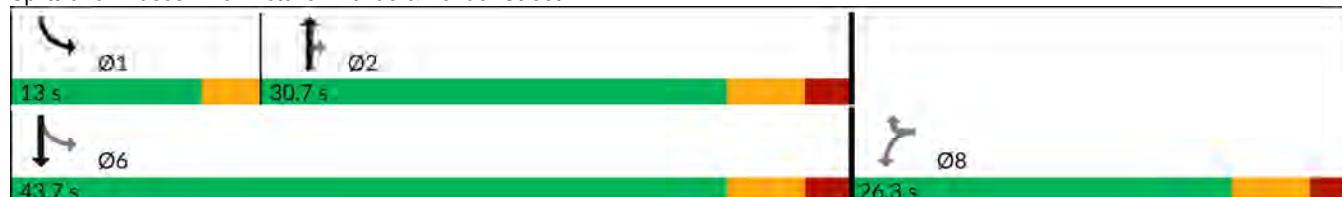
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	210	367	275	355	511
Future Volume (vph)	150	210	367	275	355	511
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.88	1.00	0.88	1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00	1.00	0.98	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1333	969	1533	960	1353	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.38	1.00
Satd. Flow (perm)	1333	969	1533	960	540	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	214	374	281	362	521
RTOR Reduction (vph)	0	169	0	186	0	0
Lane Group Flow (vph)	153	45	374	95	362	521
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	12.0	12.0	19.3	19.3	32.5	32.5
Effective Green, g (s)	12.0	12.0	19.3	19.3	32.5	32.5
Actuated g/C Ratio	0.21	0.21	0.34	0.34	0.57	0.57
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	280	203	518	324	452	889
v/s Ratio Prot			0.24		c0.14	0.33
v/s Ratio Perm	c0.11	0.05		0.10	c0.31	
v/c Ratio	0.55	0.22	0.72	0.29	0.80	0.59
Uniform Delay, d1	20.1	18.7	16.6	13.9	8.0	8.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.4	5.1	0.6	9.8	1.1
Delay (s)	21.8	19.1	21.6	14.5	17.8	9.0
Level of Service	C	B	C	B	B	A
Approach Delay (s/veh)	20.2		18.6			12.6
Approach LOS	C		B			B
Intersection Summary						
HCM 2000 Control Delay (s/veh)			16.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.78			
Actuated Cycle Length (s)			57.1		Sum of lost time (s)	15.6
Intersection Capacity Utilization			79.0%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	7	3	637	642	18
Future Volume (vph)	5	7	3	637	642	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.921					0.850
Flt Protected	0.980					
Satd. Flow (prot)	1293	0	0	1166	1563	1106
Flt Permitted	0.980					
Satd. Flow (perm)	1293	0	0	1166	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	5	7	3	643	648	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	0	646	648	18
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	74.3%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	7	3	637	642	18
Future Volume (Veh/h)	5	7	3	637	642	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	7	3	643	648	18
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.86	0.73	0.73			
vC, conflicting volume	1501	851	869			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	794	611	635			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	99			
cM capacity (veh/h)	245	289	557			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	12	646	648	18		
Volume Left	5	3	0	0		
Volume Right	7	0	0	18		
cSH	269	557	1700	1700		
Volume to Capacity	0.04	0.00*	0.38	0.01		
Queue Length 95th (m)	1.0	0.1	0.0	0.0		
Control Delay (s/veh)	19.0	0.2	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s/veh)	19.0	0.2	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			74.3%	ICU Level of Service		D
Analysis Period (min)			15			
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	24	65	52	51	57	69	461	33	23	485	141
Future Volume (vph)	122	24	65	52	51	57	69	461	33	23	485	141
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.88			0.90			0.96			0.99	0.64
Frt		0.958			0.952			0.992				0.850
Flt Protected		0.972			0.984			0.994			0.998	
Satd. Flow (prot)	0	1222	0	0	1227	0	0	1366	0	0	1176	1063
Flt Permitted		0.750			0.832			0.864			0.962	
Satd. Flow (perm)	0	883	0	0	997	0	0	1167	0	0	1126	676
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			33			7				148
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	128	25	68	55	54	60	73	485	35	24	511	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	221	0	0	169	0	0	593	0	0	535	148
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	27.0	27.0		27.0	27.0		53.0	53.0		53.0	53.0	53.0
Total Split (%)	33.8%	33.8%		33.8%	33.8%		66.3%	66.3%		66.3%	66.3%	66.3%
Maximum Green (s)	20.3	20.3		20.3	20.3		45.8	45.8		45.8	45.8	45.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		19.3			19.3			40.7			40.7	40.7
Actuated g/C Ratio		0.26			0.26			0.55			0.55	0.55
v/c Ratio		0.89			0.60			0.92			0.87	0.34
Control Delay (s/veh)		62.2			30.9			37.8			31.3	3.9
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		62.2			30.9			37.8			31.3	3.9

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E			C			D			C	A
Approach Delay (s/veh)		62.2			30.9			37.8			25.4	
Approach LOS		E			C			D			C	
Queue Length 50th (m)		28.5			18.2			70.4			59.9	0.0
Queue Length 95th (m)		#68.8			#39.5			#141.1			#123.2	7.6
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		265			301			737			708	480
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		0.83			0.56			0.80			0.76	0.31

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 74.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay (s/veh): 35.3

Intersection LOS: D

Intersection Capacity Utilization 125.4%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	24	65	52	51	57	69	461	33	23	485	141
Future Volume (vph)	122	24	65	52	51	57	69	461	33	23	485	141
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.94			0.94			0.98			1.00	0.66
Flpb, ped/bikes		0.94			0.96			0.98			0.99	1.00
Frt		0.96			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			0.99			1.00	1.00
Satd. Flow (prot)		1155			1187			1346			1168	704
Flt Permitted		0.75			0.83			0.86			0.96	1.00
Satd. Flow (perm)		891			1004			1170			1126	704
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	25	68	55	54	60	73	485	35	24	511	148
RTOR Reduction (vph)	0	20	0	0	24	0	0	3	0	0	0	66
Lane Group Flow (vph)	0	201	0	0	145	0	0	590	0	0	535	82
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		19.3			19.3			40.7			40.7	40.7
Effective Green, g (s)		19.3			19.3			40.7			40.7	40.7
Actuated g/C Ratio		0.26			0.26			0.55			0.55	0.55
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		232			262			644			620	387
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.14			c0.50			0.48	0.12
v/c Ratio		0.87			0.55			0.92			0.86	0.21
Uniform Delay, d1		26.1			23.6			15.0			14.2	8.4
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		26.8			2.0			17.7			11.8	0.2
Delay (s)		52.8			25.6			32.8			26.0	8.6
Level of Service		D			C			C			C	A
Approach Delay (s/veh)		52.8			25.6			32.8			22.2	
Approach LOS		D			C			C			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			30.4									
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			73.9									
Intersection Capacity Utilization			125.4%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1022	257	34	765	8	264	22	22	7	26	24
Future Volume (vph)	43	1022	257	34	765	8	264	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.970			0.998			0.990			0.943	
Flt Protected	0.950			0.950				0.959			0.994	
Satd. Flow (prot)	1381	2887	0	1381	2964	0	0	1349	0	0	1330	0
Flt Permitted	0.275			0.090				0.716			0.952	
Satd. Flow (perm)	399	2887	0	131	2964	0	0	998	0	0	1274	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			1			4			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	1054	265	35	789	8	272	23	23	7	27	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	1319	0	35	797	0	0	318	0	0	59	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	50.4		9.0	50.4		40.6	40.6		40.6	40.6	
Total Split (%)	9.0%	50.4%		9.0%	50.4%		40.6%	40.6%		40.6%	40.6%	
Maximum Green (s)	6.0	44.1		6.0	44.1		33.3	33.3		33.3	33.3	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	51.1	44.3		51.1	44.3			32.0			32.0	
Actuated g/C Ratio	0.54	0.47		0.54	0.47			0.34			0.34	
v/c Ratio	0.16	0.97		0.23	0.58			0.94			0.13	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	11.4	43.4		13.8	21.6			69.0			16.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	11.4	43.4		13.8	21.6			69.0			16.0	
LOS	B	D		B	C			E			B	
Approach Delay (s/veh)		42.4			21.2			69.0			16.0	
Approach LOS		D			C			E			B	
Queue Length 50th (m)	3.6	~134.3		2.8	60.1			58.2			4.4	
Queue Length 95th (m)	8.3	#181.3		7.0	79.2			#111.4			13.3	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	276	1366		149	1381			354			464	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.16	0.97		0.23	0.58			0.90			0.13	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 95.1

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay (s/veh): 38.2

Intersection LOS: D

Intersection Capacity Utilization 87.4%

ICU Level of Service E

Analysis Period (min) 15

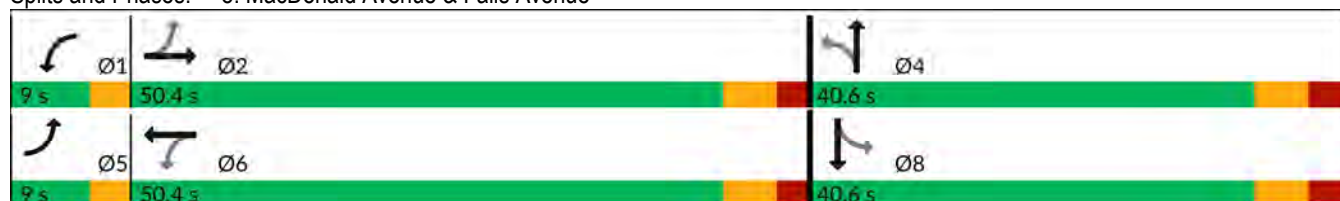
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1022	257	34	765	8	264	22	22	7	26	24
Future Volume (vph)	43	1022	257	34	765	8	264	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2887		1381	2966			1337			1330	
Flt Permitted	0.28	1.00		0.09	1.00			0.72			0.95	
Satd. Flow (perm)	400	2887		131	2966			998			1274	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	44	1054	265	35	789	8	272	23	23	7	27	25
RTOR Reduction (vph)	0	22	0	0	1	0	0	3	0	0	17	0
Lane Group Flow (vph)	44	1297	0	35	796	0	0	315	0	0	42	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	47.7	44.3		47.7	44.3			32.0			32.0	
Effective Green, g (s)	47.7	44.3		47.7	44.3			32.0			32.0	
Actuated g/C Ratio	0.50	0.46		0.50	0.46			0.33			0.33	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	232	1328		109	1364			331			423	
v/s Ratio Prot	0.01	c0.45		c0.01	0.27							
v/s Ratio Perm	0.09			0.15				c0.32			0.03	
v/c Ratio	0.19	0.98		0.32	0.58			0.95			0.10	
Uniform Delay, d1	13.2	25.5		16.6	19.2			31.4			22.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	19.4		1.2	1.0			36.9			0.2	
Delay (s)	13.5	44.9		17.9	20.2			68.3			22.4	
Level of Service	B	D		B	C			E			C	
Approach Delay (s/veh)		43.9			20.1			68.3			22.4	
Approach LOS		D			C			E			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			38.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			96.3			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			87.4%			ICU Level of Service			E			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Future Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.991			0.933			0.998			0.987	
Flt Protected		0.984			0.995			0.999			0.988	
Satd. Flow (prot)	0	1397	0	0	1320	0	0	1429	0	0	1397	0
Flt Permitted		0.984			0.995			0.999			0.988	
Satd. Flow (perm)	0	1397	0	0	1320	0	0	1429	0	0	1397	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	33	63	7	15	63	76	3	215	3	80	222	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	0	0	154	0	0	221	0	0	335	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	63.9%						ICU Level of Service B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Future Volume (vph)	31	60	7	14	60	72	3	204	3	76	211	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	33	63	7	15	63	76	3	215	3	80	222	33
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	103	154	221	335								
Volume Left (vph)	33	15	3	80								
Volume Right (vph)	7	76	3	33								
Hadj (s)	0.02	-0.26	-0.01	-0.01								
Departure Headway (s)	5.6	5.2	5.1	4.9								
Degree Utilization, x	0.16	0.22	0.31	0.46								
Capacity (veh/h)	567	616	664	697								
Control Delay (s/veh)	9.7	9.7	10.4	12.0								
Approach Delay (s/veh)	9.7	9.7	10.4	12.0								
Approach LOS	A	A	B	B								
Intersection Summary												
Delay			10.8									
Level of Service			B									
Intersection Capacity Utilization			63.9%	ICU Level of Service					B			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	99	10	6	65	3	23	0	10	0	0	2
Future Volume (vph)	0	99	10	6	65	3	23	0	10	0	0	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.988				0.994				0.959		0.865	
Flt Protected					0.996				0.966			
Satd. Flow (prot)	0	1416	0	0	1419	0	0	1328	0	0	1240	0
Flt Permitted					0.996				0.966			
Satd. Flow (perm)	0	1416	0	0	1419	0	0	1328	0	0	1240	0
Link Speed (k/h)	50				50				50		50	
Link Distance (m)	362.4				79.0				93.8		56.1	
Travel Time (s)	26.1				5.7				6.8		4.0	
Confl. Peds. (#/hr)	10	5		5	10		4		4			
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	0	119	12	7	78	4	28	0	12	0	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	131	0	0	89	0	0	40	0	0	2	0
Sign Control	Free				Free				Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	28.4%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

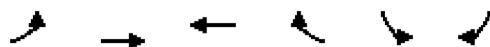
4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	99	10	6	65	3	23	0	10	0	0	2
Future Volume (Veh/h)	0	99	10	6	65	3	23	0	10	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	0	119	12	7	78	4	28	0	12	0	0	2
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	92			136			226	236	134	245	240	90
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	92			136			226	236	134	245	240	90
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 %	100			100			96	100	99	100	100	100
cM capacity (veh/h)	1500			1453			718	655	912	683	652	964
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	131	89	40	2								
Volume Left	0	7	28	0								
Volume Right	12	4	12	2								
cSH	1500	1453	767	964								
Volume to Capacity	0.00	0.00*	0.05	0.00*								
Queue Length 95th (m)	0.0	0.1	1.2	0.0								
Control Delay (s/veh)	0.0	0.6	10.0	8.7								
Lane LOS		A	A	A								
Approach Delay (s/veh)	0.0	0.6	10.0	8.7								
Approach LOS			A	A								
Intersection Summary												
Average Delay			1.8									
Intersection Capacity Utilization			28.4%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

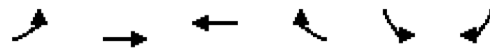
4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	101	74	1	3	1
Future Volume (vph)	7	101	74	1	3	1
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.999		0.973	
Flt Protected		0.997			0.962	
Satd. Flow (prot)	0	1174	1337	0	1341	0
Flt Permitted		0.997			0.962	
Satd. Flow (perm)	0	1174	1337	0	1341	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		79.0	37.0		36.9	
Travel Time (s)		5.7	2.7		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	125	91	1	4	1
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	134	92	0	5	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	26.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	101	74	1	3	1
Future Volume (Veh/h)	7	101	74	1	3	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	9	125	91	1	4	1
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	103				246	106
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	103				246	106
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				99	100
cM capacity (veh/h)	1485				735	941
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	134	92	5			
Volume Left	9	0	4			
Volume Right	0	1	1			
cSH	1485	1700	768			
Volume to Capacity	0.00*	0.05	0.00*			
Queue Length 95th (m)	0.1	0.0	0.1			
Control Delay (s/veh)	0.5	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s/veh)	0.5	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			26.8%	ICU Level of Service		A
Analysis Period (min)			15			

* Value less than 0.01.

Lanes, Volumes, Timings
12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	103	0	0	70	6	3	1	0	5	0	1
Future Volume (vph)	1	103	0	0	70	6	3	1	0	5	0	1
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.989						0.981					
Flt Protected							0.964					
Satd. Flow (prot)	0	1178	0	0	1323	0	0	1381	0	0	1348	0
Flt Permitted							0.964					
Satd. Flow (perm)	0	1178	0	0	1323	0	0	1381	0	0	1348	0
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	37.0			57.8			32.6			36.9		
Travel Time (s)	2.7			4.2			2.3			2.7		
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	120	0	0	81	7	3	1	0	6	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	0	0	88	0	0	4	0	0	7	0
Sign Control	Free			Free			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	21.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Background Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	103	0	0	70	6	3	1	0	5	0	1
Future Volume (Veh/h)	1	103	0	0	70	6	3	1	0	5	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	1	120	0	0	81	7	3	1	0	6	0	1
Pedestrians		3			1			2			29	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			3	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	117			122			213	241	123	237	238	117
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	117			122			213	241	123	237	238	117
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 %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	1441			1475			726	643	931	682	646	911
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	121	88	4	7								
Volume Left	1	0	3	6								
Volume Right	0	7	0	1								
cSH	1441	1700	703	708								
Volume to Capacity	0.00*	0.05	0.00*	0.00*								
Queue Length 95th (m)	0.0	0.0	0.1	0.2								
Control Delay (s/veh)	0.1	0.0	10.1	10.1								
Lane LOS	A		B	B								
Approach Delay (s/veh)	0.1	0.0	10.1	10.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			21.5%	ICU Level of Service					A			
Analysis Period (min)			15									
* Value less than 0.01.												

Appendix P

Five-Year Total Traffic Operations with Background Development



Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	136	387	222	149
Future Volume (vph)	0	0	136	387	222	149
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.946	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1381	1518	1219	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1381	1518	1219	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	1		29			29
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	4%	5%	2%
Adj. Flow (vph)	0	0	158	450	258	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	158	450	431	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	47.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	136	387	222	149
Future Volume (Veh/h)	0	0	136	387	222	149
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	0	158	450	258	173
Pedestrians	29				1	
Lane Width (m)	0.0				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	0				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	1141	374	460			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1141	374	460			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	86			
cM capacity (veh/h)	192	677	1112			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	158	450	431			
Volume Left	158	0	0			
Volume Right	0	0	173			
cSH	1112	1700	1700			
Volume to Capacity	0.14	0.26	0.25			
Queue Length 95th (m)	3.7	0.0	0.0			
Control Delay (s/veh)	8.8	0.0	0.0			
Lane LOS	A					
Approach Delay (s/veh)	2.3		0.0			
Approach LOS						
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			47.1%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	8	515	0	0	222
Future Volume (vph)	10	8	515	0	0	222
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.939					
Flt Protected	0.973					
Satd. Flow (prot)	1165	0	1533	0	0	1504
Flt Permitted	0.973					
Satd. Flow (perm)	1165	0	1533	0	0	1504
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		2		10	10	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	11%	14%	3%	0%	0%	5%
Adj. Flow (vph)	12	10	628	0	0	271
Shared Lane Traffic (%)						
Lane Group Flow (vph)	22	0	628	0	0	271
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	89.8%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	8	515	0	0	222
Future Volume (Veh/h)	10	8	515	0	0	222
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	12	10	628	0	0	271
Pedestrians	10					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	909	640			638	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	756	418			415	
tC, single (s)	6.5	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.6	3.4			2.2	
p0 queue free %	96	98			100	
cM capacity (veh/h)	286	479			908	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	22	628	271			
Volume Left	12	0	0			
Volume Right	10	0	0			
cSH	350	1700	1700			
Volume to Capacity	0.06	0.37	0.16			
Queue Length 95th (m)	1.5	0.0	0.0			
Control Delay (s/veh)	16.0	0.0	0.0			
Lane LOS	C					
Approach Delay (s/veh)	16.0	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			89.8%	ICU Level of Service		E
Analysis Period (min)			15			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	402	0	0	0	0	317	10	8	225	0
Future Volume (vph)	198	0	402	0	0	0	0	317	10	8	225	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.98					1.00		0.99		
Frt			0.850					0.996				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1381	0	1095	0	0	0	0	1258	0	1381	1504	0
Flt Permitted	0.950									0.519		
Satd. Flow (perm)	1381	0	1072	0	0	0	0	1258	0	746	1504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			391					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)			1	1			34		13	13		34
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Adj. Flow (vph)	228	0	462	0	0	0	0	364	11	9	259	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	228	0	462	0	0	0	0	375	0	9	259	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	29.2		29.2					30.8		30.8	30.8	
Total Split (%)	48.7%		48.7%					51.3%		51.3%	51.3%	
Maximum Green (s)	23.1		23.1					24.7		24.7	24.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	13.3		13.3					16.9		16.9	16.9	
Actuated g/C Ratio	0.31		0.31					0.39		0.39	0.39	
v/c Ratio	0.54		0.77					0.76		0.03	0.44	
Control Delay (s/veh)	18.6		13.5					24.3		9.9	13.2	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	18.6		13.5					24.3		9.9	13.2	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B		B				C		A		B	
Approach Delay (s/veh)	15.2				24.3				13.1			
Approach LOS	B				C				B			
Queue Length 50th (m)	13.0		3.7				20.7		0.3	12.2		
Queue Length 95th (m)	32.0		28.0				#68.9		2.7	35.1		
Internal Link Dist (m)	97.1				44.8				42.6		27.0	
Turn Bay Length (m)												
Base Capacity (vph)	849		810				772		457	921		
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	0.27		0.57				0.49		0.02	0.28		

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 43.3

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay (s/veh): 17.3

Intersection LOS: B

Intersection Capacity Utilization 89.8%

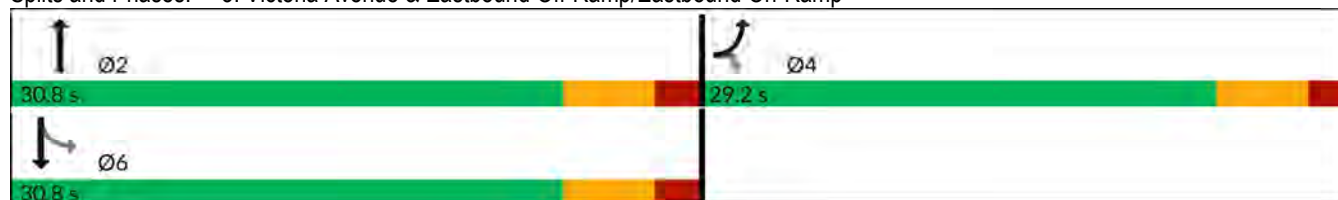
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	198	0	402	0	0	0	0	317	10	8	225	0
Future Volume (vph)	198	0	402	0	0	0	0	317	10	8	225	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.98					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1381		1072					1258		1369	1504	
Flt Permitted	0.95		1.00					1.00		0.52	1.00	
Satd. Flow (perm)	1381		1072					1258		748	1504	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	228	0	462	0	0	0	0	364	11	9	259	0
RTOR Reduction (vph)	0	0	268	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	228	0	194	0	0	0	0	373	0	9	259	0
Confl. Peds. (#/hr)			1	1			34		13	13		34
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	6%	0%	0%	5%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	13.3		13.3					16.9		16.9	16.9	
Effective Green, g (s)	13.3		13.3					16.9		16.9	16.9	
Actuated g/C Ratio	0.31		0.31					0.40		0.40	0.40	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	433		336					501		298	599	
v/s Ratio Prot	0.17							c0.30			0.17	
v/s Ratio Perm			c0.18							0.01		
v/c Ratio	0.53		0.58					0.74		0.03	0.43	
Uniform Delay, d1	12.0		12.2					10.9		7.8	9.3	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.6		1.6					5.3		0.0	0.2	
Delay (s)	12.6		13.8					16.2		7.8	9.5	
Level of Service	B		B					B		A	A	
Approach Delay (s/veh)		13.4			0.0			16.2			9.4	
Approach LOS		B			A			B			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		13.4										
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		42.4										
Intersection Capacity Utilization		89.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	52	37	21	275	550	76
Future Volume (vph)	52	37	21	275	550	76
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.944				0.984	
Flt Protected	0.972			0.996		
Satd. Flow (prot)	1315	0	0	1084	1283	0
Flt Permitted	0.972			0.996		
Satd. Flow (perm)	1315	0	0	1084	1283	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		11	19			19
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	0%	25%	7%	3%	0%
Adj. Flow (vph)	62	44	25	327	655	90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	106	0	0	352	745	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	67.1%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	37	21	275	550	76
Future Volume (Veh/h)	52	37	21	275	550	76
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	62	44	25	327	655	90
Pedestrians	19			11		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	2			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.93	0.90	0.90			
vC, conflicting volume	1096	730	764			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	647	685			
tC, single (s)	6.4	6.2	4.4			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	79	89	97			
cM capacity (veh/h)	302	416	717			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	106	352	745			
Volume Left	62	25	0			
Volume Right	44	0	90			
cSH	341	717	1700			
Volume to Capacity	0.31	0.03	0.44			
Queue Length 95th (m)	9.7	0.8	0.0			
Control Delay (s/veh)	20.3	1.1	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	20.3	1.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			67.1%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	55	241	107	338	249
Future Volume (vph)	58	55	241	107	338	249
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.493	
Satd. Flow (perm)	1310	1069	1449	1027	704	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		63		123		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	67	63	277	123	389	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	63	277	123	389	286
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.9	8.9	15.4	15.4	31.9	28.5
Actuated g/C Ratio	0.18	0.18	0.31	0.31	0.64	0.57
v/c Ratio	0.29	0.26	0.63	0.31	0.67	0.34

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	23.6	9.9	21.5	5.3	11.6	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.6	9.9	21.5	5.3	11.6	7.0
LOS	C	A	C	A	B	A
Approach Delay (s/veh)	16.9		16.5			9.7
Approach LOS	B		B			A
Queue Length 50th (m)	5.2	0.0	21.2	0.0	13.0	11.3
Queue Length 95th (m)	15.9	7.8	41.5	7.9	28.7	24.1
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	530	470	716	569	581	1128
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.13	0.39	0.22	0.67	0.25

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 50.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 12.7

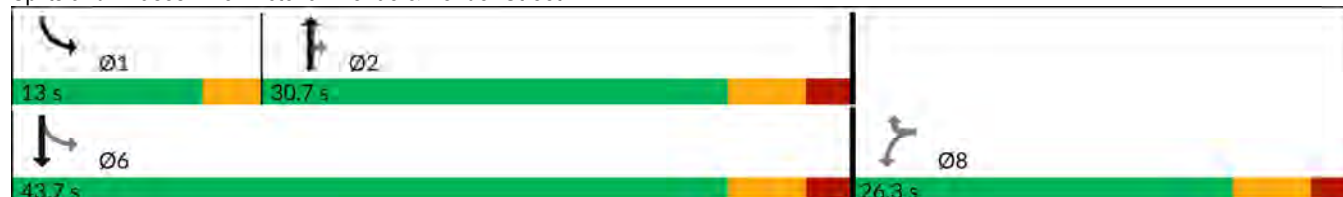
Intersection LOS: B

Intersection Capacity Utilization 64.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	55	241	107	338	249
Future Volume (vph)	58	55	241	107	338	249
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1312	1073	1449	1031	1364	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1312	1073	1449	1031	708	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	67	63	277	123	389	286
RTOR Reduction (vph)	0	52	0	85	0	0
Lane Group Flow (vph)	67	11	277	38	389	286
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.9	8.9	15.4	15.4	28.5	28.5
Effective Green, g (s)	8.9	8.9	15.4	15.4	28.5	28.5
Actuated g/C Ratio	0.18	0.18	0.31	0.31	0.57	0.57
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	233	190	446	317	536	849
v/s Ratio Prot			0.19		c0.15	0.19
v/s Ratio Perm	c0.05	0.01		0.04	c0.27	
v/c Ratio	0.29	0.06	0.62	0.12	0.73	0.34
Uniform Delay, d1	17.8	17.1	14.8	12.4	6.6	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	2.8	0.2	4.9	0.3
Delay (s)	18.3	17.2	17.6	12.6	11.5	6.0
Level of Service	B	B	B	B	B	A
Approach Delay (s/veh)	17.8		16.1			9.2
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			50.0		Sum of lost time (s)	15.6
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	12	8	344	304	2
Future Volume (vph)	3	12	8	344	304	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.895					0.850
Flt Protected	0.989			0.999		
Satd. Flow (prot)	1168	0	0	1092	1504	1106
Flt Permitted	0.989			0.999		
Satd. Flow (perm)	1168	0	0	1092	1504	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	14	10	410	362	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	420	362	2
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	49.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	12	8	344	304	2
Future Volume (Veh/h)	3	12	8	344	304	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	14	10	410	362	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.94	0.92	0.92			
vC, conflicting volume	815	384	386			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	287	289			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	438	658	1156			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	18	420	362	2		
Volume Left	4	10	0	0		
Volume Right	14	0	0	2		
cSH	592	1156	1700	1700		
Volume to Capacity	0.03	0.00*	0.21	0.00*		
Queue Length 95th (m)	0.7	0.2	0.0	0.0		
Control Delay (s/veh)	11.3	0.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	11.3	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay				0.4		
Intersection Capacity Utilization	49.6%			ICU Level of Service	A	
Analysis Period (min)	15					
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Future Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.98			0.99			1.00	0.95
Frt		0.956			0.952			0.995				0.850
Flt Protected		0.970			0.979			0.994			0.997	
Satd. Flow (prot)	0	1143	0	0	1254	0	0	1336	0	0	1121	851
Flt Permitted		0.777			0.809			0.912			0.969	
Satd. Flow (perm)	0	907	0	0	1025	0	0	1222	0	0	1088	806
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			20			4				67
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	113	9	59	24	12	20	44	281	12	16	292	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	181	0	0	56	0	0	337	0	0	308	64
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2		2			2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	41.7%	41.7%		41.7%	41.7%		58.3%	58.3%		58.3%	58.3%	58.3%
Maximum Green (s)	18.3	18.3		18.3	18.3		27.8	27.8		27.8	27.8	27.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		12.6			12.6			18.4			18.4	18.4
Actuated g/C Ratio		0.28			0.28			0.40			0.40	0.40
v/c Ratio		0.65			0.19			0.68			0.71	0.18
Control Delay (s/veh)		25.3			12.4			19.5			21.7	4.1
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		25.3			12.4			19.5			21.7	4.1

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			B			B			C	A
Approach Delay (s/veh)		25.3			12.4			19.5			18.7	
Approach LOS		C			B			B			B	
Queue Length 50th (m)		8.8			2.0			20.2			18.6	0.0
Queue Length 95th (m)		27.8			9.0			46.1			44.0	5.6
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		410			447			791			703	545
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		0.44			0.13			0.43			0.44	0.12

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 45.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay (s/veh): 19.9

Intersection LOS: B

Intersection Capacity Utilization 78.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Future Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.99			1.00			1.00	0.96
Flpb, ped/bikes		0.99			0.99			1.00			1.00	1.00
Frt		0.96			0.95			1.00			1.00	0.85
Flt Protected		0.97			0.98			0.99			1.00	1.00
Satd. Flow (prot)		1137			1245			1333			1120	813
Flt Permitted		0.78			0.81			0.91			0.97	1.00
Satd. Flow (perm)		911			1029			1224			1088	813
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	113	9	59	24	12	20	44	281	12	16	292	64
RTOR Reduction (vph)	0	30	0	0	14	0	0	2	0	0	0	38
Lane Group Flow (vph)	0	151	0	0	42	0	0	335	0	0	308	26
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		12.6			12.6			18.4			18.4	18.4
Effective Green, g (s)		12.6			12.6			18.4			18.4	18.4
Actuated g/C Ratio		0.28			0.28			0.41			0.41	0.41
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		255			288			501			445	333
v/s Ratio Prot												
v/s Ratio Perm		c0.17			0.04			0.27			c0.28	0.03
v/c Ratio		0.59			0.14			0.67			0.69	0.08
Uniform Delay, d1		13.9			12.1			10.8			10.9	8.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		3.1			0.2			3.0			4.3	0.1
Delay (s)		17.0			12.3			13.8			15.2	8.2
Level of Service		B			B			B			B	A
Approach Delay (s/veh)		17.0			12.3			13.8			14.0	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		14.4			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.65										
Actuated Cycle Length (s)		44.9			Sum of lost time (s)			13.9				
Intersection Capacity Utilization		78.6%			ICU Level of Service			D				
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Future Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.983						0.993			0.925	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1316	2920	0	1381	2941	0	0	1341	0	0	1307	0
Flt Permitted	0.497			0.218				0.727			0.984	
Satd. Flow (perm)	688	2920	0	317	2941	0	0	1008	0	0	1288	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18						3			24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	28	862	110	5	401	1	207	23	12	2	17	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	972	0	5	402	0	0	242	0	0	43	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	40.6		9.0	40.6		40.4	40.4		40.4	40.4	
Total Split (%)	10.0%	45.1%		10.0%	45.1%		44.9%	44.9%		44.9%	44.9%	
Maximum Green (s)	6.0	34.3		6.0	34.3		33.1	33.1		33.1	33.1	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	35.5	31.1		34.9	29.4			20.7			20.7	
Actuated g/C Ratio	0.53	0.46		0.52	0.44			0.31			0.31	
v/c Ratio	0.07	0.72		0.02	0.31			0.78			0.10	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	9.8	20.2		9.8	15.6			40.1			11.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	9.8	20.2		9.8	15.6			40.1			11.3	
LOS	A	C		A	B			D			B	
Approach Delay (s/veh)		19.9			15.5			40.1			11.3	
Approach LOS		B			B			D			B	
Queue Length 50th (m)	1.6	44.5		0.3	14.7			27.4			1.7	
Queue Length 95th (m)	6.5	#114.0		2.0	37.4			59.8			8.6	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	420	1570		263	1572			521			676	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.07	0.62		0.02	0.26			0.46			0.06	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 67.4

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay (s/veh): 21.5

Intersection LOS: C

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Future Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.98		1.00	1.00			0.99			0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1315	2920		1381	2940			1333			1308	
Flt Permitted	0.50	1.00		0.22	1.00			0.73			0.98	
Satd. Flow (perm)	688	2920		318	2940			1010			1290	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	862	110	5	401	1	207	23	12	2	17	24
RTOR Reduction (vph)	0	10	0	0	0	0	0	2	0	0	17	0
Lane Group Flow (vph)	28	962	0	5	402	0	0	240	0	0	26	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	33.1	31.1		30.9	30.0			20.7			20.7	
Effective Green, g (s)	33.1	31.1		30.9	30.0			20.7			20.7	
Actuated g/C Ratio	0.48	0.45		0.45	0.43			0.30			0.30	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	346	1310		155	1272			301			385	
v/s Ratio Prot	c0.00	c0.33		0.00	0.14							
v/s Ratio Perm	0.04			0.01				c0.24			0.02	
v/c Ratio	0.08	0.73		0.03	0.32			0.80			0.07	
Uniform Delay, d1	9.7	15.7		11.1	12.9			22.4			17.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	2.6		0.1	0.3			13.2			0.2	
Delay (s)	9.7	18.3		11.2	13.2			35.6			17.6	
Level of Service	A	B		B	B			D			B	
Approach Delay (s/veh)		18.1			13.2			35.6			17.6	
Approach LOS		B			B			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			19.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			69.3			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			65.3%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	52	7	5	22	61	1	154	5	38	77	7
Future Volume (vph)	7	52	7	5	22	61	1	154	5	38	77	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.985			0.907			0.996			0.992	
Flt Protected		0.994			0.997						0.985	
Satd. Flow (prot)	0	1371	0	0	1227	0	0	1387	0	0	1383	0
Flt Permitted		0.994			0.997						0.985	
Satd. Flow (perm)	0	1371	0	0	1227	0	0	1387	0	0	1383	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	2		1	1		2	14		5	5		14
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles (%)	0%	3%	0%	100%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	9	63	9	6	27	74	1	188	6	46	94	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	81	0	0	107	0	0	195	0	0	149	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	40.5%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
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	52	7	5	22	61	1	154	5	38	77	7
Future Volume (vph)	7	52	7	5	22	61	1	154	5	38	77	7
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	9	63	9	6	27	74	1	188	6	46	94	9
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	81	107	195	149								
Volume Left (vph)	9	6	1	46								
Volume Right (vph)	9	74	6	9								
Hadj (s)	0.00	-0.31	0.03	0.05								
Departure Headway (s)	4.9	4.5	4.6	4.6								
Degree Utilization, x	0.11	0.13	0.25	0.19								
Capacity (veh/h)	679	730	751	732								
Control Delay (s/veh)	8.4	8.2	9.1	8.7								
Approach Delay (s/veh)	8.4	8.2	9.1	8.7								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.7									
Level of Service			A									
Intersection Capacity Utilization			40.5%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	67	9	1	58	3	6	3	6	42	3	2
Future Volume (vph)	3	67	9	1	58	3	6	3	6	42	3	2
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.984			0.993			0.946			0.993	
Flt Protected		0.998			0.999			0.980			0.958	
Satd. Flow (prot)	0	1407	0	0	1330	0	0	1329	0	0	1363	0
Flt Permitted		0.998			0.999			0.980			0.958	
Satd. Flow (perm)	0	1407	0	0	1330	0	0	1329	0	0	1363	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	3		6	6		3			2	2		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles (%)	0%	0%	0%	100%	6%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	4	88	12	1	76	4	8	4	8	55	4	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	104	0	0	81	0	0	20	0	0	62	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	22.3%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	67	9	1	58	3	6	3	6	42	3	2
Future Volume (Veh/h)	3	67	9	1	58	3	6	3	6	42	3	2
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	4	88	12	1	76	4	8	4	8	55	4	3
Pedestrians					2		6				3	
Lane Width (m)					3.6		3.6				3.6	
Walking Speed (m/s)					1.0		1.0				1.0	
Percent Blockage					0		1				0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	83			106			193	193	102	197	197	81
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	83			106			193	193	102	197	197	81
tC, single (s)	4.1			5.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			3.1			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	99	99	93	99	100
cM capacity (veh/h)	1522			1039			753	697	951	746	693	982
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	104	81	20	62								
Volume Left	4	1	8	55								
Volume Right	12	4	8	3								
cSH	1522	1039	807	751								
Volume to Capacity	0.00*	0.00*	0.02	0.08								
Queue Length 95th (m)	0.1	0.0	0.6	2.0								
Control Delay (s/veh)	0.3	0.1	9.6	10.2								
Lane LOS	A	A	A	B								
Approach Delay (s/veh)	0.3	0.1	9.6	10.2								
Approach LOS			A	B								
Intersection Summary												
Average Delay				3.2								
Intersection Capacity Utilization				22.3%	ICU Level of Service				A			
Analysis Period (min)				15								

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	52	72	59	26	13	12
Future Volume (vph)	52	72	59	26	13	12
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.958		0.936	
Flt Protected		0.980			0.974	
Satd. Flow (prot)	0	1154	1231	0	888	0
Flt Permitted		0.980			0.974	
Satd. Flow (perm)	0	1154	1231	0	888	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	4			4		2
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Heavy Vehicles (%)	0%	0%	6%	0%	0%	100%
Adj. Flow (vph)	71	99	81	36	18	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	170	117	0	34	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	28.1%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	52	72	59	26	13	12
Future Volume (Veh/h)	52	72	59	26	13	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	71	99	81	36	18	16
Pedestrians		2			4	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	121				344	105
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	121				344	105
tC, single (s)	4.1				6.4	7.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	4.2
p0 queue free %	95				97	98
cM capacity (veh/h)	1473				622	734
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	170	117	34			
Volume Left	71	0	18			
Volume Right	0	36	16			
cSH	1473	1700	670			
Volume to Capacity	0.05	0.07	0.05			
Queue Length 95th (m)	1.1	0.0	1.2			
Control Delay (s/veh)	3.4	0.0	10.7			
Lane LOS	A		B			
Approach Delay (s/veh)	3.4	0.0	10.7			
Approach LOS			B			
Intersection Summary						
Average Delay		2.9				
Intersection Capacity Utilization		28.1%		ICU Level of Service		A
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	79	0	0	77	20	1	0	0	10	0	7
Future Volume (vph)	6	79	0	0	77	20	1	0	0	10	0	7
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.972						0.944					
Flt Protected	0.996						0.950					
Satd. Flow (prot)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Flt Permitted	0.996						0.950					
Satd. Flow (perm)	0	1173	0	0	1232	0	0	1361	0	0	1315	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	3						3					
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles (%)	0%	0%	0%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	9	114	0	0	112	29	1	0	0	14	0	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	141	0	0	1	0	0	24	0
Sign Control	Free				Free				Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	24.6%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total AM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	79	0	0	77	20	1	0	0	10	0	7
Future Volume (Veh/h)	6	79	0	0	77	20	1	0	0	10	0	7
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	9	114	0	0	112	29	1	0	0	14	0	10
Pedestrians						2						3
Lane Width (m)						3.6						3.6
Walking Speed (m/s)						1.0						1.0
Percent Blockage						0						0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	144			114			269	276	116	264	262	130
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	144			114			269	276	116	264	262	130
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			100			100	100	100	98	100	99
cM capacity (veh/h)	1447			1488			676	629	940	685	641	923
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	123	141	1	24								
Volume Left	9	0	1	14								
Volume Right	0	29	0	10								
cSH	1447	1700	676	767								
Volume to Capacity	0.00*	0.08	0.00*	0.03								
Queue Length 95th (m)	0.1	0.0	0.0	0.7								
Control Delay (s/veh)	0.6	0.0	10.3	9.8								
Lane LOS	A		B	A								
Approach Delay (s/veh)	0.6	0.0	10.3	9.8								
Approach LOS			B	A								
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			24.6%	ICU Level of Service				A				
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	306	638	463	285
Future Volume (vph)	0	0	306	638	463	285
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.949					
Flt Protected	0.950					
Satd. Flow (prot)	0	0	1381	1563	1245	0
Flt Permitted	0.950					
Satd. Flow (perm)	0	0	1381	1563	1245	0
Link Speed (k/h)	40	50				50
Link Distance (m)	75.7	60.3				168.1
Travel Time (s)	6.8	4.3				12.1
Confl. Peds. (#/hr)	1		58	58		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	0	0	322	672	487	300
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	322	672	787	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	96.8%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	306	638	463	285
Future Volume (Veh/h)	0	0	306	638	463	285
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	322	672	487	300
Pedestrians	58			1		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	2011	696	845			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2011	696	845			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	60			
cM capacity (veh/h)	39	445	800			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	322	672	787			
Volume Left	322	0	0			
Volume Right	0	0	300			
cSH	800	1700	1700			
Volume to Capacity	0.40	0.40	0.46			
Queue Length 95th (m)	14.7	0.0	0.0			
Control Delay (s/veh)	12.5	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	4.0		0.0			
Approach LOS						
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			96.8%	ICU Level of Service		F
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	53	49	895	0	0	463
Future Volume (vph)	53	49	895	0	0	463
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.935					
Flt Protected	0.975					
Satd. Flow (prot)	1306	0	1563	0	0	1548
Flt Permitted	0.975					
Satd. Flow (perm)	1306	0	1563	0	0	1548
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)	1	3		33	33	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	2%
Adj. Flow (vph)	57	53	962	0	0	498
Shared Lane Traffic (%)						
Lane Group Flow (vph)	110	0	962	0	0	498
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	137.4%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	53	49	895	0	0	463
Future Volume (Veh/h)	53	49	895	0	0	463
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	57	53	962	0	0	498
Pedestrians	33		1			3
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.0		1.0			1.0
Percent Blockage	3		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.47	0.47			0.47	
vC, conflicting volume	1494	998			995	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1487	440			434	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	10	81			100	
cM capacity (veh/h)	63	284			521	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	110	962	498			
Volume Left	57	0	0			
Volume Right	53	0	0			
cSH	101	1700	1700			
Volume to Capacity	1.09	0.57	0.29			
Queue Length 95th (m)	52.5	0.0	0.0			
Control Delay (s/veh)	193.9	0.0	0.0			
Lane LOS	F					
Approach Delay (s/veh)	193.9	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		13.6				
Intersection Capacity Utilization		137.4%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	377	0	0	0	0	712	17	59	457	0
Future Volume (vph)	183	0	377	0	0	0	0	712	17	59	457	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00				
Frt			0.850					0.997				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1095	0	0	0	0	1305	0	1354	1563	0
Flt Permitted	0.950									0.253		
Satd. Flow (perm)	1368	0	1095	0	0	0	0	1305	0	361	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			303					2				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)							57		32	32		57
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Adj. Flow (vph)	199	0	410	0	0	0	0	774	18	64	497	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	199	0	410	0	0	0	0	792	0	64	497	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	28.2		28.2					61.8		61.8	61.8	
Total Split (%)	31.3%		31.3%					68.7%		68.7%	68.7%	
Maximum Green (s)	22.1		22.1					55.7		55.7	55.7	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effct Green (s)	16.6		16.6					53.2		53.2	53.2	
Actuated g/C Ratio	0.20		0.20					0.65		0.65	0.65	
v/c Ratio	0.72		0.89					0.94		0.27	0.49	
Control Delay (s/veh)	46.9		32.1					35.5		11.3	10.3	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	46.9		32.1					35.5		11.3	10.3	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D		C					D		B	B	
Approach Delay (s/veh)		36.9						35.5			10.4	
Approach LOS		D						D			B	
Queue Length 50th (m)	30.3		16.2					103.5		4.0	37.3	
Queue Length 95th (m)	52.4		#69.5					#210.0		12.5	67.3	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	373		519					899		248	1076	
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	0.53		0.79					0.88		0.26	0.46	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 82.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay (s/veh): 28.8

Intersection LOS: C

Intersection Capacity Utilization 137.4%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	0	377	0	0	0	0	712	17	59	457	0
Future Volume (vph)	183	0	377	0	0	0	0	712	17	59	457	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		0.99	1.00	
Frt	1.00		0.85					1.00		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		1095					1306		1336	1563	
Flt Permitted	0.95		1.00					1.00		0.25	1.00	
Satd. Flow (perm)	1368		1095					1306		355	1563	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	199	0	410	0	0	0	0	774	18	64	497	0
RTOR Reduction (vph)	0	0	242	0	0	0	0	1	0	0	0	0
Lane Group Flow (vph)	199	0	168	0	0	0	0	791	0	64	497	0
Confl. Peds. (#/hr)							57		32	32		57
Heavy Vehicles (%)	1%	0%	1%	0%	0%	0%	0%	2%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	16.6		16.6					53.3		53.3	53.3	
Effective Green, g (s)	16.6		16.6					53.3		53.3	53.3	
Actuated g/C Ratio	0.20		0.20					0.65		0.65	0.65	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	276		221					847		230	1014	
v/s Ratio Prot	0.15							c0.61			0.32	
v/s Ratio Perm			c0.15							0.18		
v/c Ratio	0.72		0.76					0.93		0.28	0.49	
Uniform Delay, d1	30.6		30.9					12.8		6.2	7.4	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	7.8		13.1					16.9		0.3	0.2	
Delay (s)	38.4		44.0					29.7		6.5	7.6	
Level of Service	D		D					C		A	A	
Approach Delay (s/veh)		42.2			0.0			29.7			7.4	
Approach LOS		D			A			C			A	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			27.2									
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			82.1									
Intersection Capacity Utilization			137.4%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	131	86	88	599	617	217
Future Volume (vph)	131	86	88	599	617	217
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.947				0.965	
Flt Protected	0.971			0.994		
Satd. Flow (prot)	1318	0	0	1161	1282	0
Flt Permitted	0.971			0.994		
Satd. Flow (perm)	1318	0	0	1161	1282	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)		4	46			46
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	139	91	94	637	656	231
Shared Lane Traffic (%)						
Lane Group Flow (vph)	230	0	0	731	887	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	151.3%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	131	86	88	599	617	217
Future Volume (Veh/h)	131	86	88	599	617	217
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	139	91	94	637	656	231
Pedestrians	46			4		
Lane Width (m)	3.6			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	5			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.83	0.84	0.84			
vC, conflicting volume	1643	822	933			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1249	696	828			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	75	86			
cM capacity (veh/h)	131	357	654			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	230	731	887			
Volume Left	139	94	0			
Volume Right	91	0	231			
cSH	174	654	1700			
Volume to Capacity	1.32	0.14	0.52			
Queue Length 95th (m)	100.5	3.8	0.0			
Control Delay (s/veh)	229.8	3.8	0.0			
Lane LOS	F	A				
Approach Delay (s/veh)	229.8	3.8	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		30.1				
Intersection Capacity Utilization		151.3%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	239	448	173	237	467
Future Volume (vph)	141	239	448	173	237	467
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.97	0.96		0.93	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.313	
Satd. Flow (perm)	1339	1063	1563	1032	441	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		252		182		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	148	252	472	182	249	492
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	252	472	182	249	492
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	32.7	32.7	11.0	43.7
Total Split (%)	37.6%	37.6%	46.7%	46.7%	15.7%	62.4%
Maximum Green (s)	20.0	20.0	26.4	26.4	8.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	11.8	11.8	22.3	22.3	36.7	33.4
Actuated g/C Ratio	0.20	0.20	0.38	0.38	0.63	0.58
v/c Ratio	0.55	0.61	0.79	0.36	0.61	0.55

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	30.0	10.3	27.6	4.8	13.5	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.0	10.3	27.6	4.8	13.5	11.0
LOS	C	B	C	A	B	B
Approach Delay (s/veh)	17.6		21.3			11.8
Approach LOS	B		C			B
Queue Length 50th (m)	15.0	0.0	41.4	0.0	9.5	27.3
Queue Length 95th (m)	30.3	16.5	#94.9	10.7	#27.3	61.5
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	471	537	726	576	410	1028
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.47	0.65	0.32	0.61	0.48

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 58

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay (s/veh): 16.5

Intersection LOS: B

Intersection Capacity Utilization 71.6%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	239	448	173	237	467
Future Volume (vph)	141	239	448	173	237	467
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96	1.00	0.94	1.00	1.00
Flpb, ped/bikes	0.97	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1347	1067	1563	1042	1360	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.31	1.00
Satd. Flow (perm)	1347	1067	1563	1042	448	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	148	252	472	182	249	492
RTOR Reduction (vph)	0	201	0	111	0	0
Lane Group Flow (vph)	148	51	472	71	249	492
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	11.8	11.8	22.4	22.4	33.4	33.4
Effective Green, g (s)	11.8	11.8	22.4	22.4	33.4	33.4
Actuated g/C Ratio	0.20	0.20	0.39	0.39	0.58	0.58
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	274	217	605	403	385	903
v/s Ratio Prot			c0.30		c0.09	0.31
v/s Ratio Perm	c0.11	0.05		0.07	0.28	
v/c Ratio	0.54	0.24	0.78	0.18	0.65	0.54
Uniform Delay, d1	20.6	19.2	15.5	11.6	7.5	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.4	6.6	0.2	3.7	0.8
Delay (s)	22.3	19.6	22.2	11.9	11.2	8.3
Level of Service	C	B	C	B	B	A
Approach Delay (s/veh)	20.6		19.3			9.2
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			15.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			57.8		Sum of lost time (s)	15.6
Intersection Capacity Utilization			71.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	20	25	614	588	20
Future Volume (vph)	7	20	25	614	588	20
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899					0.850
Flt Protected	0.988			0.998		
Satd. Flow (prot)	1273	0	0	1164	1563	1106
Flt Permitted	0.988			0.998		
Satd. Flow (perm)	1273	0	0	1164	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	7	21	26	640	613	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	0	666	613	21
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	94.8%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	20	25	614	588	20
Future Volume (Veh/h)	7	20	25	614	588	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	21	26	640	612	21
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.81	0.76	0.76			
vC, conflicting volume	1387	695	716			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	682	434	462			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	95	97			
cM capacity (veh/h)	301	434	769			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	28	666	612	21		
Volume Left	7	26	0	0		
Volume Right	21	0	0	21		
cSH	390	769	1700	1700		
Volume to Capacity	0.07	0.03	0.36	0.01		
Queue Length 95th (m)	1.7	0.8	0.0	0.0		
Control Delay (s/veh)	14.9	0.9	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s/veh)	14.9	0.9	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	94.8%			ICU Level of Service	F	
Analysis Period (min)	15					

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Future Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.90			0.92			0.98			1.00	0.74
Frt		0.963			0.962			0.991				0.850
Flt Protected		0.970			0.980			0.997			0.998	
Satd. Flow (prot)	0	1232	0	0	1265	0	0	1380	0	0	1164	1024
Flt Permitted		0.770			0.827			0.940			0.969	
Satd. Flow (perm)	0	919	0	0	1020	0	0	1292	0	0	1127	756
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			23			8				131
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	98	18	43	59	47	42	43	547	44	19	503	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	159	0	0	148	0	0	634	0	0	522	131
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	25.0	25.0		25.0	25.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	31.3%	31.3%		31.3%	31.3%		68.8%	68.8%		68.8%	68.8%	68.8%
Maximum Green (s)	18.3	18.3		18.3	18.3		47.8	47.8		47.8	47.8	47.8
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		14.7			14.7			38.3			38.3	38.3
Actuated g/C Ratio		0.22			0.22			0.56			0.56	0.56
v/c Ratio		0.73			0.62			0.87			0.82	0.27
Control Delay (s/veh)		45.9			35.6			27.0			24.9	3.0
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		45.9			35.6			27.0			24.9	3.0

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D			D			C			C	A
Approach Delay (s/veh)		45.9			35.6			27.0			20.6	
Approach LOS		D			D			C			C	
Queue Length 50th (m)		18.4			16.2			66.5			52.8	0.0
Queue Length 95th (m)		#46.5			#36.0			#138.3			#115.1	6.7
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		279			309			937			815	583
Starvation Cap Reductn		0			0			0			2	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.57			0.48			0.68			0.64	0.22

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 67.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay (s/veh): 27.0

Intersection LOS: C

Intersection Capacity Utilization 113.8%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Future Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.96			0.96			0.99			1.00	0.78
Flpb, ped/bikes		0.95			0.96			0.99			1.00	1.00
Frt		0.96			0.96			0.99			1.00	0.85
Flt Protected		0.97			0.98			1.00			1.00	1.00
Satd. Flow (prot)		1177			1224			1374			1162	796
Flt Permitted		0.77			0.83			0.94			0.97	1.00
Satd. Flow (perm)		934			1033			1296			1128	796
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	98	18	43	59	47	42	43	547	44	19	503	131
RTOR Reduction (vph)	0	17	0	0	18	0	0	3	0	0	0	56
Lane Group Flow (vph)	0	142	0	0	130	0	0	631	0	0	522	75
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		14.7			14.7			38.3			38.3	38.3
Effective Green, g (s)		14.7			14.7			38.3			38.3	38.3
Actuated g/C Ratio		0.22			0.22			0.57			0.57	0.57
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		205			226			741			645	455
v/s Ratio Prot												
v/s Ratio Perm		c0.15			0.13			c0.49			0.46	0.09
v/c Ratio		0.69			0.58			0.85			0.81	0.16
Uniform Delay, d1		24.0			23.3			11.9			11.4	6.8
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		8.9			2.9			9.2			7.2	0.1
Delay (s)		32.9			26.2			21.1			18.6	6.9
Level of Service		C			C			C			B	A
Approach Delay (s/veh)		32.9			26.2			21.1			16.2	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		20.8										
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		66.9										
Intersection Capacity Utilization		113.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Future Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.967			0.998			0.992			0.936	
Flt Protected	0.950			0.950				0.959			0.998	
Satd. Flow (prot)	1381	2872	0	1381	2964	0	0	1338	0	0	1294	0
Flt Permitted	0.165			0.091				0.716			0.989	
Satd. Flow (perm)	240	2872	0	132	2964	0	0	991	0	0	1282	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		37			2			3			27	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	60	912	262	44	955	15	354	33	26	2	28	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	1174	0	44	970	0	0	413	0	0	57	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	55.0		9.0	55.0		56.0	56.0		56.0	56.0	
Total Split (%)	7.5%	45.8%		7.5%	45.8%		46.7%	46.7%		46.7%	46.7%	
Maximum Green (s)	6.0	48.7		6.0	48.7		48.7	48.7		48.7	48.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	56.8	48.7		56.8	48.7			48.7			48.7	
Actuated g/C Ratio	0.48	0.41		0.48	0.41			0.41			0.41	
v/c Ratio	0.35	0.97		0.35	0.79			1.01			0.10	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	20.9	54.2		22.7	36.5			82.4			14.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	20.9	54.2		22.7	36.5			82.4			14.0	
LOS	C	D		C	D			F			B	
Approach Delay (s/veh)		52.5			35.9			82.4			14.0	
Approach LOS		D			D			F			B	
Queue Length 50th (m)	6.9	138.5		5.0	103.9			~101.7			4.2	
Queue Length 95th (m)	14.1	#187.9		11.2	131.0			#162.2			12.6	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	173	1206		127	1223			410			544	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.35	0.97		0.35	0.79			1.01			0.10	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 118.2

Natural Cycle: 125

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay (s/veh): 50.1

Intersection LOS: D

Intersection Capacity Utilization 92.2%

ICU Level of Service F

Analysis Period (min) 15

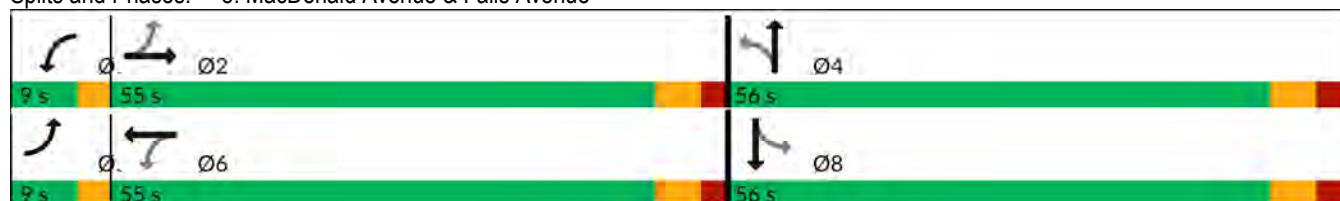
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Future Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			1.00	
Satd. Flow (prot)	1381	2871		1381	2963			1326			1294	
Flt Permitted	0.17	1.00		0.09	1.00			0.72			0.99	
Satd. Flow (perm)	241	2871		132	2963			991			1282	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	60	912	262	44	955	15	354	33	26	2	28	27
RTOR Reduction (vph)	0	22	0	0	1	0	0	2	0	0	16	0
Lane Group Flow (vph)	60	1152	0	44	969	0	0	411	0	0	41	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	53.4	48.7		53.4	48.7			48.7			48.7	
Effective Green, g (s)	53.4	48.7		53.4	48.7			48.7			48.7	
Actuated g/C Ratio	0.45	0.41		0.45	0.41			0.41			0.41	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	153	1177		108	1215			406			525	
v/s Ratio Prot	0.02	c0.40		c0.02	0.33							
v/s Ratio Perm	0.16			0.17				c0.42			0.03	
v/c Ratio	0.39	0.98		0.41	0.80			1.01			0.08	
Uniform Delay, d1	21.0	34.5		23.0	30.7			35.0			21.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.2	21.3		1.8	4.3			47.9			0.1	
Delay (s)	22.2	55.7		24.8	35.0			82.9			21.5	
Level of Service	C	E		C	C			F			C	
Approach Delay (s/veh)		54.1			34.5			82.9			21.5	
Approach LOS		D			C			F			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			50.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			118.7			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			92.2%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Future Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.986			0.916			0.988			0.991	
Flt Protected		0.986			0.997			0.999			0.981	
Satd. Flow (prot)	0	1393	0	0	1309	0	0	1378	0	0	1385	0
Flt Permitted		0.986			0.997			0.999			0.981	
Satd. Flow (perm)	0	1393	0	0	1309	0	0	1378	0	0	1385	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	1		1	1		1	14		9	9		14
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	1%	0%
Adj. Flow (vph)	28	60	10	14	74	146	6	235	23	127	184	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	98	0	0	234	0	0	264	0	0	332	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	68.0%						ICU Level of Service C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Future Volume (vph)	26	56	9	13	70	137	6	221	22	119	173	20
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	28	60	10	14	74	146	6	235	23	127	184	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	98	234	264	332								
Volume Left (vph)	28	14	6	127								
Volume Right (vph)	10	146	23	21								
Hadj (s)	0.00	-0.36	0.00	0.05								
Departure Headway (s)	6.0	5.3	5.4	5.3								
Degree Utilization, x	0.16	0.35	0.39	0.49								
Capacity (veh/h)	509	608	618	639								
Control Delay (s/veh)	10.1	11.1	11.8	13.3								
Approach Delay (s/veh)	10.1	11.1	11.8	13.3								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			12.0									
Level of Service			B									
Intersection Capacity Utilization			68.0%	ICU Level of Service					C			
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	152	17	2	148	10	6	16	5	46	12	10
Future Volume (vph)	10	152	17	2	148	10	6	16	5	46	12	10
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.987			0.991			0.975			0.980	
Flt Protected		0.997			0.999			0.989			0.967	
Satd. Flow (prot)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Flt Permitted		0.997			0.999			0.989			0.967	
Satd. Flow (perm)	0	1410	0	0	1419	0	0	1382	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	2		1	1		2	2		1	1		2
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	12	179	20	2	174	12	7	19	6	54	14	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	211	0	0	188	0	0	32	0	0	80	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	38.6%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	152	17	2	148	10	6	16	5	46	12	10
Future Volume (Veh/h)	10	152	17	2	148	10	6	16	5	46	12	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	179	20	2	174	12	7	19	6	54	14	12
Pedestrians		2			1			1			2	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	188			200			419	406	191	416	410	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	188			200			419	406	191	416	410	184
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			100			99	96	99	90	97	99
cM capacity (veh/h)	1396			1383			523	530	854	525	528	860
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	211	188	32	80								
Volume Left	12	2	7	54								
Volume Right	20	12	6	12								
cSH	1396	1383	569	558								
Volume to Capacity	0.00*	0.00*	0.06	0.14								
Queue Length 95th (m)	0.2	0.0	1.3	3.7								
Control Delay (s/veh)	0.5	0.1	11.7	12.5								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.5	0.1	11.7	12.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			38.6%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	84	126	129	109	61	38
Future Volume (vph)	84	126	129	109	61	38
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.938		0.948	
Flt Protected		0.980			0.970	
Satd. Flow (prot)	0	1154	1255	0	1318	0
Flt Permitted		0.980			0.970	
Satd. Flow (perm)	0	1154	1255	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	5			5		
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	94	142	145	122	69	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	236	267	0	112	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	55.1%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	126	129	109	61	38
Future Volume (Veh/h)	84	126	129	109	61	38
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	94	142	145	122	69	43
Pedestrians					5	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.0	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	272				541	211
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272				541	211
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				85	95
cM capacity (veh/h)	1296				467	830
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	236	267	112			
Volume Left	94	0	69			
Volume Right	0	122	43			
cSH	1296	1700	561			
Volume to Capacity	0.07	0.16	0.20			
Queue Length 95th (m)	1.8	0.0	5.5			
Control Delay (s/veh)	3.6	0.0	13.0			
Lane LOS	A		B			
Approach Delay (s/veh)	3.6	0.0	13.0			
Approach LOS			B			
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utilization		55.1%		ICU Level of Service		B
Analysis Period (min)		15				

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	33	155	0	0	211	94	0	0	2	59	0	28	
Future Volume (vph)	33	155	0	0	211	94	0	0	2	59	0	28	
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor													
Frt					0.958					0.865			0.956
Flt Protected	0.991												0.967
Satd. Flow (prot)	0	1167	0	0	1282	0	0	1240	0	0	1325	0	
Flt Permitted	0.991												0.967
Satd. Flow (perm)	0	1167	0	0	1282	0	0	1240	0	0	1325	0	
Link Speed (k/h)	50				50				50				50
Link Distance (m)	58.7				57.8				32.6				33.2
Travel Time (s)	4.2				4.2				2.3				2.4
Confl. Peds. (#/hr)	7					7	1			3	3	1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Adj. Flow (vph)	38	176	0	0	240	107	0	0	2	67	0	32	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	214	0	0	347	0	0	2	0	0	99	0	
Sign Control	Free				Free				Stop		Stop		
Intersection Summary													
Area Type:	Other												
Control Type:	Unsignalized												
Intersection Capacity Utilization	63.5%				ICU Level of Service B								
Analysis Period (min)	15												

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total PM (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	155	0	0	211	94	0	0	2	59	0	28
Future Volume (Veh/h)	33	155	0	0	211	94	0	0	2	59	0	28
Sign Control	Free				Free				Stop		Stop	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	38	176	0	0	240	107	0	0	2	67	0	32
Pedestrians	1				3				7		7	
Lane Width (m)	3.6				3.6				3.6		3.6	
Walking Speed (m/s)	1.0				1.0				1.0		1.0	
Percent Blockage	0				0				1		1	
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	354			176			579	606	179	558	553	302
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	354			176			579	606	179	558	553	302
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			100			100	100	100	84	100	96
cM capacity (veh/h)	1207			1412			399	398	866	425	427	737
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	214	347	2	99								
Volume Left	38	0	0	67								
Volume Right	0	107	2	32								
cSH	1207	1700	866	493								
Volume to Capacity	0.03	0.20	0.00*	0.20								
Queue Length 95th (m)	0.7	0.0	0.1	5.6								
Control Delay (s/veh)	1.7	0.0	9.2	14.1								
Lane LOS	A		A	B								
Approach Delay (s/veh)	1.7	0.0	9.2	14.1								
Approach LOS			A	B								
Intersection Summary												
Average Delay			2.7									
Intersection Capacity Utilization			63.5%	ICU Level of Service			B					
Analysis Period (min)			15									
* Value less than 0.01.												

Lanes, Volumes, Timings
1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	294	573	493	216
Future Volume (vph)	0	0	294	573	493	216
Ideal Flow (vphpl)	1900	1900	1454	1579	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt					0.959	
Flt Protected			0.950			
Satd. Flow (prot)	0	0	1354	1563	1270	0
Flt Permitted			0.950			
Satd. Flow (perm)	0	0	1354	1563	1270	0
Link Speed (k/h)	40			50	50	
Link Distance (m)	75.7			60.3	168.1	
Travel Time (s)	6.8			4.3	12.1	
Confl. Peds. (#/hr)	5		63	63		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	2%	1%	1%	1%
Adj. Flow (vph)	0	0	323	630	542	237
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	323	630	779	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	93.1%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 1: Victoria Avenue & Westbound On-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	294	573	493	216
Future Volume (Veh/h)	0	0	294	573	493	216
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	0	0	323	630	542	237
Pedestrians	63			5		
Lane Width (m)	0.0			3.6		
Walking Speed (m/s)	1.0			1.0		
Percent Blockage	0			1		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				111		
pX, platoon unblocked						
vC, conflicting volume	2000	729	842			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2000	729	842			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	59			
cM capacity (veh/h)	40	424	794			
Direction, Lane #	NB 1	NB 2	SB 1			
Volume Total	323	630	779			
Volume Left	323	0	0			
Volume Right	0	0	237			
cSH	794	1700	1700			
Volume to Capacity	0.41	0.37	0.46			
Queue Length 95th (m)	14.9	0.0	0.0			
Control Delay (s/veh)	12.6	0.0	0.0			
Lane LOS	B					
Approach Delay (s/veh)	4.3		0.0			
Approach LOS						
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			93.1%	ICU Level of Service		F
Analysis Period (min)			15			

Lanes, Volumes, Timings
2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	59	45	823	0	0	493
Future Volume (vph)	59	45	823	0	0	493
Ideal Flow (vphpl)	1433	1433	1579	1900	1900	1579
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.941					
Flt Protected	0.973					
Satd. Flow (prot)	1312	0	1563	0	0	1563
Flt Permitted	0.973					
Satd. Flow (perm)	1312	0	1563	0	0	1563
Link Speed (k/h)	40		50			50
Link Distance (m)	86.2		51.0			60.3
Travel Time (s)	7.8		3.7			4.3
Confl. Peds. (#/hr)		1		57	57	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Adj. Flow (vph)	61	47	857	0	0	514
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	0	857	0	0	514
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	151.9%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 2: Victoria Avenue & Westbound Off-Ramp

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	45	823	0	0	493
Future Volume (Veh/h)	59	45	823	0	0	493
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	61	47	857	0	0	514
Pedestrians	57					1
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.0					1.0
Percent Blockage	6					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)			51			
pX, platoon unblocked	0.52	0.52			0.52	
vC, conflicting volume	1428	915			914	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1362	376			374	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	25	86			100	
cM capacity (veh/h)	81	331			587	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	108	857	514			
Volume Left	61	0	0			
Volume Right	47	0	0			
cSH	121	1700	1700			
Volume to Capacity	0.90	0.50	0.30			
Queue Length 95th (m)	42.2	0.0	0.0			
Control Delay (s/veh)	123.6	0.0	0.0			
Lane LOS	F					
Approach Delay (s/veh)	123.6	0.0	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		9.0				
Intersection Capacity Utilization		151.9%		ICU Level of Service		H
Analysis Period (min)		15				

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	529	0	0	0	0	650	26	80	471	0
Future Volume (vph)	172	0	529	0	0	0	0	650	26	80	471	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.90					0.99				
Frt			0.850					0.995				
Flt Protected	0.950									0.950		
Satd. Flow (prot)	1368	0	1106	0	0	0	0	1309	0	1354	1563	0
Flt Permitted	0.950									0.182		
Satd. Flow (perm)	1361	0	992	0	0	0	0	1309	0	259	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			188					3				
Link Speed (k/h)		40			40			50			50	
Link Distance (m)		121.1			68.8			66.6			51.0	
Travel Time (s)		10.9			6.2			4.8			3.7	
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Adj. Flow (vph)	179	0	551	0	0	0	0	677	27	83	491	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	0	551	0	0	0	0	704	0	83	491	0
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Detector Phase	4		4					2		6	6	
Switch Phase												
Minimum Initial (s)	8.0		8.0					8.0		8.0	8.0	
Minimum Split (s)	28.1		28.1					24.1		24.1	24.1	
Total Split (s)	49.4		49.4					60.6		60.6	60.6	
Total Split (%)	44.9%		44.9%					55.1%		55.1%	55.1%	
Maximum Green (s)	43.3		43.3					54.5		54.5	54.5	
Yellow Time (s)	4.1		4.1					4.1		4.1	4.1	
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	0.0	
Total Lost Time (s)	6.1		6.1					6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Recall Mode	Min		Min					Min		Min	Min	
Walk Time (s)	8.0		8.0					7.0		7.0	7.0	
Flash Don't Walk (s)	14.0		14.0					11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0		0					0		0	0	
Act Effect Green (s)	43.3		43.3					54.5		54.5	54.5	
Actuated g/C Ratio	0.39		0.39					0.50		0.50	0.50	
v/c Ratio	0.33		1.09					1.08		0.65	0.63	
Control Delay (s/veh)	25.5		90.7					88.3		48.0	25.1	
Queue Delay	0.0		0.0					0.0		0.0	0.0	
Total Delay (s/veh)	25.5		90.7					88.3		48.0	25.1	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C		F					F		D	C	
Approach Delay (s/veh)		74.7						88.3			28.4	
Approach LOS		E						F			C	
Queue Length 50th (m)	26.3		~106.3					~168.9		12.8	74.5	
Queue Length 95th (m)	43.9		#171.1					#239.3		#39.5	109.8	
Internal Link Dist (m)		97.1			44.8			42.6			27.0	
Turn Bay Length (m)												
Base Capacity (vph)	538		504					650		128	774	
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	0.33		1.09					1.08		0.65	0.63	

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.09

Intersection Signal Delay (s/veh): 66.2

Intersection LOS: E

Intersection Capacity Utilization 151.9%

ICU Level of Service H

Analysis Period (min) 15

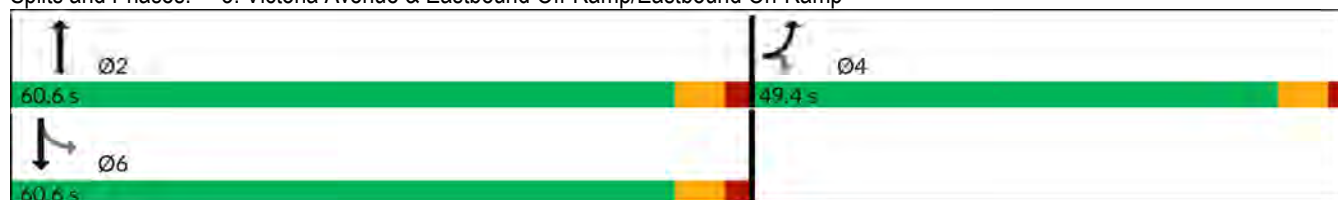
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp



HCM Signalized Intersection Capacity Analysis

4873 and 4898 Kitchener Street TIS

3: Victoria Avenue & Eastbound Off-Ramp/Eastbound On-Ramp

Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	0	529	0	0	0	0	650	26	80	471	0
Future Volume (vph)	172	0	529	0	0	0	0	650	26	80	471	0
Ideal Flow (vphpl)	1454	1900	1301	1900	1900	1900	1900	1338	1338	1454	1579	1900
Total Lost time (s)	6.1		6.1					6.1		6.1	6.1	
Lane Util. Factor	1.00		1.00					1.00		1.00	1.00	
Frpb, ped/bikes	1.00		0.90					0.99		1.00	1.00	
Flpb, ped/bikes	1.00		1.00					1.00		1.00	1.00	
Frt	1.00		0.85					0.99		1.00	1.00	
Flt Protected	0.95		1.00					1.00		0.95	1.00	
Satd. Flow (prot)	1368		992					1309		1354	1563	
Flt Permitted	0.95		1.00					1.00		0.18	1.00	
Satd. Flow (perm)	1368		992					1309		259	1563	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	179	0	551	0	0	0	0	677	27	83	491	0
RTOR Reduction (vph)	0	0	114	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	179	0	437	0	0	0	0	702	0	83	491	0
Confl. Peds. (#/hr)	2		34	34		2	86		57	57		86
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	1%	0%	2%	1%	0%
Turn Type	Prot		Perm					NA		Perm	NA	
Protected Phases	4							2			6	
Permitted Phases			4							6		
Actuated Green, G (s)	43.3		43.3					54.5		54.5	54.5	
Effective Green, g (s)	43.3		43.3					54.5		54.5	54.5	
Actuated g/C Ratio	0.39		0.39					0.50		0.50	0.50	
Clearance Time (s)	6.1		6.1					6.1		6.1	6.1	
Vehicle Extension (s)	2.1		2.1					2.1		2.1	2.1	
Lane Grp Cap (vph)	538		390					648		128	774	
v/s Ratio Prot	0.13							c0.54			0.31	
v/s Ratio Perm			c0.44							0.32		
v/c Ratio	0.33		1.12					1.08		0.65	0.63	
Uniform Delay, d1	23.3		33.4					27.8		20.6	20.4	
Progression Factor	1.00		1.00					1.00		1.00	1.00	
Incremental Delay, d2	0.2		82.5					60.3		8.5	1.3	
Delay (s)	23.4		115.8					88.1		29.1	21.7	
Level of Service	C		F					F		C	C	
Approach Delay (s/veh)		93.2			0.0			88.1			22.8	
Approach LOS		F			A			F			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			71.3									
HCM 2000 Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			110.0							12.2		
Intersection Capacity Utilization			151.9%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	112	106	57	564	798	202
Future Volume (vph)	112	106	57	564	798	202
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.934				0.973	
Flt Protected	0.975			0.995		
Satd. Flow (prot)	1305	0	0	1162	1292	0
Flt Permitted	0.975			0.995		
Satd. Flow (perm)	1305	0	0	1162	1292	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	57.8			126.4	66.6	
Travel Time (s)	4.2			9.1	4.8	
Confl. Peds. (#/hr)	11	16	88			88
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	119	113	61	600	849	215
Shared Lane Traffic (%)						
Lane Group Flow (vph)	232	0	0	661	1064	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	148.6%			ICU Level of Service H		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 4: Victoria Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	106	57	564	798	202
Future Volume (Veh/h)	112	106	57	564	798	202
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	119	113	61	600	849	215
Pedestrians	88			16	11	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.0			1.0	1.0	
Percent Blockage	9			2	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				126	67	
pX, platoon unblocked	0.88	0.77	0.77			
vC, conflicting volume	1778	1061	1152			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1274	932	1050			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	8	50	87			
cM capacity (veh/h)	129	226	473			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	232	661	1064			
Volume Left	119	61	0			
Volume Right	113	0	215			
cSH	163	473	1700			
Volume to Capacity	1.42	0.13	0.63			
Queue Length 95th (m)	109.4	3.3	0.0			
Control Delay (s/veh)	274.9	3.8	0.0			
Lane LOS	F	A				
Approach Delay (s/veh)	274.9	3.8	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		33.9				
Intersection Capacity Utilization		148.6%		ICU Level of Service		H
Analysis Period (min)		15				

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	225	396	275	364	540
Future Volume (vph)	150	225	396	275	364	540
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	35.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95	0.83		0.83	0.93	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.344	
Satd. Flow (perm)	1313	923	1533	911	466	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		230		281		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	153	230	404	281	371	551
Shared Lane Traffic (%)						
Lane Group Flow (vph)	153	230	404	281	371	551
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	35.7	35.7	18.0	53.7
Total Split (%)	32.9%	32.9%	44.6%	44.6%	22.5%	67.1%
Maximum Green (s)	20.0	20.0	29.4	29.4	15.0	47.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	13.0	13.0	22.7	22.7	42.8	39.3
Actuated g/C Ratio	0.20	0.20	0.35	0.35	0.65	0.60
v/c Ratio	0.59	0.63	0.76	0.56	0.75	0.59

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	35.6	12.4	30.3	7.5	18.2	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	35.6	12.4	30.3	7.5	18.2	11.6
LOS	D	B	C	A	B	B
Approach Delay (s/veh)	21.6		20.9			14.3
Approach LOS	C		C			B
Queue Length 50th (m)	17.8	0.0	44.0	0.0	17.1	34.9
Queue Length 95th (m)	36.5	18.7	84.7	17.5	#53.9	76.4
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				35.0	
Base Capacity (vph)	417	450	715	575	522	1168
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.51	0.57	0.49	0.71	0.47

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 65.5

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay (s/veh): 18.0

Intersection LOS: B

Intersection Capacity Utilization 81.4%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	225	396	275	364	540
Future Volume (vph)	150	225	396	275	364	540
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.86	1.00	0.86	1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00	1.00	0.98	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1326	953	1533	943	1356	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.34	1.00
Satd. Flow (perm)	1326	953	1533	943	491	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	230	404	281	371	551
RTOR Reduction (vph)	0	184	0	182	0	0
Lane Group Flow (vph)	153	46	404	99	371	551
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	13.1	13.1	22.9	22.9	39.4	39.4
Effective Green, g (s)	13.1	13.1	22.9	22.9	39.4	39.4
Actuated g/C Ratio	0.20	0.20	0.35	0.35	0.61	0.61
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	266	191	539	331	476	945
v/s Ratio Prot			0.26		c0.16	0.35
v/s Ratio Perm	c0.12	0.05		0.10	c0.31	
v/c Ratio	0.58	0.24	0.75	0.30	0.78	0.58
Uniform Delay, d1	23.5	21.8	18.6	15.3	8.2	7.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.5	0.5	5.9	0.6	7.9	1.0
Delay (s)	25.9	22.3	24.4	15.9	16.1	8.8
Level of Service	C	C	C	B	B	A
Approach Delay (s/veh)	23.8		20.9			11.7
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay (s/veh)			17.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			65.1		Sum of lost time (s)	15.6
Intersection Capacity Utilization			81.4%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	13	16	666	671	18
Future Volume (vph)	5	13	16	666	671	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1579	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.902					0.850
Flt Protected	0.986			0.999		
Satd. Flow (prot)	1274	0	0	1165	1563	1106
Flt Permitted	0.986			0.999		
Satd. Flow (perm)	1274	0	0	1165	1563	1106
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	5	13	16	673	678	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	689	678	18
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	87.3%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	13	16	666	671	18
Future Volume (Veh/h)	5	13	16	666	671	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	13	16	673	678	18
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.83	0.72	0.72			
vC, conflicting volume	1587	881	899			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	848	643	668			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	95	97			
cM capacity (veh/h)	213	275	536			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	18	689	678	18		
Volume Left	5	16	0	0		
Volume Right	13	0	0	18		
cSH	254	536	1700	1700		
Volume to Capacity	0.07	0.03	0.40	0.01		
Queue Length 95th (m)	1.7	0.7	0.0	0.0		
Control Delay (s/veh)	20.2	0.9	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s/veh)	20.2	0.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			87.3%		ICU Level of Service	E
Analysis Period (min)			15			

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Future Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.88			0.90			0.96			0.99	0.64
Frt		0.958			0.952			0.993				0.850
Flt Protected		0.972			0.984			0.994			0.998	
Satd. Flow (prot)	0	1222	0	0	1227	0	0	1370	0	0	1176	1063
Flt Permitted		0.742			0.828			0.853			0.962	
Satd. Flow (perm)	0	874	0	0	993	0	0	1158	0	0	1127	676
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			33			6				148
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	128	25	68	55	54	60	73	529	35	24	547	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	221	0	0	169	0	0	637	0	0	571	148
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Detector Phase	4	4		4	4		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	31.2
Total Split (s)	26.2	26.2		26.2	26.2		53.8	53.8		53.8	53.8	53.8
Total Split (%)	32.8%	32.8%		32.8%	32.8%		67.3%	67.3%		67.3%	67.3%	67.3%
Maximum Green (s)	19.5	19.5		19.5	19.5		46.6	46.6		46.6	46.6	46.6
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	4.1
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	3.1
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		6.7			6.7			7.2			7.2	7.2
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	2.5
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	Min
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	10.0
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)		19.4			19.4			44.4			44.4	44.4
Actuated g/C Ratio		0.25			0.25			0.57			0.57	0.57
v/c Ratio		0.93			0.62			0.96			0.89	0.33
Control Delay (s/veh)		73.4			33.2			44.5			33.2	3.7
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay (s/veh)		73.4			33.2			44.5			33.2	3.7

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E			C			D			C	A
Approach Delay (s/veh)		73.4			33.2			44.5			27.1	
Approach LOS		E			C			D			C	
Queue Length 50th (m)		29.2			18.4			80.7			66.2	0.0
Queue Length 95th (m)		#70.8			#43.4			#155.9			#134.3	7.4
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		239			275			699			678	465
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		0.92			0.61			0.91			0.84	0.32

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 77.7

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay (s/veh): 39.9

Intersection LOS: D

Intersection Capacity Utilization 131.3%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Future Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1178	1178	1301
Total Lost time (s)		6.7			6.7			7.2			7.2	7.2
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.94			0.94			0.98			1.00	0.65
Flpb, ped/bikes		0.94			0.96			0.99			0.99	1.00
Frt		0.96			0.95			0.99			1.00	0.85
Flt Protected		0.97			0.98			0.99			1.00	1.00
Satd. Flow (prot)		1149			1183			1350			1169	686
Flt Permitted		0.74			0.83			0.85			0.96	1.00
Satd. Flow (perm)		877			995			1158			1127	686
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	25	68	55	54	60	73	529	35	24	547	148
RTOR Reduction (vph)	0	20	0	0	25	0	0	3	0	0	0	63
Lane Group Flow (vph)	0	201	0	0	144	0	0	634	0	0	571	85
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		2
Actuated Green, G (s)		19.4			19.4			44.4			44.4	44.4
Effective Green, g (s)		19.4			19.4			44.4			44.4	44.4
Actuated g/C Ratio		0.25			0.25			0.57			0.57	0.57
Clearance Time (s)		6.7			6.7			7.2			7.2	7.2
Vehicle Extension (s)		2.5			2.5			2.5			2.5	2.5
Lane Grp Cap (vph)		218			248			661			644	392
v/s Ratio Prot												
v/s Ratio Perm		c0.23			0.15			c0.55			0.51	0.12
v/c Ratio		0.92			0.58			0.96			0.89	0.22
Uniform Delay, d1		28.4			25.6			15.8			14.5	8.1
Progression Factor		1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2		40.3			2.9			25.1			13.8	0.2
Delay (s)		68.7			28.4			40.9			28.3	8.3
Level of Service		E			C			D			C	A
Approach Delay (s/veh)		68.7			28.4			40.9			24.2	
Approach LOS		E			C			D			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			36.3									
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			77.7									
Intersection Capacity Utilization			131.3%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Future Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.965			0.999			0.992			0.943	
Flt Protected	0.950			0.950				0.958			0.994	
Satd. Flow (prot)	1381	2873	0	1381	2967	0	0	1350	0	0	1328	0
Flt Permitted	0.251			0.073				0.711			0.950	
Satd. Flow (perm)	365	2873	0	106	2967	0	0	990	0	0	1270	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			1			3			25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	1126	337	35	815	8	325	23	23	7	27	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	1463	0	35	823	0	0	371	0	0	59	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Detector Phase	5	2		1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3		40.3	40.3	
Total Split (s)	9.0	62.4		9.0	62.4		48.6	48.6		48.6	48.6	
Total Split (%)	7.5%	52.0%		7.5%	52.0%		40.5%	40.5%		40.5%	40.5%	
Maximum Green (s)	6.0	56.1		6.0	56.1		41.3	41.3		41.3	41.3	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2		3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5		5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0		12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0		21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effect Green (s)	63.0	56.2		62.3	54.3			41.4			41.4	
Actuated g/C Ratio	0.54	0.48		0.54	0.47			0.36			0.36	
v/c Ratio	0.18	1.04		0.29	0.59			1.05			0.13	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	13.3	64.3		17.6	25.4			99.3			18.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay (s/veh)	13.3	64.3		17.6	25.4			99.3			18.0	
LOS	B	E		B	C			F			B	
Approach Delay (s/veh)		62.8			25.1			99.3			18.0	
Approach LOS		E			C			F			B	
Queue Length 50th (m)	4.3	~197.4		3.4	72.7			~96.3			5.3	
Queue Length 95th (m)	9.6	#240.2		8.0	92.5			#155.3			14.7	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0								
Base Capacity (vph)	249	1409		122	1432			353			467	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.18	1.04		0.29	0.57			1.05			0.13	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 116.4

Natural Cycle: 135

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay (s/veh): 55.1

Intersection LOS: E

Intersection Capacity Utilization 93.3%

ICU Level of Service F

Analysis Period (min) 15

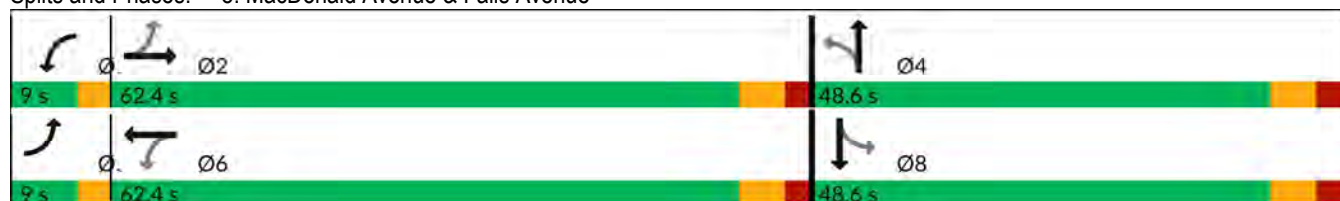
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Future Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1433	1433	1433	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99			1.00	
Frt	1.00	0.97		1.00	1.00			0.99			0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1381	2874		1381	2966			1334			1328	
Flt Permitted	0.25	1.00		0.07	1.00			0.71			0.95	
Satd. Flow (perm)	365	2874		106	2966			990			1269	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	44	1126	337	35	815	8	325	23	23	7	27	25
RTOR Reduction (vph)	0	23	0	0	1	0	0	2	0	0	16	0
Lane Group Flow (vph)	44	1440	0	35	822	0	0	369	0	0	43	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	61.0	56.2		58.4	54.9			41.4			41.4	
Effective Green, g (s)	61.0	56.2		58.4	54.9			41.4			41.4	
Actuated g/C Ratio	0.52	0.48		0.50	0.47			0.35			0.35	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3			7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5			5.0	
Lane Grp Cap (vph)	230	1372		90	1383			348			446	
v/s Ratio Prot	c0.01	c0.50		c0.01	0.28							
v/s Ratio Perm	0.09			0.18				c0.37			0.03	
v/c Ratio	0.19	1.05		0.39	0.59			1.06			0.10	
Uniform Delay, d1	15.1	30.8		22.3	23.2			38.2			25.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	38.4		2.0	1.0			65.1			0.2	
Delay (s)	15.4	69.2		24.3	24.2			103.3			25.8	
Level of Service	B	E		C	C			F			C	
Approach Delay (s/veh)		67.6			24.2			103.3			25.8	
Approach LOS		E			C			F			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			58.1			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			117.7			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			93.3%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Future Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.992			0.922			0.991			0.989	
Flt Protected		0.986			0.995			0.999			0.982	
Satd. Flow (prot)	0	1402	0	0	1306	0	0	1419	0	0	1392	0
Flt Permitted		0.986			0.995			0.999			0.982	
Satd. Flow (perm)	0	1402	0	0	1306	0	0	1419	0	0	1392	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		198.6			362.4			74.6			92.7	
Travel Time (s)		14.3			26.1			5.4			6.7	
Confl. Peds. (#/hr)	3					3	10		4	4		10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	33	78	7	22	71	129	3	215	16	154	222	33
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	118	0	0	222	0	0	234	0	0	409	0
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	71.5%											
Analysis Period (min)	15											
	ICU Level of Service C											

HCM Unsignalized Intersection Capacity Analysis
9: MacDonald Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Future Volume (vph)	31	74	7	21	67	123	3	204	15	146	211	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	33	78	7	22	71	129	3	215	16	154	222	33
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	118	222	234	409								
Volume Left (vph)	33	22	3	154								
Volume Right (vph)	7	129	16	33								
Hadj (s)	0.02	-0.32	-0.04	0.03								
Departure Headway (s)	6.1	5.6	5.5	5.3								
Degree Utilization, x	0.20	0.34	0.36	0.61								
Capacity (veh/h)	498	577	593	644								
Control Delay (s/veh)	10.7	11.5	11.6	16.2								
Approach Delay (s/veh)	10.7	11.5	11.6	16.2								
Approach LOS	B	B	B	C								
Intersection Summary												
Delay			13.4									
Level of Service			B									
Intersection Capacity Utilization			71.5%		ICU Level of Service					C		
Analysis Period (min)			15									

Lanes, Volumes, Timings
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	187	10	6	125	10	23	9	14	52	6	7
Future Volume (vph)	8	187	10	6	125	10	23	9	14	52	6	7
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.993			0.990			0.959			0.986	
Flt Protected		0.998			0.998			0.976			0.961	
Satd. Flow (prot)	0	1420	0	0	1416	0	0	1341	0	0	1358	0
Flt Permitted		0.998			0.998			0.976			0.961	
Satd. Flow (perm)	0	1420	0	0	1416	0	0	1341	0	0	1358	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		362.4			57.3			93.8			56.1	
Travel Time (s)		26.1			4.1			6.8			4.0	
Confl. Peds. (#/hr)	10		5	5		10			4	4		
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	10	225	12	7	151	12	28	11	17	63	7	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	247	0	0	170	0	0	56	0	0	78	0
Sign Control		Free			Free			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	31.9%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis
10: Hunter Street/Second Avenue & Kitchener Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	187	10	6	125	10	23	9	14	52	6	7
Future Volume (Veh/h)	8	187	10	6	125	10	23	9	14	52	6	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	10	225	12	7	151	12	28	11	17	63	7	8
Pedestrians					4			5			10	
Lane Width (m)					3.6			3.6			3.6	
Walking Speed (m/s)					1.0			1.0			1.0	
Percent Blockage					0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	173			242			439	443	240	459	443	167
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	173			242			439	443	240	459	443	167
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			99			94	98	98	87	99	99
cM capacity (veh/h)	1402			1330			508	498	797	480	498	874
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	247	170	56	78								
Volume Left	10	7	28	63								
Volume Right	12	12	17	8								
cSH	1402	1330	568	505								
Volume to Capacity	0.00*	0.00*	0.10	0.15								
Queue Length 95th (m)	0.2	0.1	2.4	4.1								
Control Delay (s/veh)	0.4	0.4	12.0	13.4								
Lane LOS	A	A	B	B								
Approach Delay (s/veh)	0.4	0.4	12.0	13.4								
Approach LOS			B	B								
Intersection Summary												
Average Delay			3.4									
Intersection Capacity Utilization			31.9%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Lanes, Volumes, Timings
11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	96	166	126	80	40	26
Future Volume (vph)	96	166	126	80	40	26
Ideal Flow (vphpl)	1178	1178	1338	1338	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt			0.948		0.947	
Flt Protected		0.982			0.971	
Satd. Flow (prot)	0	1157	1268	0	1318	0
Flt Permitted		0.982			0.971	
Satd. Flow (perm)	0	1157	1268	0	1318	0
Link Speed (k/h)		50	50		50	
Link Distance (m)		57.3	58.7		36.9	
Travel Time (s)		4.1	4.2		2.7	
Confl. Peds. (#/hr)	11			11		3
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	119	205	156	99	49	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	324	255	0	81	0
Sign Control		Free	Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	55.4%			ICU Level of Service B		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 11: Kitchener Street & West Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	96	166	126	80	40	26
Future Volume (Veh/h)	96	166	126	80	40	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	119	205	156	99	49	32
Pedestrians		3			11	
Lane Width (m)		3.6			3.6	
Walking Speed (m/s)		1.0			1.0	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	266				660	220
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	266				660	220
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				87	96
cM capacity (veh/h)	1295				387	814
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	324	255	81			
Volume Left	119	0	49			
Volume Right	0	99	32			
cSH	1295	1700	489			
Volume to Capacity	0.09	0.15	0.17			
Queue Length 95th (m)	2.3	0.0	4.4			
Control Delay (s/veh)	3.5	0.0	13.8			
Lane LOS	A		B			
Approach Delay (s/veh)	3.5	0.0	13.8			
Approach LOS			B			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			55.4%	ICU Level of Service		B
Analysis Period (min)			15			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	174	0	0	184	74	3	1	0	43	0	18
Future Volume (vph)	32	174	0	0	184	74	3	1	0	43	0	18
Ideal Flow (vphpl)	1178	1178	1900	1900	1338	1338	1433	1433	1433	1433	1433	1433
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt	0.961						0.960					
Flt Protected	0.992						0.964					
Satd. Flow (prot)	0	1169	0	0	1286	0	0	1381	0	0	1329	0
Flt Permitted	0.992						0.964					
Satd. Flow (perm)	0	1169	0	0	1286	0	0	1381	0	0	1329	0
Link Speed (k/h)	50						50					
Link Distance (m)	58.7						32.6					
Travel Time (s)	4.2						2.3					
Confl. Peds. (#/hr)	29		2	2		29	3		1	1		3
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	37	202	0	0	214	86	3	1	0	50	0	21
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	239	0	0	300	0	0	4	0	0	71	0
Sign Control	Free						Stop					
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	54.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 12: Kitchener Street & East Parking Lot Access

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	174	0	0	184	74	3	1	0	43	0	18
Future Volume (Veh/h)	32	174	0	0	184	74	3	1	0	43	0	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	37	202	0	0	214	86	3	1	0	50	0	21
Pedestrians		3			1			2			29	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.0			1.0			1.0			1.0	
Percent Blockage		0			0			0			3	
Right turn flare (veh)												
Median type	None				None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	329			204			559	607	205	564	564	289
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	329			204			559	607	205	564	564	289
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			100			99	100	100	88	100	97
cM capacity (veh/h)	1206			1377			408	388	838	406	411	731
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	239	300	4	71								
Volume Left	37	0	3	50								
Volume Right	0	86	0	21								
cSH	1206	1700	403	467								
Volume to Capacity	0.03	0.18	0.00*	0.15								
Queue Length 95th (m)	0.7	0.0	0.2	4.0								
Control Delay (s/veh)	1.5	0.0	14.0	14.1								
Lane LOS	A		B	B								
Approach Delay (s/veh)	1.5	0.0	14.0	14.1								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			54.5%		ICU Level of Service				A			
Analysis Period (min)			15									

* Value less than 0.01.

Appendix Q

Traffic Control Signal Warrant



Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: Total 2033 (with BGD)
Municipality: Niagara Falls

Project number: 250550

Major Street: Victoria Avenue
Minor Street: Kitchener Street

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection?: Y
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
200% Satisfied	No	Case 1: Signal is undoubtedly warranted
100% Satisfied	No	Case 2: Signal might be warranted
Case 3: Signal warrant is unlikely		

Time Period	Major Street Victoria Avenue						Minor Street Kitchener Street						Peds Crossing
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	21	275	0	0	550	76	52	0	37	0	0	0	11
PM Peak Hour	88	599	0	0	617	217	131	0	86	0	0	0	4
verage Hourly Volum	27	219	0	0	292	73	46	0	31	0	0	0	4

Warrant	AHV
1A - All	687
1B - Minor	77
2A - Major	611
2B - Cross	50

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	All Approaches	480	720	600	900	687
					% Fulfilled	95.5%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Minor Street Approaches	180	255	180	255	77
					% Fulfilled	30.0%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Major Street Approaches	480	720	600	900	611
					% Fulfilled	84.8%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Traffic Crossing Major Street	50	75	50	75	50
					% Fulfilled	66.0%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: Total 2033 (with BGD)
Municipality: Niagara Falls

Project number: 250550

Major Street: Victoria Avenue
Minor Street: Westbound Off-Ramp

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection? Y
Flow Conditions: Restricted

PM Forecast Only? N

Warrant Results		
200% Satisfied	No	Case 1: Signal is undoubtedly warranted
100% Satisfied	No	Case 2: Signal might be warranted
Case 3: Signal warrant is unlikely		

Time Period	Major Street Victoria Avenue						Minor Street Westbound Off-Ramp						Peds Crossing
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	0	515	0	0	222	0	0	0	0	10	0	8	2
PM Peak Hour	0	895	0	0	463	0	0	0	0	53	0	49	4
Average Hourly Volume	0	353	0	0	171	0	0	0	0	16	0	14	2

Warrant	AHV
1A - All	554
1B - Minor	30
2A - Major	524
2B - Cross	17

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	All Approaches	480	720	600	900	554
					% Fulfilled	76.9%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Minor Street Approaches	180	255	180	255	30
					% Fulfilled	11.8%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Major Street Approaches	480	720	600	900	524
					% Fulfilled	72.7%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
			X			
	Traffic Crossing Major Street	50	75	50	75	17
					% Fulfilled	23.0%

Appendix R

Improved Five-Year Total Traffic Operations with Background Development



Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	55	241	107	338	249
Future Volume (vph)	58	55	241	107	338	249
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	50.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	0.97		0.98	0.99	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1316	1106	1449	1053	1368	1490
Flt Permitted	0.950				0.493	
Satd. Flow (perm)	1306	1069	1449	1027	704	1490
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		63		123		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	4	8		15	15	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Adj. Flow (vph)	67	63	277	123	389	286
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	63	277	123	389	286
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	30.7	30.7	13.0	43.7
Total Split (%)	37.6%	37.6%	43.9%	43.9%	18.6%	62.4%
Maximum Green (s)	20.0	20.0	24.4	24.4	10.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effect Green (s)	8.9	8.9	15.4	15.4	31.9	28.5
Actuated g/C Ratio	0.18	0.18	0.31	0.31	0.64	0.57
v/c Ratio	0.29	0.26	0.63	0.31	0.67	0.34

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	23.6	9.9	21.5	5.3	11.7	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	23.6	9.9	21.5	5.3	11.7	7.0
LOS	C	A	C	A	B	A
Approach Delay (s/veh)	16.9		16.5			9.7
Approach LOS	B		B			A
Queue Length 50th (m)	5.2	0.0	21.2	0.0	13.0	11.3
Queue Length 95th (m)	15.9	7.8	41.7	8.0	28.8	24.2
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				50.0	
Base Capacity (vph)	529	470	715	569	581	1128
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.13	0.39	0.22	0.67	0.25

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 50.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 12.7

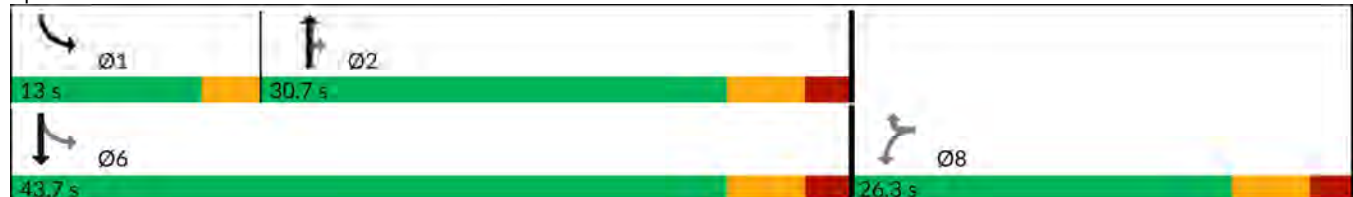
Intersection LOS: B

Intersection Capacity Utilization 64.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	58	55	241	107	338	249
Future Volume (vph)	58	55	241	107	338	249
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1309	1073	1449	1031	1364	1490
Flt Permitted	0.95	1.00	1.00	1.00	0.49	1.00
Satd. Flow (perm)	1309	1073	1449	1031	708	1490
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	67	63	277	123	389	286
RTOR Reduction (vph)	0	52	0	85	0	0
Lane Group Flow (vph)	67	11	277	38	389	286
Confl. Peds. (#/hr)	4	8		15	15	
Heavy Vehicles (%)	5%	0%	9%	5%	1%	6%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	8.9	8.9	15.4	15.4	28.5	28.5
Effective Green, g (s)	8.9	8.9	15.4	15.4	28.5	28.5
Actuated g/C Ratio	0.18	0.18	0.31	0.31	0.57	0.57
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	233	190	446	317	536	849
v/s Ratio Prot			0.19		c0.15	0.19
v/s Ratio Perm	c0.05	0.01		0.04	c0.27	
v/c Ratio	0.29	0.06	0.62	0.12	0.73	0.34
Uniform Delay, d1	17.8	17.1	14.8	12.4	6.6	5.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.1	2.8	0.2	4.9	0.3
Delay (s)	18.3	17.2	17.6	12.6	11.5	6.0
Level of Service	B	B	B	B	B	A
Approach Delay (s/veh)	17.8		16.1			9.2
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			50.0		Sum of lost time (s)	15.6
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	3	12	8	344	304	2
Future Volume (vph)	3	12	8	344	304	2
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.895				0.999	
Flt Protected	0.989			0.999		
Satd. Flow (prot)	1168	0	0	1092	1273	0
Flt Permitted	0.989			0.999		
Satd. Flow (perm)	1168	0	0	1092	1273	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		22			22
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles (%)	0%	11%	0%	8%	5%	0%
Adj. Flow (vph)	4	14	10	410	362	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	420	364	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	49.6%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	12	8	344	304	2
Future Volume (Veh/h)	3	12	8	344	304	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	4	14	10	410	362	2
Pedestrians	22				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	2				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.94	0.92	0.92			
vC, conflicting volume	816	385	386			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	576	287	288			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	99	98	99			
cM capacity (veh/h)	438	657	1156			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	18	420	364			
Volume Left	4	10	0			
Volume Right	14	0	2			
cSH	591	1156	1700			
Volume to Capacity	0.03	0.00*	0.21			
Queue Length 95th (m)	0.7	0.2	0.0			
Control Delay (s/veh)	11.3	0.3	0.0			
Lane LOS	B	A				
Approach Delay (s/veh)	11.3	0.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		49.6%		ICU Level of Service	A	
Analysis Period (min)		15				
* Value less than 0.01.						

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Future Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1454	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.98			0.99		0.97	0.99	
Frt		0.956			0.952			0.995			0.973	
Flt Protected		0.970			0.979			0.994		0.950		
Satd. Flow (prot)	0	1143	0	0	1254	0	0	1336	0	1381	1178	0
Flt Permitted		0.777			0.809			0.904		0.627		
Satd. Flow (perm)	0	907	0	0	1025	0	0	1211	0	882	1178	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		43			20			4			24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Adj. Flow (vph)	113	9	59	24	12	20	44	281	12	16	292	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	181	0	0	56	0	0	337	0	16	356	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	
Total Split (s)	26.0	26.0		26.0	26.0		34.0	34.0		34.0	34.0	
Total Split (%)	43.3%	43.3%		43.3%	43.3%		56.7%	56.7%		56.7%	56.7%	
Maximum Green (s)	19.3	19.3		19.3	19.3		26.8	26.8		26.8	26.8	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.7			6.7			7.2		7.2	7.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		12.6			12.6			18.2		18.2	18.2	
Actuated g/C Ratio		0.28			0.28			0.40		0.40	0.40	
v/c Ratio		0.64			0.19			0.69		0.05	0.73	
Control Delay (s/veh)		24.2			12.1			20.2		9.4	21.5	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay (s/veh)		24.2			12.1			20.2		9.4	21.5	

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		C			B			C		A	C	
Approach Delay (s/veh)		24.2			12.1			20.2			21.0	
Approach LOS		C			B			C			C	
Queue Length 50th (m)		8.8			2.0			20.1		0.7	20.0	
Queue Length 95th (m)		26.9			8.7			48.0		3.5	49.6	
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		431			471			757		550	744	
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			0.12			0.45		0.03	0.48	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 45.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay (s/veh): 20.8

Intersection LOS: C

Intersection Capacity Utilization 79.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Future Volume (vph)	96	8	50	20	10	17	37	239	10	14	248	54
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1454	1338	1338
Total Lost time (s)		6.7			6.7			7.2		7.2	7.2	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		0.99			0.99			1.00		1.00	0.99	
Flpb, ped/bikes		0.99			0.99			1.00		0.98	1.00	
Frt		0.96			0.95			1.00		1.00	0.97	
Flt Protected		0.97			0.98			0.99		0.95	1.00	
Satd. Flow (prot)		1137			1246			1333		1347	1179	
Flt Permitted		0.78			0.81			0.90		0.63	1.00	
Satd. Flow (perm)		911			1029			1213		888	1179	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	113	9	59	24	12	20	44	281	12	16	292	64
RTOR Reduction (vph)	0	31	0	0	14	0	0	2	0	0	14	0
Lane Group Flow (vph)	0	150	0	0	42	0	0	335	0	16	342	0
Confl. Peds. (#/hr)	10		19	19		10	27		44	44		27
Heavy Vehicles (%)	23%	0%	0%	12%	0%	0%	0%	7%	0%	0%	5%	30%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		12.6			12.6			18.2		18.2	18.2	
Effective Green, g (s)		12.6			12.6			18.2		18.2	18.2	
Actuated g/C Ratio		0.28			0.28			0.41		0.41	0.41	
Clearance Time (s)		6.7			6.7			7.2		7.2	7.2	
Vehicle Extension (s)		2.5			2.5			2.5		2.5	2.5	
Lane Grp Cap (vph)		256			290			493		361	480	
v/s Ratio Prot											c0.29	
v/s Ratio Perm		c0.16			0.04			0.28		0.02		
v/c Ratio		0.59			0.14			0.68		0.04	0.71	
Uniform Delay, d1		13.8			12.0			10.9		8.0	11.1	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.8			0.2			3.4		0.0	4.6	
Delay (s)		16.6			12.2			14.2		8.0	15.7	
Level of Service		B			B			B		A	B	
Approach Delay (s/veh)		16.6			12.2			14.2			15.4	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		15.0										
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		44.7										
Intersection Capacity Utilization		79.9%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Future Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1178	1178	1301	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		15.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99	0.98		0.99	
Frt		0.983							0.850		0.925	
Flt Protected	0.950			0.950				0.957			0.998	
Satd. Flow (prot)	1316	2920	0	1381	2941	0	0	1107	1106	0	1307	0
Flt Permitted	0.499			0.203				0.716			0.986	
Satd. Flow (perm)	690	2920	0	295	2941	0	0	822	1088	0	1291	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18							76		24	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	1					1	12		5	5		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Adj. Flow (vph)	28	862	110	5	401	1	207	23	12	2	17	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	972	0	5	402	0	0	230	12	0	43	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	5	2		1	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3	40.3	40.3	40.3	
Total Split (s)	9.0	40.4		9.0	40.4		40.6	40.6	40.6	40.6	40.6	
Total Split (%)	10.0%	44.9%		10.0%	44.9%		45.1%	45.1%	45.1%	45.1%	45.1%	
Maximum Green (s)	6.0	34.1		6.0	34.1		33.3	33.3	33.3	33.3	33.3	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1	4.1	4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2	3.2	3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5	2.5	5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min	Min	Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0	12.0	12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0	21.0	21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effect Green (s)	35.9	31.5		35.4	29.9			24.8	24.8		24.8	
Actuated g/C Ratio	0.50	0.44		0.49	0.42			0.34	0.34		0.34	
v/c Ratio	0.07	0.75		0.02	0.33			0.81	0.03		0.09	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	11.2	23.3		11.0	17.5			46.2	0.1		10.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay (s/veh)	11.2	23.3		11.0	17.5			46.2	0.1		10.6	
LOS	B	C		B	B			D	A		B	
Approach Delay (s/veh)		22.9			17.4			43.9			10.6	
Approach LOS		C			B			D			B	
Queue Length 50th (m)	1.9	53.4		0.3	17.6			27.8	0.0		1.7	
Queue Length 95th (m)	6.5	#114.6		2.0	37.6			#70.6	0.0		8.6	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0					15.0			
Base Capacity (vph)	398	1451		239	1452			396	564		635	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.07	0.67		0.02	0.28			0.58	0.02		0.07	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 71.9

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay (s/veh): 24.3

Intersection LOS: C

Intersection Capacity Utilization 73.6%

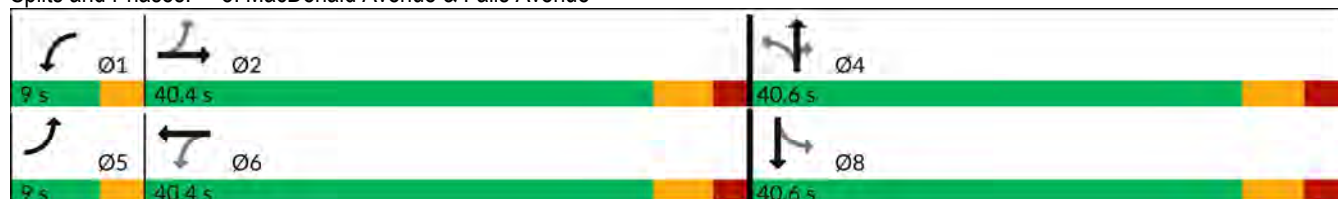
ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis 8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total AM (5-Year RM)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Future Volume (vph)	26	793	101	5	369	1	190	21	11	2	16	22
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1178	1178	1301	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85		0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1315	2920		1381	2940			1100	1089		1307	
Flt Permitted	0.50	1.00		0.20	1.00			0.72	1.00		0.99	
Satd. Flow (perm)	691	2920		295	2940			823	1089		1292	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	862	110	5	401	1	207	23	12	2	17	24
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	8	0	16	0
Lane Group Flow (vph)	28	962	0	5	402	0	0	230	4	0	27	0
Confl. Peds. (#/hr)	1					1	12		5	5		12
Heavy Vehicles (%)	5%	1%	1%	0%	2%	0%	2%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	33.5	31.5		31.5	30.5			24.8	24.8		24.8	
Effective Green, g (s)	33.5	31.5		31.5	30.5			24.8	24.8		24.8	
Actuated g/C Ratio	0.45	0.43		0.43	0.41			0.34	0.34		0.34	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5	2.5		5.0	
Lane Grp Cap (vph)	330	1244		140	1213			276	365		433	
v/s Ratio Prot	c0.00	c0.33		0.00	0.14							
v/s Ratio Perm	0.04			0.01				c0.28	0.00		0.02	
v/c Ratio	0.08	0.77		0.04	0.33			0.83	0.01		0.06	
Uniform Delay, d1	11.3	18.1		12.8	14.8			22.6	16.4		16.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	3.6		0.1	0.3			18.6	0.0		0.1	
Delay (s)	11.4	21.7		12.9	15.1			41.3	16.4		16.8	
Level of Service	B	C		B	B			D	B		B	
Approach Delay (s/veh)		21.4			15.1			40.1			16.8	
Approach LOS		C			B			D			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			22.4			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			73.9			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			73.6%			ICU Level of Service			D			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	239	448	173	237	467
Future Volume (vph)	141	239	448	173	237	467
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	50.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.95	0.96		0.93	0.98	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1563	1106	1368	1563
Flt Permitted	0.950				0.312	
Satd. Flow (perm)	1311	1063	1563	1032	439	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		252		182		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	29	11		64	64	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Adj. Flow (vph)	148	252	472	182	249	492
Shared Lane Traffic (%)						
Lane Group Flow (vph)	148	252	472	182	249	492
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	32.7	32.7	11.0	43.7
Total Split (%)	37.6%	37.6%	46.7%	46.7%	15.7%	62.4%
Maximum Green (s)	20.0	20.0	26.4	26.4	8.0	37.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	11.9	11.9	22.3	22.3	36.8	33.4
Actuated g/C Ratio	0.20	0.20	0.38	0.38	0.63	0.57
v/c Ratio	0.55	0.60	0.79	0.36	0.61	0.55

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	30.2	10.1	27.9	4.8	13.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	30.2	10.1	27.9	4.8	13.8	11.1
LOS	C	B	C	A	B	B
Approach Delay (s/veh)	17.6		21.5			12.0
Approach LOS	B		C			B
Queue Length 50th (m)	15.0	0.0	41.5	0.0	9.6	27.6
Queue Length 95th (m)	30.5	16.3	#95.4	10.8	#28.0	62.4
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				50.0	
Base Capacity (vph)	460	536	724	576	407	1026
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.47	0.65	0.32	0.61	0.48

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 58.2

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay (s/veh): 16.7

Intersection LOS: B

Intersection Capacity Utilization 71.6%

ICU Level of Service C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	141	239	448	173	237	467
Future Volume (vph)	141	239	448	173	237	467
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96	1.00	0.94	1.00	1.00
Flpb, ped/bikes	0.96	1.00	1.00	1.00	0.99	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1323	1066	1563	1042	1360	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.31	1.00
Satd. Flow (perm)	1323	1066	1563	1042	447	1563
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	148	252	472	182	249	492
RTOR Reduction (vph)	0	200	0	112	0	0
Lane Group Flow (vph)	148	52	472	70	249	492
Confl. Peds. (#/hr)	29	11		64	64	
Heavy Vehicles (%)	0%	0%	1%	0%	1%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	11.9	11.9	22.4	22.4	33.4	33.4
Effective Green, g (s)	11.9	11.9	22.4	22.4	33.4	33.4
Actuated g/C Ratio	0.21	0.21	0.39	0.39	0.58	0.58
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	271	219	604	403	384	901
v/s Ratio Prot			c0.30		c0.09	0.31
v/s Ratio Perm	c0.11	0.05		0.07	0.28	
v/c Ratio	0.55	0.24	0.78	0.17	0.65	0.55
Uniform Delay, d1	20.6	19.2	15.6	11.7	7.5	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8	0.4	6.7	0.2	3.7	0.8
Delay (s)	22.4	19.6	22.3	11.9	11.3	8.3
Level of Service	C	B	C	B	B	A
Approach Delay (s/veh)	20.6		19.4			9.3
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay (s/veh)			15.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			57.9		Sum of lost time (s)	15.6
Intersection Capacity Utilization			71.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	20	25	614	588	20
Future Volume (vph)	7	20	25	614	588	20
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899				0.996	
Flt Protected	0.988			0.998		
Satd. Flow (prot)	1273	0	0	1164	1320	0
Flt Permitted	0.988			0.998		
Satd. Flow (perm)	1273	0	0	1164	1320	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)			83			83
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	7	21	26	640	613	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	0	666	634	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	94.8%			ICU Level of Service F		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	7	20	25	614	588	20
Future Volume (Veh/h)	7	20	25	614	588	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	7	21	26	640	612	21
Pedestrians	83					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.0					
Percent Blockage	8					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.83	0.75	0.75			
vC, conflicting volume	1398	706	716			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	692	437	451			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	95	97			
cM capacity (veh/h)	304	428	768			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	28	666	633			
Volume Left	7	26	0			
Volume Right	21	0	21			
cSH	388	768	1700			
Volume to Capacity	0.07	0.03	0.37			
Queue Length 95th (m)	1.7	0.8	0.0			
Control Delay (s/veh)	15.0	0.9	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	15.0	0.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		0.8				
Intersection Capacity Utilization		94.8%		ICU Level of Service		F
Analysis Period (min)		15				

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Future Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1454	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.89			0.91			0.98		0.91	0.94	
Frt		0.963			0.962			0.991			0.969	
Flt Protected		0.970			0.980			0.997		0.950		
Satd. Flow (prot)	0	1226	0	0	1259	0	0	1377	0	1381	1189	0
Flt Permitted		0.756			0.822			0.929		0.413		
Satd. Flow (perm)	0	893	0	0	1005	0	0	1276	0	546	1189	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			20			8			28	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Adj. Flow (vph)	98	18	43	59	47	42	43	547	44	19	503	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	159	0	0	148	0	0	634	0	19	634	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	
Total Split (s)	26.0	26.0		26.0	26.0		64.0	64.0		64.0	64.0	
Total Split (%)	28.9%	28.9%		28.9%	28.9%		71.1%	71.1%		71.1%	71.1%	
Maximum Green (s)	19.3	19.3		19.3	19.3		56.8	56.8		56.8	56.8	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.7			6.7			7.2		7.2	7.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		16.3			16.3			45.1		45.1	45.1	
Actuated g/C Ratio		0.21			0.21			0.59		0.59	0.59	
v/c Ratio		0.77			0.64			0.84		0.06	0.89	
Control Delay (s/veh)		54.4			41.3			24.0		7.0	29.4	
Queue Delay		0.0			0.0			0.0		0.0	0.5	
Total Delay (s/veh)		54.4			41.3			24.0		7.0	29.9	

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D			D			C		A	C	
Approach Delay (s/veh)		54.4			41.3			24.0			29.2	
Approach LOS		D			D			C			C	
Queue Length 50th (m)		21.4			18.8			71.0		1.1	73.5	
Queue Length 95th (m)		#54.2			#44.7			123.6		3.7	#152.3	
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		254			286			961		410	900	
Starvation Cap Reductn		0			0			0		0	56	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.63			0.52			0.66		0.05	0.75	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 76.2

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay (s/veh): 30.8

Intersection LOS: C

Intersection Capacity Utilization 113.8%

ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Future Volume (vph)	91	17	40	55	44	39	40	509	41	18	468	122
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1454	1338	1338
Total Lost time (s)		6.7			6.7			7.2		7.2	7.2	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		0.96			0.96			0.98		1.00	0.95	
Flpb, ped/bikes		0.94			0.96			0.99		0.92	1.00	
Frt		0.96			0.96			0.99		1.00	0.97	
Flt Protected		0.97			0.98			1.00		0.95	1.00	
Satd. Flow (prot)		1166			1214			1373		1275	1201	
Flt Permitted		0.76			0.82			0.93		0.41	1.00	
Satd. Flow (perm)		909			1018			1280		555	1201	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	98	18	43	59	47	42	43	547	44	19	503	131
RTOR Reduction (vph)	0	15	0	0	16	0	0	3	0	0	11	0
Lane Group Flow (vph)	0	144	0	0	132	0	0	631	0	19	623	0
Confl. Peds. (#/hr)	58		68	68		58	148		136	136		148
Heavy Vehicles (%)	6%	0%	0%	6%	0%	0%	0%	1%	0%	0%	1%	8%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		16.3			16.3			45.1		45.1	45.1	
Effective Green, g (s)		16.3			16.3			45.1		45.1	45.1	
Actuated g/C Ratio		0.22			0.22			0.60		0.60	0.60	
Clearance Time (s)		6.7			6.7			7.2		7.2	7.2	
Vehicle Extension (s)		2.5			2.5			2.5		2.5	2.5	
Lane Grp Cap (vph)		196			220			766		332	719	
v/s Ratio Prot											c0.52	
v/s Ratio Perm		c0.16			0.13			0.49		0.03		
v/c Ratio		0.74			0.60			0.82		0.06	0.87	
Uniform Delay, d1		27.5			26.6			11.9		6.3	12.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		12.6			3.9			7.0		0.1	10.6	
Delay (s)		40.1			30.4			19.0		6.3	23.2	
Level of Service		D			C			B		A	C	
Approach Delay (s/veh)		40.1			30.4			19.0			22.7	
Approach LOS		D			C			B			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		23.7										
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		75.3										
Intersection Capacity Utilization		113.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Future Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1178	1178	1301	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		15.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99	0.98		0.99	
Frt		0.967			0.998				0.850		0.936	
Flt Protected	0.950			0.950				0.956			0.998	
Satd. Flow (prot)	1381	2872	0	1381	2964	0	0	1106	1106	0	1294	0
Flt Permitted	0.138			0.091				0.703			0.990	
Satd. Flow (perm)	201	2872	0	132	2964	0	0	806	1081	0	1283	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35			1				57		27	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	10		10	10		10
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Adj. Flow (vph)	60	912	262	44	955	15	354	33	26	2	28	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	1174	0	44	970	0	0	387	26	0	57	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	5	2		1	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3	40.3	40.3	40.3	
Total Split (s)	9.0	50.2		9.0	50.2		60.8	60.8	60.8	60.8	60.8	
Total Split (%)	7.5%	41.8%		7.5%	41.8%		50.7%	50.7%	50.7%	50.7%	50.7%	
Maximum Green (s)	6.0	43.9		6.0	43.9		53.5	53.5	53.5	53.5	53.5	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1	4.1	4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2	3.2	3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5	2.5	5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min	Min	Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0	12.0	12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0	21.0	21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effect Green (s)	52.0	43.9		52.0	43.9			53.6	53.6		53.6	
Actuated g/C Ratio	0.44	0.37		0.44	0.37			0.45	0.45		0.45	
v/c Ratio	0.41	1.08		0.36	0.88			1.06	0.05		0.10	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	26.1	86.2		26.2	45.7			97.3	0.8		12.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay (s/veh)	26.1	86.2		26.2	45.7			97.3	0.8		12.2	
LOS	C	F		C	D			F	A		B	
Approach Delay (s/veh)		83.2			44.8			91.3			12.2	
Approach LOS		F			D			F			B	
Queue Length 50th (m)	7.6	~161.1		5.5	111.6			~100.3	0.0		3.9	
Queue Length 95th (m)	15.4	#203.1		12.2	#149.8			#158.8	1.0		11.6	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0					15.0			
Base Capacity (vph)	148	1089		121	1102			365	520		595	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.41	1.08		0.36	0.88			1.06	0.05		0.10	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 118.2

Natural Cycle: 135

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay (s/veh): 68.6

Intersection LOS: E

Intersection Capacity Utilization 95.9%

ICU Level of Service F

Analysis Period (min) 15

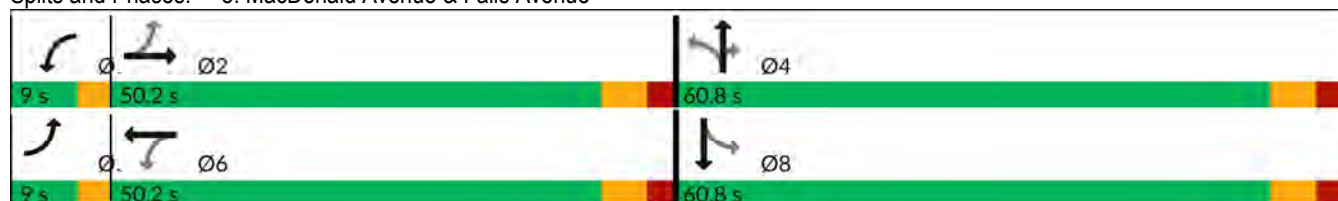
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total PM (5-Year RM)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Future Volume (vph)	56	848	244	41	888	14	329	31	24	2	26	25
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1178	1178	1301	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.97		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1381	2871		1381	2963			1096	1081		1294	
Flt Permitted	0.14	1.00		0.09	1.00			0.70	1.00		0.99	
Satd. Flow (perm)	201	2871		132	2963			806	1081		1283	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	60	912	262	44	955	15	354	33	26	2	28	27
RTOR Reduction (vph)	0	22	0	0	1	0	0	0	14	0	15	0
Lane Group Flow (vph)	60	1152	0	44	969	0	0	387	12	0	42	0
Confl. Peds. (#/hr)	2					2	10		10	10		10
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	2%	0%	0%	0%	0%	5%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	48.6	43.9		48.6	43.9			53.6	53.6		53.6	
Effective Green, g (s)	48.6	43.9		48.6	43.9			53.6	53.6		53.6	
Actuated g/C Ratio	0.41	0.37		0.41	0.37			0.45	0.45		0.45	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5	2.5		5.0	
Lane Grp Cap (vph)	128	1060		103	1094			363	487		578	
v/s Ratio Prot	c0.02	c0.40		0.02	0.33							
v/s Ratio Perm	0.17			0.16				c0.48	0.01		0.03	
v/c Ratio	0.47	1.09		0.43	0.89			1.07	0.02		0.07	
Uniform Delay, d1	24.4	37.4		26.4	35.1			32.6	18.1		18.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	2.0	54.3		2.1	9.5			65.9	0.0		0.1	
Delay (s)	26.3	91.8		28.4	44.6			98.5	18.1		18.6	
Level of Service	C	F		C	D			F	B		B	
Approach Delay (s/veh)		88.6			43.9			93.4			18.6	
Approach LOS		F			D			F			B	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			71.2			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			118.8			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			95.9%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	225	396	275	364	540
Future Volume (vph)	150	225	396	275	364	540
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Storage Length (m)	15.0	0.0		0.0	50.0	
Storage Lanes	1	1		1	1	
Taper Length (m)	2.5				2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.92	0.83		0.83	0.93	
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1381	1106	1533	1095	1381	1563
Flt Permitted	0.950				0.343	
Satd. Flow (perm)	1268	923	1533	911	464	1563
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		230		281		
Link Speed (k/h)	50		50			50
Link Distance (m)	120.0		58.6			126.4
Travel Time (s)	8.6		4.2			9.1
Confl. Peds. (#/hr)	41	74		159	159	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Adj. Flow (vph)	153	230	404	281	371	551
Shared Lane Traffic (%)						
Lane Group Flow (vph)	153	230	404	281	371	551
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	26.3	26.3	30.3	30.3	9.0	30.3
Total Split (s)	26.3	26.3	35.7	35.7	18.0	53.7
Total Split (%)	32.9%	32.9%	44.6%	44.6%	22.5%	67.1%
Maximum Green (s)	20.0	20.0	29.4	29.4	15.0	47.4
Yellow Time (s)	4.1	4.1	4.1	4.1	3.0	4.1
All-Red Time (s)	2.2	2.2	2.2	2.2	0.0	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Recall Mode	Min	Min	Min	Min	None	Min
Walk Time (s)	8.0	8.0	10.0	10.0		10.0
Flash Don't Walk (s)	12.0	12.0	14.0	14.0		14.0
Pedestrian Calls (#/hr)	0	0	0	0		0
Act Effct Green (s)	13.2	13.2	22.8	22.8	42.9	39.4
Actuated g/C Ratio	0.20	0.20	0.35	0.35	0.65	0.60
v/c Ratio	0.60	0.62	0.76	0.56	0.76	0.59

Lanes, Volumes, Timings
5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Control Delay (s/veh)	36.5	12.3	30.5	7.5	18.5	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	36.5	12.3	30.5	7.5	18.5	11.7
LOS	D	B	C	A	B	B
Approach Delay (s/veh)	21.9		21.1			14.4
Approach LOS	C		C			B
Queue Length 50th (m)	18.0	0.0	44.3	0.0	17.4	35.5
Queue Length 95th (m)	36.8	18.7	84.7	17.5	#54.2	76.4
Internal Link Dist (m)	96.0		34.6			102.4
Turn Bay Length (m)	15.0				50.0	
Base Capacity (vph)	401	449	713	574	519	1164
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.51	0.57	0.49	0.71	0.47

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 65.8

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay (s/veh): 18.2

Intersection LOS: B

Intersection Capacity Utilization 81.4%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 5: Victoria Avenue & Bender Street



HCM Signalized Intersection Capacity Analysis

5: Victoria Avenue & Bender Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	225	396	275	364	540
Future Volume (vph)	150	225	396	275	364	540
Ideal Flow (vphpl)	1454	1301	1579	1301	1454	1579
Total Lost time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.86	1.00	0.86	1.00	1.00
Flpb, ped/bikes	0.93	1.00	1.00	1.00	0.98	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1289	953	1533	943	1356	1563
Flt Permitted	0.95	1.00	1.00	1.00	0.34	1.00
Satd. Flow (perm)	1289	953	1533	943	490	1563
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	230	404	281	371	551
RTOR Reduction (vph)	0	183	0	182	0	0
Lane Group Flow (vph)	153	47	404	99	371	551
Confl. Peds. (#/hr)	41	74		159	159	
Heavy Vehicles (%)	0%	0%	3%	1%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	13.2	13.2	22.9	22.9	39.4	39.4
Effective Green, g (s)	13.2	13.2	22.9	22.9	39.4	39.4
Actuated g/C Ratio	0.20	0.20	0.35	0.35	0.60	0.60
Clearance Time (s)	6.3	6.3	6.3	6.3	3.0	6.3
Vehicle Extension (s)	2.5	2.5	3.5	3.5	3.0	3.5
Lane Grp Cap (vph)	260	192	538	331	475	944
v/s Ratio Prot			0.26		c0.16	0.35
v/s Ratio Perm	c0.12	0.05		0.10	c0.31	
v/c Ratio	0.59	0.24	0.75	0.30	0.78	0.58
Uniform Delay, d1	23.5	21.8	18.6	15.3	8.2	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.5	6.0	0.6	8.1	1.0
Delay (s)	26.3	22.3	24.7	15.9	16.4	8.9
Level of Service	C	C	C	B	B	A
Approach Delay (s/veh)	23.9		21.1			11.9
Approach LOS	C		C			B
Intersection Summary						
HCM 2000 Control Delay (s/veh)			17.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77			
Actuated Cycle Length (s)			65.2		Sum of lost time (s)	15.6
Intersection Capacity Utilization			81.4%		ICU Level of Service	D
Analysis Period (min)			15			

c Critical Lane Group

Lanes, Volumes, Timings
6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	5	13	16	666	671	18
Future Volume (vph)	5	13	16	666	671	18
Ideal Flow (vphpl)	1433	1433	1178	1178	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.902				0.997	
Flt Protected	0.986			0.999		
Satd. Flow (prot)	1274	0	0	1165	1321	0
Flt Permitted	0.986			0.999		
Satd. Flow (perm)	1274	0	0	1165	1321	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	100.0			75.4	58.6	
Travel Time (s)	7.2			5.4	4.2	
Confl. Peds. (#/hr)	1		203			203
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Heavy Vehicles (%)	0%	0%	0%	1%	1%	0%
Adj. Flow (vph)	5	13	16	673	678	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	18	0	0	689	696	0
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	87.3%			ICU Level of Service E		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 6: Victoria Avenue & Hunter Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	13	16	666	671	18
Future Volume (Veh/h)	5	13	16	666	671	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	13	16	673	678	18
Pedestrians	203				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.0				1.0	
Percent Blockage	20				0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				75	59	
pX, platoon unblocked	0.85	0.72	0.72			
vC, conflicting volume	1596	890	899			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	860	649	661			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	95	97			
cM capacity (veh/h)	215	270	535			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	18	689	696			
Volume Left	5	16	0			
Volume Right	13	0	18			
cSH	252	535	1700			
Volume to Capacity	0.07	0.03	0.41			
Queue Length 95th (m)	1.7	0.7	0.0			
Control Delay (s/veh)	20.4	0.9	0.0			
Lane LOS	C	A				
Approach Delay (s/veh)	20.4	0.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		0.7				
Intersection Capacity Utilization		87.3%	ICU Level of Service	E		
Analysis Period (min)		15				

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Future Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1454	1338	1338
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.88			0.90			0.97		0.87	0.92	
Frt		0.958			0.952			0.993			0.968	
Flt Protected		0.972			0.984			0.994		0.950		
Satd. Flow (prot)	0	1222	0	0	1227	0	0	1370	0	1381	1185	0
Flt Permitted		0.734			0.821			0.761		0.409		
Satd. Flow (perm)	0	865	0	0	985	0	0	1037	0	516	1185	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			32			6			30	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		104.4			35.5			141.0			75.4	
Travel Time (s)		7.5			2.6			10.2			5.4	
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Adj. Flow (vph)	128	25	68	55	54	60	73	529	35	24	547	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	221	0	0	169	0	0	637	0	24	695	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	24.7	24.7		24.7	24.7		31.2	31.2		31.2	31.2	
Total Split (s)	25.2	25.2		25.2	25.2		54.8	54.8		54.8	54.8	
Total Split (%)	31.5%	31.5%		31.5%	31.5%		68.5%	68.5%		68.5%	68.5%	
Maximum Green (s)	18.5	18.5		18.5	18.5		47.6	47.6		47.6	47.6	
Yellow Time (s)	4.1	4.1		4.1	4.1		4.1	4.1		4.1	4.1	
All-Red Time (s)	2.6	2.6		2.6	2.6		3.1	3.1		3.1	3.1	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.7			6.7			7.2		7.2	7.2	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	2.5		2.5	2.5		2.5	2.5		2.5	2.5	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)	8.0	8.0		8.0	8.0		10.0	10.0		10.0	10.0	
Flash Don't Walk (s)	10.0	10.0		10.0	10.0		14.0	14.0		14.0	14.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		18.5			18.5			47.6		47.6	47.6	
Actuated g/C Ratio		0.23			0.23			0.60		0.60	0.60	
v/c Ratio		1.00			0.67			1.03		0.08	0.97	
Control Delay (s/veh)		93.1			37.7			63.2		7.7	44.5	
Queue Delay		0.0			0.0			0.0		0.0	3.9	
Total Delay (s/veh)		93.1			37.7			63.2		7.7	48.4	

Lanes, Volumes, Timings
7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		F			D			E		A	D	
Approach Delay (s/veh)		93.1			37.7			63.2			47.0	
Approach LOS		F			D			E			D	
Queue Length 50th (m)		~30.1			19.0			~104.3		1.4	87.7	
Queue Length 95th (m)		#72.8			#46.0			#165.6		4.5	#166.8	
Internal Link Dist (m)		80.4			11.5			117.0			51.4	
Turn Bay Length (m)												
Base Capacity (vph)		220			252			619		307	717	
Starvation Cap Reductn		0			0			0		0	15	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		1.00			0.67			1.03		0.08	0.99	

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.03

Intersection Signal Delay (s/veh): 57.8

Intersection LOS: E

Intersection Capacity Utilization 137.8%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Victoria Avenue & Walnut Street



HCM Signalized Intersection Capacity Analysis

7: Victoria Avenue & Walnut Street

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Future Volume (vph)	122	24	65	52	51	57	69	503	33	23	520	141
Ideal Flow (vphpl)	1433	1433	1433	1433	1433	1433	1433	1433	1433	1454	1338	1338
Total Lost time (s)		6.7			6.7			7.2		7.2	7.2	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		0.94			0.94			0.98		1.00	0.92	
Flpb, ped/bikes		0.94			0.96			0.99		0.87	1.00	
Frt		0.96			0.95			0.99		1.00	0.97	
Flt Protected		0.97			0.98			0.99		0.95	1.00	
Satd. Flow (prot)		1146			1180			1354		1198	1185	
Flt Permitted		0.73			0.82			0.76		0.41	1.00	
Satd. Flow (perm)		866			984			1036		516	1185	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	128	25	68	55	54	60	73	529	35	24	547	148
RTOR Reduction (vph)	0	20	0	0	25	0	0	2	0	0	12	0
Lane Group Flow (vph)	0	201	0	0	144	0	0	635	0	24	683	0
Confl. Peds. (#/hr)	68		85	85		68	211		226	226		211
Heavy Vehicles (%)	4%	0%	0%	7%	2%	0%	0%	1%	4%	0%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		18.5			18.5			47.6		47.6	47.6	
Effective Green, g (s)		18.5			18.5			47.6		47.6	47.6	
Actuated g/C Ratio		0.23			0.23			0.60		0.60	0.60	
Clearance Time (s)		6.7			6.7			7.2		7.2	7.2	
Vehicle Extension (s)		2.5			2.5			2.5		2.5	2.5	
Lane Grp Cap (vph)		200			227			616		307	705	
v/s Ratio Prot											0.58	
v/s Ratio Perm		c0.23			0.15			c0.61		0.05		
v/c Ratio		1.01			0.64			1.03		0.08	0.97	
Uniform Delay, d1		30.8			27.7			16.2		6.9	15.5	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		64.9			5.0			44.2		0.1	26.0	
Delay (s)		95.7			32.7			60.4		7.0	41.5	
Level of Service		F			C			E		A	D	
Approach Delay (s/veh)		95.7			32.7			60.4			40.3	
Approach LOS		F			C			E			D	
Intersection Summary												
HCM 2000 Control Delay (s/veh)		53.9										
HCM 2000 Volume to Capacity ratio		1.02										
Actuated Cycle Length (s)		80.0										
Intersection Capacity Utilization		137.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Future Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1178	1178	1301	1433	1433	1433
Storage Length (m)	25.0		0.0	35.0		0.0	0.0		15.0	0.0		0.0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				1.00			0.99			0.99	
Frt		0.965			0.999				0.850		0.943	
Flt Protected	0.950			0.950				0.955			0.994	
Satd. Flow (prot)	1381	2873	0	1381	2967	0	0	1115	1106	0	1328	0
Flt Permitted	0.234			0.079				0.697			0.954	
Satd. Flow (perm)	340	2873	0	115	2967	0	0	804	1106	0	1275	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			1				57		25	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		205.1			175.2			92.7			81.8	
Travel Time (s)		12.3			10.5			6.7			5.9	
Confl. Peds. (#/hr)	2					2	13					13
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Adj. Flow (vph)	44	1126	337	35	815	8	325	23	23	7	27	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	1463	0	35	823	0	0	348	23	0	59	0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Detector Phase	5	2		1	6		4	4	4	8	8	
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	9.0	32.3		9.0	32.3		40.3	40.3	40.3	40.3	40.3	
Total Split (s)	9.0	58.0		9.0	58.0		53.0	53.0	53.0	53.0	53.0	
Total Split (%)	7.5%	48.3%		7.5%	48.3%		44.2%	44.2%	44.2%	44.2%	44.2%	
Maximum Green (s)	6.0	51.7		6.0	51.7		45.7	45.7	45.7	45.7	45.7	
Yellow Time (s)	3.0	4.1		3.0	4.1		4.1	4.1	4.1	4.1	4.1	
All-Red Time (s)	0.0	2.2		0.0	2.2		3.2	3.2	3.2	3.2	3.2	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	2.5	5.0		2.5	5.0		2.5	2.5	2.5	5.0	5.0	
Recall Mode	None	Min		None	Min		Min	Min	Min	Min	Min	
Walk Time (s)		10.0			10.0		12.0	12.0	12.0	12.0	12.0	
Flash Don't Walk (s)		16.0			16.0		21.0	21.0	21.0	21.0	21.0	
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	
Act Effect Green (s)	58.6	51.8		57.9	49.9			45.8	45.8		45.8	
Actuated g/C Ratio	0.50	0.45		0.50	0.43			0.39	0.39		0.39	
v/c Ratio	0.20	1.12		0.29	0.65			1.10	0.05		0.11	

Lanes, Volumes, Timings
8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay (s/veh)	15.8	97.5		19.6	29.5			115.7	0.2		16.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay (s/veh)	15.8	97.5		19.6	29.5			115.7	0.2		16.0	
LOS	B	F		B	C			F	A		B	
Approach Delay (s/veh)		95.1			29.1			108.6			16.0	
Approach LOS		F			C			F			B	
Queue Length 50th (m)	4.7	~211.4		3.7	78.3			~94.3	0.0		5.0	
Queue Length 95th (m)	10.5	#254.2		8.7	99.5			#150.3	0.3		13.8	
Internal Link Dist (m)		181.1			151.2			68.7			57.8	
Turn Bay Length (m)	25.0			35.0					15.0			
Base Capacity (vph)	224	1301		122	1320			316	469		516	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.20	1.12		0.29	0.62			1.10	0.05		0.11	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 116.4

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay (s/veh): 74.9

Intersection LOS: E

Intersection Capacity Utilization 96.9%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: MacDonald Avenue & Falls Avenue



HCM Signalized Intersection Capacity Analysis

8: MacDonald Avenue & Falls Avenue

4873 and 4898 Kitchener Street TIS
Total Sat (5-Year RM)

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Future Volume (vph)	43	1092	327	34	791	8	315	22	22	7	26	24
Ideal Flow (vphpl)	1454	1579	1338	1454	1579	1338	1178	1178	1301	1433	1433	1433
Total Lost time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	
Frt	1.00	0.97		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.99	
Satd. Flow (prot)	1381	2874		1381	2966			1102	1106		1328	
Flt Permitted	0.23	1.00		0.08	1.00			0.70	1.00		0.95	
Satd. Flow (perm)	340	2874		115	2966			804	1106		1274	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	44	1126	337	35	815	8	325	23	23	7	27	25
RTOR Reduction (vph)	0	23	0	0	1	0	0	0	14	0	15	0
Lane Group Flow (vph)	44	1440	0	35	822	0	0	348	9	0	44	0
Confl. Peds. (#/hr)	2					2	13					13
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	56.6	51.8		54.0	50.5			45.8	45.8		45.8	
Effective Green, g (s)	56.6	51.8		54.0	50.5			45.8	45.8		45.8	
Actuated g/C Ratio	0.48	0.44		0.46	0.43			0.39	0.39		0.39	
Clearance Time (s)	3.0	6.3		3.0	6.3			7.3	7.3		7.3	
Vehicle Extension (s)	2.5	5.0		2.5	5.0			2.5	2.5		5.0	
Lane Grp Cap (vph)	205	1264		90	1272			312	430		495	
v/s Ratio Prot	c0.01	c0.50		c0.01	0.28							
v/s Ratio Perm	0.09			0.17				c0.43	0.01		0.03	
v/c Ratio	0.21	1.14		0.39	0.65			1.12	0.02		0.09	
Uniform Delay, d1	17.6	33.0		25.5	26.5			36.0	22.1		22.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.4	72.7		2.0	1.6			85.7	0.0		0.2	
Delay (s)	18.0	105.7		27.5	28.1			121.7	22.2		22.9	
Level of Service	B	F		C	C			F	C		C	
Approach Delay (s/veh)		103.1			28.1			115.5			22.9	
Approach LOS		F			C			F			C	
Intersection Summary												
HCM 2000 Control Delay (s/veh)			80.0			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.10									
Actuated Cycle Length (s)			117.7			Sum of lost time (s)			16.6			
Intersection Capacity Utilization			96.9%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

Appendix S

ITE Parking Generation Data



Land Use: 310 Hotel

Description

A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, concierge service, valet parking, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room.

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a weekday (four study sites) and a Saturday (three study sites) in a general urban/suburban setting.

Hour Beginning	Percent of Peak Parking Demand	
	Weekday	Saturday
12:00–4:00 a.m.	100	100
5:00 a.m.	—	—
6:00 a.m.	90	80
7:00 a.m.	90	81
8:00 a.m.	90	80
9:00 a.m.	80	79
10:00 a.m.	74	70
11:00 a.m.	67	65
12:00 p.m.	65	61
1:00 p.m.	61	57
2:00 p.m.	59	48
3:00 p.m.	58	50
4:00 p.m.	61	55
5:00 p.m.	60	59
6:00 p.m.	62	66
7:00 p.m.	65	76
8:00 p.m.	70	76
9:00 p.m.	75	78
10:00 p.m.	88	87
11:00 p.m.	97	95

Additional Data

Parking demand at a hotel is related to the presence of supporting facilities. A hotel with a convention facility, meeting rooms, restaurant, or banquet space, may include parking demand generated by event attendees who are not hotel guests. As a result, peak parking demand for the hotel may occur during the afternoon or evening instead of the typical hotel peak parking demand that occurs overnight. To illustrate, for four of the 12 study sites in the database, the time-of-day parking demand distribution clearly demonstrates that an event took place during the evening of the study period. The peak parking demand at these four sites ranged between 50 and 100 percent greater than that of the peak overnight parking demand for hotel guests.

The database for this land use does not include information on potential independent variables for the generation of event-related parking demand (such as meeting facility GFA or event attendees) during the count period. For that reason, the peak parking demand displayed in the data plots only includes a site's overnight peak parking demand (i.e., parking demand associated with overnight guests and hotel staff). The plots do not contain peak parking demands generated by other supporting facilities or events that occur outside of the typical overnight peak parking period.

Parking demand at all lodging land uses may be related to the recent emergence of transportation network companies (TNCs) (also referred to as ride-share or ride-hailing companies). Hotel parking demand may be reduced if a hotel guest uses a TNC service for hotel drop-off or pick-up rather than using a rental car and parking on-site. Additional data are needed in order to measure and understand the potential impact of TNCs on lodging land use parking demand.

The average parking supply ratio for the nine study sites with parking supply information is 1.1 spaces per room. The average peak parking occupancy at the four sites with event parking is 69 percent. For the nine sites with overnight parking demand counted, the average peak parking occupancy is 54 percent.

The sites were surveyed in the 1990s, the 2000s, and the 2020s in California, and Washington.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms. Future data submissions should indicate the presence of supporting facilities and the level of activity/event taking place during the count period (e.g., full, empty, partially active; number of people attending a meeting/banquet). Data on the presence and usage of TNC service should be documented for all lodging land uses for future analysis purposes.

Source Numbers

217, 315, 401, 438, 603

Hotel (310)

Peak Period Parking Demand vs: Rooms

On a: Weekday (Monday - Friday)

Setting/Location: General Urban/Suburban

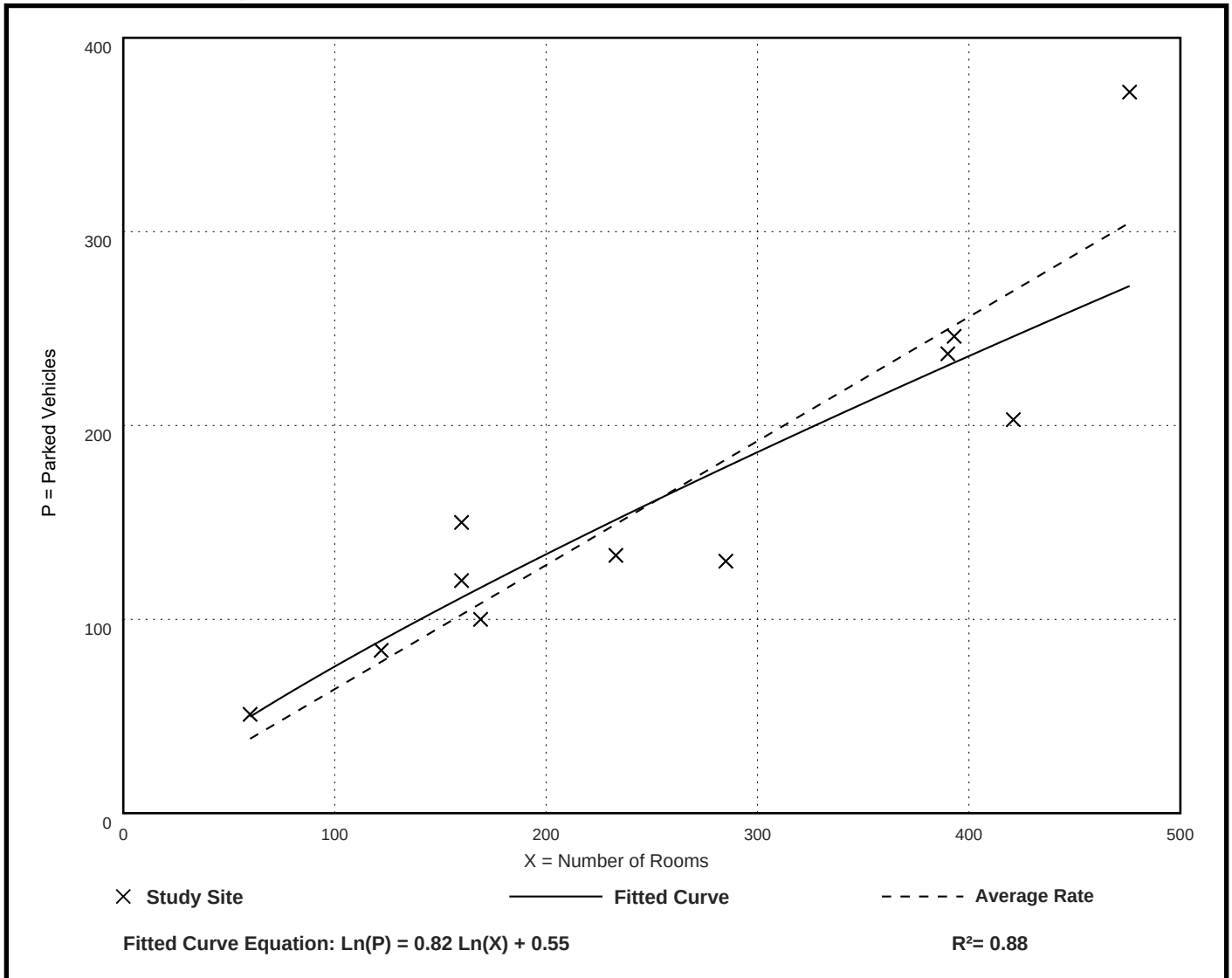
Number of Studies: 11

Avg. Num. of Rooms: 261

Peak Period Parking Demand per Room

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.64	0.46 - 0.94	0.59 / 0.87	***	0.14 (22%)

Data Plot and Equation



Hotel (310)

Peak Period Parking Demand vs: Rooms

On a: Saturday

Setting/Location: General Urban/Suburban

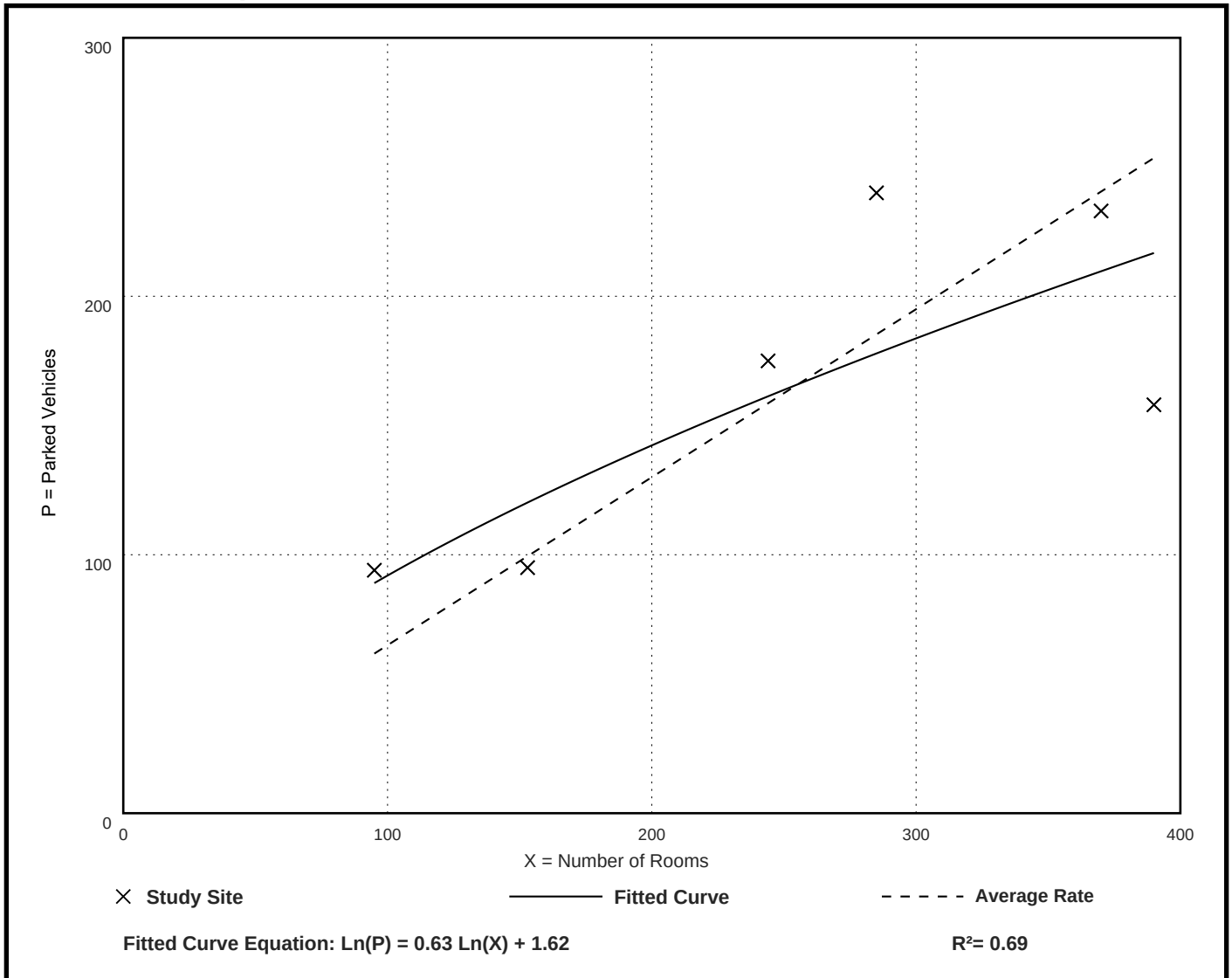
Number of Studies: 6

Avg. Num. of Rooms: 256

Peak Period Parking Demand per Room

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
0.65	0.41 - 0.99	0.62 / 0.98	***	0.19 (29%)

Data Plot and Equation



Land Use: 822 Strip Retail Plaza (<40k)

Description

A strip retail plaza is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Each study site in this land use has less than 40,000 square feet of gross leasable area (GLA). Because a strip retail plaza is open-air, the GLA is the same as the gross floor area (GFA) of the building.

The 40,000 square feet GLA threshold between shopping plaza and strip retail plaza (Land Use 822) is based on an examination of the parking demand database. All shopping plazas with a supermarket as their anchor in the database are larger than 40,000 square feet GLA.

Time-of-Day Distribution for Parking Demand

The following table presents a time-of-day distribution of parking demand on a Monday–Thursday (five study sites), a Friday (two study sites), and a Saturday (four study sites).

Hour Beginning	Percent of Peak Parking Demand		
	Monday–Thursday	Friday	Saturday
12:00–4:00 a.m.	—	—	—
5:00 a.m.	—	—	—
6:00 a.m.	—	—	—
7:00 a.m.	—	—	—
8:00 a.m.	19	19	—
9:00 a.m.	33	40	38
10:00 a.m.	47	44	55
11:00 a.m.	55	52	66
12:00 p.m.	89	96	85
1:00 p.m.	100	96	100
2:00 p.m.	73	84	96
3:00 p.m.	73	52	79
4:00 p.m.	66	50	66
5:00 p.m.	70	63	64
6:00 p.m.	75	49	67
7:00 p.m.	70	100	70
8:00 p.m.	54	94	70
9:00 p.m.	48	73	51
10:00 p.m.	—	—	—
11:00 p.m.	—	—	—

Additional Data

The average parking supply ratios for the study sites with parking supply information are the following:

- 5.7 spaces per 1,000 square feet GLA (24 sites) in a general urban/suburban setting
- 3.3 spaces per 1,000 square feet GLA (3 sites) in a dense multi-use urban setting

The average peak parking occupancy is 50 percent at the general urban/suburban sites and 76 percent at the dense multi-use urban sites.

The sites were surveyed in the 1990s, the 2010s, and the 2020s in Alberta (CAN), British Columbia (CAN), California, Colorado, Kansas, Maine, Manitoba (CAN), Maryland, Michigan, Minnesota, Missouri, New York, Texas, Virginia, and Washington.

Future data submissions should attempt to provide information on the composition of each study site (types and number of stores, restaurants, or other tenants within the shopping center).

Source Numbers

89, 209, 219, 297, 511, 601, 605, 606, 618, 619, 621, 635

Strip Retail Plaza (< 40k) (822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA

On a: Weekday (Monday - Thursday)

Setting/Location: General Urban/Suburban

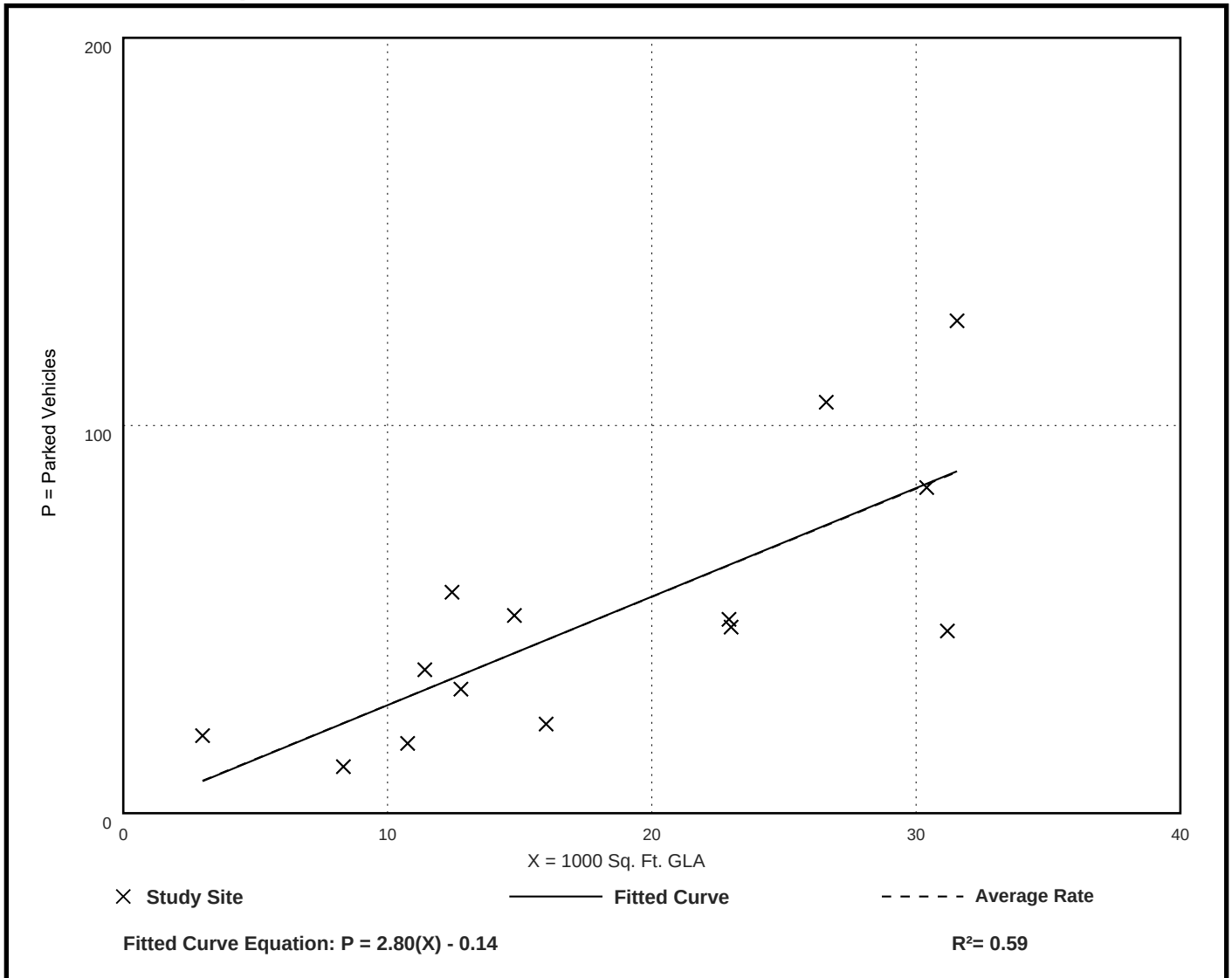
Number of Studies: 14

Avg. 1000 Sq. Ft. GLA: 18

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.79	1.44 - 6.67	2.07 / 4.44	***	1.14 (41%)

Data Plot and Equation



Strip Retail Plaza (< 40k) (822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA

On a: Friday

Setting/Location: General Urban/Suburban

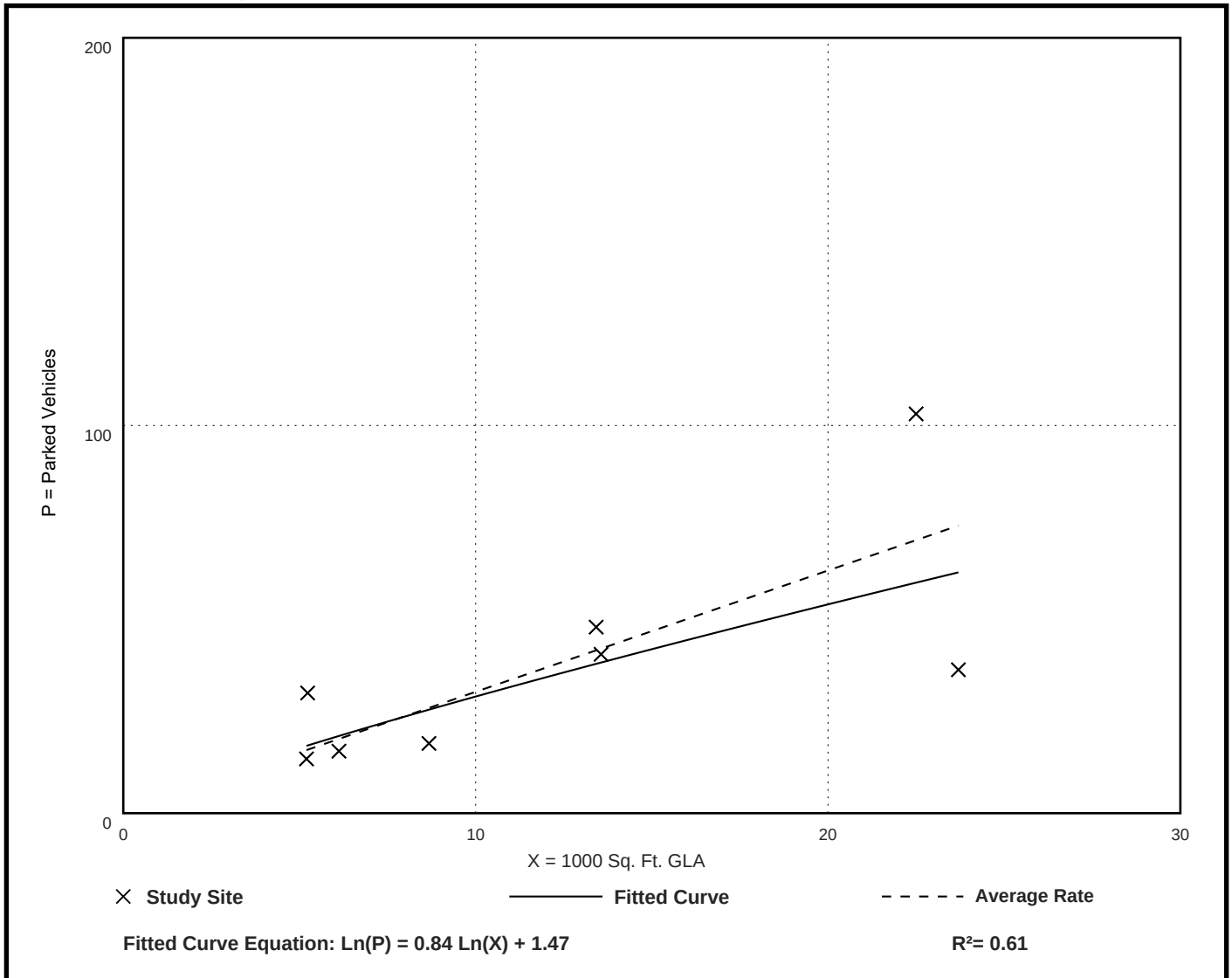
Number of Studies: 8

Avg. 1000 Sq. Ft. GLA: 12

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
3.13	1.56 - 5.93	2.60 / 5.45	***	1.37 (44%)

Data Plot and Equation



Strip Retail Plaza (< 40k) (822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA

On a: Saturday

Setting/Location: General Urban/Suburban

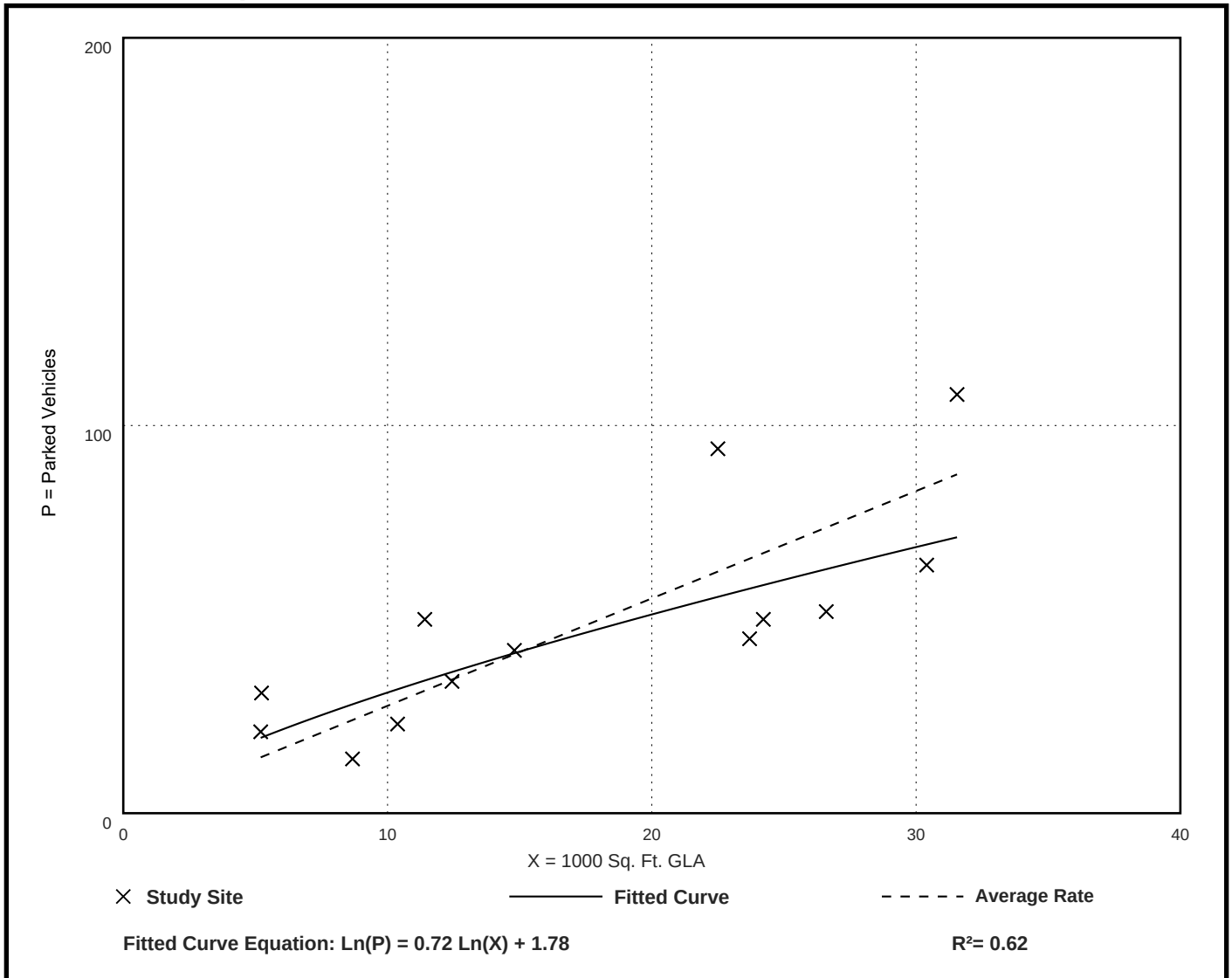
Number of Studies: 13

Avg. 1000 Sq. Ft. GLA: 17

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.77	1.61 - 5.93	2.09 / 4.36	***	1.03 (37%)

Data Plot and Equation



Strip Retail Plaza (< 40k) (822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA

On a: Weekday (Monday - Thursday)

Setting/Location: Dense Multi-Use Urban

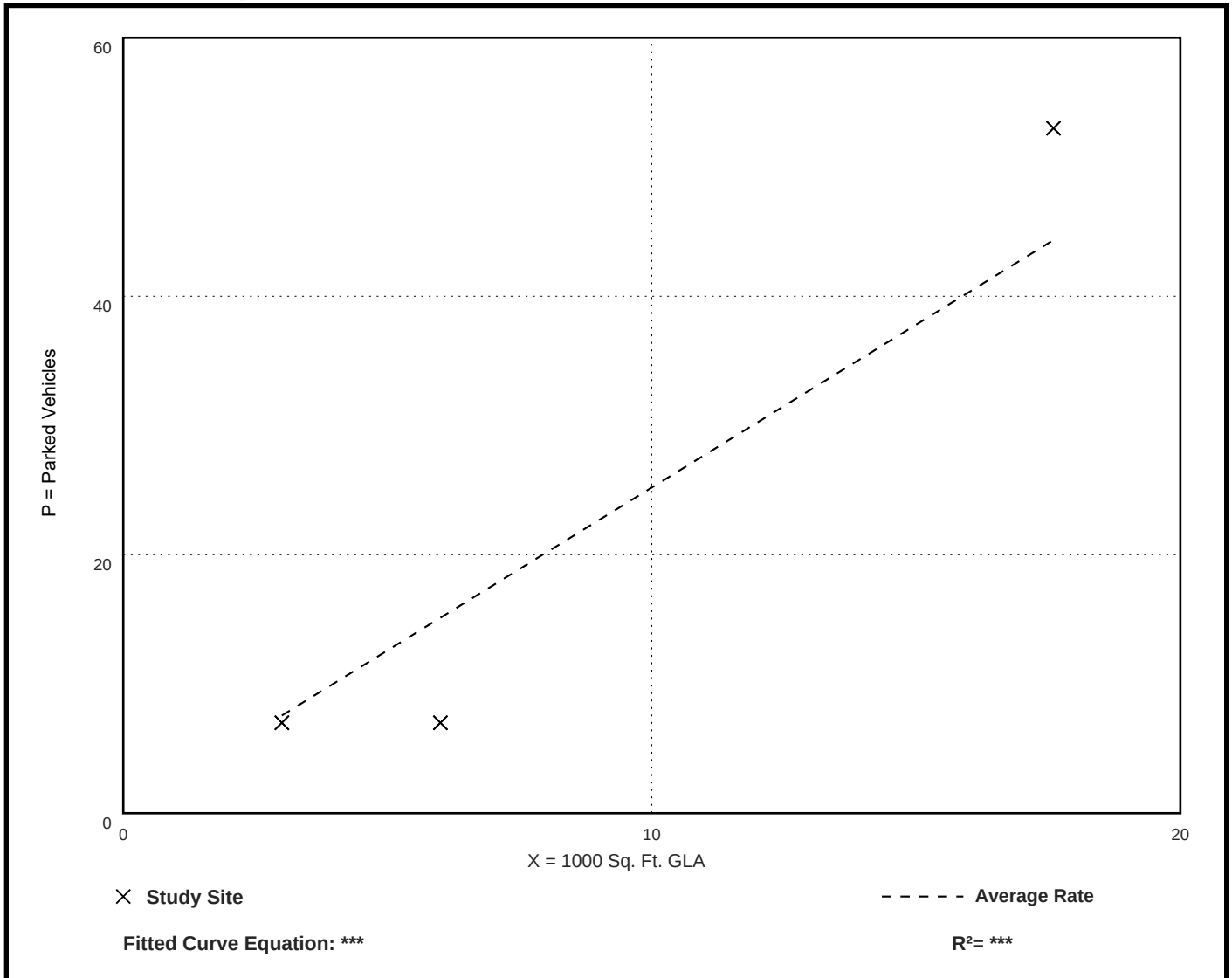
Number of Studies: 3

Avg. 1000 Sq. Ft. GLA: 8.9

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
2.52	1.17 - 3.01	1.54 / 3.01	***	0.93 (37%)

Data Plot and Equation



Strip Retail Plaza (< 40k) (822)

Peak Period Parking Demand vs: 1000 Sq. Ft. GLA

On a: Saturday

Setting/Location: Dense Multi-Use Urban

Number of Studies: 2

Avg. 1000 Sq. Ft. GLA: 11

Peak Period Parking Demand per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	33rd / 85th Percentile	95% Confidence Interval	Standard Deviation (Coeff. of Variation)
3.04	2.91 - 3.07	*** / ***	***	*** (***)

Data Plot and Equation

Caution – Small Sample Size

