

Appendix F

Traffic Study



Block 1 Servicing Strategy Transportation Study Hamilton, ON

Paradigm Transportation Solutions Limited

2024-04
210193



Project Summary



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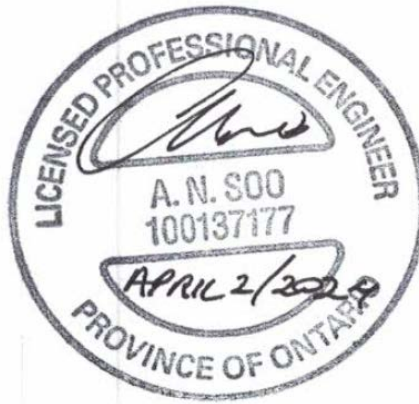
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Block 1 Servicing Strategy, Transportation Study, Hamilton, ON



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Executive Summary

Content

The Fruitland-Winona Block 1 Owners Group retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Study for the Block 1 lands within the Fruitland-Winona Secondary Plan (FWSP) area (formerly Stoney Creek Urban Boundary Expansion) in the City of Hamilton.

Paradigm previously prepared a Transportation Study for the Block 1 lands dated March 2022. Following submission of the Transportation Study, comments were received from the City of Hamilton and an updated Secondary Plan was developed. This submission addresses the review comments and reflects the proposed changes to the Secondary Plan from a transportation perspective.

This study determines the impacts of the proposed development plan on the surrounding road network and identifies the recommended improvements to accommodate the site-generated traffic. The analysis horizon years include 2023 (base year), 2031 (anticipated full build-out year), and 2036 (five years beyond the anticipated full build-out).

Development Concept

The FWSP area is generally located at the eastern limits of the City of Hamilton (Stoney Creek). Block 1 is part of the “West Lands” which is generally bound by Barton Street to the north, Fruitland Road to the west, Highway 8 to the south, and just east of Jones Road to the east. The development concept includes residential, commercial, and institutional land uses.

The anticipated full build-out/occupancy of Block 1 is Year 2031. It is understood that internal roadways would be constructed first, and land use developments would be constructed over the years without a defined phase plan. The Secondary Plan proposes four new roads in Block 1:

- ▶ Gordon Dean Avenue: a north-south collector road that extends southerly from Sunnyhurst Avenue to Highway 8;
- ▶ Collector B: an east-west collector road that extends easterly from Sherwood Park Road into the adjacent Block 2 lands located east of the Block 1 lands;
- ▶ Street C: a local road that is proposed to generally bisect the lands west of Gordon Dean Avenue. Two scenarios for the



Street C alignment are assessed. Scenario 1 – connection to Highway 8 and Scenario 2 – no connection to Highway 8; and

- ▶ Street D: a local road located in the southwest corner of Block 1. It contains two cul-de-sacs and intersects with Street C approximately mid-point between Highway 8 and Collector B.

Conclusions

The main findings and conclusions of this study are as follows:

- ▶ **Base Year Traffic Conditions:** The study area intersections are currently operating at acceptable levels of service and well within capacity during the weekday AM and PM peak hours.
The northbound and southbound left-turn movements at the unsignalized intersection of Highway 8 and Jones Road are reported to operate at LOS D during the AM and PM peak hours; however, both movements operate within capacity and no other critical movements are noted;
- ▶ **Site Trip Generation:** Full build-out of Block 1 is estimated to generate approximately 1,787 AM peak hour vehicle trips and 2,066 PM peak hour vehicle trips;
- ▶ **Site Trip Distribution and Assignments:** Trip distribution was estimated based on a review of existing traffic patterns as well as trip distribution data determined from 2016 TTS data. Site trips were assigned to the internal and external road networks in accordance with the trip distribution and logical routing choices;
- ▶ **Future Road Network:** Future road network improvements within the study area include two new collector roadways (Gordon Dean Avenue and Collector B), two local streets (Street C and Street D), the planned widening of both Barton Street and Highway 8 from two to four lanes. It is assumed that the planned improvements will be in place by 2031 to support the build-out of the Fruitland-Winona Secondary Plan area;
- ▶ **Horizon Years:** Year 2031 and 2036 were analyzed, representing the assumed full build-out/occupancy year and a period of five years beyond full build-out/occupancy year;
- ▶ **Background Traffic Forecasts:** A 2.0% per annum compounded growth rate was applied to the base year traffic volumes to derive the 2031 background traffic forecasts. A 4.5% per annum compounded growth rate was applied to the 2031 background traffic forecasts to derive the 2036 background traffic forecasts.



Block 2 site traffic and diverted truck traffic volumes to Gordon Dean Avenue were accounted for within the future background forecasts;

- ▶ **Background Traffic Conditions:** Under the 2031 and 2036 horizon years, the following critical movements are identified at the study area intersections during the AM and PM peak hours;

Barton Street and Fruitland Road (signalized)

- Southbound shared through/right-turn – v/c ratio of 0.94 during the AM peak hour and a v/c ratio of 1.12 during the PM peak hour under the 2036 horizon; and
- Eastbound left-turn – v/c ratio of 1.12 during the PM peak hour under the 2036 horizon.

Highway 8 and Jones Road (unsignalized)

- Southbound left-turn – LOS D/E under the 2031 and 2036 horizons; and
- Northbound left-turn – LOS D/E under the 2031 and 2036 horizons.

- ▶ **Total Traffic Conditions:** Total traffic analyses were conducted accounting for two scenarios related to Street C. Scenario 1 – Street C connects to Highway 8 and Scenario 2 – Street C does not connect to Highway 8.

Under the 2031 and 2036 horizon years, capacity issues identified under background conditions are forecast to continue to occur under total traffic conditions. Several critical movements were identified in addition to those identified under background conditions at multiple study area intersections.

The majority of study area intersections are forecast to operate similarly under both Scenario 1 and Scenario 2 conditions. One major difference is noted at the intersection of Fruitland Road and Sherwood Park Road/Collector B. Specifically, the westbound approach is forecast to operate over-capacity under Scenario 2 while it is reported to operate within capacity under Scenario 1. This is due to increased westbound left-turn movements at Fruitland Road and Sherwood Park Road/Collector B under Scenario 2 as Street C does not provide direct access to Highway 8;

Remedial Measures: Geometric and traffic control improvements are required to accommodate the forecast traffic volumes resulting from the build-out of the Fruitland-Winona Secondary Plan area and the Block 1 lands. **Figure ES.1**



illustrates the recommended future lane configurations and traffic control for the study area intersections.

- Fruitland Road and Barton Street:
 - Westbound left-turn: 30 metres of storage (based on the Barton Street EA study);
 - Northbound left-turn: 85 metres of storage (remedial measure); and
 - A permitted and protected left-turn phase for northbound, southbound, eastbound, and westbound left-turn movements (remedial measure).
- Barton Street and Sunnyhurst Avenue/Gordon Dean Avenue:
 - Westbound and eastbound left-turn: 20 metres of storage (based on the Barton Street EA study);
 - Northbound left-turn lane (based on the Gordon Dean Avenue Environmental Study); and
 - Traffic control signal (based on the Gordon Dean Avenue Environmental Study).
- Barton Street and Jones Road:
 - Westbound and eastbound left-turn: 30 metres of storage (based on the Barton Street EA study); and
 - Traffic control signal (based on the Barton Street EA study).
- Fruitland Road and Sherwood Park Road/Collector B:
 - Southbound left-turn: 35 metres of storage (remedial measure);
 - Westbound left-turn: 50 metres of storage (remedial measure); and
 - Traffic control signal (remedial measure).
- Highway 8 and Fruitland Road/Regalview Drive:
 - Northbound left-turn: 30 metres of storage (based on the Highway 8 EA study);
 - Southbound and westbound left-turn: 50 metres of storage (based on the Highway 8 EA study); and
 - Eastbound left-turn: 80 metres of storage (based on the Highway 8 EA study).
- Highway 8 and Jones Road:



- Northbound, eastbound, and westbound left-turn: 30 metres of storage (based on the Highway 8 EA study);
 - Southbound left-turn: 40 metres of storage (based on the Highway 8 EA study); and
 - Traffic control signal (remedial measure).
- Gordon Dean Avenue and Collector B:
 - Traffic control signal (based on the Gordon Dean Avenue Environmental Study); and
 - Northbound, southbound, eastbound, and westbound left-turn: 20 metres of storage (based on storage length at nearby intersections).
- Jones Road and Collector B:
 - Collector B operating under stop-control (assumed based on traffic forecasts and road classification).
- Highway 8 and Gordon Dean Avenue:
 - Eastbound left-turn: 50 metres of storage (based on the Highway 8 EA study); and
 - Traffic control signal (based on the Highway 8 EA study).
- Gordon Dean Avenue and Street C (north):
 - Street C operating under stop-control (assumed).
- Collector B and Street C:
 - Street C operating under stop-control (assumed).
- Gordon Dean Avenue and Street C (south):
 - Street C operating under stop-control (assumed).

The above remedial measures account for full development of the Fruitland-Winona Secondary Plan area which includes the Block 1 lands. As the Block 1 lands build-out, future transportation studies may be required if development occurs prior to the planned implementation of the EA improvements along Barton Street and Highway 8;

- ▶ **Street C Connection Scenarios:** From a traffic operational perspective Scenario 1 (Street C connection to Highway 8) and Scenario 2 (Street C no connection to Highway 8) result in similar traffic operational performance under the 2031 and 2036 horizons with recommended remedial measures.



From an access management perspective, Scenario 2 is considered the preferred scenario as it minimizes the number of direct access points on Highway 8; and

- ▶ **Access Review:** The proposed road network (Scenario 2) and intersections meet and satisfy the TAC GDGCR requirements in terms of intersection spacing and sight distance requirements.

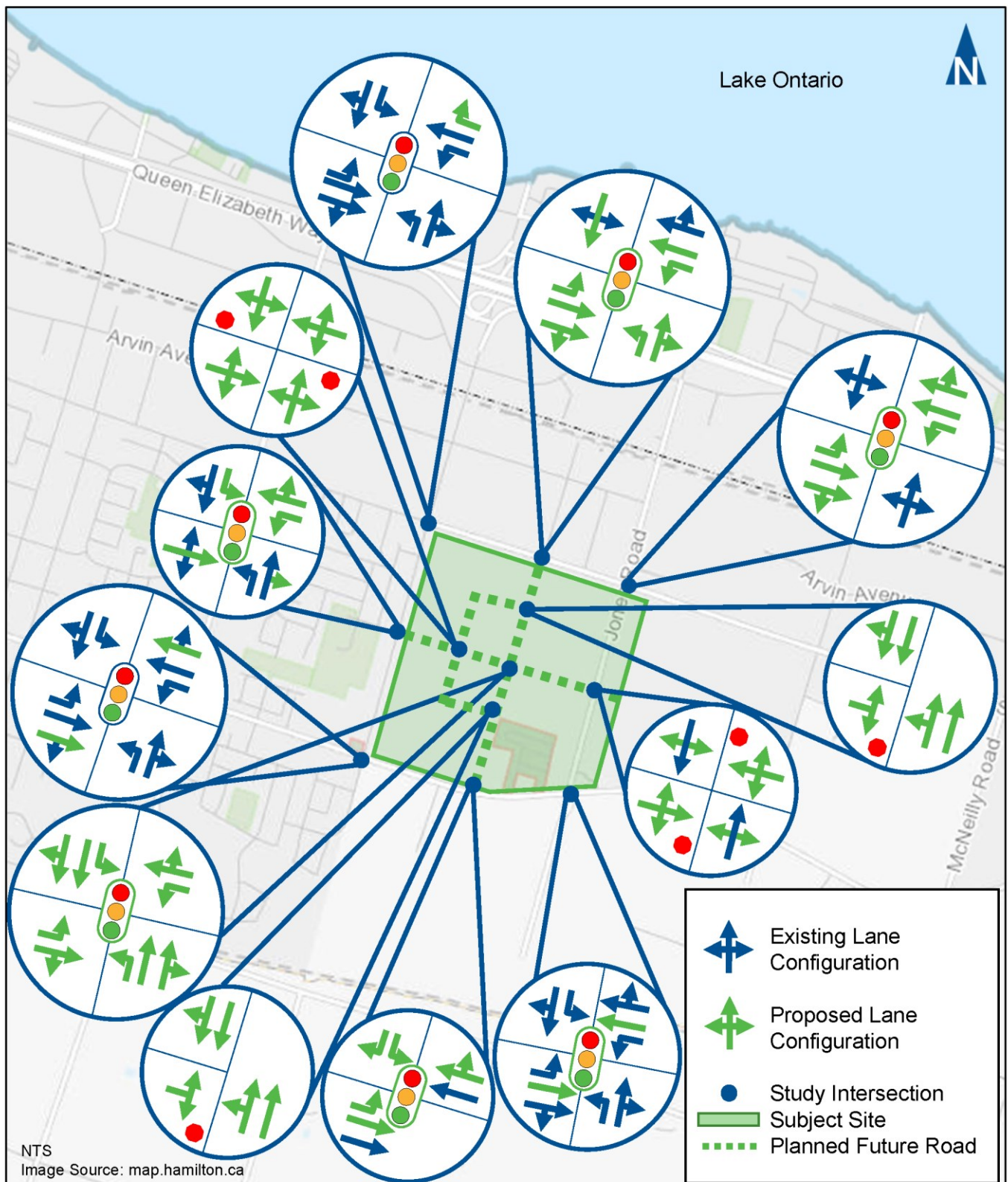
Recommendations

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

- ▶ The City of Hamilton recognizes the conclusions drawn above;
- ▶ Traffic conditions to be monitored within the study area, to determine appropriate timing for implementation of road network improvements and remedial measures in response to actual growth realized and actual site traffic generated; and
- ▶ The preferred Street C connection is Scenario 2, where Street C does not connect to Highway 8.

In support of draft plan approval, this report can be amended to document any staging of interim or ultimate network improvements.





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1 Introduction

The Fruitland-Winona Block 1 Owners Group retained Paradigm Transportation Solutions Limited (Paradigm) to conduct this Transportation Study for the Block 1 lands within the Fruitland-Winona Secondary Plan (FWSP) area (formerly Stoney Creek Urban Boundary Expansion) in the City of Hamilton.

The Block 1 lands are proposed to consist of low-density and medium-density residential land uses, institutional land uses, neighbourhood parks, commercial/retail land uses, and a supporting transportation road network. **Figure 1.1** illustrates the site location.

Paradigm previously prepared a Transportation Study for the Block 1 lands dated March 2022. Following submission of the Transportation Study, comments were received from the City of Hamilton and an updated Secondary Plan was developed. This submission addresses the review comments and reflects the proposed changes to the Secondary Plan from a transportation perspective.

The scope of the study includes:

- ▶ Determine and assess the current study area traffic conditions;
- ▶ Forecast the additional traffic generated by the proposed development;
- ▶ Analyze the impacts of the additional traffic on the study area road network; and
- ▶ Recommend necessary remedial measures required to mitigate the transportation impacts.

The study area intersections include:

- ▶ Barton Street and Fruitland Road (signalized);
- ▶ Barton Street and Sunnyhurst Avenue (unsignalized);
- ▶ Barton Street and proposed Gorden Dean Avenue (proposed signalized);
- ▶ Barton Street and Jones Road (unsignalized);
- ▶ Highway 8 and Fruitland Road/Regalview Drive (signalized);
- ▶ Highway 8 and Jones Road (unsignalized); and
- ▶ Fruitland Road and Sherwood Park Road/proposed Collector B (unsignalized);



- ▶ Proposed Collector B and Jones Road (assumed unsignalized); and
- ▶ The proposed Gordon Dean Avenue intersections with Highway 8 and Collector B (proposed signalized).

This study has been carried out in general accordance with the City of Hamilton *Traffic Impact Study Guidelines*,¹ City's comments and direction provided by City staff during pre-study consultation from the previous submission. **Appendix A** contains the pre-study consultation correspondence for reference.

¹ City of Hamilton, *Traffic Impact Study Guidelines*, July 2009.





2 Existing Conditions

2.1 Road Network

The characteristics of the roads and intersections in the vicinity of the subject site are described below. Reference was made to the *Urban Hamilton Official Plan, Schedule C – Functional Road Classification*.²

- ▶ **Highway 8** is an east-west major arterial road. The road provides one lane in each direction and has a posted speed limit of 60 km/h. Within the study area, the adjacent area consists of mainly farmland, a few residential dwellings, institutional land uses, and some businesses. The intersection with Fruitland Road/Regalview Drive is signalized and the intersection with Jones Road is unsignalized;
- ▶ **Barton Street** is an east-west minor arterial road west of Fruitland Road and a major arterial road east of Fruitland Road. The road provides one lane in each direction beginning approximately 75 metres east of the Fruitland Road intersection and provides two lanes in each direction to the west. A continuous two-way left-turn lane (TWLTL) is provided along Barton Street west of Fruitland Road. The road has a posted speed limit of 60 km/h. The intersection with Fruitland Road is signalized while the intersections with Sunnyhurst Avenue and Jones Road are unsignalized. The Jones Road intersection operates under all-way stop-control;
- ▶ **Fruitland Road** is a north-south minor arterial road. The road provides one lane in each direction and a posted speed limit of 50 km/h. The intersection with Sherwood Park Road is unsignalized. The road provides a connection to the provincial highway network (Queen Elizabeth Way (QEW)) to the north. Fruitland Road continues as Regalview Drive south of Highway 8;
- ▶ **Jones Road** is a north-south collector road. The road provides one lane in each direction and has a posted speed limit of 50 km/h. Jones Road is discontinuous to the south ending with a cul-de-sac located approximately 720 metres south of Highway 8;
- ▶ **Sunnyhurst Avenue** is a north-south local road. The road provides one lane in each direction and has an assumed statutory speed limit of 50 km/h given no posted speed limit signage was observed. Sunnyhurst Avenue is discontinuous

² City of Hamilton, *Urban Hamilton Official Plan, Schedule C – Functional Road Classification*, November 2022.

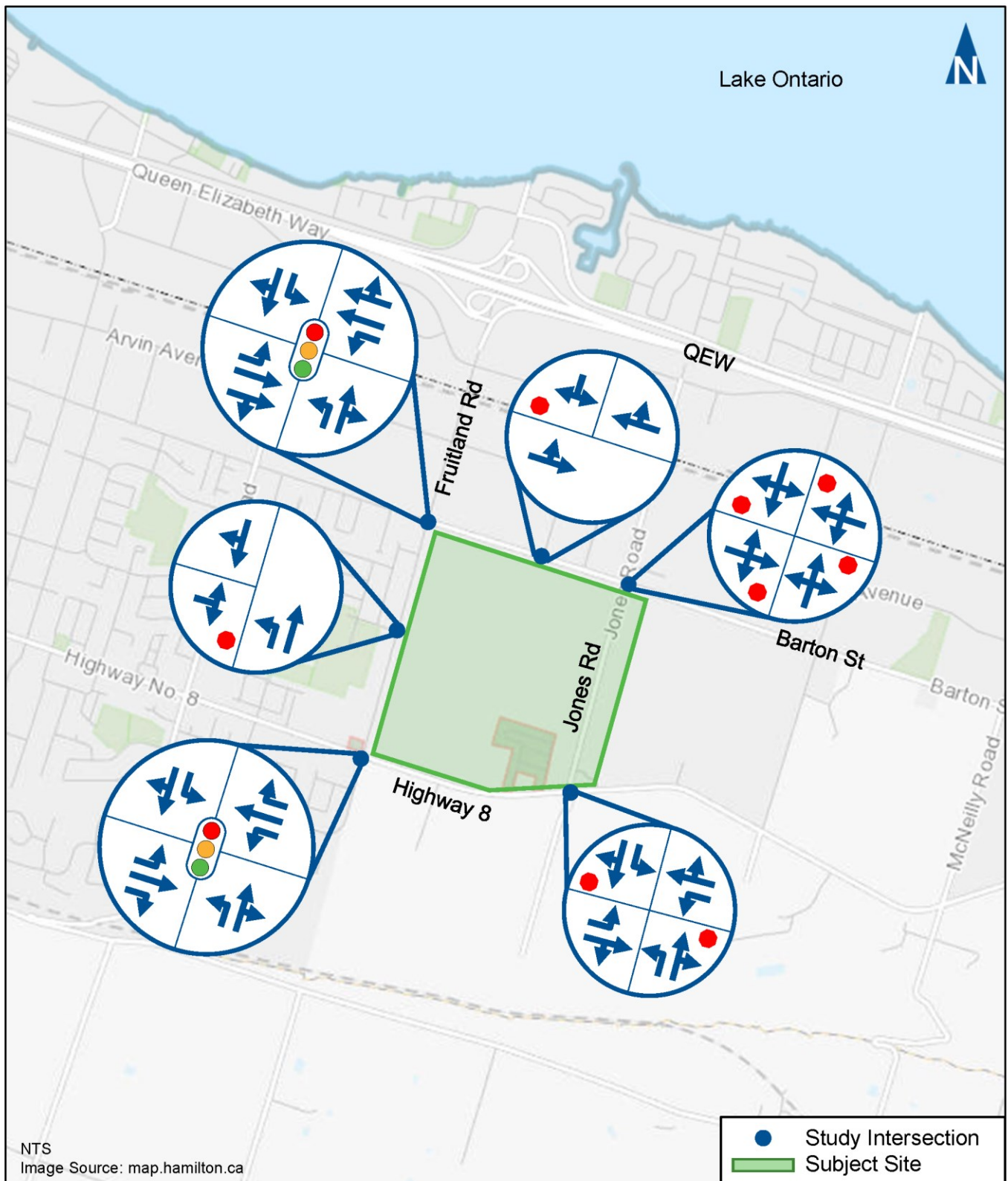


ending with a T-intersection at Barton Street to the south, and ending with a cul-de-sac located approximately 515 metres north of Barton Street; and

- ▶ **Sherwood Park Road** is an east-west local road. The road provides one lane in each direction and has a posted speed limit of 40 km/h.

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





2.2 Walking

Pedestrian travel is accommodated by sidewalks provided along the study area roadways. This includes:

- ▶ A sidewalk on the south side of Barton Street and an unpaved shoulder on the north side of Barton Street;
- ▶ Sidewalks on both sides of Fruitland Road;
- ▶ A sidewalk on the north side of Highway 8 and a paved shoulder on the south side of Highway 8; and
- ▶ A discontinues section of sidewalk on the east side of Jones Road from Highway 8 northerly 200 metres .

At the signalized intersections of Fruitland Road with Barton Street and Highway 8, delineated crosswalks and pedestrian signal heads are provided for all intersection legs. It is noted that pedestrian push buttons are not provided at the intersection of Fruitland Road and Barton Street.

Apart from the north leg of the intersection of Highway 8 and Jones Road, no other delineated crosswalks are provided at the unsignalized study area intersections.

Figure 2.2 illustrates the existing sidewalk network near the subject site.

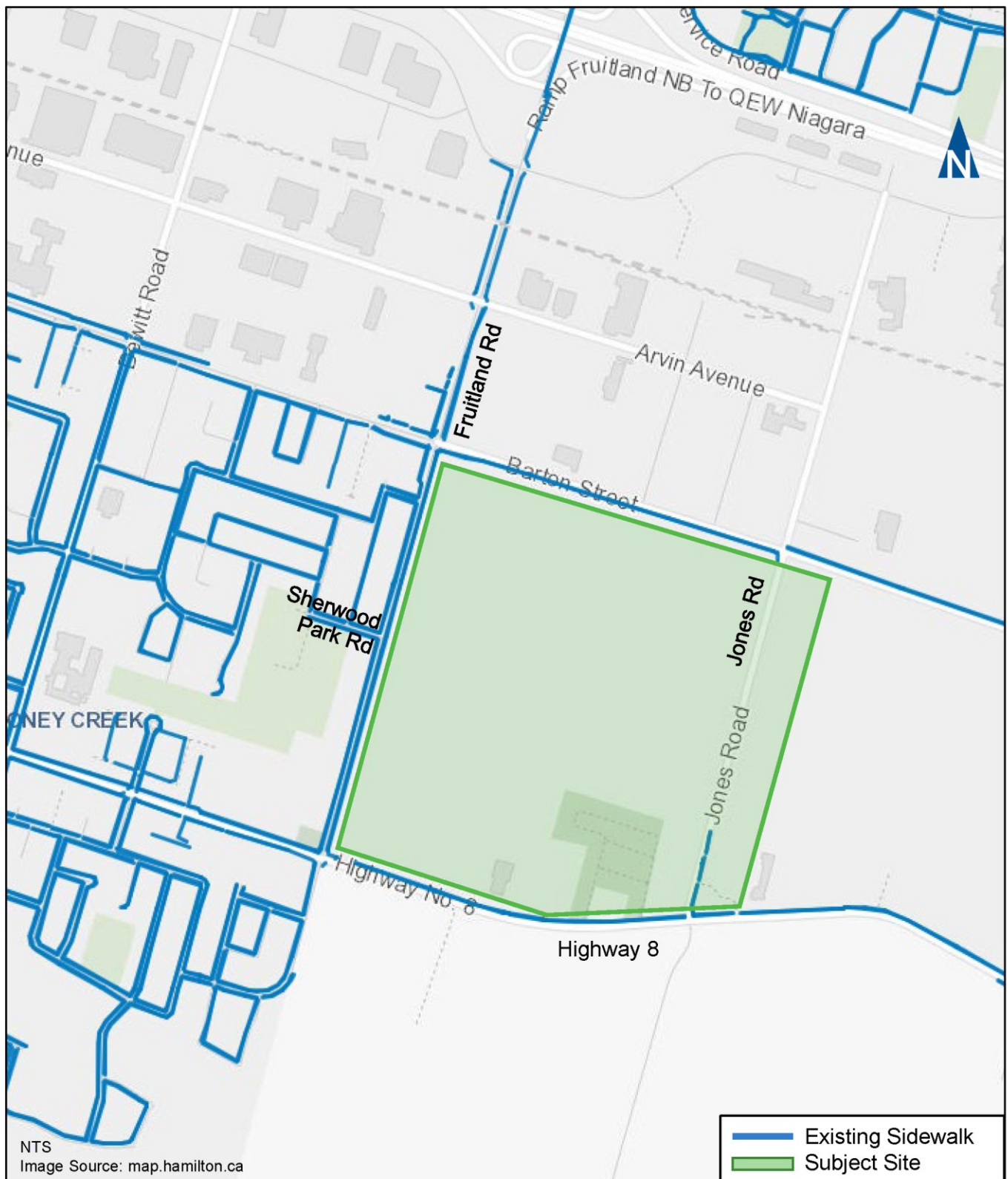
2.3 Cycling Network

Cycling infrastructure typically consists of on-street and off-street facilities. On-street facilities comprise cycling lanes, signed cycling routes, and paved shoulders. Off-street facilities are in the form of multi-use or informal trails.

Designated cycling lanes are provided on both sides of Highway 8 throughout the study area. Jones Road, Sherwood Park Road, and Fruitland Road/Regalview Drive south of Sherwood Park Road are designated as cautionary unsigned cycle routes. **Figure 2.3** illustrates the existing cycling network.

The City of Hamilton also provides a bikeshare program, Sobi Bike, across the City. However, it is noted this service currently does not operate within the study area.







2.4 Transit

Hamilton Street Railway (HSR) operates the public transit system in the City of Hamilton. **Figure 2.4** illustrates the existing transit network within and adjacent to the study area.

The area is currently serviced by **Route 55 (Stoney Creek Central)** which travels east/west from Eastgate Square to Vince Mazza and Winona. During weekdays, several trips on this route are interlined with Route 10 (B Line Express).

Weekday and Saturday service runs from approximately 5:00 AM to 1:00 AM and Sunday service runs from approximately 5:45 AM to 12:00 AM. Service headways are approximately 15 minutes during the day (before 9:00 PM) and approximately 30 minutes at night (after 9:00 PM) Monday to Sunday.

Existing bus stops in the vicinity to the study area are located on Barton Street at Fruitland Road, Sunnyhurst Avenue, and Jones Road, and on Highway 8 at Fruitland Road, the City of Hamilton office, and Jones Road.

All HSR buses have accessible low floors with ramps that provide entry and exit without steps. This allows users to enter and exit the vehicles more easily. The HSR provides accessible transportation services (DARTS and Taxi Scrip) in addition to the regular transit routes.

Trans-Cab, a shared-ride taxi service operated jointly by HSR and Blue Line Taxi, services parts of Glanbrook and Stoney Creek where buses do not currently provide service. The closest transfer point between HSR transit and Trans-Cab service to Block 1 is at Highway 8 and Jones Road. When using this transfer point, riders can be dropped off/picked up from any location within the Stoney Creek Trans-Cab East Zone.





2.5 Traffic Volumes

To assess intersection operations, turning movement counts (TMCs) are used to quantify the movement of vehicles, pedestrians, trucks, buses, and cyclists through an intersection. Existing traffic data at an intersection or on a road section forms the foundation for operational analysis. The counts are usually collected during peak periods to complete level of service (LOS) analysis under its worst-case operating conditions.

Table 2.1 summarizes the collected TMC Data. All TMC data were counted in 15-minute intervals and vehicles were classified by type.

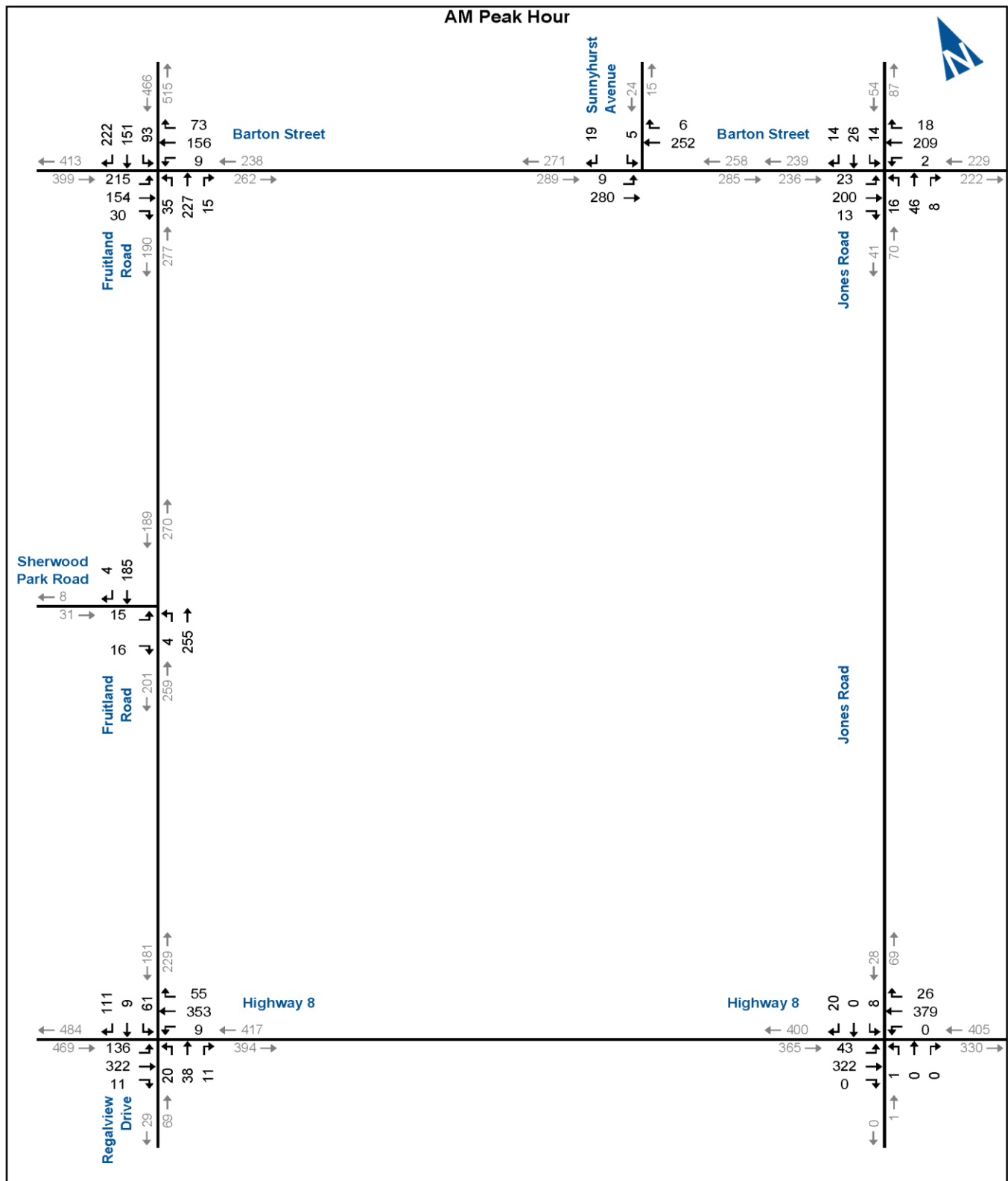
TABLE 2.1: EXISTING TMC DATA

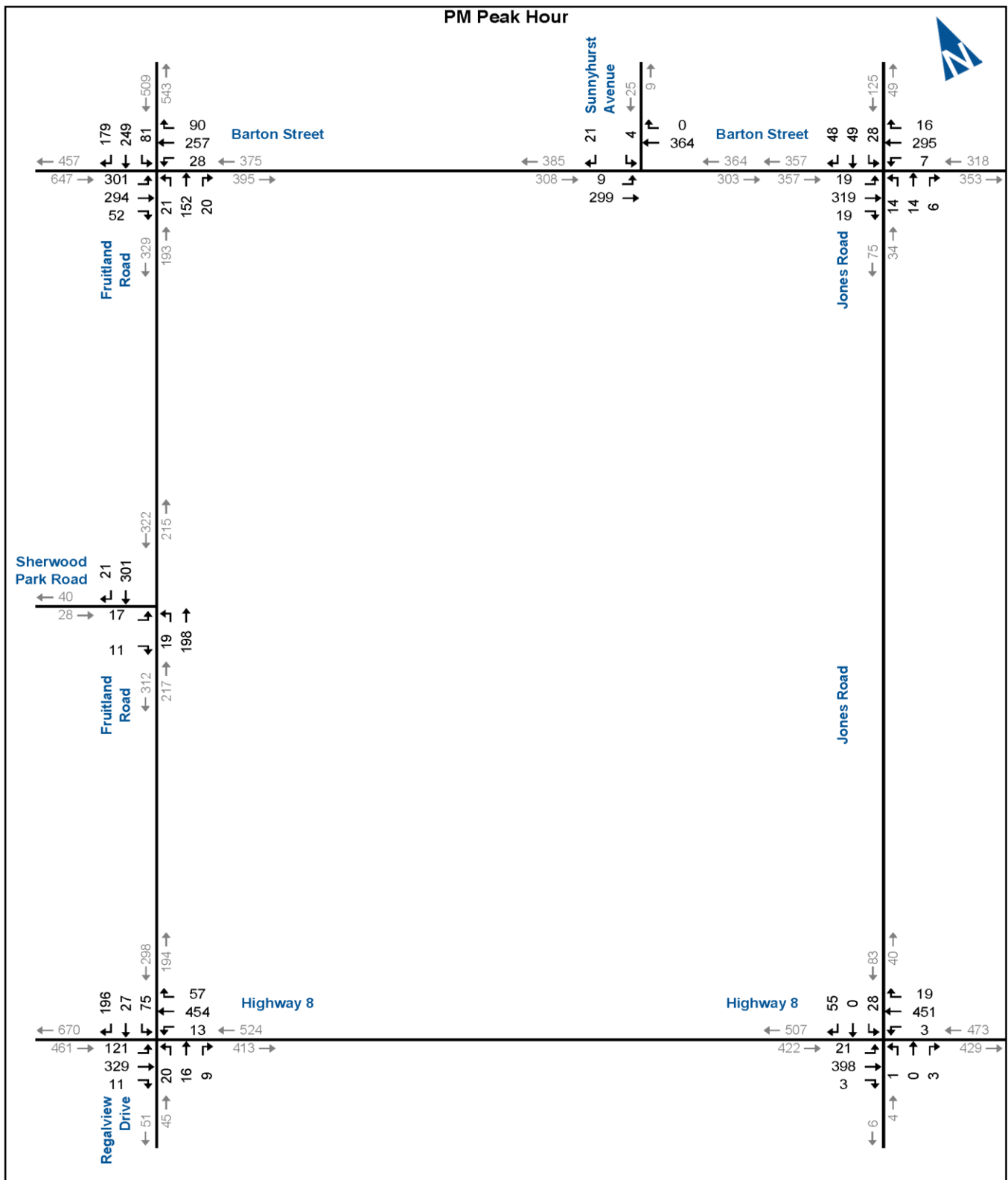
Intersection	Date
Barton Street and Fruitland Road	29 November 2022
Barton Street and Sunnyhurst Avenue	16 September 2021
Barton Street and Jones Road	29 November 2022
Fruitland Road and Sherwood Park Road	16 September 2021
Highway 8 and Fruitland Road	29 November 2022
Highway 8 and Jones Road	29 November 2022

To estimate the base year (2023) traffic volumes for the study area intersections, a compound annual growth rate of 2% was applied to the historical TMCs for all movements. Direction and application of this growth rate was provided by City staff.

Figure 2.5 and **Figure 2.6** illustrate the base year (2023) weekday AM and PM peak hour traffic volumes, respectively. **Appendix B** contains the raw turning movement count data for reference.







2.6 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying traffic flow efficiency at intersections. It is based on the delay experienced by individual vehicles executing various movements. The delay is related to the number of vehicles wanting to make a movement compared to the estimated capacity for that movement. The capacity is based on several criteria related to the opposing traffic flows.

The highest possible rating is LOS A, where the average total delay is equal to or less than 10 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized intersections), the movement is considered to have a LOS F and remedial measures are usually implemented if feasible.

The operations of the intersections in the study area were evaluated under existing conditions using Synchro 11 software and the Highway Capacity Manual (HCM) 2000 procedures. The intersection analysis considered three separate measures of performance:

- ▶ LOS for each turning movement. LOS is based on the average control delay per vehicle;
- ▶ Volume-to-capacity ratio (v/c) for each movement and the overall intersection; and
- ▶ 95th percentile queue length (metres).

Under the City of Hamilton *Traffic Impact Study Guidelines*,³ the operational analysis must include the identification of signalized and unsignalized intersections where:

- ▶ v/c ratios for through or shared through/turning movements that equal or exceed 0.85 at a signalized intersection;
- ▶ v/c ratios for exclusive turning movements that equal or surpass 0.90 at a signalized intersection;
- ▶ 95th percentile queues for an individual movement that are projected to exceed available turning lane storage; and
- ▶ Based on the average delay per vehicle on individual movements, LOS operating at LOS D or worse at unsignalized intersections.

The key parameters used in the analysis include:

³ City of Hamilton, *Traffic Impact Study Guidelines*, July 2009, p9-10.



- ▶ Existing lane configurations and lane widths;
- ▶ Heavy vehicle percentages derived from existing traffic count data;
- ▶ Conflicting pedestrian volumes derived from existing traffic count data;
- ▶ Calculated intersection Peak Hour Factors (PHF), which facilitates an assessment of the busiest 15-minute period within the peak hour;
- ▶ Existing signal timing plans obtained from the City. **Appendix B** contains the existing signal timing plan data;
- ▶ SimTraffic was utilized to output vehicle queues at the all-way stop-controlled intersection of Barton Street and Jones Road. The 95th percentile queues were generated via an average of five 60-minute simulation runs; and
- ▶ Synchro default values for all other inputs (for example, saturation flow rate of 1900 vehicles per hour per lane).

Table 2.2 and **Table 2.3** summarize the base year operational results including the LOS, average delay in seconds, v/c ratios, and 95th percentile queue lengths in metres for the weekday AM and PM peak hours, respectively. Critical movements are highlighted in the results tables. **Appendix C** contains the Synchro analysis outputs for reference.

The results indicate the study area intersections are operating at acceptable levels of service and within capacity during the weekday AM and PM peak hours.

The exceptions include the southbound left-turn movement at the intersection of Highway 8 and Jones Road during the AM peak hour, and the northbound and southbound left-turn movements during the PM peak hour, which operate at a LOS D. These movements are reported to operate within capacity ($v/c < 0.85$), and it is common for a minor roadway approach to an arterial roadway to experience higher delay during peak hours.

The 95th percentile queue lengths were checked for all turn lanes against provided storage, and queue lengths for through movements were also checked.

No spillback issues were identified, except for the eastbound left-turn movement at the intersection of Barton Street and Fruitland Road during the PM peak hour. The storage deficiency is noted to be seven metres, which is approximately the length of one vehicle. Upstream of the turn lane, the eastbound left-turn lane transitions into a two-way



left-turn lane (TWLTL), which can accommodate the additional storage required and it does not impact or block the adjacent through travel lane.



TABLE 2.2: BASE YEAR AM PEAK HOUR TRAFFIC OPERATIONS

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	
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Stor. Avail.	B 16 0.48 46 80 34	B 10 0.12 13 - -	> > > > >	B 13	A 10 0.02 3 40 37	B 10 0.15 14 - -	> > > > >	B 10	C 24 0.28 12 35 23	C 26 0.51 52 - -	> > > > >	C 25	C 25 0.44 25 50 25	D 35 0.78 74 - -	> > > > >	C 33	C 22 0.59
	Barton Street & Sunnyhurst Avenue	TWSC	LOS Delay V/C Q	< < <	A 0 0.01 0	> > >	A 0	> > >	A 0 0.18 0	> > >	A 0					B 11 0.04 1	> > >	B 11		
	Jones Road & Barton Street	AWSC	LOS Delay D'Util Q	< < <	B 11 0.39 28	> > >	B 11	< < <	B 11 0.38 27	> > >	B 11	< < <	A 9 0.13 17	> > >	A 9	< < <	A 10 0.11 22	> > >	A 10	
	Fruitland Road & Sherwood Park Road	TWSC	LOS Delay V/C Stor. Avail.	B 11 0.05 1 - -	> > >	B 11						A 8 0 0 20 20	A 0 0.16 0 - -	> > >	A 0		A 0 0.12 0 - -	> > >	A 0	
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Stor. Avail.	A 4 0.23 12 75 63	A 5 0.29 31 - 10 10	A 3 0.01 0 10 10	A 4	A 7 0.02 3 65 62	A 10 0.37 55 - 66	A 7 0.05 4 70 66	A 9	D 35 0.16 10 20 10	D 35 0.20 16 - -	> > >	D 35	D 38 0.46 22 25 3	C 35 0.14 14 - -	> > >	D 36	B 13 0.38
	Jones Road & Highway 8	TWSC	LOS Delay V/C Stor. Avail.	A 9 0.05 1 75 74	A 0 0.23 0 - -	> > >	A 1	A 0 0 0 35 35	A 0 0.29 0 - -	> > >	A 0	C 22 0 0 25 25	A 0 0 0 - -	> > >	C 22	D 26 0.05 1 15 14	B 12 0.04 1 - -	> > >	C 16	

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 with through movement

D'Util - Degree Utilization



TABLE 2.3: BASE YEAR PM PEAK HOUR TRAFFIC OPERATIONS

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		
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	C 21 0.63 87 80 -7	B 12 0.20 27 - -	> > > > > >	B 16	B 11 0.06 8 40 32	B 12 0.20 25 - -	> > > > > >	B 12	C 21 0.13 7 35 28	C 22 0.29 32 - -	> > > > > >	C 22	C 22 0.26 18 50 32	C 33 0.76 83 - -	> > > > > >	C 31	C 20 0.68	
	Barton Street & Sunnyhurst Avenue	TWSC	LOS Delay V/C Q	< < <	A 0 0.01 0		A 0		A 0 0.26 0	> > > >	A 0						B 13 0.06 2		> > > >	B 13	
	Jones Road & Barton Street	AWSC	LOS Delay D'Utl Q	< < <	C 16 0.61 31	> > > >	C 16	< < <	B 14 0.55 28	> > > >	B 14	< < <	A 10 0.07 14	> > > >	A 10	< < <	B 11 0.25 19	> > > >	B 11		
	Fruitland Road & Sherwood Park Road	TWSC	LOS Delay V/C Q Stor. Avail.	B 12 0.06 1 - -		> > > > > >	B 12						A 8 0.02 0 20 20	A 0 0.13 0 - -		A 1		A 0 0.2 0 - -	> > > > > >	A 0	
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.23 12 75 63	A 5 0.28 35 - 10	A 3 0.01 0 10 10	A 5	A 7 0.02 4 65 61	B 11 0.46 79 - -	A 7 0.05 4 70 66	B 10	D 37 0.29 10 20 10	C 34 0.08 9 - -	> > > > > >	D 35	D 38 0.48 25 25 0	D 36 0.29 24 - -	> > > > > >	D 36	B 15 0.44	
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 9 0.02 1 75 74	A 0 0.26 0 - -	> > > > > >	A 0	A 8 0 0 35 35	A 0 0.31 0 - -	> > > > > >	A 0	D 25 0.01 0 25 25	B 11 0 0 - -	> > > > > >	B 14	D 26 0.15 4 15 11	B 12 0.11 3 - -	> > > > > >	C 17		

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 with through movement

D'Utl - Degree Utilization



3 Development Concept

3.1 Development Description

The Fruitland-Winona Secondary Plan (FWSP) area is generally located at the eastern limits of the City of Hamilton (Stoney Creek). Block 1 is part of the “West Lands” which is generally bound by Barton Street to the north, Fruitland Road to the west, Highway 8 to the south, and just east of Jones Road to the east. The development concept includes residential, commercial, and institutional land uses. **Figure 3.1** illustrates the Secondary Plan.

The FWSP establishes defined land uses and standards to guide developments within the Secondary Plan area. The Secondary Plan is currently under appeal, except for specific areas approved per Ontario Land Tribunal (OLT) decisions.

A Block Servicing Strategy is being developed for the approved Secondary Plan area per the provisions set out in the FWSP. **Table 3.1** summarizes the development statistics (maximum densities) for the Secondary Plan area. **Appendix D** contains the population summary data prepared by the consultant team. For a conservative approach (i.e., err on the high side), the maximum densities are adopted for assessment.

The subject site is anticipated to be built-out and occupied by Year 2031 without a defined phase plan. As the lands build-out, individual site plans will be developed. These plans may vary from the plans proposed here and as a result, additional studies may be required from the City to support the development of the individual sites.





Figure 3.1

TABLE 3.1: DEVELOPMENT STATISTICS (MAXIMUM DENSITY)

Area	Land Use	Units / GFA
B1	Commercial	1.6 ha
B2	Residential (Medium Density)	76 units
B3	Residential (Medium Density)	335 units
F1	Residential (Low Density)	24 units
F2	Residential (Low Density)	96 units
F3	Residential (Low Density)	90 units
F4	Institutional (Elementary School)	30 students*
J1	Residential (Medium Density)	67 units
J2	Park	0.05 ha
J3	Residential (Medium Density)	107 units
J4	Residential (Medium Density)	119 units
J5	Commercial	2.19 ha
NW1	Residential (Low Density)	192 units
NW2	Residential (Low Density)	36 units
NW3	Residential (Low Density)	102 units
NW4	Residential (Medium Density)	253 units
NE1	Park	7.18 ha
NE2	Residential (Medium Density)	153 units
NE3	Institutional (Elementary School)	310 students*
SW1	Residential (Low Density)	59 units
SW2	Residential (Medium Density)	192 units
SW3	Residential (Low Density)	104 units
SW4	Park	2.5 ha
SW5	Residential (Low Density)	230 units
SW6	Residential (Low Density)	98 units
SW7	Residential (Medium Density)	265 units
SW8	Commercial	0.76 ha
SW9	Commercial	0.35 ha
SW10	Residential (Low Density)	28 units
SE1	Residential (Medium Density)	188 units
SE2	Residential (Low Density)	125 units
SE3	Residential (Low Density)	116 units
SE4	Park	5.09 ha
SE5	Commercial	2.14 ha
SE6	Institutional (Elementary School)	260 students*
SE7	Residential (Low Density)	38 units
Total Site		
Residential (Low Density)		1,338 Units
Residential (Medium Density)		1,755 Units
Institutional (Elementary School)		600 Students
Commercial		7.04 ha
*The number of students for F4, NE3, SE6 were prorated based on land size and an assumption of a total of 600 students for Block 1.		



3.2 Internal Road Network

It is understood that internal roadways would be constructed first, and land use developments would be constructed over the years without a defined phase plan. The concept plan proposes three new roads in Block 1:

Gordon Dean Avenue:

- ▶ Reference was made to *Gordon Dean Avenue Environmental Study Report*⁴ and *Urban Hamilton Official Plan*;⁵
- ▶ Gordon Dean Avenue is a new north-south collector road extending southerly from Sunnyhurst Avenue to Highway 8. The proposed speed limit is 50 km/h. Gordon Dean Avenue will provide a 36-metre Right-of-Way (ROW) and a five-lane cross section (two northbound and two southbound lanes separated by painted median and an exclusive left-turn lane at the intersections). The purpose of this new road is to remove trucks from Fruitland Road between Barton Street and Highway 8. Gordon Dean Avenue would become a new truck route;
- ▶ A 1.8-metre sidewalk is proposed on the west side of Gordon Dean Avenue and a 3.0-metre multi-use path is proposed on the east side of the roadway;
- ▶ The intersections of Gordon Dean Avenue with Barton Street, Collector B, and Highway 8 are proposed as signalized intersections as outlined in Table 6.4 of the Environmental Study report; and
- ▶ Storage lane lengths for the exclusive left-turn lanes on Gordon Dean Avenue were not provided in the Environmental Study report. A minimum storage provision of 20 metres is assumed for analysis purposes.

Collector B:

- ▶ Reference was made to *Gordon Dean Avenue Environmental Study Report*⁶ and *Urban Hamilton Official Plan*;⁷
- ▶ Collector B is a new east-west collector road that extends easterly from Sherwood Park Road into the adjacent Block 2

⁴ <https://www.hamilton.ca/sites/default/files/2022-08/gordon-dean-environmental-study-report.pdf>

⁵ City of Hamilton, *Urban Hamilton Official Plan*, November 2022.

⁶ <https://www.hamilton.ca/sites/default/files/2022-08/gordon-dean-environmental-study-report.pdf>

⁷ City of Hamilton, *Urban Hamilton Official Plan, Schedule C – Functional Road Classification*, November 2022.



lands east of the Block 1 lands. The proposed speed limit is 50 km/h. Collector B will provide a 26-metre ROW and a two-lane cross section (one lane in each direction);

- ▶ As per City of Hamilton *Complete Streets Design Guidelines* (June 2022),⁸ a typical connector cross section (26-metre ROW) for new construction includes a 1.8-metre sidewalk and 2.0-metre cycle track on both sides of the street. When left-turn lanes are introduced approaching intersections, on-street parking provisions can be used for additional lane width requirement;
- ▶ Proposed intersection lane configurations and intersection control for intersections of Collector B with Fruitland Road and Gordon Dean Avenue are documented in Table 6.4 of the Environmental Study report. For this study, it was assumed the intersection of Jones Road and Collector B operates unsignalized with two-way stop-control on the Collector B approaches; and
- ▶ Recommended storage lengths for exclusive turn lanes on Collector B were not provided in the Environmental Study report; therefore, a minimum storage provision of 20 metres is assumed for the exclusive eastbound and westbound turn lanes for analysis purposes.

Street C and Street D:

- ▶ Street C is a local road that is proposed to generally bisect the lands west of Gordon Dean Avenue. It is assumed Street C provides a two-lane cross section (one lane in each direction);
- ▶ Street D is a local road located in the southwest corner of Block 1. It contains two cul-de-sacs and intersects with Street C approximately mid-point between Highway 8 and Collector B;
- ▶ Street C connects with Gordon Dean Avenue at its north end and two scenarios are proposed for the Street C alignment at the south end. Scenario 1 – connection to Highway 8 and Scenario 2 – no connection to Highway 8. Both scenarios are assessed in this study;
- ▶ As per the City of Hamilton *Complete Streets Design Guidelines* (June 2022),⁹ a typical neighbourhood street ROW ranges between 15 to 20 metres in an urban area. Assuming a 20-metre ROW, Street C and Street D would provide a 1.8-metre

⁸ City of Hamilton, *Complete Streets Design Guidelines*, June 2022, p138.

⁹ *ibid*, p142.



sidewalk on both sides and cycling trips would be accommodated within the travelled sections of the roadway; and

- ▶ It is assumed the Street C intersections with Gordon Dean Avenue, Collector B, and Highway 8 are unsignalized with Street C operating under stop-control, and the T-intersection of Street C and Street D is all-way stop-control.

3.3 Trip Generation

Trip generation for the subject site reflects its multiple uses (residential, institutional, and commercial) and is based on data contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual (11th Edition)*.¹⁰ The proposed land uses align most closely with the following ITE Land Use Codes (LUC):

- ▶ **LUC 220 (Multifamily Housing – Low-Rise):** includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units that have two or three floors;
- ▶ **LUC 221 (Multifamily Housing – Mid-Rise):** includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways;
- ▶ **LUC 520 (Elementary School):** typically serves students attending kindergarten through the fifth or sixth grade. An elementary school is usually centrally located in a residential community to facilitate student access; and
- ▶ **LUC 820 (Shopping Centre (>150k)):** is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit.

Given the size of the Secondary Plan area, Block 1 was divided into six Traffic Analysis Zones (TAZ) based on the supporting internal road network. Trip generation was estimated for each TAZ based on the development statistics using ITE data.

Figure 3.2 illustrates the six TAZs and **Table 3.2** summarizes the estimated trip generation. A 25% coverage was assumed for the commercial lands as detailed site plans with Gross Floor Area (GFA) were not available.

For a conservative approach (i.e., errs on the high side), no vehicular trip reduction is applied to account for internal trips or pass-by trips. An

¹⁰ Institute of Transportation Engineers. *Trip Generation Manual (11th Edition)*, 2021.



internal trip is a trip that has both its origin and destination within the development site. These trips would not impact the external transportation network. Whereas pass-by trips represent intermediate stops at the subject site on a trip that is already on the road network. Commercial/retail land uses usually generate pass-by trips; however, for analysis purposes it was assumed all commercial trips are new trips.

Overall, Block 1 is conservatively estimated to generate approximately 1,787 AM peak hour and 2,066 PM peak hour vehicle trips at full build-out/occupancy.



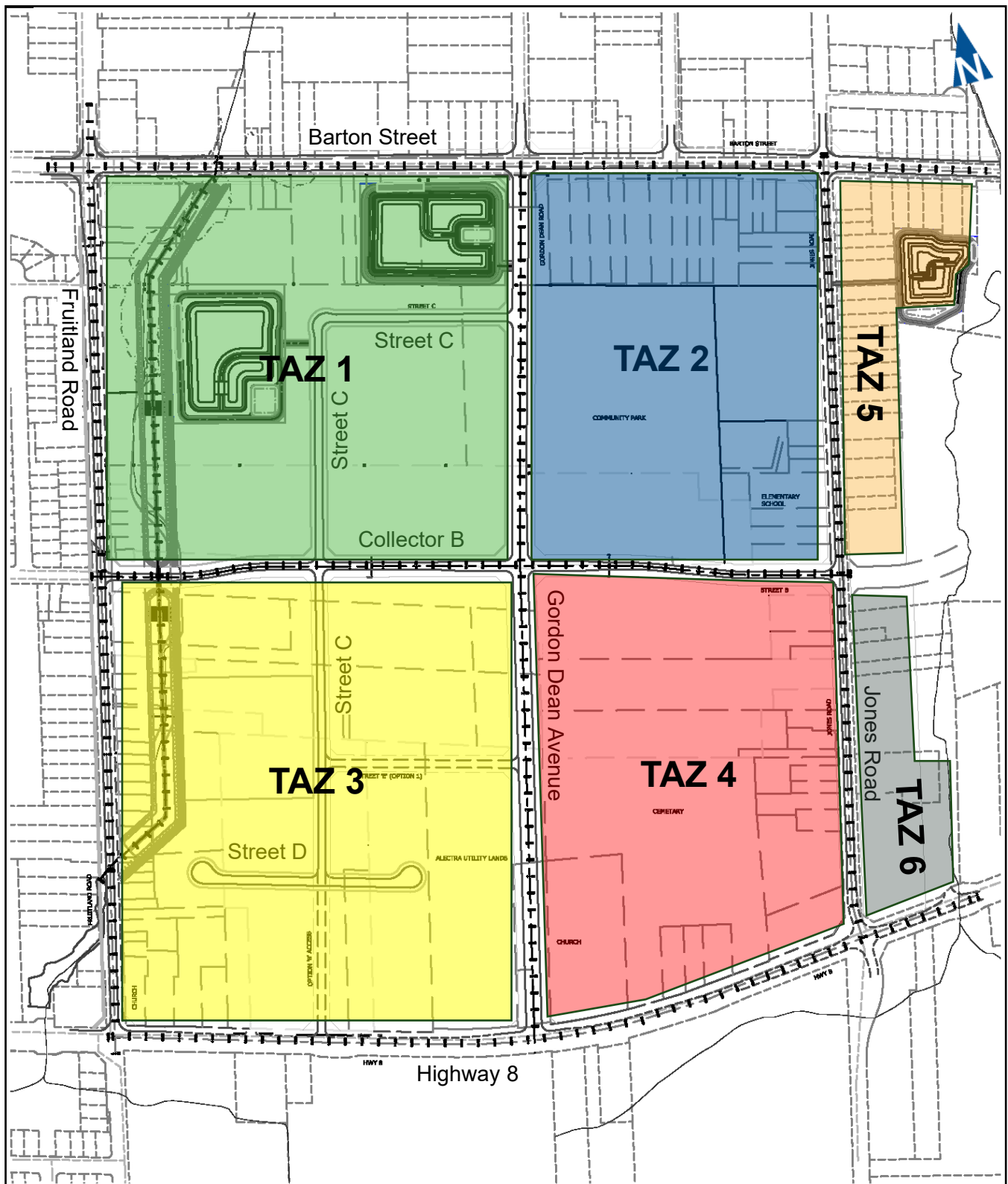


TABLE 3.2: TRIP GENERATION ESTIMATE

LUC	Variable	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
TAZ 1 (B1, B2, F1, F2 NW1, NW2, NW3, NW4)									
220	450 units	Eqn ¹	39	123	162	Eqn ²	135	79	214
221	329 units	Eqn ³	31	102	133	Eqn ⁴	79	50	129
820	43,056 SF	R ¹	22	14	36	R ²	70	76	146
Sub Total			92	239	331		284	205	489
TAZ 2 (B3, NE1, NE2, NE3)									
221	488 units	Eqn ³	47	156	203	Eqn ⁴	117	74	191
520	310 students	R ³	124	105	229	R ⁴	23	27	50
Sub Total			171	261	432		140	101	241
TAZ 3 (F3, F4, SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8, SW9, SW10)									
220	609 units	Eqn ¹	51	161	212	Eqn ²	178	104	282
221	457 units	Eqn ³	43	146	189	Eqn ⁴	109	70	179
520	30 students	R ³	12	10	22	R ⁴	2	3	5
820	29,870 SF	R ¹	16	9	25	R ²	49	53	102
Sub Total			122	326	448		338	230	568
TAZ 4 (SE1, SE2, SE3, SE4, SE5, SE6, SE7)									
220	279 units	Eqn ¹	26	83	109	Eqn ²	89	52	141
221	188 units	Eqn ³	16	55	71	Eqn ⁴	45	29	74
520	260 students	R ³	104	88	192	R ⁴	19	23	42
820	57,587 SF	R ¹	30	18	48	R ²	94	102	196
Sub Total			176	244	420		247	206	453
TAZ 5 (J1, J3)									
221	174 units	Eqn ³	15	50	65	Eqn ⁴	41	27	68
Sub Total			15	50	65		41	27	68
TAZ 6 (J4, J5)									
221	119 units	Eqn ³	9	32	41	Eqn ⁴	29	18	47
820	58,932 SF	R ¹	31	19	50	R ²	96	104	200
Sub Total			40	51	91		125	122	247
Block 1 (TAZ 1 to 6)									
220	1338 units		116	367	483		402	235	637
221	1755 units		161	541	702		420	268	688
520	600 students		240	203	443		44	53	97
820	189,445 SF		99	60	159		309	335	644
TOTAL			616	1,171	1,787		1,175	891	2,066
Eqn ¹ : T = 0.31X + 22.85 (24%in/76%out); Eqn ² : T = 0.43X + 20.55 (63%in/37%out); Eqn ³ : T = 0.44X – 11.61 (23%in/77%out); Eqn ⁴ : T = 0.39X + 0.34 (61%in/39%out); R ¹ : 0.84 vehicle trips per 1,000 GLA (62%in/38%out); R ² : 3.4 vehicle trips per 1,000 GLA (48%in/52%out); R ³ : 0.74 vehicle trips per student (54%in/46%out); R ⁴ : 0.16 vehicle trips per student (46%in/54%out).									



3.4 Trip Distribution

The directional distribution of traffic approaching and departing the subject lands is a function of several variables including population density, existing travel patterns, and efficiency of the roadways leading to the site.

Trip distribution for the subject lands was estimated based on a review of existing traffic patterns and trip distribution data calculated from extracted 2016 Transportation Tomorrow Survey (TTS) data.

Appendix E includes the TTS queries and outputs for reference.

Trip origin/destination information for all vehicle trips in and out of the Traffic Analysis Zone (TAZ) 5077 were extracted from the TTS database. TAZ 5077 is bounded by Barton Street to the north, Fruitland Road to the west, Glover Road to the east, and Canadian Pacific Railway Hamilton Subdivision to the south. Trips were separated as those to/from TAZ 5077 through general four directions (that is, north, south, east, and west). The TTS origin/destination distribution was then cross-referenced with the general travel patterns documented in the base year traffic volumes to obtain a final trip distribution via the study area roadways.

Table 3.3 summarizes the resultant trip distribution. The distribution reflects both macro travel direction (derived from the TTS) and micro route choices within the study area (derived from the existing travel patterns). It is noted trips were not assigned to/from the south via Jones Road due to the discontinuous road network caused by the Niagara Escarpment.

TABLE 3.3: ESTIMATED TRIP DISTRIBUTION

To/From	Via	AM Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	Fruitland Road	20%	25%	20%	20%
	Jones Road	5%	5%	5%	5%
South	Regalview Drive	5%	5%	5%	5%
East	Barton Street	10%	10%	15%	15%
	Highway 8	20%	15%	15%	15%
West	Barton Street	20%	20%	25%	15%
	Highway 8	20%	20%	15%	25%
Total		100%	100%	100%	100%

Two sets of site-generated traffic assignments are prepared to reflect Scenario 1 – Street C connection to Highway 8 and Scenario 2 – Street C no connection to Highway 8.

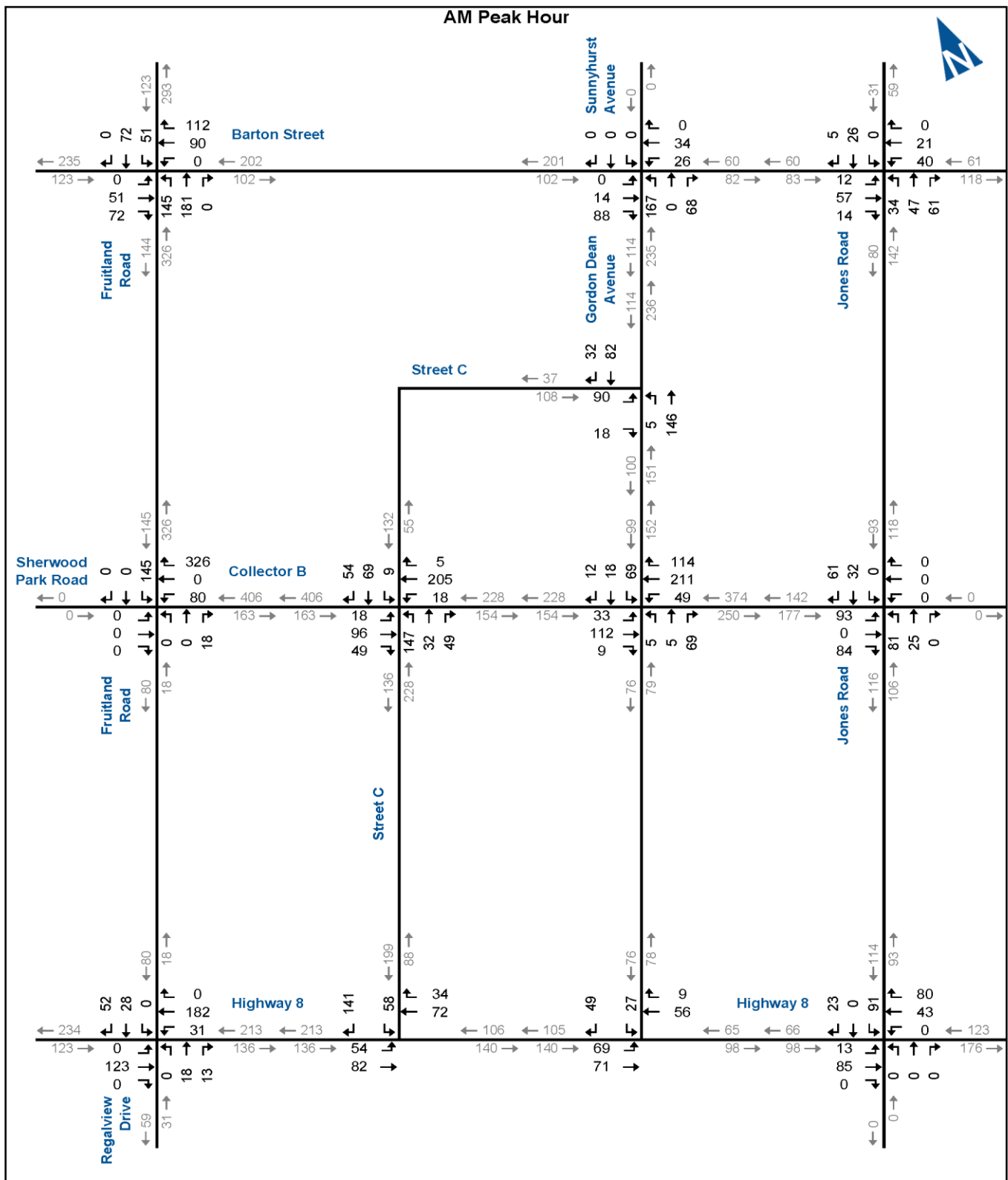


Site trips for each TAZ are assigned to the internal and external road networks in accordance with the trip distribution and logical routing choice. **Appendix F** contains the detailed trip assignment diagrams for each TAZ.

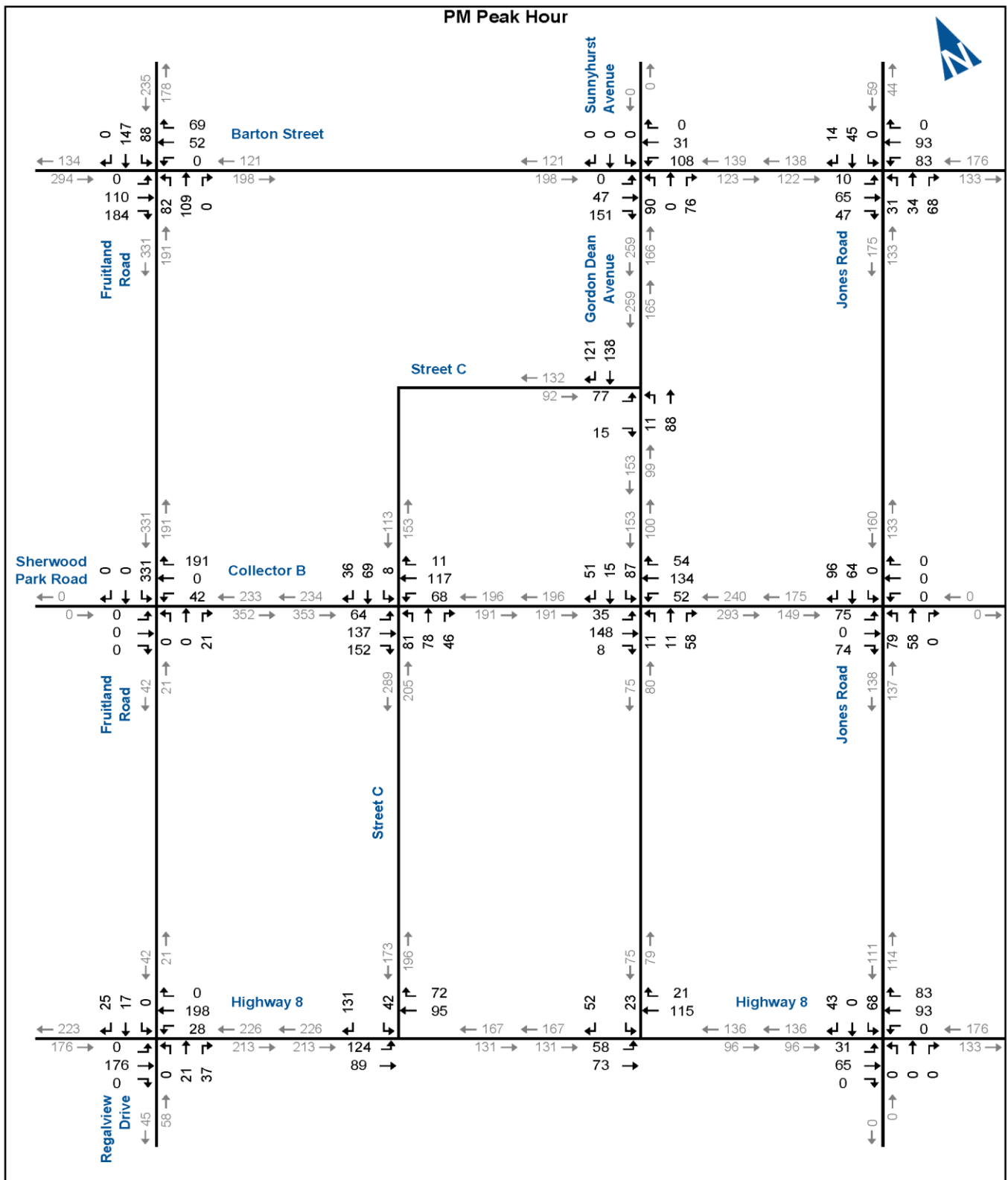
Figure 3.3 and **Figure 3.4** illustrate the site-generated traffic forecasts under Scenario 1 for the AM and PM peak hours, respectively. **Figure 3.5** and **Figure 3.6** illustrate the site-generated traffic forecasts under Scenario 2 for the AM and PM peak hours, respectively.

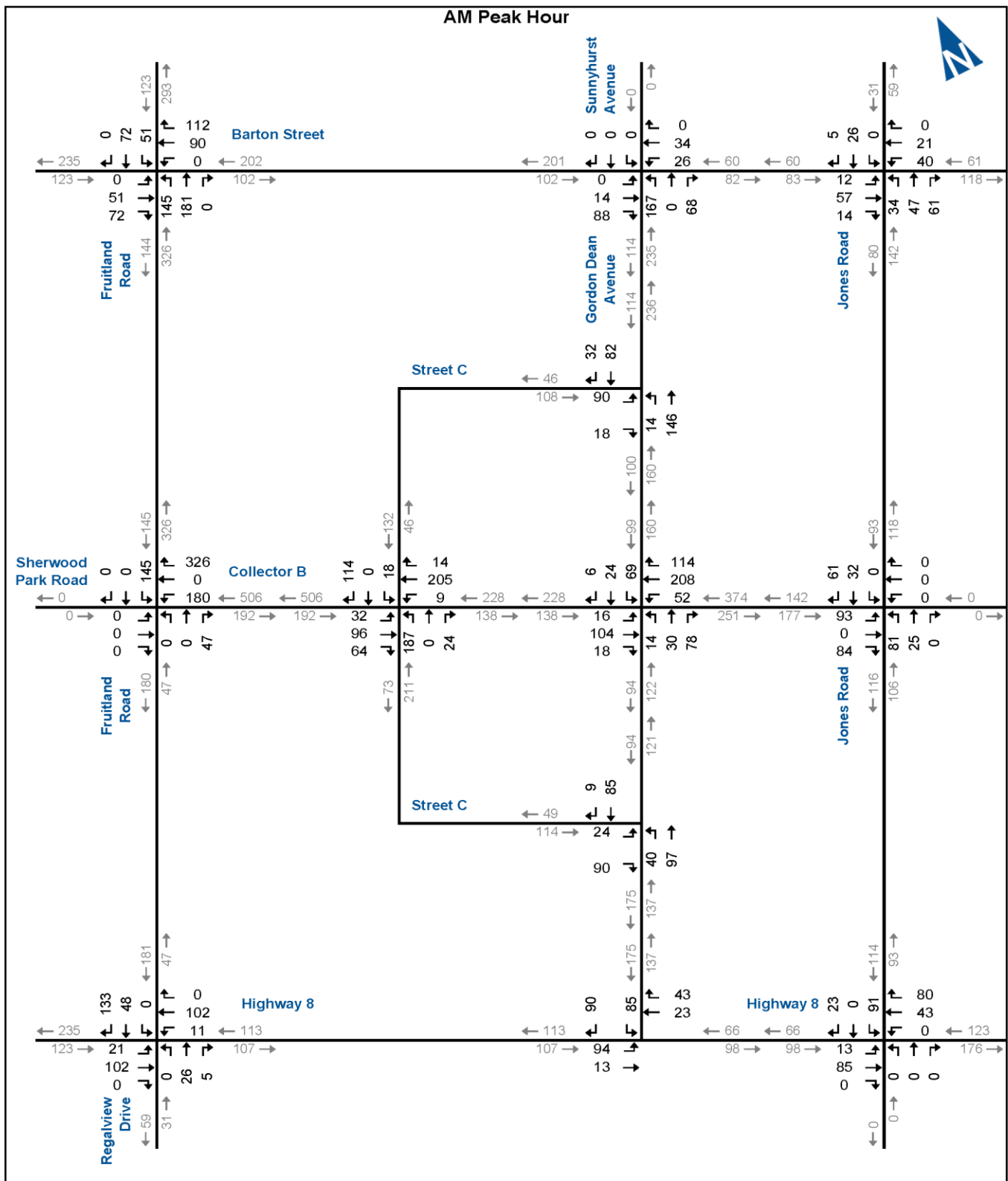
Slight differences (less than five trips) between the total inbound/outbound volumes from the figures and the trip generation estimates are due to rounding.



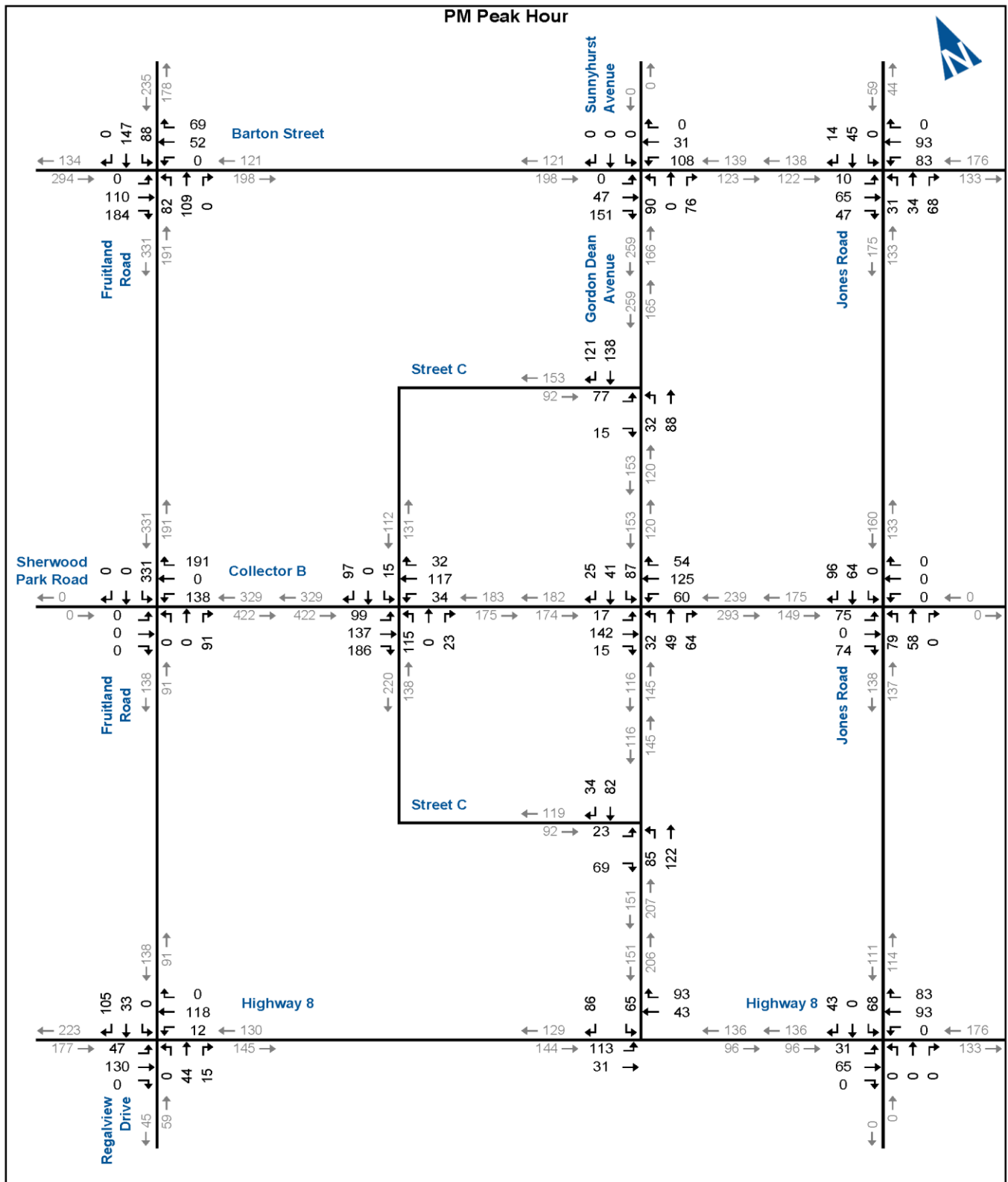


Site-Generated Traffic Forecasts AM Peak Hour (Scenario 1)





Site-Generated Traffic Forecasts AM Peak Hour (Scenario 2)



Site-Generated Traffic Forecasts PM Peak Hour (Scenario 2)

4 Future Traffic Conditions

4.1 Horizon Years

Consistent with the City of Hamilton *Traffic Impact Study Guidelines*¹¹ and the established terms of reference, traffic forecasts and analyses have been completed for the horizon years of 2031 and 2036, representing the assumed full build-out/occupancy year and a period of five years beyond the full build-out/occupancy year.

4.2 Future Transportation Network

4.2.1 Road Network

Through a review of applicable background documents, the following transportation network improvements are identified. It is assumed that the planned improvements will be in place by 2031 to support the Fruitland-Winona Secondary Plan area, which includes the Block 1 lands.

Descriptions for the new internal roadways of Gordon Dean Avenue, Collector B, Street C, and Street D were previously detailed in **Section 3.2**.

Barton Street:

- ▶ Reference was made to the *Barton Street and Fifty Road Improvement Environmental Assessment*¹² and *Urban Hamilton Official Plan*,¹³
- ▶ Widening of Barton Street from two to four lanes from Fruitland Road to Fifty Road (Alternative 3) with a 36.6-metre ROW (interim solution) or a 40-metre ROW (ultimate solution);
- ▶ With a 36.6-metre ROW (interim solution), a 1.5-metre sidewalk is proposed on the north side of Barton Street and a 3.0-metre multi-use path is proposed on the south side;
- ▶ With a 40-metre ROW (ultimate solution), a 1.5-metre sidewalk is proposed on the north side and a 3.0-metre cycle track (two-way) and a 3.0-metre promenade are proposed on the south side;
- ▶ Proposed intersection lane configurations along Barton Street were based on the Draft Roll Out Plan; and

¹¹ City of Hamilton, *Traffic Impact Study Guidelines*, July 2009.

¹² <https://engage.hamilton.ca/bartonfiftyea>

¹³ City of Hamilton, *Urban Hamilton Official Plan*, November 2022.



- ▶ In terms of intersection control, it was assumed the intersection of Barton Road and Jones Road is signalized based on the intersection configurations (multi-lane approaches and stop bars on the east and west legs). The intersection of Barton Street and Gordon Dean Avenue is proposed signalized based on the Gordon Dean Avenue Environmental Study Report.

Highway 8:

- ▶ Reference was made to the *Municipal Class Environmental Assessment for Improvements to Highway 8 Between Fruitland Road and Fifty Road, Transportation Assessment Report*¹⁴ and *Urban Hamilton Official Plan*;¹⁵
- ▶ Widening of Highway 8 from two to four lanes from Fruitland Road to Fifty Road with a 36-metre ROW. The proposed pedestrian and cycling facilities have not been determined; however, it is assumed that active transportation infrastructure will be provided on both sides of Highway 8 based on the City of Hamilton *Complete Streets Design Guidelines* (June 2022);¹⁶
- ▶ Proposed intersection lane configurations and intersection traffic control along Highway 8 were illustrated in Figure 39 of the Transportation Assessment Report; and
- ▶ Recommended storage lengths for exclusive turn lanes were summarized in Table 18 of the Transportation Assessment Report.

Fruitland Road:

- ▶ Reference was made to *Fruitland Road Right of Way Options*;¹⁷
- ▶ Fruitland Road was originally designated as a 36-metre ROW arterial road. With Gordon Dean Avenue proposed to replace Fruitland Road as the designated truck route, the proposed ROW of Fruitland Road can be reduced to 26 metres;
- ▶ With a 26-metre ROW, a 1.8-metre bike lane and a 1.8-metre sidewalk are proposed on both sides of Fruitland Road; and
- ▶ The proposed cross-section is either two travel lanes (one lane in each direction) or two travel lanes and a centre left-turn lane. **Figure 4.1** illustrates the proposed Fruitland Road ROW

¹⁴ John Wood Group, *Municipal Class Environmental Assessment for Improvements to Highway 8 Between Fruitland Road and Fifty Road, Transportation Assessment Report*, November 2020.

¹⁵ City of Hamilton, *Urban Hamilton Official Plan*, November 2022.

¹⁶ City of Hamilton, *Complete Streets Design Guidelines*, June 2022, p130.

¹⁷ <chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.hamilton.ca/sites/default/files/2023-09/block1-stoney-creek-pic3-presentation-slide10.pdf>

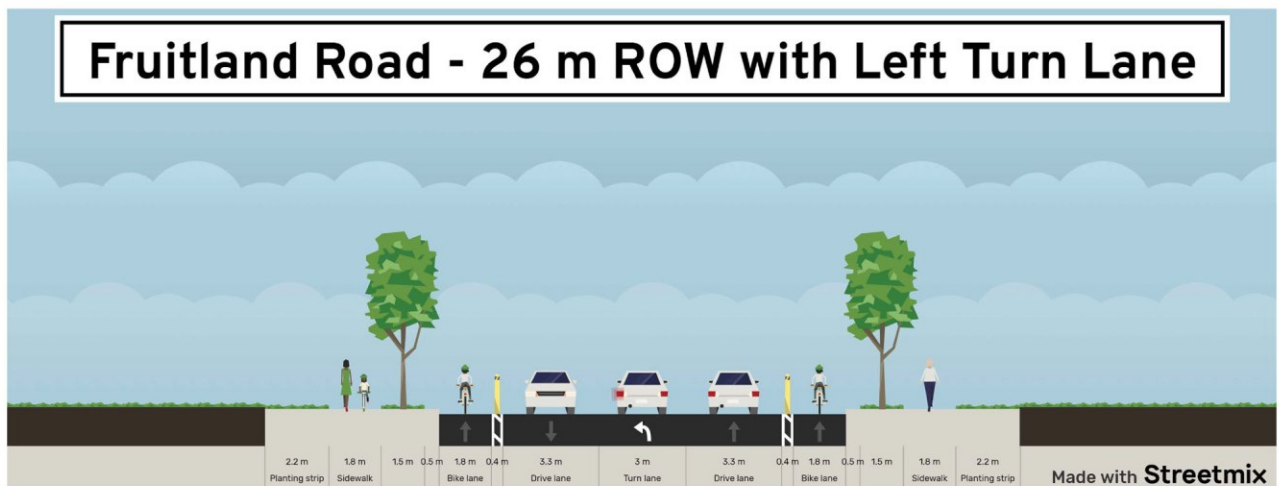
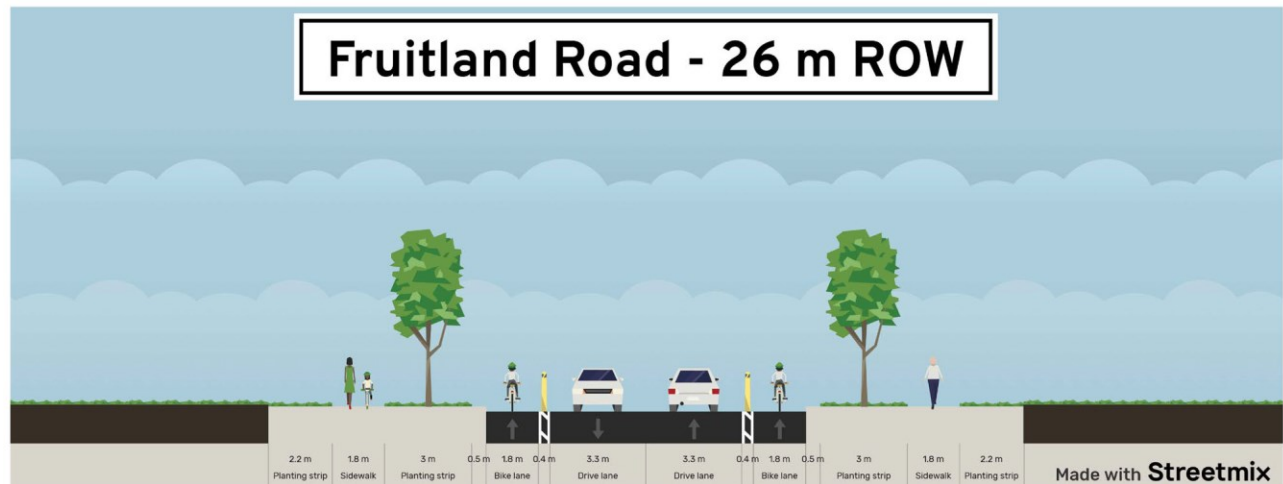


options. For a conservative approach, the existing two-lane cross section with exclusive left-turn lanes at intersections have been used for all future operational analyses.

Figure 4.2 illustrates the planned future road network (without Street C and Street D).

Table 4.1 summarizes the planned intersection control and storage lengths at the study area intersections.





NTS

Image Source: <https://www.hamilton.ca/sites/default/files/2023-09/block1-stoney-creek-pic3-presentation.pdf>

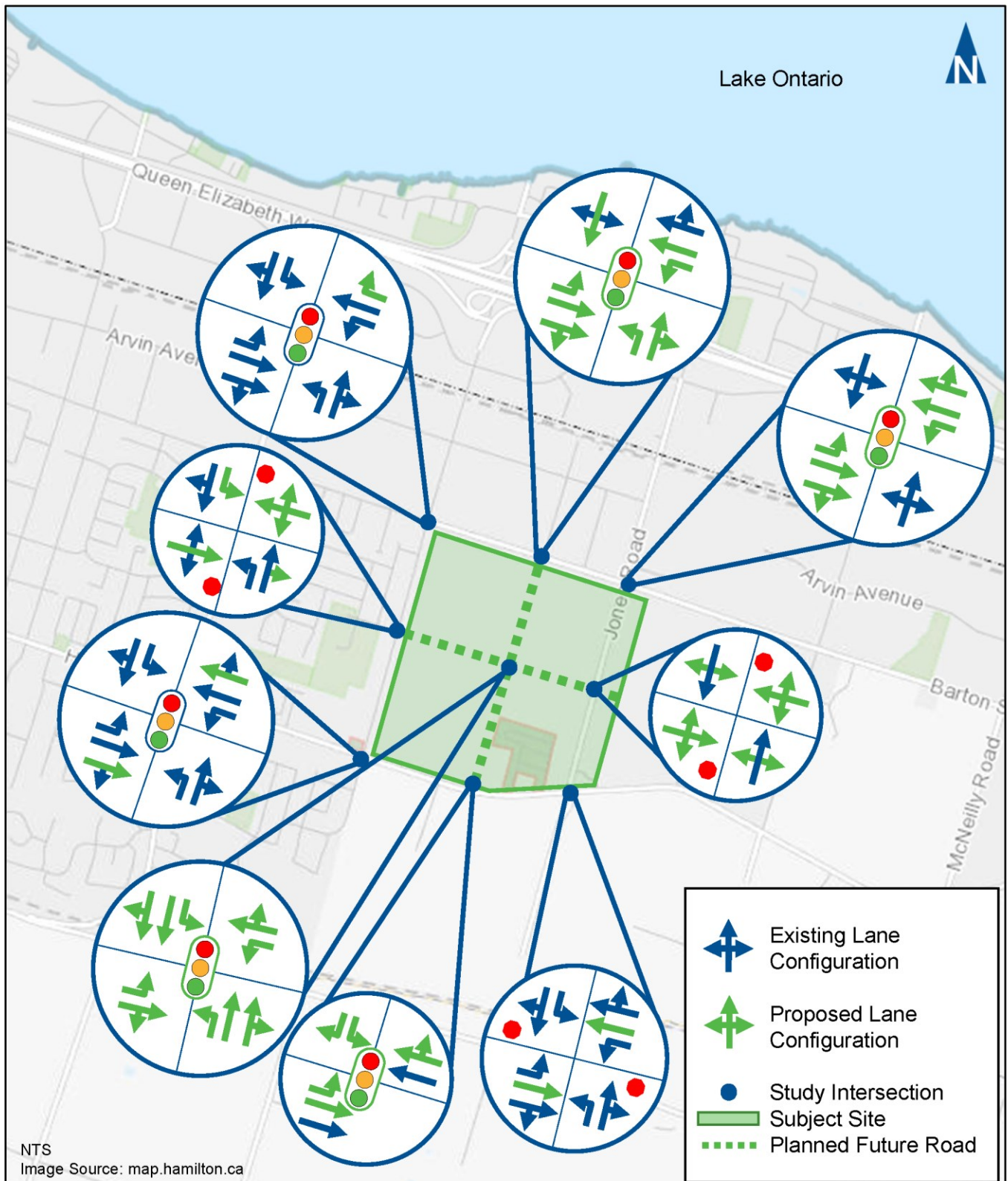


TABLE 4.1: PLANNED INTERSECTION CONTROL AND STORAGE LENGTHS

Intersection	Movement	Storage Length	Source/Assumptions
Barton Street and Fruitland Road (signalized)	NBL	as existing (35 m)	-
	SBL	as existing (50 m)	-
	EBL	as existing (80 m)	-
	WBL	30 m	Based on the Barton Street Roll Out Plan
Barton Street and Gordon Dean Avenue/Sunnyhurst Avenue (proposed signalized)	NBL	-	Based on Table 6.4 in the Gordon Dean Avenue Environmental Study Report
	EBL	20 m	Based on the Barton Street Roll Out Plan;
	WBL	20 m	Traffic signal cycle length was assumed to be 90 seconds, same as the nearby signalized intersections (i.e., Barton Street with Fruitland Road and Highway 8).
Barton Street and Jones Road (proposed signalized)	EBL	30 m	Based on the Barton Street Roll Out Plan;
	WBL	30 m	Traffic signal cycle length was assumed to be 90 seconds, same as the nearby signalized intersections (i.e., Barton Street with Fruitland Road and Highway 8).
Fruitland Road and Sherwood Park Road/Collector B (unsignalized)	NBL	as existing (20 m)	-
	SBL	20 m	Assumed to be the same as the NBL storage length
Gordon Dean Avenue and Collector B (proposed signalized)	NBL	20 m	Traffic signal cycle length was assumed to be 90 seconds, same as the nearby signalized intersections (i.e., Barton Street with Fruitland Road and Highway 8); A minimum storage provision of 20 metres is assumed for analysis purposes.
	SBL	20 m	
	EBL	20 m	
	WBL	20 m	
Jones Road and Collector B (assumed unsignalized)	-	-	Assumed two-way stop-control with no exclusive turn lanes
Highway 8 and Fruitland Road/Regalview Drive (signalized)	NBL	30 m	Based on Table 18 in the Highway 8 EA Transportation Assessment Report
	SBL	50 m	
	EBL	80 m	
	WBL	50 m	
Highway 8 and Gordon Dean Avenue (proposed signalized)	NBL	-	Based on Table 6.4 in the Gordon Dean Avenue Environmental Study Report
	SBL	-	
	EBL	50 m	Traffic signal cycle length was assumed to be 90 seconds, same as nearby signalized intersections (i.e., Barton Street with Fruitland Road and Highway 8); EBL storage length was based on Table 18 in the Highway 8 EA Transportation Assessment Report.
	WBL	50 m	
Highway 8 and Jones Road (unsignalized)	NBL	30 m	Based on Table 18 in the Highway 8 EA Transportation Assessment Report
	SBL	40 m	
	EBL	30 m	
	WBL	30 m	



4.2.2 Transit

With extensive developments planned in the Fruitland-Winona Secondary Plan (FWSP) area, there will be opportunities/demand to expand transit service in consultation with HSR as the area is built-out and demand for transit services increase.

Reference was made to the City of Hamilton *Transportation Master Plan Review and Update*.¹⁸ As related to our study area, Route 10 (B Line Express) will continue operating east beyond Centennial Parkway to Fifty Road and is proposed to travel through Block 1 along Gordon Dean Avenue. Route 10 (B Line Express) is part of the BLAST network which is a frequent rapid transit system in the City of Hamilton.

4.2.3 Active Transportation

The City of Hamilton *Transportation Master Plan Review and Update*¹⁹ identifies the planned cycling network for the city. The city intends to provide a transportation system that offers a choice of integrated travel modes, emphasizing active transportation (walking and cycling), public transit and carpooling.

Along with other background studies, the following active transportation network improvements are identified for the study area roadways.

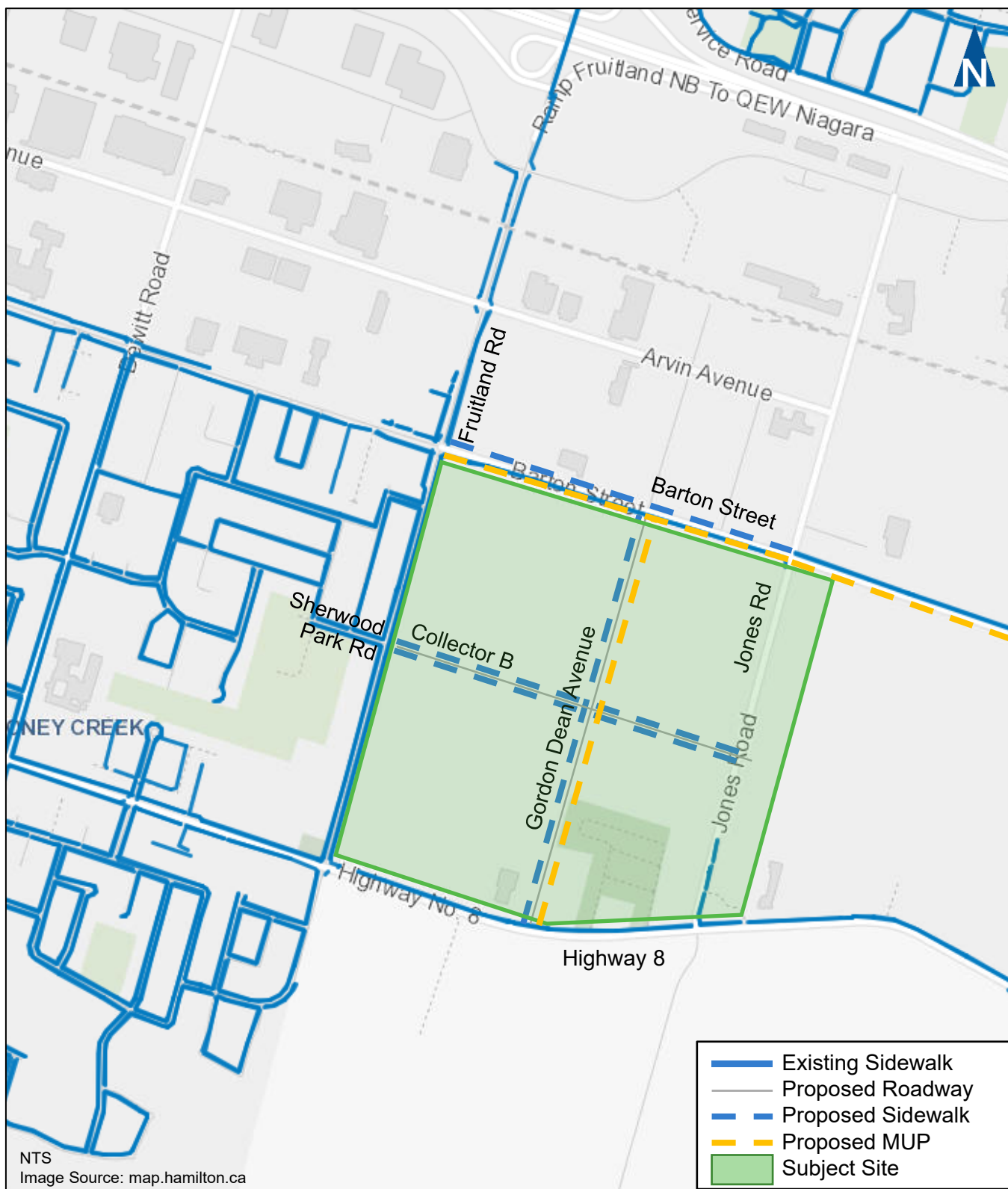
- ▶ Proposed bike lanes on Fruitland Road north of Highway 8;
- ▶ Proposed bike lanes on Barton Street west of Fruitland Road;
- ▶ A proposed multi-use path and a cycle track on the south side of Barton Street east of Fruitland Road;
- ▶ A sidewalk on the north side of Barton Street east of Fruitland Road;
- ▶ A proposed 3.0-metre multi-use path on the east side of Gordon Dean Avenue and a 1.8-metre sidewalk on the west side of the road;
- ▶ Sidewalks and cycle track on both sides of Collector B.

Figure 4.3 and **Figure 4.4** illustrate the future sidewalk and cycling networks, respectively.

¹⁸ City of Hamilton, *Transportation Master Plan Review and Update, Map 2: Rapid Transit Map & Inter-Regional Connections*.

¹⁹ Ibid, *Map 1B: Planned Cycling Network - Urban*.







4.3 General Background Growth

General background traffic growth reflects increases in traffic unrelated to development within the immediate area of the subject site. This background traffic growth has been estimated using a compounded per annum growth rate.

Based on the comments received from the City on the previous submission, a general compounded per annum growth rate should be used for the study area. City of Hamilton staff suggested an annual growth rate of 2.0% up to 2031 followed with an annual growth rate of 4.5% from 2031 to 2041.

Specifically, the 2.0% per annum compounded growth rate was applied to the base year traffic volumes to derive the 2031 background traffic forecasts. The 4.5% per annum compounded growth rate was then applied to the 2031 traffic forecasts to derive the 2036 background traffic forecasts.

These growth rates account for the estimated site traffic contributions generated by the adjacent Block 2 lands. The application of generalized growth rates does not reflect/account for the traffic travelling east/west via Collector B between Block 1 and Block 2 as the roadway does not currently exist.

The Block 2 traffic volumes expected to use Collector B were estimated based on the land uses and densities identified in the FWSP using the ITE data (11th edition). **Appendix G** contains the trip generation, trip distribution, and trip assignment for Block 2 site traffic. The Block 2 traffic volumes forecast to use Collector B were conservatively included in addition to the generalized background forecasts.

As Gordon Dean Avenue will be constructed by 2031 to replace Fruitland Road as the designated truck route, truck volumes on Fruitland Road were diverted to Gordon Dean Avenue in 2031 and 2036 horizons using the following methodology:

- ▶ Extract truck volumes from the turning movement counts data at the study area intersections;
- ▶ Applied appropriate growth rates (2.0% up to 2031 and 4.5% from 2031 to 2041) to obtain 2031 and 2036 truck traffic forecasts; and
- ▶ Assign diverted truck traffic from the Fruitland Road segment (between Barton Street and Highway 8) to Gordon Dean Avenue.



Figure 4.5 and **Figure 4.6** illustrate the 2031 diverted truck forecasts during the weekday AM and PM peak hours, respectively.

Figure 4.7 and **Figure 4.8** illustrate the 2036 diverted truck forecasts during the weekday AM and PM peak hours, respectively.

Figure 4.9 and **Figure 4.10** illustrate the 2031 background traffic forecasts during the weekday AM and PM peak hours, respectively.

Figure 4.11 and **Figure 4.12** illustrate the 2036 background traffic forecasts during the weekday AM and PM peak hours, respectively.

4.4 Total Traffic

The forecast total traffic volumes are the summation of the forecast site-generated traffic volumes and the forecast background traffic volumes.

Two sets of traffic forecasts were prepared representing Scenario 1 – Street C connection to Highway 8 and Scenario 2 – Street C no connection to Highway 8.

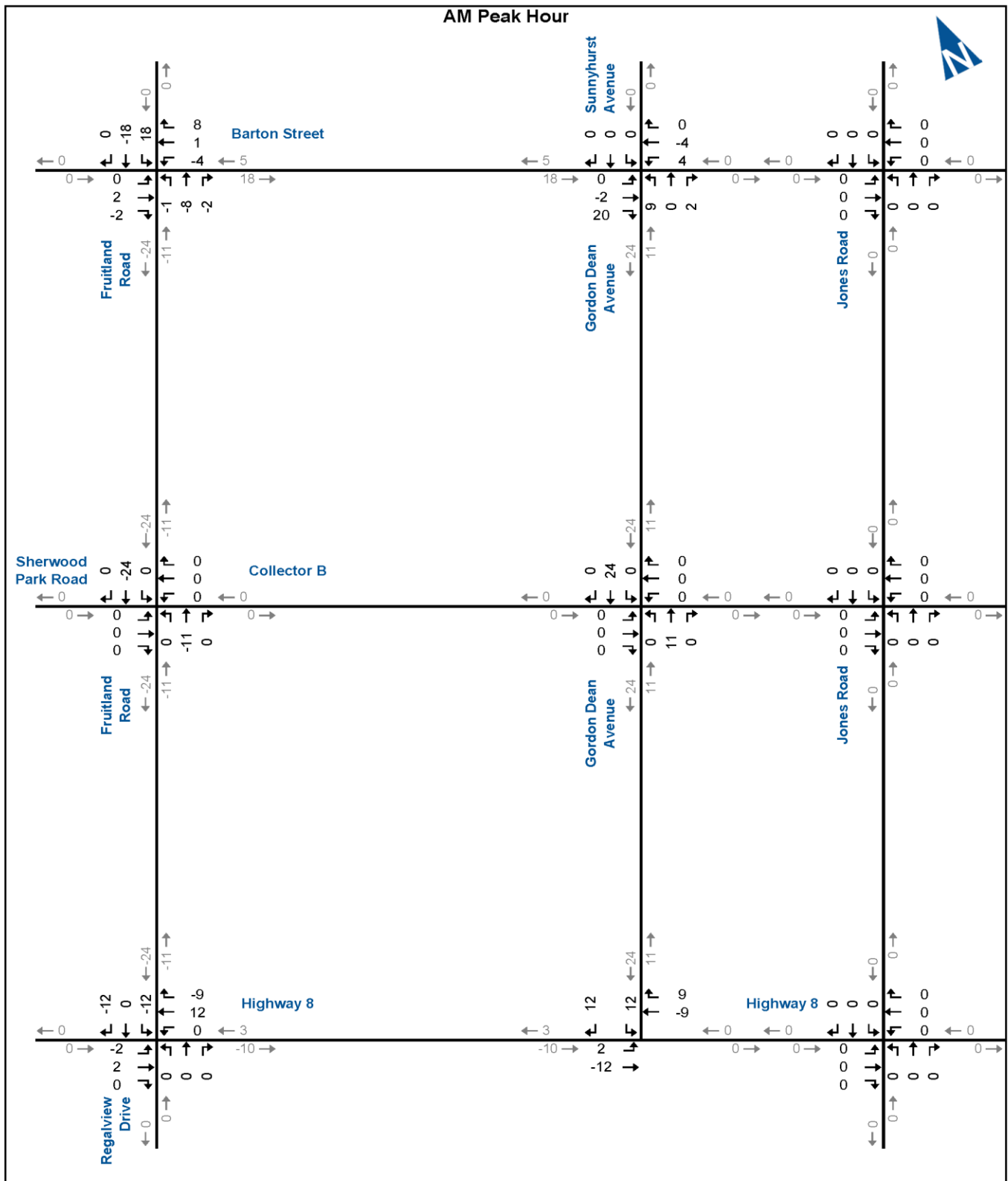
Figure 4.13 and **Figure 4.14** illustrate the Scenario 1 2031 total traffic forecasts during the weekday AM and PM peak hours, respectively.

Figure 4.15 and **Figure 4.16** illustrate the Scenario 1 2036 total traffic forecasts during the weekday AM and PM peak hours, respectively.

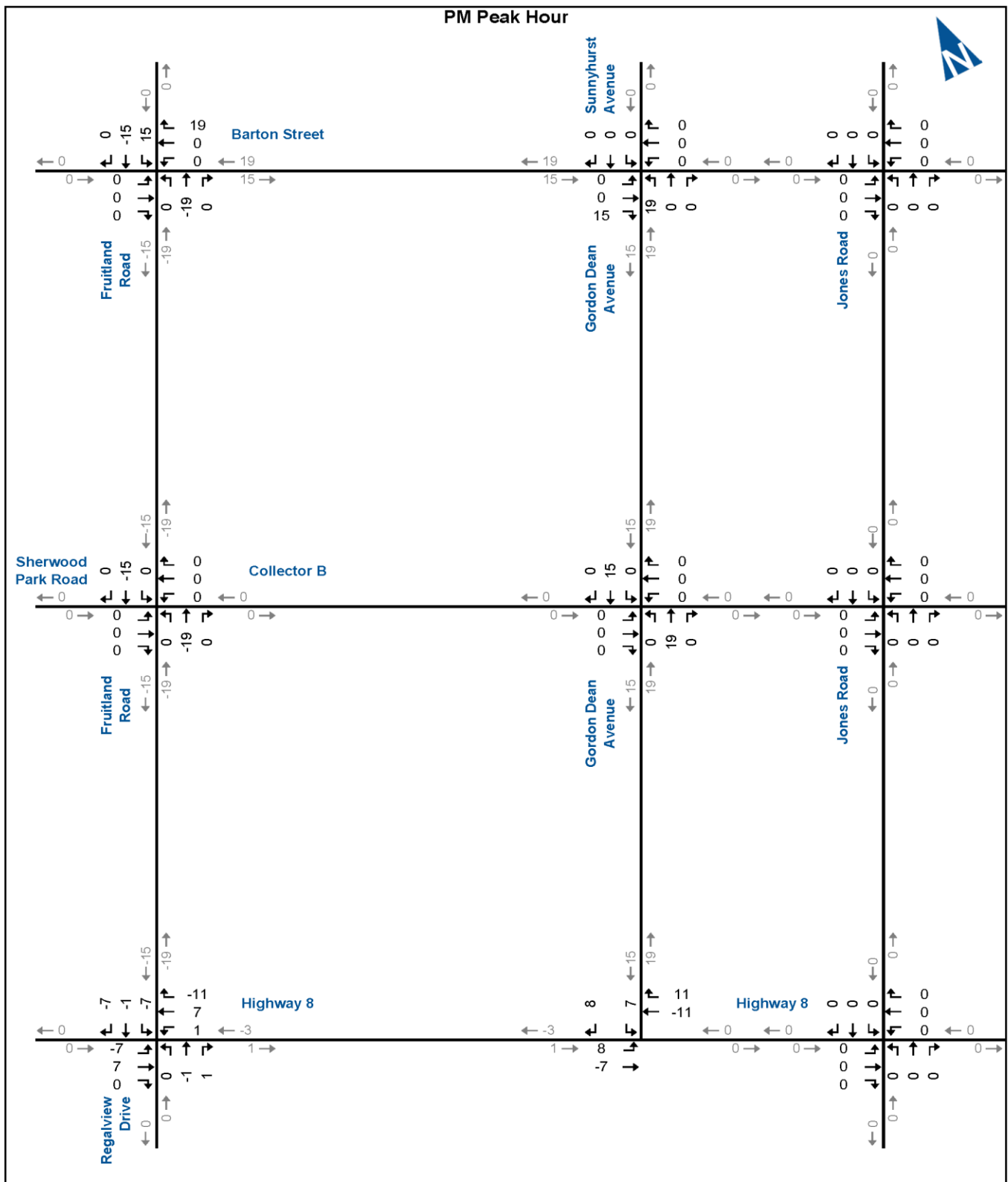
Figure 4.17 and **Figure 4.18** illustrate the Scenario 2 2031 total traffic forecasts during the weekday AM and PM peak hours, respectively.

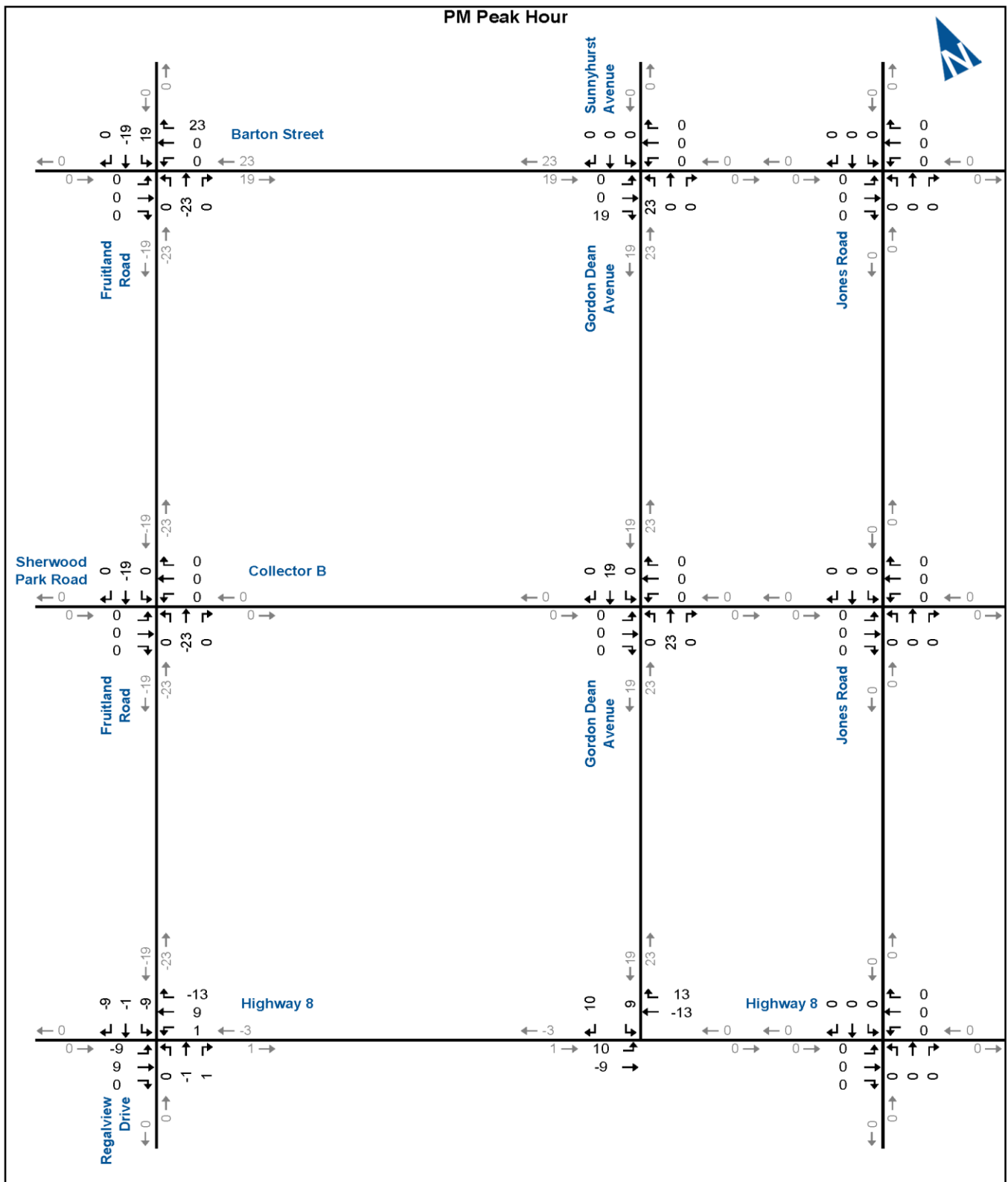
Figure 4.19 and **Figure 4.20** illustrate the Scenario 2 2036 total traffic forecasts during the weekday AM and PM peak hours, respectively.

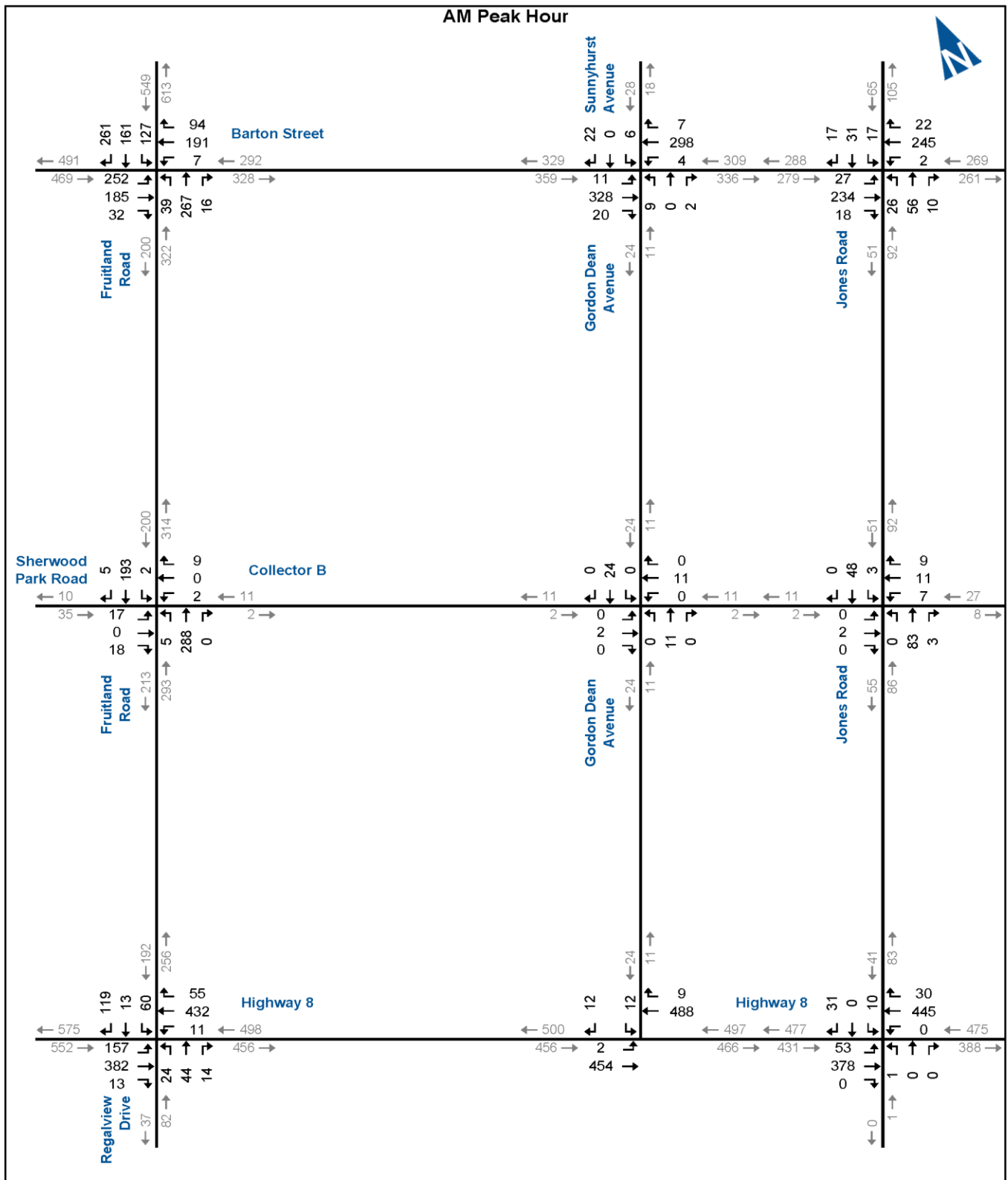


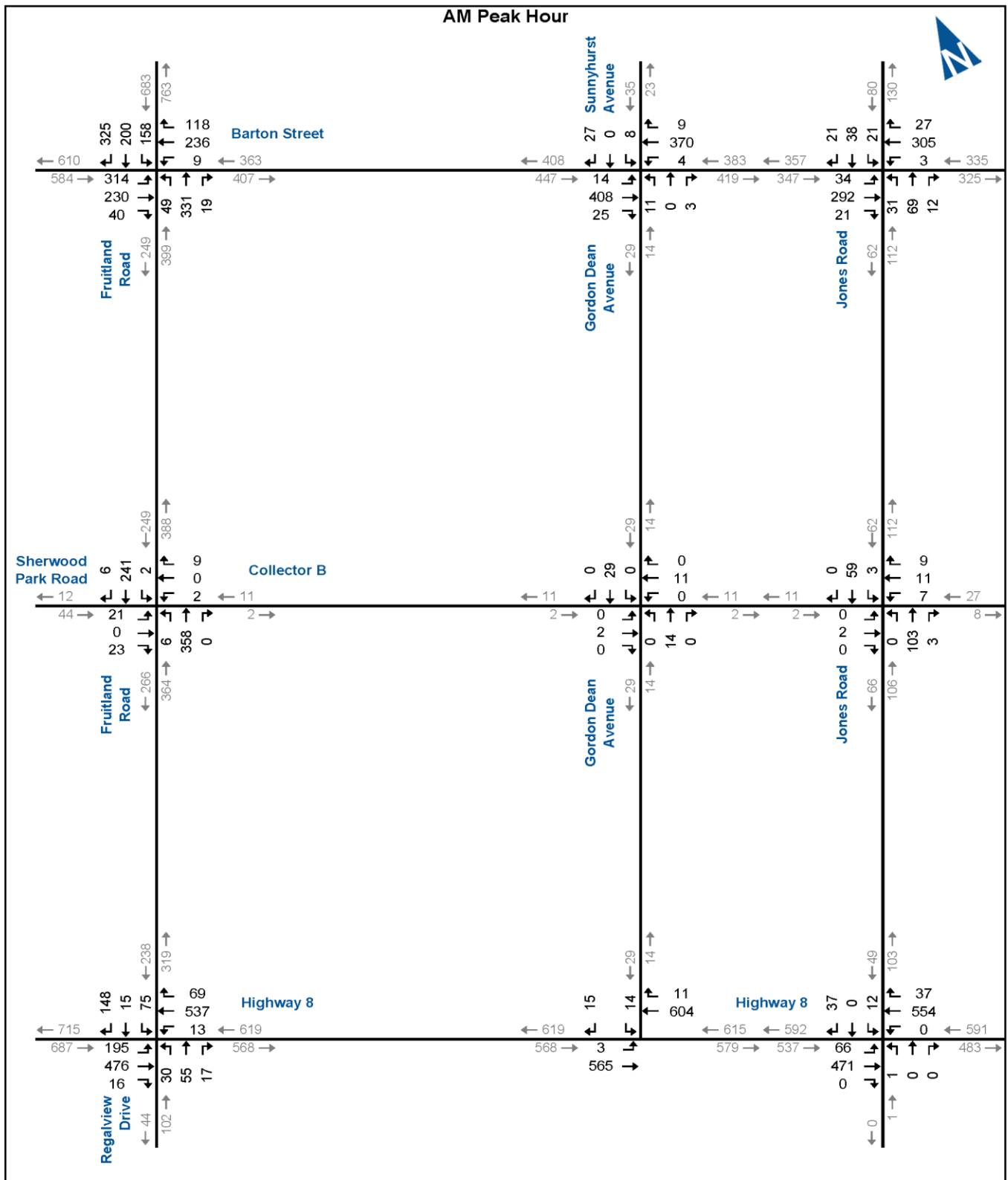


2031 Diverted Truck Forecasts AM Peak Hour

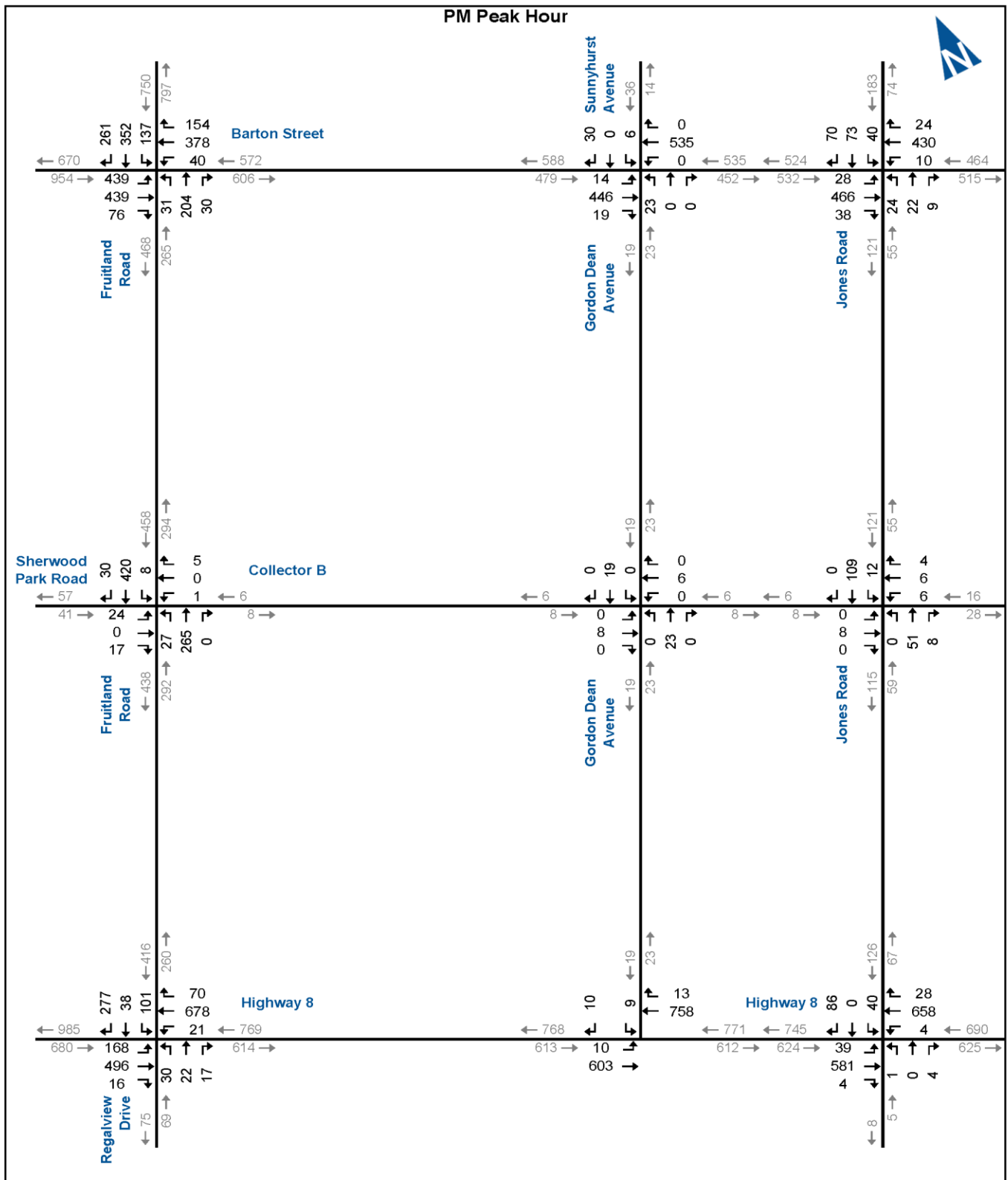




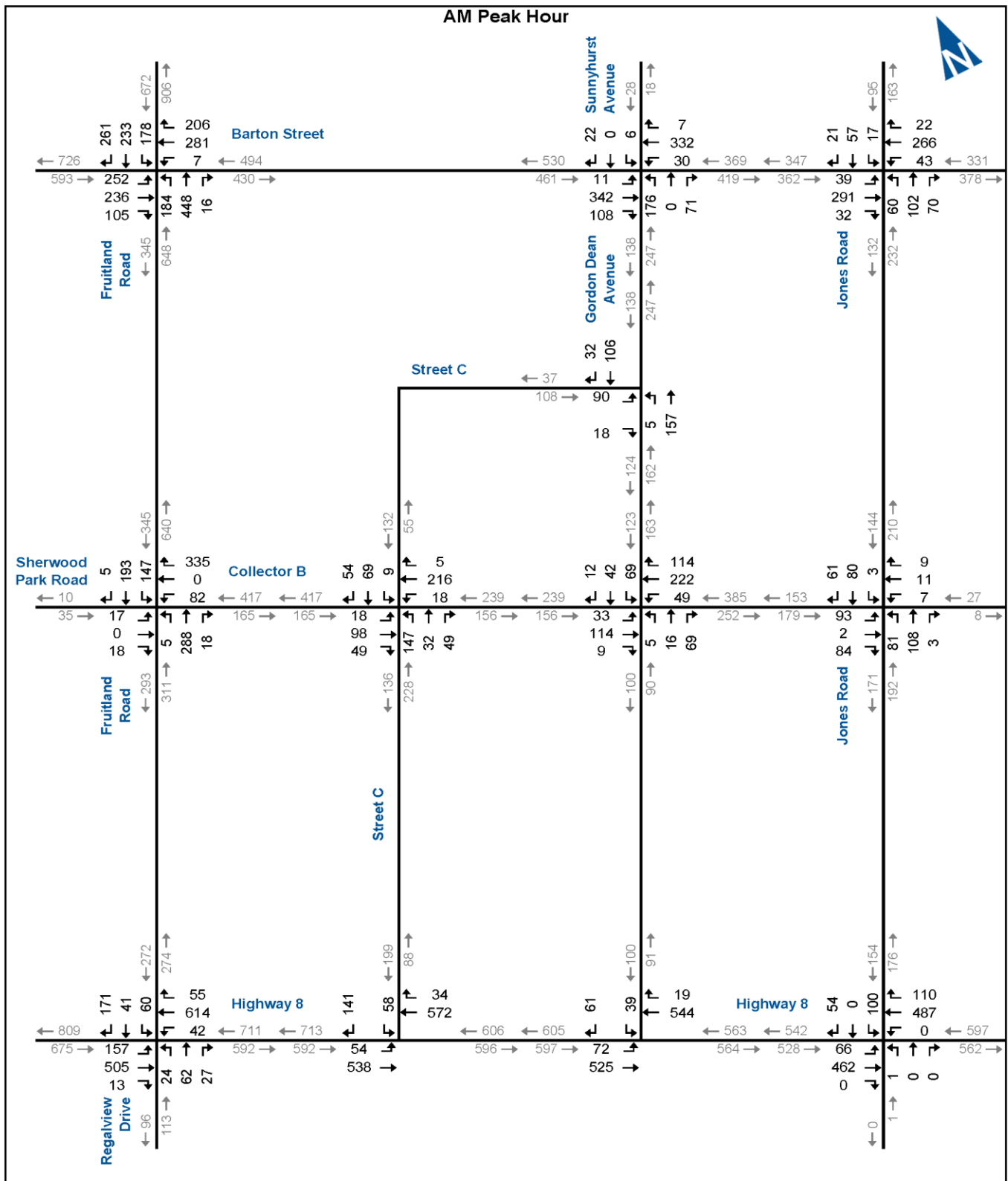




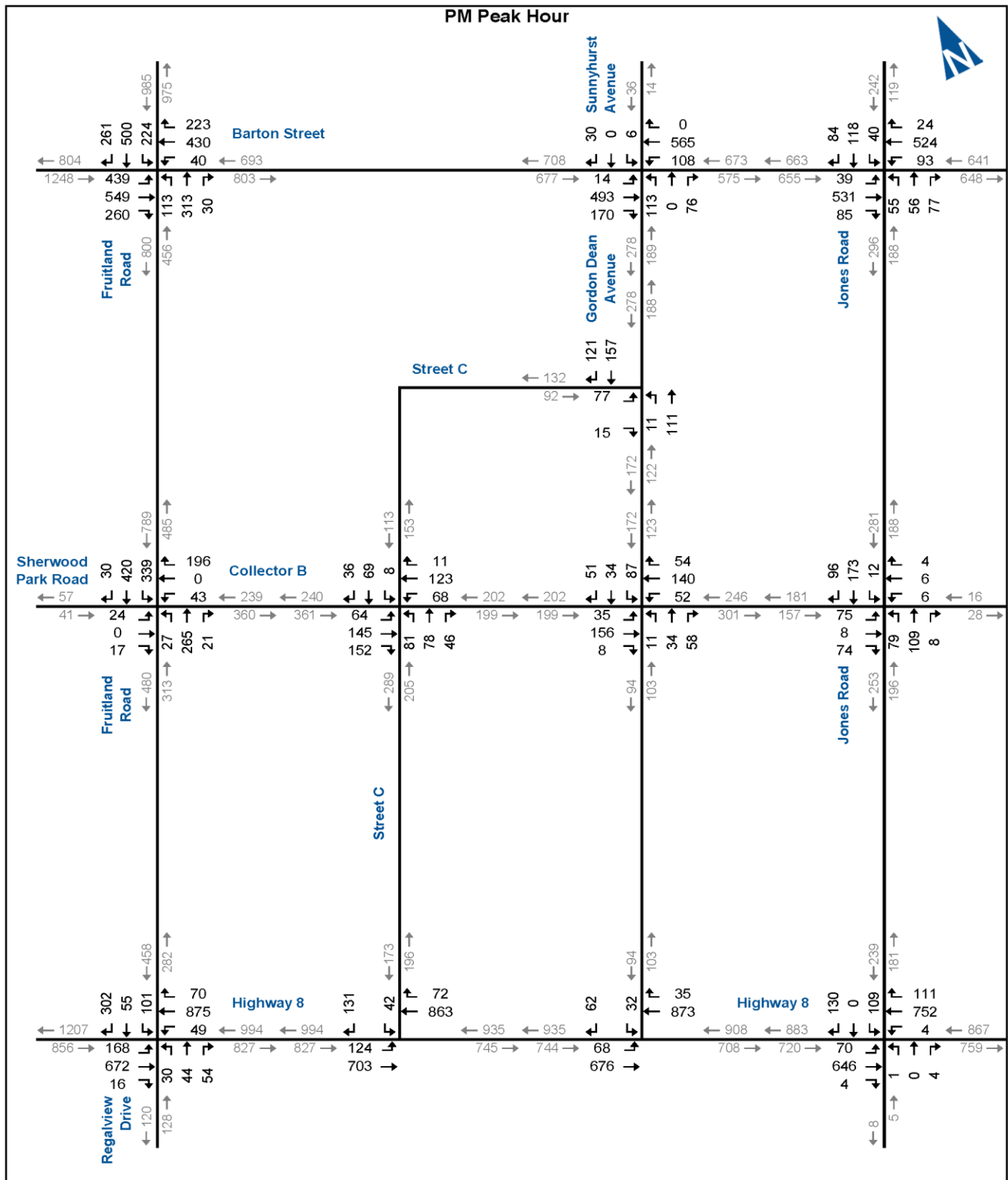
2036 Background Traffic Forecasts AM Peak Hour

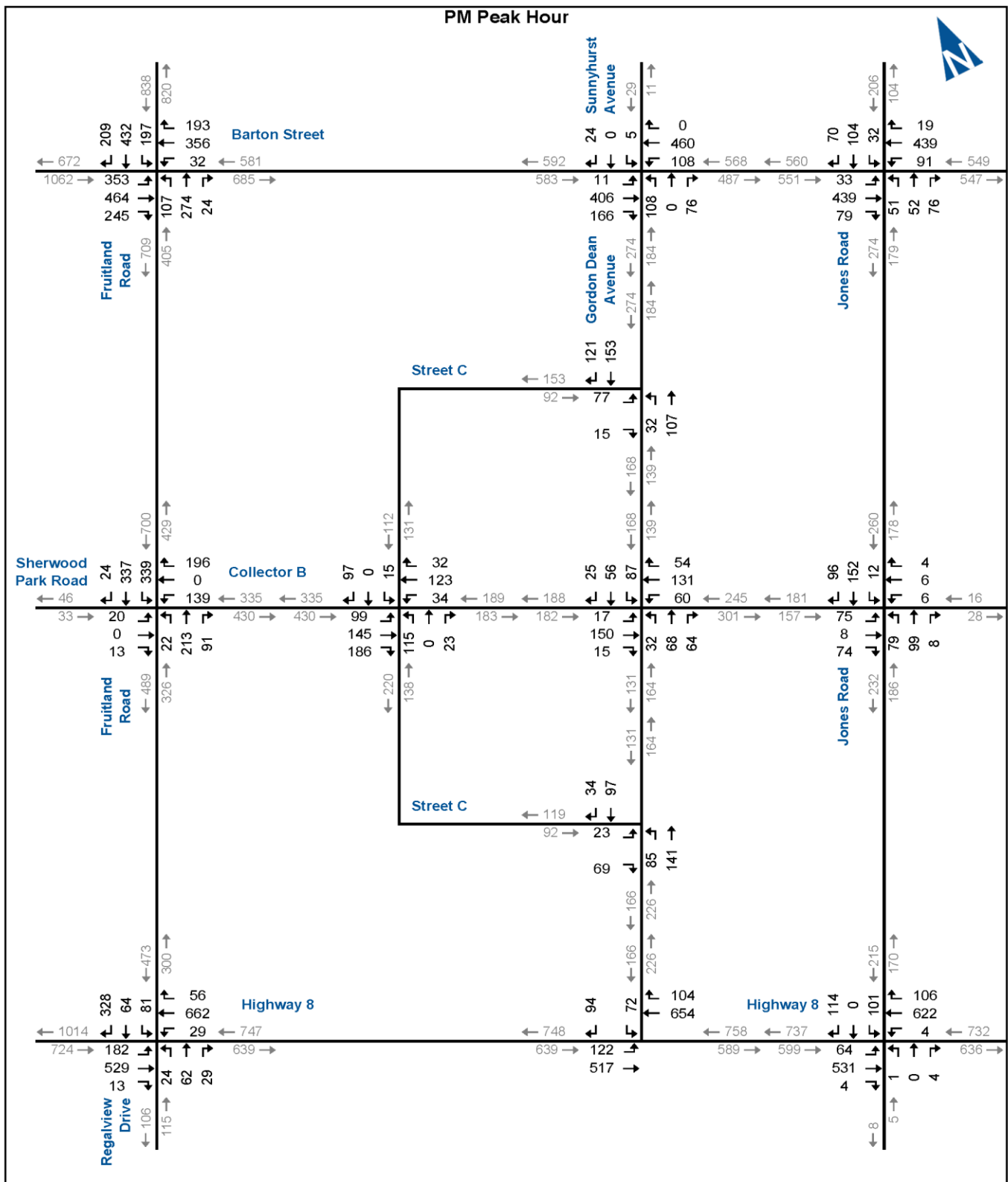


2036 Background Traffic Forecasts PM Peak Hour









2031 Total Traffic Forecasts PM Peak Hour (Scenario 2)

4.5 Background Traffic Operations

To assess the automobile operating conditions for the background traffic forecasts during the study peak hours, operational analyses were undertaken using the same methodology, parameters, lane arrangements, and traffic control devices as in the analysis of base year conditions, with the exceptions of:

- ▶ All road network improvements identified in **Section 3.2** and **Section 4.2.1**, excluding Street C which is analyzed under total traffic conditions;
- ▶ Traffic control signal at the Gordon Dean Avenue intersections with Barton Street, Collector B, and Highway 8, and at the intersection of Barton Street and Jones Road. Regarding signal timing, a similar cycle length (90 seconds) is utilized based on nearby signalized intersections; and
- ▶ Traffic signal optimization at the signalized intersections of Barton Street with Fruitland Road and Highway 8 during the AM and PM peak hours under 2031 and 2036 horizons.

Signal timing splits within existing cycle lengths were optimized to provide the best possible traffic operations for all movements.

Table 4.2 and **Table 4.3** summarize the operational results for 2031 background traffic conditions during the AM and PM peak hours, respectively.

Table 4.4 and **Table 4.5** summarize the operational results for 2036 background traffic conditions during the AM and PM peak hours, respectively.

Any movements identified as critical movements are highlighted within the results tables. **Appendix H** contains the Synchro analysis outputs for reference.

Under 2031 and 2036 background traffic conditions (without the subject development), the study area intersections are forecast to continue operating at acceptable levels of service and within capacity. The exceptions include the following movements:

- ▶ Highway 8 and Jones Road (unsignalized):
 - Southbound left-turn movement is forecast to operate at a LOS D during AM and PM peak hours under the 2031 horizon, and at a LOS E under the 2036 horizon; and
 - Northbound left-turn movement is forecast to operate at a LOS D during the PM peak hour under the 2031 horizon, at



a LOS D during the AM peak hour under the 2036 horizon, and at a LOS E during the PM peak hour under 2036 horizon.

These movements are reported to operate within capacity ($v/c < 0.85$), and it is common for a minor roadway approach to an arterial roadway operating under stop-control to experience higher delay during peak hours.

- ▶ Barton Street and Fruitland Road (signalized):
 - Southbound shared through/right-turn movement is forecast to approach capacity ($v/c \geq 0.85$) during the AM peak hour and exceed capacity ($v/c > 1.00$) during the PM peak hour under the 2036 horizon; and
 - Eastbound left-turn movement is forecast to operate over-capacity ($v/c > 1.00$) during the PM peak hour under the 2036 horizon.

The 95th percentile queue lengths were reviewed for all turn lanes against provided storage. Queue lengths for through movements were also checked. No spillback issues were found, with the exceptions of the following movements at the intersection of Barton Street and Fruitland Road:

- ▶ Eastbound left-turn movement reports a storage deficiency of approximately 67 metres under the 2031 and 2036 horizons. The eastbound left-turn lane transitions to a centre TWLTL west of the intersection. Additional queuing can be accommodated by the centre TWLTL; and
- ▶ Southbound left-turn movement reports a storage deficiency of approximately six metres during the AM peak hour under the 2036 horizon. The anticipated storage deficiency is approximately the length of one vehicle. Upstream of the turn-lane, the southbound left-turn lane transitions into a TWLTL which can accommodate the additional vehicle.



TABLE 4.2: 2031 BACKGROUND OPERATIONS – AM PEAK HOUR

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach															
				Eastbound				Westbound				Northbound				Southbound			
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	C 20 0.59 63 80 17	B 12 0.16 18 - -	> > > > > >	B 16	C 22 0.02 4 30 26	C 24 0.26 46 - -	D 51 0.09 16 - -	C 33	C 23 0.33 12 35 23	C 24 0.55 55 - -	> > > > > >	C 24	C 29 0.62 33 50 17	C 35 0.81 77 - -	> > > > > >	C 34
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.02 1 20 19	A 5 0.21 10 - -	> > > > > >	A 5	B 10 0.01 1 20 18	B 12 0.19 32 - -	> > > > > >	B 12	B 19 0.03 6 - -	C 22 0.00 0 - -	> > > > > >	B 19	< C 22 0.03 6 - -	< C 22 0.03 6 - -	> > > > > >	C 22
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.09 6 30 24	A 9 0.20 18 - -	> > > > > >	A 9	B 13 0.00 1 30 29	B 15 0.22 22 - -	> > > > > >	B 15	< C 24 0.15 26 - -	C 24 0.15 26 - -	> > > > > >	C 24	< C 15 0.12 12 - -	< B 15 0.12 12 - -	> > > > > >	B 15
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< 12 0.07 2 - -	B 12 0.07 2 - -	> > > > > >	B 12	< 11 0.02 0 - -	B 11 0.02 0 - -	> > > > > >	B 11	A 8 0 0 20 20	A 0 0.18 0 - -	> > > > > >	A 0	A 8 0 0 20 20	A 0 0.12 0 - -	> > > > > >	A 0
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.29 14 80 66	A 4 0.19 17 - -	> > > > > >	A 4	A 7 0.02 4 50 46	A 9 0.28 34 - -	> > > > > >	A 9	D 36 0.22 11 30 19	D 35 0.23 17 - -	> > > > > >	D 35	D 38 0.46 22 50 28	C 35 0.17 16 - -	> > > > > >	D 36
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 9 0.07 2 30 28	A 0 0.18 0 - -	> > > > > >	A 1	A 0 0 0 30 30	A 0 0.21 0 - -	> > > > > >	A 0	C 22 0 0 30 30	A 0 0.01 0 - -	> > > > > >	C 22	D 30 0.08 2 40 40	B 11 0.06 1 - -	> > > > > >	C 15
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	A 0 0.00 0 20 20	D 45 0.07 1 - -	> > > > > >	D 45	A 0 0.00 0 20 20	D 52 0.40 7 - -	> > > > > >	D 52	A 0 0.00 0 20 20	A 0 0.00 0 - -	> > > > > >	A 0	A 0 0.00 0 20 20	A 0 0.01 1 - -	> > > > > >	A 1
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< 10 0 0	A 10 0 0	> > > >	A 10	< 10 0.04 1	A 10 0.04 1	> > > >	A 10	< 0 0 0	A 0 0 0	> > > >	A 0	< 0 0 0	A 0 0 0	> > > >	A 0
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.01 1 50 49	B 16 0.32 38 - -	> > > > > >	B 16	> 17 0.35 42 - -	> > > > > >	> > > > > >	B 17	> > > > > >	> > > > > >	> > > > > >	> > > > > >	A 7 0.02 4 - -	A 8 0.01 0 - -	> > > > > >	A 8

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 with through movement



TABLE 4.3: 2031 BACKGROUND OPERATIONS – 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	
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	D 35 0.83 115 80 -35	B 13 > > > -	> > > >	C 23	C 23 0.08 14 30 16	C 29 0.35 79 -	E 75 0.09 28 -	D 41	B 20 0.17 8 35 27	C 21 > > > -	C 21 > > > -	C 22 0.34 25 50 25	D 36 0.83 102 -	> > > > -	C 33	C 30 0.83	
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.03 2 20 18	A 7 0.23 17 -	> > > >	A 7	A 0 0.00 0 20 20	B 12 > 42 -	> > > >	B 12	B 20 0.06 9 -	A 0 > 0 -	> > > >	B 20 < 22 0.03 6 -	C 22 > > > > -	C 22 > > > > -	C 22	B 10 0.19	
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.07 5 30 25	A 10 0.32 23 -	> > > >	A 10	B 14 0.03 4 30 26	B 16 0.28 30 -	> > > >	B 16	< 22 < 0.07 < 14 < - < -	C 22 > > > >	C 22 < 16 0.22 23 -	B 16 > > > > -	B 16 > > > > -	B 16	B 14 0.27		
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< 14 < 0.09 < 2 - -	B 14 > > > -	> > > >	B 14	< 10 < 0.01 < 0 - -	B 10 > > > >	> > > >	B 10	A 8 0.02 1 20 19	A 0 0.13 0 - -	> > > > -	A 1 > > > >	A 8 0.01 0 20 20	A 0 0.23 0 - -	> > > > -	A 0	
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.28 13 80 67	A 4 0.19 20 -	> > > >	A 4	A 7 0.04 5 50 45	A 9 0.33 46 -	> > > >	A 9	D 38 0.36 12 30 18	C 33 0.09 10 -	> > > > -	D 35 > > > >	D 38 0.51 27 50 23	D 35 0.32 26 -	> > > > -	D 36	B 14 0.36
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 9 0.04 1 30 29	A 0 0.2 0 -	> > > >	A 1	A 8 0 0 30 30	A 0 0.23 0 -	> > > >	A 0	D 25 0.01 0 30 30	A 10 0.01 0 -	> > > > -	B 13 > > > >	D 27 0.18 5 40 35	B 11 0.12 3 -	> > > > -	C 16	
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	A 0 0.00 0 20 20	D 40 0.32 3 -	> > > >	D 40	A 0 0.00 0 20 20	D 48 0.25 5 -	> > > >	D 48	A 0 0.00 0 20 20	A 0 0.01 0 -	> > > > -	A 0 > > > >	A 0 0.00 0 20 20	A 1 0.01 1 -	> > > > -	A 1	B 13 0.01
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< 10 < 0.01 < 0	B 10 > > >	> > >	B 10	< 10 < 0.02 < 1	A 10 > > >	> > >	A 10	< 0 < 0 < 0	A 0 > > >	A 0 > > >	A 0 < 1 0.01 0	< 1 0.01 0	A 1 > > >	A 1 > > >	A 1	
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.03 4 50 46	B 17 0.34 41 -		B 17		B 18 0.44 54 -	> > > >	B 18					A 4 0.01 2 -		A 5 0.01 0 -	A 4 > > >	B 17 0.22

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 with through movement



TABLE 4.4: 2036 BACKGROUND OPERATIONS – 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	
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	D 45 0.89 98 80 -18	B 14 0.21 > > >	> > > > >	C 31	C 22 0.03 4 30 26	C 25 0.35 50 - -	D 52 0.11 15 - -	C 33	C 29 0.58 22 35 13	C 23 0.61 74 - -	> > > > >	C 24	D 44 0.82 56 50 -6	D 50 0.94 132 - -	> > > > >	D 48	D 36 0.91
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.03 1 20 19	A 5 0.26 > > >	> > > > >	A 5	B 10 0.01 2 20 18	B 13 0.24 38 - -	> > > > >	B 13	B 18 0.03 6 - -	C 22 0.00 0 - -	> > > > >	B 19	< C 22 0.04 7 - -	> > > > >	C 22	A 9 0.19	
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 7 0.12 7 30 23	A 8 0.24 > > >	> > > > >	A 8	B 12 0.01 2 30 28	B 14 0.26 25 - -	> > > > >	B 14	< C 26 0.20 31 - -	> > > > >	C 26	< B 18 0.17 16 - -	> > > > >	B 18	B 13 0.23		
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< 13 < 0.09 < 2 - -	> > > > >	> > > > >	B 13	< B 11 < 0.02 < 0 - -	> > > > >	B 11	A 8 0 0 20 20	A 0 0.22 > > >	> > > > >	A 0	A 8 0 0 20 20	> > > > >	A 0			
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 5 0.41 18 80 62	A 4 0.24 > > >	> > > > >	A 5	A 8 0.03 4 50 46	B 10 0.36 48 - -	> > > > >	B 10	D 36 0.30 13 30 17	C 35 0.27 > > >	> > > > >	C 35	D 39 0.54 25 50 25	C 34 0.20 17 - -	> > > > >	D 36	B 13 0.45
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 10 0.1 2 30 28	A 0 0.22 > > >	> > > > >	A 1	A 0 0 0 30 30	A 0 0.26 0 - -	> > > > >	A 0	D 30 0.01 0 30 30	A 0 0.01 > > >	> > > > >	D 30	E 47 0.14 4 40 36	B 12 0.08 2 - -	> > > > >	C 20	
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	A 0 0.00 0 20 20	D 46 0.07 > > >	> > > > >	D 46	A 0 0.00 20 20	D 52 0.40 7 - -	> > > > >	D 52	A 0 0.00 20 20	A 0 0.00 > > >	> > > > >	A 0	A 0 0.01 20 20	> > > > >	A 1	B 12 0.02	
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< 10 < 0 < 0	B 10 > > >	> > > > >	B 10	< A 10 < 0.04 <	> > > > >	A 10	< A 0 < 0 < 0	> > > > >	A 0	< A 0 < 0 < 0	> > > > >	A 0	> > > > >	A 0		
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.01 2 50 48	B 17 0.40 48 - -		B 17		B 18 0.43 53 - -	> > > > >	B 18					A 6 0.02 4 - -	A 8 0.01 0 - -		A 7	B 17 0.23

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 with through movement



TABLE 4.5: 2036 BACKGROUND OPERATIONS – 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	
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 102 1.12 147 80 -67	B 13 0.30 34 -> ->	> > > > >	D 54	C 28 0.10 17 30 13	D 36 0.41 98 -> ->	F 106 0.11 31 -> ->	D 54	C 26 0.41 16 35 19	C 23 0.40 50 -> ->	> > > > >	C 23	C 25 0.52 38 50 12	F 106 1.12 186 -> ->	> > > > >	F 91	E 62 1.12
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.05 2 20 18	A 7 0.29 18 -> ->	> > > > >	A 7	A 0 0.00 0 20 20	B 13 0.32 52 -> ->	> > > > >	B 13	B 19 0.07 11 -> ->	A 0 0.00 0 -> ->	> > > > >	B 19	< C 22 0.04 7 -> ->	> > > > >	C 22	B 10 0.23	
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.10 6 30 24	A 10 0.38 32 -> ->	> > > > >	A 10	B 13 0.04 4 30 26	B 16 0.34 36 -> ->	> > > > >	B 15	< C 24 0.09 17 -> ->	> > > > >	C 24	< B 18 0.30 31 -> ->	> > > > >	B 18	B 14 0.34		
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< 17 0.13 3 -> ->	C 17 0.13 3 -> ->	> > > > >	C 17	< B 11 0.01 0 -> ->	> > > > >	B 11	A 8 0.03 1 20 19	A 0 0.17 0 -> ->	> > > > >	A 1	A 8 0.01 0 20 20	A 0 0.28 0 -> ->	> > > > >	A 0		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.41 19 80 61	A 5 0.24 28 -> ->	> > > > >	A 5	A 9 0.05 6 50 44	B 12 0.43 68 -> ->	> > > > >	B 12	D 38 0.44 13 30 17	C 32 0.10 11 -> ->	> > > > >	C 35	D 39 0.57 31 50 19	C 34 0.38 30 -> ->	> > > > >	D 35	B 15 0.46
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 10 0.05 1 30 29	A 0 0.25 0 -> ->	> > > > >	A 1	A 9 0 0 30 30	A 0 0.29 0 -> ->	> > > > >	A 0	E 37 0.01 0 30 30	B 10 0.01 0 -> ->	> > > > >	C 16	E 45 0.33 10 40 30	B 12 0.16 4 -> ->	> > > > >	C 23	
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	A 0 0.00 0 20 20	D 37 0.32 2 -> ->	> > > > >	D 37	A 0 0.00 0 20 20	D 48 0.25 5 -> ->	> > > > >	D 48	A 0 0.00 0 20 20	A 0 0.01 0 -> ->	> > > > >	A 0	A 0 0.00 0 20 20	A 1 0.01 1 -> ->	> > > > >	A 1	B 11 0.01
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< 10 0.01 0	B 10 0.01 0	> > >	B 10	< 10 0.02 1	A 10 0.02 1	> > >	A 10	< 0 0 0	A 0 0 0	> > >	A 0	< 1 0.01 0	A 1 0.01 0	> > >	A 1	
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.06 4 50 46	B 18 0.43 52 -> ->	> > > > >	B 18	> > > > >	B 19 0.55 70 -> ->	> > > > >	B 19	> > > > >	> > > > >	> > > > >	> > > > >	A 3 0.01 2 -> ->	A 5 0.01 0 -> ->	A 4	B 18 0.28	

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 with through movement



4.6 Total Traffic Operations

To assess the automobile operating conditions for the total traffic forecasts during the study peak hours, operational analyses were undertaken using the same methodology, parameters, lane arrangements, and traffic control devices as in the analysis of background conditions.

The exception being the inclusion and assessment of the internal intersections of Street C (north) and Gordon Dean Avenue, Street C and Collector B, and Street C and Highway 8 (Scenario 1) or Street C (south) and Gordon Dean Avenue (Scenario 2).

Given the proposed roadway classifications, it was assumed Street C provides a two-lane cross section (one lane in each direction) with stop control provided on approaches to Gordon Dean Avenue, Collector B, and Highway 8.

4.6.1 Scenario 1 – Street C Connection to Highway 8

Table 4.6, Table 4.7, Table 4.8, and Table 4.9 summarize the operational results for the 2031 and 2036 total traffic conditions where Street C connects to Highway 8. Any movements identified as critical movements are highlighted within the results tables. **Appendix I** contains the Synchro analysis outputs for reference.

The previously identified critical movements under background traffic conditions are further exacerbated under total traffic conditions. The following additional critical movements are identified due to site-generated traffic:

- ▶ Barton Street and Fruitland Road (signalized):
 - Under the 2031 and 2036 horizons, the eastbound and northbound left-turn movements are forecast to operate over-capacity ($v/c > 1.00$) during the AM and PM peak hours;
 - The southbound left-turn movement is forecast to approach capacity ($v/c \geq 0.90$) during the AM peak hour under the 2031 horizon, and during the PM peak hour under 2036 horizon, and is forecast to exceed capacity ($v/c > 1.00$) during the AM peak hour under the 2036 horizon; and
 - The southbound shared through/right-turn movement is forecast to approach capacity ($v/c \geq 0.85$) during the PM peak hour under the 2031 horizon, and during the AM peak hour under the 2036 horizon, and exceed capacity ($v/c > 1.00$) during the PM peak hour under the 2036 horizon.



- ▶ Fruitland Road and Sherwood Park Road/Collector B (unsignalized):
 - Under the 2031 and 2036 horizons the eastbound and westbound approaches are forecast to operate at a LOS E or F during the AM and PM peak hours. The westbound approach is anticipated to approach capacity ($v/c \geq 0.85$) under the 2036 horizon.
- ▶ Highway 8 and Jones Road (unsignalized):
 - Under the 2031 and 2036 horizons the southbound left-turn movement is forecast to operate at a LOS F with a v/c ratio approaching ($v/c \geq 0.90$) or exceeding capacity ($v/c > 1.00$) during the AM and PM peak hours; and
 - Under the 2031 and 2036 horizons the northbound left-turn movement is forecast to operate at a LOS of D or worse during the AM and PM peak hours.
- ▶ Collector B and Street C (unsignalized):
 - Under the 2031 and 2036 horizons the northbound approach is forecast to operate at a LOS of E during the PM peak hour. However, the movement is reported to operate within capacity ($v/c < 0.85$).

The previously identified queue storage deficiencies noted under background traffic conditions are further exacerbated by the addition of site-generated traffic. The following additional queue deficiencies are identified:

- ▶ Barton Street and Fruitland Road (signalized):
 - Northbound left-turn movement reports a storage deficiency of approximately 41 metres during the AM and PM peak hours under the 2031 and 2036 horizons. It is noted the movement is forecast to operate over-capacity ($v/c > 1.00$).
- ▶ Highway 8 and Jones Road (unsignalized):
 - Southbound left-turn movement reports a storage deficiency of approximately 44 metres during the AM and PM peak hours under the 2031 and 2036 horizons. It is noted the movement is forecast to operate either approaching ($v/c \geq 0.90$) or exceeding capacity ($v/c > 1.00$).

Section 4.9 summarizes the preferred scenario for **Street C**.



TABLE 4.6: 2031 TOTAL OPERATIONS – AM PEAK HOUR (SCENARIO 1)

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		
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 92 1.04 92 80 -12	B 20 0.30 27 - -	> > > > >	D 51	B 20 0.03 3 30 27	C 26 0.50 65 - -	D 44 0.19 17 - -	C 34	F 84 1.00 72 35 -37	C 20 0.67 92 - -	> > > > >	D 38	E 66 0.94 68 50 -18	C 24 0.75 96 - -	> > > > >	C 35	D 39 1.02	
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.02 1 20 19	A 4 0.26 7 - -	> > > > >	A 4	A 5 0.07 4 20 16	> > > > >	A 5	D 36 0.50 45 - -	C 22 0.05 0 - -	> > > > >	C 32	< < < < <	C 22 0.03 6 - -	> > > > >	C 22	B 11 0.34		
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	C 20 0.16 12 30 18	C 20 0.32 30 - -	> > > > >	C 20	B 19 0.16 12 30 18	B 20 0.29 27 - -	> > > > >	B 20	< < < < <	B 12 0.33 29 - -	> > > > >	B 12	< < < < <	B 12 0.16 15 - -	> > > > >	B 12	B 18 0.33	
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< < < < <	E 41 0.27 8 - -	> > > > >	E 41	< < < < <	E 36 0.82 61 - -	> > > > >	E 36	A 8 0 0 20 20	A 0 0.19 0 - -	> > > > >	A 0	A 8 0.12 3 20 17	A 0 0.12 0 - -	> > > > >	A 4		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 5 0.36 15 80 65	A 4 0.25 25 - -	> > > > >	A 4	A 8 0.10 10 50 40	A 10 0.39 52 - -	> > > > >	A 10	D 39 0.39 11 30 19	D 36 0.34 23 - -	> > > > >	D 36	D 38 0.46 21 50 29	D 36 0.36 24 - -	> > > > >	D 36	B 14 0.4	
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 10 0.1 2 30 28	A 0 0.22 0 - -	> > > > >	A 1	A 0 0 0 30 30	A 0 0.23 0 - -	> > > > >	A 0	D 30 0.01 0 30 30	A 0 0.01 0 - -	> > > > >	D 30	F 197 1.12 57 40 -17	B 12 0.11 3 - -	> > > > >	F 132		
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 26 0.29 9 20 11	C 25 0.28 22 - -	> > > > >	C 25	C 24 0.17 12 20 8	C 35 0.75 67 - -	> > > > >	C 33	A 0 0.01 0 20 20	A 0 0.03 0 - -	> > > > >	A 0	A 7 0.09 16 20 4	A 6 0.03 5 - -	> > > > >	A 7	C 23 0.29	
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< < <	B 13 0.31 10	> > >	B 13	< < <	B 12 0.06 1	> > >	B 12	< < <	A 4 0.06 2	> > >	A 4	< < <	A 0 0 0	> > >	A 0		
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 18 0.27 18 50 32	B 17 0.37 45 - -	> > > > >	B 17	B 17 0.40 48 - -	> > > > >	B 17						A 4 0.05 3 -	A 5 0.04 0 -	> > > > >	A 4	B 16 0.23	
	Gordon Dean Avenue & Street C	TWSC	LOS Delay V/C Q	B 10 0.15 4	> > >	> > >	B 10					< < <	A 1 0.07 0	> > >	A 0		A 0 0.05 0	> > >	A 0		
	Street C & Collector B	TWSC	LOS Delay V/C Q	< < <	A 1 0.01 0	> > >	A 1	< < <	A 1 0.01 0	> > >	A 1	< < <	C 23 0.55 25	> > >	C 23	< < <	B 13 0.25 7	> > >	B 13		
	Highway 8 & Street C	TWSC	LOS Delay V/C Q	< < <	A 2 0.23 1	> > >	A 1	A 0 0.24 0	> > >	A 0						C 16 0.41 15	> > >	> > >	C 16		

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 with through movement



TABLE 4.7: 2031 TOTAL OPERATIONS – PM PEAK HOUR (SCENARIO 1)

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		
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 101 1.09 124 80 -44	B 19 0.46 52 - -	> > > > > >	D 46	B 20 0.14 12 30 18	C 24 0.46 80 - -	D 47 0.14 25 - -	C 32	F 136 1.08 54 35 -19	B 19 0.41 56 - -	> > > > > >	D 50	C 26 0.66 56 50 -6	D 49 0.95 176 - -	> > > > > >	D 43	D 43 1.08	
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 5 0.03 1 20 19	A 6 0.34 17 - -	> > > > > >	A 6	A 8 0.34 14 20 6	A 7 0.27 19 - -	> > > > > >	A 7	C 23 0.32 26 - -	C 22 0.06 0 - -	> > > > > >	C 23	< < < < < <	C 22 0.04 6 - -	> > > > > >	C 22	A 9 0.33	
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	B 15 0.10 8 30 22	B 16 0.34 37 - -	> > > > > >	B 16	B 14 0.34 19 30 11	B 12 0.30 32 - -	> > > > > >	B 12	< < < < < <	B 20 0.35 31 - -	> > > > > >	B 20	< < < < < <	C 24 0.40 42 - -	> > > > > >	C 24	B 16 0.37	
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< < < < < <	F 102 0.52 16 - -	> > > > > >	F 102	< < < < < <	E 45 0.78 47 - -	> > > > > >	E 45	A 8 0.02 1 20 19	A 0 0.15 0 - -	> > > > > >	A 1	A 9 0.28 9 20 11	A 0 0.23 0 - -	> > > > > >	A 4		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 5 0.34 14 80 66	A 5 0.27 31 - -	> > > > > >	A 5	A 9 0.11 11 50 39	B 11 0.45 69 - -	> > > > > >	B 11	D 37 0.36 11 30 19	C 34 0.21 18 - -	> > > > > >	C 34	D 38 0.52 26 50 24	D 36 0.40 31 - -	> > > > > >	D 36	B 15 0.45	
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 10 0.09 2 30 28	A 0 0.23 0 - -	> > > > > >	A 1	A 9 0 0 30 30	A 0 0.27 0 - -	> > > > > >	A 0	E 41 0.01 0 30 30	B 10 0.01 0 - -	> > > > > >	C 16	F 128 0.92 44 40 -4	B 13 0.22 6 - -	> > > > > >	F 67		
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 32 0.31 9 20 11	D 35 0.58 36 - -	> > > > > >	C 35	D 37 0.39 18 20 2	D 42 0.64 46 - -	> > > > > >	D 41	A 0 0.01 0 20 20	A 0 0.03 0 - -	> > > > > >	A 0	A 5 0.10 17 20 3	A 6 0.03 5 - -	> > > > > >	A 6	C 25 0.21	
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< < <	B 15 0.31 10	> > >	B 15	< < <	B 14 0.04 1	> > >	B 14	< < <	A 4 0.07 2	> > >	A 4	< < <	A 0 0.01 0	> > >	A 0		
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	C 21 0.36 19 50 31	B 17 0.40 48 - -	> > > > > >	B 18		B 19 0.54 68 - -	> > > > > >	B 19					A 3 0.04 1 -		A 5 0.04 0 -	> > > > > >	A 4	B 18 0.29
	Gordon Dean Avenue & Street C	TWSC	LOS Delay V/C Q	B 11 0.15 4	> > >	> > >	B 11					< < <	A 2 0.05 0		A 1		A 0 0.07 0	> > >	A 0		
	Street C & Collector B	TWSC	LOS Delay V/C Q	< < <	A 2 0.05 1	> > >	A 2	< < <	A 3 0.06 1	> > >	A 3	< < <	E 37 0.69 36	> > >	E 37	< < <	C 19 0.33 11	> > >	C 19		
	Highway 8 & Street C	TWSC	LOS Delay V/C Q	< < <	A 5 0.25 4	> > >	A 2		A 0 0.3 0	> > >	A 0					C 20 0.44 17	> > >	C 20			

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 with through movement



TABLE 4.8: 2036 TOTAL OPERATIONS – AM PEAK HOUR (SCENARIO 1)

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		
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 242 1.43 125 80 -45	B 20 0.35 32 - -	> > > > >	F 118	B 19 0.05 4 30 26	C 28 0.56 79 - -	C 29 0.31 25 - -	C 28	F 466 1.92 76 35 -41	C 25 0.78 114 - -	> > > > >	F 143	F 302 1.56 95 50 -45	D 44 0.94 152 - -	> > > > >	F 111	F 104 1.69	
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.03 1 20 19	A 5 0.32 10 - -	> > > > >	A 5	A 5 0.08 3 20 17	> > > > >	> 0.26 13 - -	A 5	D 36 0.51 46 - -	C 22 0.05 0 - -	> > > > >	C 32	< - - - -	C 22 0.04 7 - -	> > > > >	C 22	B 11 0.39	
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	C 21 0.21 13 30 17	C 21 0.37 35 - -	> > > > >	C 21	B 19 0.17 12 30 18	B 20 0.35 33 - -	> > > > >	B 20	< - - - -	B 13 0.38 32 - -	> > > > >	B 13	< - - - -	B 13 0.20 17 - -	> > > > >	B 13	B 18 0.37	
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< - - - -	F 64 0.44 14 - -	> > > > >	F 64	< - - - -	F 61 0.95 86 - -	> > > > >	F 61	A 8 0 0 20 20	A 0 0.23 0 - -	> > > > >	A 0	A 9 0.13 3 20 17	A 0 0.15 0 - -	> > > > >	A 3		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.50 20 80 60	A 5 0.30 32 - -	> > > > >	A 5	A 9 0.13 12 50 38	B 12 0.48 73 - -	> > > > >	B 12	D 40 0.49 13 30 17	D 35 0.39 26 - -	> > > > >	D 37	D 39 0.54 25 50 25	D 36 0.38 25 - -	> > > > >	D 36	B 15 0.52	
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	B 11 0.13 3 30 27	A 0 0.26 0 - -	> > > > >	A 1	A 0 0 0 30 30	> > > > >	> 0.28 0 - -	A 0	E 43 0.01 0 30 30	A 0 0.01 0 - -	> > > > >	E 43	F 521 1.82 84 40 -44	B 13 0.14 4 - -	> > > > >	F 334		
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 26 0.29 8 20 12	C 24 0.28 21 - -	> > > > >	C 24	C 24 0.17 13 20 7	C 35 0.75 66 - -	> > > > >	C 33	A 0 0.01 0 20 20	A 0 0.04 0 - -	> > > > >	A 0	A 8 0.09 17 20 3	A 7 0.03 6 - -	> > > > >	A 7	C 23 0.29	
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< - -	B 14 0.32 10	> > >	B 14	< - -	B 12 0.06 1	> > >	B 12	< - -	A 3 0.06 2	> > >	A 3	< - -	A 0 0 0	> > >	A 0		
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 20 0.34 20 50 30	B 18 0.45 56 - -		B 18		B 18 0.48 60 - -	> > > > >	B 18					A 3 0.06 3 -		A 5 0.04 0 -		A 4	B 17 0.27
	Gordon Dean Avenue & Street C	TWSC	LOS Delay V/C Q	B 11 0.16 4		> > >	B 11					< - - -	A 1 0.07 0		A 0		A 0 0.05 0	> > >	A 0		
	Street C & Collector B	TWSC	LOS Delay V/C Q	< - -	A 1 0.01 0	> > >	A 1	< - -	A 1 0.01 0	> > >	A 1	< - -	C 23 0.55 25	> > >	C 23	< - -	B 13 0.25 7	> > >	B 13		
	Highway 8 & Street C	TWSC	LOS Delay V/C Q	< - -	A 2 0.28 2		A 1		A 0 0.29 0	> > >	A 0					C 18 0.45 17		> > >	C 18		

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 with through movement



TABLE 4.9: 2036 TOTAL OPERATIONS – PM PEAK HOUR (SCENARIO 1)

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		
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 268 1.50 166 80 -86	B 18 0.52 61 -> ->	> -> -> -> ->	F 106	C 27 0.19 15 30 15	C 32 0.53 98 -> ->	F 96 0.17 32 -> ->	D 52	F 293 1.47 48 35 -13	C 21 0.50 69 -> ->	> -> -> -> ->	F 88	E 60 0.91 81 50 -31	F 131 1.20 232 -> ->	> -> -> -> ->	F 115	F 95 1.48	
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 2 0.04 1 20 19	A 3 0.31 10 -> ->	> -> -> -> ->	A 2	A 8 0.28 20 20 0	A 7 0.26 36 -> ->	> -> -> -> ->	A 7	D 43 0.62 30 -> ->	C 34 0.06 0 -> ->	> -> -> -> ->	D 40	C 34 -> 0.06 9 -> ->	> -> -> -> ->	C 34	A 10 0.36		
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.13 8 30 22	A 8 0.40 37 -> ->	> -> -> -> ->	A 8	B 16 0.40 21 30 9	B 12 0.35 37 -> ->	> -> -> -> ->	B 12	C 27 0.40 41 -> ->	> -> -> -> ->	C 27	C 26 0.50 51 -> ->	> -> -> -> ->	C 26	B 14 0.44			
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< -> -> -> ->	F 198 0.83 27 -> ->	> -> -> -> ->	F 198	< -> -> -> ->	F 88 0.96 69 -> ->	> -> -> -> ->	F 88	A 8 0.03 1 20 19	A 0 0.18 0 -> ->	> -> -> -> ->	A 1	A 9 0.29 9 20 11	A 0 0.28 0 -> ->	> -> -> -> ->	A 4		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.51 23 80 57	A 6 0.33 47 -> ->	> -> -> -> ->	A 7	B 11 0.15 14 50 36	B 15 0.58 106 -> ->	> -> -> -> ->	B 15	D 36 0.44 13 30 17	C 31 0.20 18 -> ->	> -> -> -> ->	C 32	D 36 0.53 29 50 21	D 38 0.62 45 -> ->	> -> -> -> ->	D 37	B 17 0.58	
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	B 11 0.11 3 30 27	A 0 0.28 0 -> ->	> -> -> -> ->	A 1	A 9 0 0 30 30	A 0 0.33 0 -> ->	> -> -> -> ->	A 0	F 65 0.02 0 30 30	B 11 0.01 0 -> ->	> -> -> -> ->	C 22	F 367 1.5 73 40 -33	B 15 0.28 9 -> ->	> -> -> -> ->	F 176		
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 32 0.31 8 20 12	C 34 0.58 33 -> ->	> -> -> -> ->	C 34	D 35 0.39 18 20 2	D 40 0.64 47 -> ->	> -> -> -> ->	D 39	A 0 0.01 0 20 20	A 0 0.04 0 -> ->	> -> -> -> ->	A 0	A 8 0.10 20 20 0	A 9 0.03 7 -> ->	> -> -> -> ->	A 8	C 24 0.21	
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< -> ->	C 15 0.33 11	> -> ->	C 15	< -> ->	B 14 0.04 1	> -> ->	B 14	< -> ->	A 4 0.07 2	> -> ->	A 4	< -> ->	A 0 0.01 0	> -> ->	A 0		
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	C 30 0.51 25 50 25	B 18 0.48 60 -> ->	> -> -> -> ->	B 20	C 21 0.64 86 -> ->	> -> -> -> ->	C 21						A 2 0.05 1 -> ->		A 4 0.05 0 -> ->	A 4	B 20 0.34	
	Gordon Dean Avenue & Street C	TWSC	LOS Delay V/C Q	B 11 0.15 4	> -> ->	> -> ->	B 11					< -> ->	A 2 0.05 0		A 1		A 0 0.07 0	> -> ->	A 0		
	Street C & Collector B	TWSC	LOS Delay V/C Q	< -> ->	A 2 0.05 1	> -> ->	A 2	< -> ->	A 3 0.06 1	> -> ->	A 3	< -> ->	E 37 0.69 36	> -> ->	E 37	< -> ->	C 19 0.33 11	> -> ->	C 19		
	Highway 8 & Street C	TWSC	LOS Delay V/C Q	< -> ->	A 5 0.3 4	> -> ->	A 2		A 0 0.37 0	> -> ->	A 0					C 21 0.46 18	> -> ->	> -> ->	C 21		

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 with through movement



4.6.2 Scenario 2 – Street C No Connection to Highway 8

Table 4.10, Table 4.11, Table 4.12, and Table 4.13 summarize the operational results for the 2031 and 2036 total traffic conditions where Street C does not connect to Highway 8. Any movements identified as critical movements are highlighted within the results tables. **Appendix J** contains the Synchro analysis outputs for reference.

It is forecast under both 2031 and 2036 total traffic conditions the study area intersections would operate similar to total traffic conditions under Scenario 1 where Street C connects to Highway 8.

The most significant difference is noted at the intersection of Fruitland Road and Sherwood Park Road/Collector B (unsignalized). The westbound approach is forecast to operate over-capacity under the 2031 and 2036 horizons, while this movement is reported to operate within capacity under Scenario 1.

The poor operation is directly related to the increase in westbound left-turn volumes resulting from the removal of the Street C connection to Highway 8. Without the Street C connection to Highway 8, drivers traveling west along Highway 8 must now travel west along Collector B before traveling south along Fruitland Road to access Highway 8.

The 95th percentile queue lengths were reviewed for all turn lanes against provided storage. Queue lengths for through movements were also checked. Similar spillback issues were found as in Scenario 1. No additional queuing deficiencies are reported.

Section 4.9 summarizes the preferred scenario for **Street C**.



TABLE 4.10: 2031 TOTAL OPERATIONS – AM PEAK HOUR (SCENARIO 2)

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		
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 92 1.04 92 80 -12	B 20 0.30 27 - -	> > > > >	D 51	C 29 0.03 3 30 27	C 35 0.50 65 - -	F 81 0.19 24 - -	D 54	F 84 1.00 72 35 -37	C 20 0.67 92 - -	> > > > >	D 38	E 66 0.94 68 50 -18	C 24 0.75 96 - -	> > > > >	C 35	D 44 1.02	
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.02 1 20 19	A 4 0.26 7 - -	> > > > >	A 4	A 6 0.07 9 20 11	A 8 0.21 33 - -	> > > > >	A 8	C 34 0.50 46 - -	C 22 0.05 0 - -	> > > > >	C 31	< 22 0.03 6 - -	> > > > >	C 22	B 12 0.34		
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	B 16 0.18 11 30 19	B 16 0.34 28 - -	> > > > >	B 16	C 21 0.17 13 30 17	C 21 0.31 28 - -	> > > > >	C 21	< 16 0.32 36 - -	B 16 0.32 36 - -	> > > > >	B 16	< 11 0.16 14 - -	> > > > >	B 11	B 17 0.33		
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< 42 0.27 8 - -	E 42 0.27 8 - -	> > > > >	E 42	< 169 1.28 174 - -	F 169 1.28 174 - -	> > > > >	F 169	A 8 0 0 20 20	A 0 0.21 0 0 - -	> > > > >	A 0	A 8 0.13 3 20 17	A 0 0.12 3 - -	> > > > >	A 4		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.39 23 80 57	A 5 0.25 31 - -	> > > > >	A 6	A 9 0.05 7 50 43	B 12 0.37 57 - -	> > > > >	B 12	D 36 0.39 10 30 20	C 33 0.30 22 - -	> > > > >	C 34	C 34 0.37 19 50 31	D 38 0.61 37 - -	> > > > >	D 38	B 16 0.45	
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 10 0.1 2 30 28	A 0 0.22 0 - -	> > > > >	A 1	A 0 0 0 30 30	A 0 0.23 0 - -	> > > > >	A 0	D 30 0.01 0 30 30	A 0 0 0 - -	> > > > >	D 30	F 197 1.12 57 40 -17	B 12 0.11 3 - -	> > > > >	F 132		
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 24 0.14 5 20 15	C 25 0.27 22 - -	> > > > >	C 25	C 24 0.19 14 20 6	D 35 0.75 70 - -	> > > > >	C 34	A 1 0.02 1 20 19	A 0 0.05 0 - -	> > > > >	A 0	A 7 0.10 14 20 6	A 6 0.03 5 - -	> > > > >	A 6	C 22 0.29	
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< 13 0.31 10	B 13 0.31 10	> > >	B 13	< 12 0.06 1	B 12 0.06 1	> > >	B 12	< 4 0.06 2	A 4 0.06 2	> > >	A 4	< 0 0 0	A 0 0 0	> > >	A 0		
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	B 20 0.36 24 50 26	B 17 0.33 40 - -	> > > > >	B 17	B 17 0.40 47 - -	> > > > >	> > > > >	B 17					A 10 0.14 12 - -	A 4 0.07 0 - -	> > > > >	A 7	B 16 0.27	
	Gordon Dean Avenue & Street C (North Leg)	TWSC	LOS Delay V/C Q	B 11 0.16 4		> > >	B 11						< 2 0.07 0	A 1 0.07 0	> > >	A 1	A 0 0.05 0	> > >	A 0		
	Street C & Collector B	TWSC	LOS Delay V/C Q	< 2 0.03 1	A 2 0.03 1	> > >	A 2	< 0 0.01 0	A 0 0.01 0	> > >	A 0	< 28 0.6 28	D 28 0.6 28	> > >	D 28	< 11 0.19 5	B 11 0.19 5	> > >	B 11		
	Gordon Dean Avenue & Street C (South Leg)	TWSC	LOS Delay V/C Q	A 10 0.14 4		> > >	A 10						< 4 0.05 1	A 2 0.05 1	> > >	A 2	A 0 0.05 0	> > >	A 0		

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 with through movement



TABLE 4.11: 2031 TOTAL OPERATIONS – PM PEAK HOUR (SCENARIO 2)

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	
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 101 1.09 124 80 -44	B 19 0.46 52 - -	> > > > >	D 46	C 26 0.14 13 30 17	C 31 0.46 79 - -	F 88 0.14 28 - -	D 50	F 136 1.08 54 35 -19	B 19 0.41 56 - -	> > > > >	D 50	C 26 0.66 56 50 -6	D 49 0.95 176 - -	> > > > >	D 43	D 47 1.08
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 2 0.03 1 20 19	A 4 0.26 9 - -	> > > > >	A 4	A 8 0.25 20 20 0	A 7 0.21 30 - -	> > > > >	A 8	D 52 0.71 39 -	C 34 0.06 0 -	> > > > >	D 45	C 34 0.05 8 -	> > > > >	C 34	B 12 0.33	
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 7 0.10 7 30 23	A 8 0.34 30 - -	> > > > >	A 8	B 14 0.34 19 30 11	B 12 0.30 32 - -	> > > > >	B 12	C 25 0.35 37 -	C 25 0.35 37 -	> > > > >	C 25	C 24 0.40 42 -	> > > > >	C 24	B 14 0.37	
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< 108 0.54 17 - -	F 108 0.54 17 - -	> > > > >	F 108	< 545 2.07 211 - -	> > > > >	F 545	A 8 0.02 1 20 19	C 8 0.19 0 - -	> > > > >	A 1	A 9 0.3 9 20 11	A 0 0.23 0 - -	> > > > >	A 4		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 7 0.44 25 80 55	A 6 0.26 37 - -	> > > > >	A 6	A 10 0.08 9 50 41	B 13 0.44 74 - -	> > > > >	B 13	C 35 0.36 10 30 20	C 32 0.25 20 - -	> > > > >	C 32	C 34 0.42 23 50 27	D 39 0.64 46 - -	> > > > >	D 38	B 17 0.58
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	A 10 0.09 2 30 28	A 0 0.23 0 - -	> > > > >	A 1	A 9 0 0 30 30	A 0 0.27 0 - -	> > > > >	A 0	E 41 0.01 0 30 30	B 10 0.01 0 - -	> > > > >	C 16	F 128 0.92 44 40 -4	B 13 0.22 6 - -	> > > > >	F 67	
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 30 0.15 5 20 15	C 34 0.60 35 - -	> > > > >	C 34	D 36 0.47 20 20 0	D 38 0.61 42 - -	> > > > >	D 37	A 1 0.04 1 20 19	A 0 0.05 0 - -	> > > > >	A 1	A 6 0.11 16 20 4	A 6 0.03 7 - -	> > > > >	A 6	C 22 0.2
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< 15 0.31 10	B 15 0.31 10	> > >	B 15	< 14 0.04 1	B 14 0.04 1	> > >	B 14	< 4 0.07 2	A 4 0.07 2	> > >	A 4	< 0 0.01 0	A 0 0.01 0	> > >	A 0	
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	D 36 0.67 46 50 4	B 17 0.37 44 - -	> > > > >	C 21	B 19 0.54 67 -	> > > > >	B 19						A 8 0.10 8 -	A 3 0.07 0 -	> > > > >	A 5	B 18 0.31
	Gordon Dean Avenue & Street C (North Leg)	TWSC	LOS Delay V/C Q	B 12 0.16 4	> > >	> > >	B 12					< 4 0.05 1	A 2 0.05 1	> > >	A 2		A 0 0.07 0	> > >	A 0	
	Street C & Collector B	TWSC	LOS Delay V/C Q	< 2 0.08 2	A 2 0.08 2	> > >	A 2	< 2 0.03 1	> > >	A 2		< 32 0.54 23	D 32 0.54 23	> > >	D 32	< 11 0.17 5	B 11 0.17 5	> > >	B 11	
	Gordon Dean Avenue & Street C (South Leg)	TWSC	LOS Delay V/C Q	A 10 0.12 3	> > >	> > >	A 10					< 5 0.06 2	A 3 0.06 2	> > >	A 3		A 0 0.04 0	> > >	A 0	

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 with through movement



TABLE 4.12: 2036 TOTAL OPERATIONS – AM PEAK HOUR (SCENARIO 2)

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	
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 242 1.43 125 80 -45	B 20 0.35 32 - -	> > > >	F 118	C 27 0.05 4 30 26	D 36 0.56 79 - -	D 50 0.31 29 - -	D 42	F 466 1.92 76 35 -41	C 25 0.78 114 - -	> > > >	F 143	F 302 1.56 95 50 -45	D 44 0.94 152 - -	> > > >	F 111	F 107 1.69
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 4 0.03 1 20 19	A 5 0.32 10 - -	> > > >	A 5	A 6 0.08 10 20 10	8 0.26 40 - -	> > > >	A 8	C 35 0.51 46 - -	C 22 0.05 0 - -	> > > >	C 31	< < < <	C 22 0.04 7 - -	> > > >	C 22	B 12 0.39
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	B 14 0.21 12 30 18	B 15 0.37 32 - -	> > > >	B 15	B 19 0.17 12 30 18	20 0.35 33 - -	> > > >	B 20	< < < <	B 18 0.38 46 - -	> > > >	B 18	< < < <	B 13 0.20 17 - -	> > > >	B 13	B 17 0.37
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< < < <	F 66 0.45 14 - -	> > > >	F 66	< < < <	F 274 1.52 223 - -	> > > >	F 274	A 8 0 0 20 20	A 0.25 0 - -	> > > >	A 0	A 9 0.13 4 20 16	A 0 0.15 0 - -	> > > >	A 3	
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	A 8 0.54 29 80 51	A 6 0.30 40 - -	> > > >	A 6	B 10 0.07 8 50 42	B 14 0.46 72 - -	> > > >	B 14	D 38 0.49 12 30 18	C 32 0.33 24 - -	> > > >	C 34	C 34 0.43 22 50 28	D 39 0.64 40 - -	> > > >	D 38	B 17 0.58
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	B 11 0.13 3 30 27	A 0 0.26 0 - -	> > > >	A 1	A 0 0 0 30 30	A 0 0.28 0 - -	> > > >	A 0	E 43 0.01 0 30 30	A 0 0.01 0 - -	> > > >	E 43	F 521 1.82 84 40 -44	B 13 0.14 4 - -	> > > >	F 334	
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 24 0.14 4 20 16	C 24 0.27 21 - -	> > > >	C 24	C 24 0.19 14 20 6	D 35 0.75 69 - -	> > > >	C 34	A 1 0.02 0 20 20	A 0 0.05 0 - -	> > > >	A 0	A 7 0.10 15 20 5	A 7 0.03 6 - -	> > > >	A 7	C 22 0.29
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< < <	B 14 0.32 10	> > >	B 14	< < <	B 12 0.06 1	> > >	B 12	< < <	A 3 0.06 2	> > >	A 3	< < <	A 0 0 0	> > >	A 0	
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	C 23 0.45 28 50 22	B 18 0.41 50 - -	> > >	B 18	> > >	B 18 0.48 60 - -	> > >	B 18	> > >	> > >	> > >	> > >	A 9 0.14 12 - -	A 4 0.07 0 - -	> > >	A 7	B 17 0.42
	Gordon Dean Avenue & Street C (North Leg)	TWSC	LOS Delay V/C Q	B 11 0.16 4	> > >	> > >	B 11	> > >	> > >	> > >	> > >	< < <	A 2 0.07 0	> > >	A 1	> > >	A 0 0.05 0	> > >	A 0	
	Street C & Collector B	TWSC	LOS Delay V/C Q	< < <	A 2 0.03 1	> > >	A 2	< < <	A 0 0.01 0	> > >	A 0	< < <	D 28 0.6 28	> > >	D 28	< < <	B 11 0.19 5	> > >	B 11	
	Gordon Dean Avenue & Street C (South Leg)	TWSC	LOS Delay V/C Q	A 10 0.14 4	> > >	> > >	A 10	> > >	> > >	> > >	> > >	< < <	A 4 0.05 1	> > >	A 2	> > >	A 0 0.05 0	> > >	A 0	

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 with through movement



TABLE 4.13: 2036 TOTAL OPERATIONS – PM PEAK HOUR (SCENARIO 2)

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		
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	F 268 1.50 166 80 -86	B 18 0.52 61 - -	> > > > >	F 106	C 27 0.19 15 30 15	C 32 0.53 97 - -	F 96 0.17 32 - -	D 52	F 293 1.47 48 35 -13	C 21 0.50 69 - -	> > > > >	F 88	E 60 0.91 81 50 -31	F 131 1.20 232 - -	> > > > >	F 115	F 95 1.48	
	Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 2 0.04 1 20 19	A 3 0.31 10 - -	> > > > >	A 3	A 8 0.28 20 20 0	A 7 0.26 36 - -	> > > > >	A 8	D 44 0.62 32 - -	C 34 0.06 0 - -	> > > > >	D 40	< 34 0.06 9 - -	C 34 0.06 9 - -	> > > > >	C 34	A 10 0.36	
	Jones Road & Barton Street	TCS	LOS Delay V/C Q Stor. Avail.	A 6 0.13 8 30 22	A 8 0.40 36 - -	> > > > >	A 8	B 16 0.40 21 30 9	B 12 0.35 37 - -	> > > > >	B 12	< 26 0.40 40 - -	C 26 0.40 40 - -	> > > > >	C 26	< 26 0.50 51 - -	C 26 0.50 51 - -	> > > > >	C 26	B 14 0.44	
	Fruitland Road & Sherwood Park Road/Collector B	TWSC	LOS Delay V/C Q Stor. Avail.	< 212 0.86 27 - -	F 212 0.86 27 - -	> > > > >	F 212	< 831 2.69 243 - -	F 831 2.69 243 - -	> > > > >	F 831	A 8 0.03 1 20 19	A 0 0.23 0 - -	> > > > >	A 1	A 9 0.31 10 20 10	A 0 0.28 0 - -	> > > > >	A 4		
	Regalview Drive/Fruitland Road & Highway 8	TCS	LOS Delay V/C Q Stor. Avail.	B 13 0.62 47 80 33	A 8 0.34 54 - -	> > > > >	A 10	B 15 0.12 12 50 38	C 21 0.63 115 - -	> > > > >	C 21	C 33 0.44 12 30 18	C 27 0.21 18 - -	> > > > >	C 28	C 30 0.41 25 50 25	D 39 0.74 58 - -	> > > > >	D 37	C 21 0.68	
	Jones Road & Highway 8	TWSC	LOS Delay V/C Q Stor. Avail.	B 11 0.11 3 30 27	A 0 0.28 0 - -	> > > > >	A 1	A 9 0 0 30 30	A 0 0.33 0 - -	> > > > >	A 0	F 65 0.02 0 30 30	B 11 0.01 0 - -	> > > > >	C 22	F 367 1.5 73 40 -33	B 15 0.28 9 - -	> > > > >	F 176		
	Gordon Dean Avenue & Collector B	TCS	LOS Delay V/C Q Stor. Avail.	C 30 0.15 5 20 15	C 34 0.60 32 - -	> > > > >	C 34	D 36 0.47 20 20 0	D 38 0.61 43 - -	> > > > >	D 38	A 3 0.04 3 20 17	A 3 0.06 2 - -	> > > > >	A 3	A 6 0.11 15 20 5	A 6 0.04 6 - -	> > > > >	A 6	C 22 0.2	
	Jones Road & Collector B	TWSC	LOS Delay V/C Q	< 15 0.33 11	C 15 0.33 11	> > >	C 15	< 14 0.04 1	B 14 0.04 1	> > >	B 14	< 4 0.07 2	A 4 0.07 2	> > >	A 4	< 0 0.01 0	A 0 0.01 0	> > >	A 0		
	Highway 8 & Gordon Dean Avenue	TCS	LOS Delay V/C Q Stor. Avail.	C 24 0.60 39 50 11	B 11 0.36 42 - -	> > > > >	B 14	B 13 0.52 65 - -	> > > > >	> > > > >	B 13					B 15 0.14 18 - -	B 14 0.07 10 - -	> > > > >	B 14	B 13 0.42	
	Gordon Dean Avenue & Street C (North Leg)	TWSC	LOS Delay V/C Q	B 12 0.16 4		> > >	B 12						< 4 0.05 1	A 4 0.05 1	> > >	A 2	A 0 0.07 0	> > >	A 0		
	Street C & Collector B	TWSC	LOS Delay V/C Q	< 2 0.08 2	A 2 0.08 2	> > >	A 2	< 2 0.03 1	A 2 0.03 1	> > >	A 2	< 32 0.54 23	D 32 0.54 23	> > >	D 32	< 11 0.17 5	B 11 0.17 5	> > >	B 11		
	Gordon Dean Avenue & Street C (South Leg)	TWSC	LOS Delay V/C Q	A 10 0.12 3		> > >	A 10					< 5 0.06 2	A 5 0.06 2	> > >	A 3	A 0 0.04 0	A 0 0.04 0	> > >	A 0		

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 with through movement



4.7 Remedial Measures

Remedial measures are required to support the development of the Fruitland-Winona Secondary Plan area which includes the Block 1 lands. As the Block 1 lands build-out, future transportation studies may be required if development occurs prior to the planned implementation of the EA improvements along Barton Street and Highway 8.

Table 4.14 provides a summary of the identified critical movements under 2031 and 2036 total traffic conditions for both Scenario 1 and Scenario 2, along with the corresponding applicable remedial measures considered to mitigate/improve the critical movements.

4.7.1 Dual Left-Turn Lanes

To improve the poor traffic operational performance at the intersection of Barton Street and Fruitland Road, intersection geometric improvements were investigated. The Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads recommends the consideration of dual left-turn lanes at intersections where left turning volumes exceed 300 vehicles per hour.

Based upon this guidance, the provision of eastbound dual left-turn lanes could be considered for implementation. This improvement was determined not to be feasible due to spatial constraints. Namely, there is only a single receiving lane and there is not enough space to accommodate the provision of a second receiving lane on the north leg. Furthermore, dual eastbound left-turn lanes are not identified in the Barton Street EA or the Highway 8 EA.

In lieu, a permitted and protected left-turn phase is proposed for the eastbound, westbound, northbound, and southbound left-turn movements to address the forecast increase in traffic and improve traffic operations at the intersection of Barton Street and Fruitland Road.

4.7.2 Traffic Control Signal

Signal warrant analyses were conducted to determine whether the future background and total traffic forecasts would warrant the consideration of traffic control signal at the intersections of Highway 8 and Jones Road, and Fruitland Road and Sherwood Park Road/Collector B.

The City of Hamilton Traffic Impact Study Guidelines (July 2009) requires new signal warrant to follow the Hamilton's signal warrant worksheet with full eight hours warrant data. However, as only peak



hour traffic forecasts are available, following general industry standards the warrant analyses were conducted in accordance with OTM Book 12 – Traffic Signals, using Justification 7, which is based on projected volumes (where the minimum requirements are increased to be met for 120% for projected volumes). **Appendix K** contains the signal warrant analysis.

Under 2031 and 2036 background and total traffic conditions, the forecast traffic volumes do not meet the justification thresholds to warrant the consideration of traffic signals at the intersections of Highway 8 and Jones Road, and Fruitland Road and Sherwood Park Road/Collector B.

Regardless, from an operational perspective the provision of unwarranted traffic control signal is anticipated to improve the reported poor traffic performance and has been further investigated.

4.7.3 Auxiliary Left-Turn Lanes

Under Scenario 2, at the intersection of Fruitland Road and Sherwood Park Road/Collector B, the westbound approach is forecast to operate over-capacity during the AM and PM peak hours under the 2036 horizon due to an increase in the westbound left-turn volumes compared to Scenario 1.

The westbound left-turn volumes are forecast to be approximately 180 during the AM peak hour and approximately 140 during the PM peak hour. It is recommended that a westbound left-turn lane be provided from an operational perspective. It is also recommended an eastbound left-turn lane be provided on Sherwood Park Road for proper alignment, if feasible. However, for analysis purposes the Sherwood Park Road approach is modeled as a shared left/through/right approach as existing.

4.7.4 Storage Lane Provisions

Based on the total traffic operational results under both scenarios, it is recommended at the intersection of Barton Street and Fruitland Road, the northbound left-turn lane storage length to be increased from the existing 35 metres to 85 metres to accommodate projected queue demands.

Under Scenario 2 at the intersection of Fruitland Road and Sherwood Park Road/Collector B, the southbound left-turn lane storage length is recommended to be increased from 20 metres (assumed) to 35 metres, and the westbound left-turn lane storage length provide a minimum of 50 metres to accommodate the anticipated 95th percentile queues.



TABLE 4.14: SUMMARY OF CRITICAL MOVEMENTS AND PROPOSED REMEDIAL MEASURES

Intersection	Movement	AM Peak Hour		PM Peak Hour		Proposed Remedial Measures
		LOS	V/C	LOS	V/C	
2031 Total Conditions (Scenario 1)						
Barton Street and Fruitland Road (signalized)	EBL	F	1.04	F	1.09	Permitted and protected left-turn phase for NBL, SBL, EBL, and WBL movements; and Increase NBL storage length from existing 35 m to 85m.
	NBL	F	1.00	F	1.08	
		95 th Queue = 72 m		95 th Queue = 54 m		
	SBL	E	0.94	C	0.66	
Fruitland Road and Sherwood Park Road/Collector B	SBTR	C	0.75	D	0.95	Traffic control signal
	EBLTR	E	0.27	F	0.52	
Highway 8 and Jones Road (unsignalized)	WBLTR	E	0.82	E	0.78	Traffic control signal
	NBL	D	0.01	E	0.01	
	SBL	F	1.12	F	0.92	
2036 Total Conditions (Scenario 1)						
Barton Street and Fruitland Road (signalized)	EBL	F	1.43	F	1.50	Permitted and protected left-turn phase for NBL, SBL, and WBL movements; and Increase NBL storage length from existing 35 m to 85m.
	NBL	F	1.92	F	1.47	
		95 th Queue = 76 m		95 th Queue = 48 m		
	SBL	F	1.56	E	0.91	
Fruitland Road and Sherwood Park Road/Collector B	SBTR	D	0.94	F	1.20	Traffic control signal
	EBLTR	F	0.44	F	0.83	
Highway 8 and Jones Road (unsignalized)	WBLTR	F	0.95	F	0.96	Traffic control signal
	NBL	E	0.01	F	0.02	
	SBL	F	1.82	F	1.50	
2031 Total Conditions (Scenario 2)						
Barton Street and Fruitland Road (signalized)	EBL	F	1.04	F	1.09	Permitted and protected left-turn phase for NBL, SBL, and WBL movements; and Increase NBL storage length from existing 35 m to 85m.
	NBL	F	1.00	F	1.08	
		95 th Queue = 72 m		95 th Queue = 54 m		
	SBL	E	0.94	C	0.66	
Fruitland Road and Sherwood Park Road/Collector B (unsignalized)	SBTR	C	0.75	D	0.95	Traffic control signal; Westbound left-turn lane with 50 m storage; and Increase SBL storage length from assumed 20 m to 35 m
	EBLTR	E	0.27	F	0.52	
Highway 8 and Jones Road (unsignalized)	WBLTR	F	1.28	F	2.07	Traffic control signal
	NBL	D	0.01	E	0.01	
	SBL	F	1.12	F	0.92	
2036 Total Conditions (Scenario 2)						
Barton Street and Fruitland Road (signalized)	EBL	F	1.43	F	1.50	Permitted and protected left-turn phase for NBL, SBL, and WBL movements; and Increase NBL storage length from existing 35 m to 85m.
	NBL	F	1.92	F	1.47	
		95 th Queue = 76 m		95 th Queue = 48 m		
	SBL	F	1.56	E	0.91	
Fruitland Road and Sherwood Park Road/Collector B (unsignalized)	SBTR	D	0.94	F	1.2	Traffic control signal; Westbound left-turn lane with 50 m storage; and Increase SBL storage length from assumed 20 m to 35 m
	EBLTR	F	0.45	F	0.86	
Highway 8 and Jones Road (unsignalized)	WBLTR	F	1.52	F	2.69	Traffic control signal
	NBL	E	0.01	F	0.02	
	SBL	F	1.82	F	1.50	



4.8 Total Traffic Operations with Remedial Measures

Table 4.15 and **Table 4.16** present the 2036 total traffic operational results with the proposed remedial measures under Scenario 1 during the AM and PM peak hour, respectively.

Table 4.17 and **Table 4.18** present the 2036 total traffic operational results with the proposed remedial measures under Scenario 2 during the AM and PM peak hour, respectively.

The operational analysis was assessed for 2036 horizon only, as this represents the “worst-case scenario.” **Appendix L** contains the Synchro analysis outputs for reference.

With the proposed remedial measures implemented, the noted study area intersections are forecast to operate at acceptable levels of service and with most movements within capacity. The exception includes several movements at the intersection of Barton Street and Fruitland Road still operating close to or over-capacity ($v/c > 1.00$).

The 95th percentile queue lengths were reviewed for all turn lanes against provided storage. Queue lengths for through movements were also checked. No spillback issues were found, except for the southbound left-turn and the eastbound left-turn movements at the intersection of Barton Street and Fruitland Road. It is noted TWLTLs are provided beyond the auxiliary left-turn lanes which provide additional queue storage without blocking the adjacent travel lane.



TABLE 4.15: 2036 TOTAL OPERATIONS WITH REMEDIAL MEASURES – AM PEAK HOUR (SCENARIO 1)

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	
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay	F 653	C 30	>	F 306	C 32	E 59	D 36	D 49	F 135	F 86	>	F 99	F 151	F 153	>	F 153	F 157
			V/C	1.43	0.40	>		0.06	0.85	0.23		1.13	1.04	>		1.17	1.22	>		1.37
			Q	133	50	>		5	118	16		84	200	>		93	235	>		
			Stor.	80	-	>		30	-	-		85	-	>		50	-	>		
			Avail.	-53	-	>		25	-	-		1	-	>		-43	-	>		
	Fruitland Road & Sherwood Park Road/Collector B	TCS	LOS Delay	<	C 29	>	<	E 79	>	E 79	A 4	A 6	>	A 6	A 6	A 6	>	A 6	C 31	
			V/C	<	0.13	>	<	0.84	>		0.01	0.33	>		0.24	0.22	>		0.45	
			Q	<	11	>	<	78	>		2	43	>		20	27	>			
			Stor.	<	-	>	<	-	>		20	-	>		20	-	>			
			Avail.	<	-	>	<	-	>		18	-	>		0	-	>			
Jones Road & Highway 8	TCS	LOS Delay	A 7	A 4	>	A 5	A 0	A 6	>	A 6	C 29	A 0	>	C 29	D 45	C 30	>	D 39	A 9	
		V/C	0.27	0.28	>		0.00	0.36	>		0.00	0.00	>		0.69	0.05	>		0.43	
		Q	22	59	>		0	41	>		1	0	>		28	0	>			
		Stor.	30	-	>		30	-	>		30	-	>		40	-	>			
		Avail.	8	-	>		30	-	>		29	-	>		12	-	>			

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

</> - Shared with through movement

LOS - Level of Service

Stor. - Existing Storage (m)

Delay - Average Delay per Vehicle in Seconds

Avail. - Available Storage (m)

V/C - Volume to Capacity Ratio

TCS - Traffic Control Signal

TABLE 4.16: 2036 TOTAL OPERATIONS WITH REMEDIAL MEASURES – PM PEAK HOUR (SCENARIO 1)

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	
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS Delay	F 663	D 38	>	F 257	C 32	E 71	D 35	E 57	F 81	D 37	>	D 48	C 28	F 143	>	F 117	F 147
			V/C	1.80	0.71	>		0.25	0.94	0.17		0.89	0.62	>		0.70	1.21	>		1.52
			Q	210	107	>		12	164	20		46	103	>		51	296	>		
			Stor.	80	-	>		30	-	-		85	-	>		50	-	>		
			Avail.	-130	-	>		18	-	-		39	-	>		-1	-	>		
	Fruitland Road & Sherwood Park Road/Collector B	TCS	LOS Delay	<	D 46	>	<	E 70	>	E 70	A 2	A 2	>	A 2	A 4	A 2	>	A 3	B 16	
			V/C	<	0.48	>	<	0.68	>		0.04	0.21	>		0.43	0.32	>		0.45	
			Q	<	20	>	<	47	>		2	11	>		20	19	>			
			Stor.	<	-	>	<	-	>		20	-	>		20	-	>			
			Avail.	<	-	>	<	-	>		18	-	>		0	-	>			
Jones Road & Highway 8	TCS	LOS Delay	A 5	A 4	>	A 4	A 3	A 4	>	A 4	C 32	C 32	>	C 32	D 38	C 32	>	C 35	A 8	
		V/C	0.22	0.28	>		0.01	0.38	>		0.01	0.00	>		0.62	0.09	>		0.42	
		Q	16	68	>		1	42	>		1	0	>		31	7	>			
		Stor.	30	-	>		30	-	>		30	-	>		40	-	>			
		Avail.	14	-	>		29	-	>		29	-	>		9	-	>			

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

</> - Shared with through movement

LOS - Level of Service

Stor. - Existing Storage (m)

Delay - Average Delay per Vehicle in Seconds

Avail. - Available Storage (m)

V/C - Volume to Capacity Ratio

TCS - Traffic Control Signal



TABLE 4.17: 2036 TOTAL OPERATIONS WITH REMEDIAL MEASURES – AM PEAK HOUR (SCENARIO 2)

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	
AM Peak Hour	Fruitland Road & Barton Street	TCS	LOS	F	C	>	F	C	E	D	D	F	F	>	F	F	F	>	F	F
			Delay	246	30	>	125	32	59	36	49	135	86	>	99	151	153	>	153	111
			V/C	1.43	0.40	>		0.06	0.85	0.23		1.13	1.04	>		1.17	1.22	>		1.37
			Q	133	50	>		5	118	16		84	200	>		93	235	>		
			Stor.	80	-	>		30	-	-		85	-	>		50	-	>		
	Avail.	-53	-	>		25	-	-		1	-	>		-43	-	>				
	Fruitland Road & Sherwood Park Road/Collector B	TCS	LOS	<	C	>	C	D	C	>	D	A	A	>	A	A	A	>	A	B
			Delay	<	30	>	30	54	31	>	39	4	6	>	6	6	5	>	5	19
			V/C	<	0.17	>		0.74	0.23	>		0.01	0.35	>		0.25	0.21	>		0.43
			Q	<	12	>		49	16	>		2	46	>		20	27	>		
			Stor.	<	-	>		50	-	>		20	-	>		35	-	>		
	Avail.	<	-	>		1	-	>		18	-	>		15	-	>				
Jones Road & Highway 8	TCS	LOS	A	A	>	A	A	A	>	A	C	A	>	C	D	C	>	D	A	
		Delay	8	5	>	6	0	6	>	6	29	0	>	29	47	30	>	40	9	
		V/C	0.27	0.28	>		0.00	0.36	>		0.00	0.00	>		0.69	0.05	>		0.43	
		Q	16	35	>		0	41	>		1	0	>		28	0	>			
Stor.	30	-	>		30	-	>		30	-	>		40	-	>					
Avail.	14	-	>		30	-	>		29	-	>		12	-	>					

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

< / > - Shared with through movement

LOS - Level of Service

Stor. - Existing Storage (m)

Delay - Average Delay per Vehicle in Seconds

Avail. - Available Storage (m)

V/C - Volume to Capacity Ratio

TCS - Traffic Control Signal

TABLE 4.18: 2036 TOTAL OPERATIONS WITH REMEDIAL MEASURES – PM PEAK HOUR (SCENARIO 2)

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	
PM Peak Hour	Fruitland Road & Barton Street	TCS	LOS	F	D	>	F	C	E	D	E	F	D	>	D	C	F	>	F	F
			Delay	409	38	>	168	32	71	35	57	81	37	>	48	28	143	>	117	114
			V/C	1.80	0.71	>		0.25	0.94	0.17		0.89	0.62	>		0.70	1.21	>		1.52
			Q	210	107	>		12	164	20		46	103	>		51	296	>		
			Stor.	80	-	>		30	-	-		85	-	>		50	-	>		
	Avail.	-130	-	>		18	-	-		39	-	>		-1	-	>				
	Fruitland Road & Sherwood Park Road/Collector B	TCS	LOS	<	D	>	D	D	C	>	D	A	A	>	A	A	A	>	A	B
			Delay	<	37	>	37	54	35	>	43	3	4	>	4	6	4	>	5	14
			V/C	<	0.28	>		0.76	0.14	>		0.05	0.28	>		0.50	0.35	>		0.54
			Q	<	14	>		50	0	>		3	21	>		35	32	>		
			Stor.	<	-	>		50	-	>		20	-	>		35	-	>		
	Avail.	<	-	>		0	-	>		17	-	>		0	-	>				
Jones Road & Highway 8	TCS	LOS	A	A	>	A	A	A	>	A	C	C	>	C	D	C	>	C	A	
		Delay	5	3	>	4	3	4	>	4	32	32	>	32	38	32	>	35	8	
		V/C	0.22	0.28	>		0.01	0.38	>		0.01	0.00	>		0.62	0.09	>		0.42	
		Q	15	52	>		1	42	>		1	0	>		31	7	>			
		Stor.	30	-	>		30	-	>		30	-	>		40	-	>			
Avail.	15	-	>		29	-	>		29	-	>		9	-	>					

MOE - Measure of Effectiveness

Q - 95th Percentile Queue Length (m)

< / > - Shared with through movement

LOS - Level of Service

Stor. - Existing Storage (m)

Delay - Average Delay per Vehicle in Seconds

Avail. - Available Storage (m)

V/C - Volume to Capacity Ratio

TCS - Traffic Control Signal



4.9 Preferred Street C Scenario

As discussed in **Section 4.6.1** and **Section 4.6.2**, the majority of study area intersections would operate similar between Scenario 1 and Scenario 2. The exception would be the westbound approach at the intersection of Fruitland Road and Sherwood Park Road/Collector B operating over-capacity ($v/c > 1.00$) under Scenario 2. However, as demonstrated in **Section 4.7**, with implementation of traffic control signal at the intersection, all movements are forecast to operate at acceptable levels of service and within capacity for both Scenario 1 and Scenario 2.

From an access management perspective, Scenario 2 is considered the preferred scenario as it minimizes the number of direct access points on Highway 8, a major arterial road. This helps improve the overall capacity of Highway 8 and road safety for all road users by reducing potential conflict points along this segment.

The preferred scenario for Street C is Scenario 2 where Street C does not connect to Highway 8.

4.10 Access Review

The study area intersections have been reviewed in terms of access control and spacing, and sight distance requirements for the preferred scenario (Scenario 2).

4.10.1 Access Control and Spacing

Future traffic control at the study area intersections is summarized as follows:

- ▶ Traffic Control Signal
 - Barton Street and Fruitland Road (existing);
 - Barton Street and Sunnyhurst Avenue/Gordon Dean Avenue (identified within the Gordon Dean Avenue Environmental Study);
 - Barton Street and Jones Road (identified within the Barton Street EA study);
 - Fruitland Road and Sherwood Park Road/Collector B (recommended remedial measure);
 - Gordon Dean Avenue and Collector B (identified within the Gordon Dean Avenue Environmental Study);
 - Highway 8 and Fruitland Road/Regalview Drive (existing);



- Highway 8 and Jones Road (recommended remedial measure); and
- Highway 8 and Gordon Dean Avenue (identified within the Gordon Dean Avenue Environmental Study).
- ▶ Unsignalized
 - Collector B and Street C – stop control on northbound and southbound Street C approaches;
 - Jones Road and Collector B – stop control on eastbound and westbound Collector B approaches;
 - Gordon Dean Avenue and Street C (north) – stop control on eastbound Street C approach;
 - Gordon Dean Avenue and Street C (south) – stop control on eastbound Street C approach; and
 - Street C and Street D – all-way stop control.

According to the Transportation Association of Canada (TAC) *Geometric Design Guide for Canadian Roads* (GDGCR),²⁰ the following minimum intersection spacing is required:

- ▶ Arterials: the typical minimum intersection spacing along arterial roadways is 200 metres;
- ▶ Collectors: the typical minimum spacing between adjacent intersections along a collector road is 60 metres; and
- ▶ Local roads: the minimum spacing between four-legged intersections is normally 60 metres. Where the adjacent intersections are three-legged, a minimum spacing of 40 metres is acceptable.

Figure 4.21 illustrates the spacing among the study area intersections. The proposed/existing spacing meets and satisfies the TAC GDGCR standards, with the exceptions of Barton Street intersections with Sunnyhurst Avenue, Kenmore Avenue, and Jones Road, which are existing intersections.

The spacing between Sunnyhurst Avenue and Kenmore Avenue, and between Kenmore Avenue and Jones Road is approximately 180 metres, which is less than the typical minimum spacing of 200 metres along arterial roadways. This is not considered a critical issue as these are existing intersections without any reported safety concerns.

²⁰ Transportation Association of Canada, *Geometric Design Guide for Canadian Roads, Chapter 9 – Intersections*, June 2017, p27.



As the lands build-out, individual site plans will be developed. The site plans may propose private driveways to the future municipal roadways.





Figure 4.21

4.10.2 Sight Distance

Based on the TAC GDGCR²¹ the sight distance requirements for signalized intersections are the first vehicle stopped on one approach should be visible to the driver of the first vehicle stopped on each of the other approaches. Left-turning vehicles should have sufficient sight distance to select gaps in oncoming traffic and complete left turns. Similar requirements must be satisfied for right turns. Apart from these sight conditions, there are generally no other approach or departure sight triangles needed for signalized intersections.

Barton Street, Fruitland Road, Jones Road, Gordon Dean Avenue, and Collector B within the study area are fairly straight and flat. Through field observation and based on the current Secondary Plan, no sight distances and sightline issues are anticipated at the existing/proposed signalized intersections. The horizontal curve along Highway 8 should be reviewed as part of the Municipal Class Environmental Assessment for Improvements to Highway 8 between Fruitland Road and Fifty Road to ensure appropriate sightlines are maintained for drivers following the planned construction. The horizontal curve will not impact the sight distance requirements for the proposed signalized intersection of Highway 8 and Gordon Dean Avenue.

At the unsignalized intersections, namely the Street C intersections with Gordon Dean Avenue and Collector B, and intersection of Jones Road and Collector B, a high-level desktop sight distance assessment has been conducted.

For vehicles approaching an intersection, the minimum stopping sight distance is the distance required for the approaching vehicle to stop safely and avoid a collision. Whereas the departure sight distance represents the minimum distance required for a vehicle to safely enter the major roadway and complete a turning movement without significantly impeding traffic flow or providing the opportunity for conflict.

For the assessment, a design speed of 60 km/h (10 km/h over the posted speed limit) has been considered for Jones Road, Gordon Dean Avenue, and Collector B.

Table 4.19 and **Table 4.20** summarizes the available and TAC GDGCR recommended minimum approach and departure sight distances, respectively.

²¹ Transportation Association of Canada, *Geometric Design Guide for Canadian Roads, Chapter 9 – Intersections*, June 2017, p77.



TABLE 4.19: APPROACH SIGHT DISTANCE ANALYSIS SUMMARY

Approach Direction	Available Sight Distance Measured (m)	TAC Sight Distance Requirement (m) ¹	Requirements Met?
Gordon Dean Avenue and Street C (north)			
Northbound	> 150.0	85.0	Yes
Southbound	> 150.0	85.0	Yes
Gordon Dean Avenue and Street C (south)			
Northbound	> 150.0	85.0	Yes
Southbound	> 150.0	85.0	Yes
Collector B and Street C			
Eastbound	> 150.0	85.0	Yes
Westbound	> 150.0	85.0	Yes
Jones Road and Collector B			
Northbound	> 150.0	85.0	Yes
Southbound	> 150.0	85.0	Yes

¹ TAC GDGCR. June 2017, Table 2.5.2: Stopping Sight Distance on Level Roadways for Automobiles



TABLE 4.20: DEPARTURE SIGHT DISTANCE ANALYSIS SUMMARY

Departure Movement	Available Sight Distance Measured (m)		TAC Sight Distance Requirement (m) ^{1,2}	Requirements Met?
	Direction	Distance		
Gordon Dean Avenue and Street C (north)				
Left-Turn Movement	Looking right (south)	> 150.0	130.0	Yes
	Looking left (north)	> 150.0	130.0	Yes
Right-Turn Movement	Looking right (south)	-	N/A	N/A
	Looking left (north)	> 150.0	110.0	Yes
Gordon Dean Avenue and Street C (south)				
Left-Turn Movement	Looking right (south)	> 150.0	130.0	Yes
	Looking left (north)	> 150.0	130.0	Yes
Right-Turn Movement	Looking right (south)	-	N/A	N/A
	Looking left (north)	> 150.0	110.0	Yes
Collector B and Street C				
Left-Turn Movement	Looking right (west)	> 150.0	130.0	Yes
	Looking left (east)	> 150.0	130.0	Yes
	Looking right (east)	> 150.0	130.0	Yes
	Looking left (west)	> 150.0	130.0	Yes
Right-Turn Movement	Looking right (west)	-	N/A	N/A
	Looking left (east)	> 150.0	110.0	Yes
	Looking right (east)	-	N/A	N/A
	Looking left (west)	> 150.0	110.0	Yes
Jones Road and Collector B				
Left-Turn Movement	Looking right (south)	> 150.0	130.0	Yes
	Looking left (north)	> 150.0	130.0	Yes
	Looking right (north)	> 150.0	130.0	Yes
	Looking left (south)	> 150.0	130.0	Yes
Right-Turn Movement	Looking right (south)	-	N/A	N/A
	Looking left (north)	> 150.0	110.0	Yes
	Looking right (north)	-	N/A	N/A
	Looking left (south)	> 150.0	110.0	Yes

¹ TAC GDGCR. June 2017, Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn from Stop

² TAC GDGCR. June 2017, Table 9.9.6: Design Intersection Sight Distance – Case B2, Right Turn from Stop



The results indicate the required approach and departure sight distances are met and satisfied for all unsignalized intersections.

It is assumed at the proposed signalized intersections, delineated crosswalks, pedestrian signal heads, and pedestrian push buttons will be provided for all intersection approaches to accommodate walking trips. At the proposed unsignalized intersections, delineated crosswalks will be provided on minor approaches under stop-control.

4.11 Summary of Improvements

This section summarizes the planned road network improvements as well as the proposed remedial measures based on the 2031 and 2036 total traffic operations for the preferred scenario (Scenario 2 – Street C no connection to Highway 8). **Figure 4.22** illustrates the recommended future lane configurations and traffic control.

Roadways:

- ▶ Barton Street: widening from two to four lanes, east of Fruitland Road (based on the Barton Street EA study);
- ▶ Highway 8: widening from two to four lanes (based on the Highway 8 EA study);
- ▶ Gordon Dean Avenue: new collector road with two lanes in each direction (based on the Gordon Dean Avenue Environmental Study);
- ▶ Fruitland Road: the existing two-lane cross section (one lane in each direction) with exclusive left-turn lanes at intersections;
- ▶ Jones Road: the existing two-lane cross section with one lane in each direction;
- ▶ Collector B: new collector road with one lane in each direction (based on the Gordon Dean Avenue Environmental Study);
- ▶ Street C: new local road with one lane in each direction; and
- ▶ Street D: new local road with one lane in each direction.

Fruitland Road and Barton Street:

- ▶ Westbound left-turn: 30 metres of storage (based on the Barton Street EA study);
- ▶ Northbound left-turn: 85 metres of storage (remedial measure);
- ▶ A new westbound right-turn lane (based on the Barton Street EA study); and



- ▶ A permitted and protected left-turn phase for northbound, southbound, eastbound, and westbound left-turn movements (remedial measure).

Barton Street and Sunnyhurst Avenue/Gordon Dean Avenue:

- ▶ Westbound and eastbound left-turn: 20 metres of storage (based on the Barton Street EA study);
- ▶ Northbound left-turn lane (based on the Gordon Dean Avenue Environmental Study); and
- ▶ Traffic control signal (based on the Gordon Dean Avenue Environmental Study).

Barton Street and Jones Road:

- ▶ Westbound and eastbound left-turn: 30 metres of storage (based on the Barton Street EA study); and
- ▶ Traffic control signal (based on the Barton Street EA study).

Fruitland Road and Sherwood Park Road/Collector B:

- ▶ Southbound left-turn: 35 metres of storage (remedial measure);
- ▶ Westbound left-turn: 50 metres of storage (remedial measure); and
- ▶ Traffic control signal (remedial measure).

Highway 8 and Fruitland Road/Regalview Drive:

- ▶ Northbound left-turn: 30 metres of storage (based on the Highway 8 EA study);
- ▶ Southbound and westbound left-turn: 50 metres of storage (based on the Highway 8 EA study); and
- ▶ Eastbound left-turn: 80 metres of storage (based on the Highway 8 EA study).

Highway 8 and Jones Road:

- ▶ Northbound, eastbound, and westbound left-turn: 30 metres of storage (based on the Highway 8 EA study);
- ▶ Southbound left-turn: 40 metres of storage (based on the Highway 8 EA study); and
- ▶ Traffic control signal (remedial measure).



Gordon Dean Avenue and Collector B:

- ▶ Traffic control signal (based on the Gordon Dean Avenue Environmental Study); and
- ▶ Northbound, southbound, eastbound, and westbound left-turn: 20 metres of storage (assumed based on storage length at nearby intersections).

Jones Road and Collector B:

- ▶ Collector B operating under stop-control (assumed based on traffic forecasts and road classification).

Highway 8 and Gordon Dean Avenue:

- ▶ Eastbound left-turn: 50 metres of storage (based on the Highway 8 EA study); and
- ▶ Traffic control signal (based on the Highway 8 EA study).

Gordon Dean Avenue and Street C (north):

- ▶ Street C operating under stop-control (assumed).

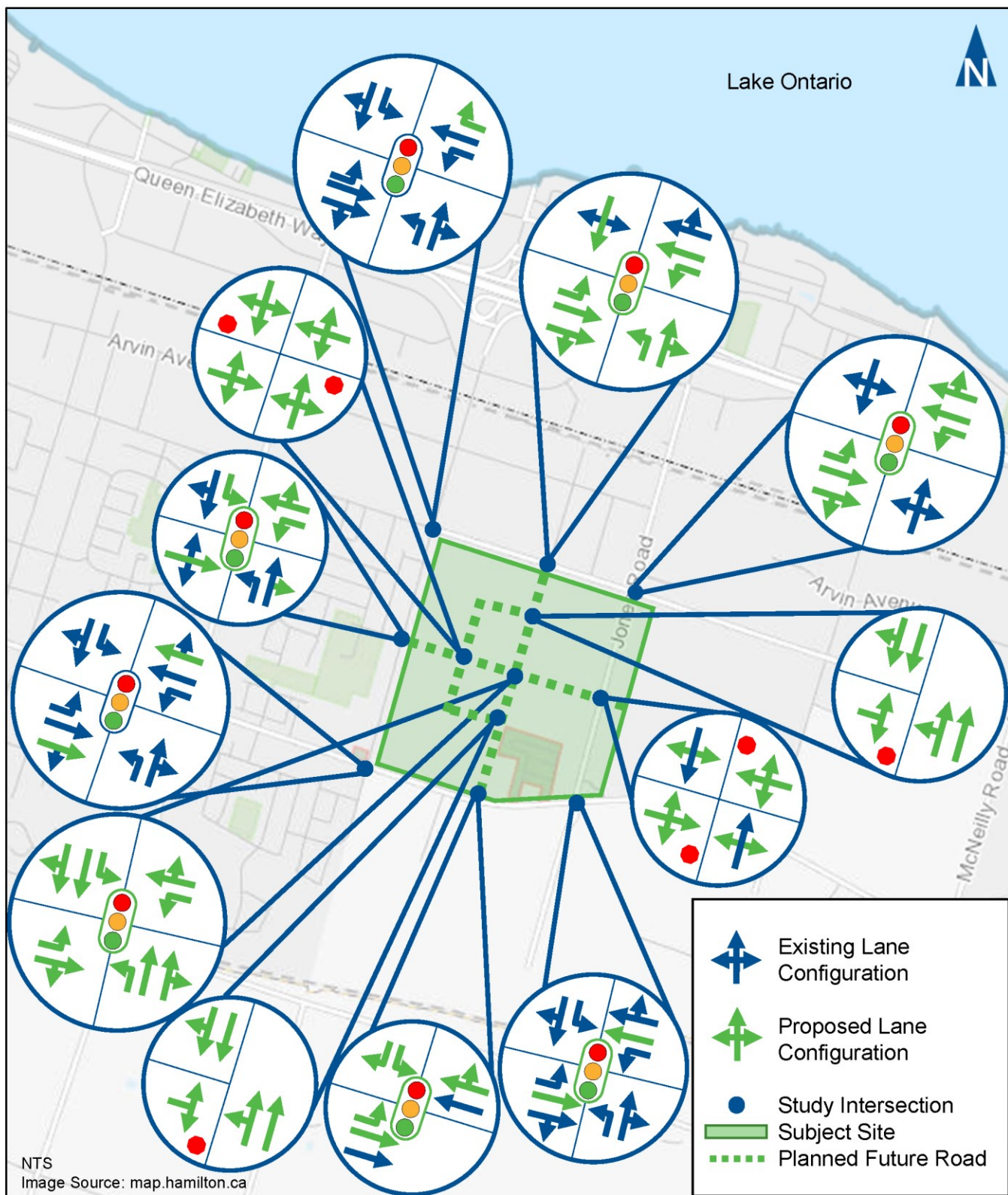
Collector B and Street C:

- ▶ Street C operating under stop-control (assumed).

Gordon Dean Avenue and Street C (south):

- ▶ Street C operating under stop-control (assumed).





5 Conclusions and Recommendations

5.1 Conclusions

The main findings and conclusions of this study are as follows:

- ▶ **Base Year Traffic Conditions:** The study area intersections are currently operating at acceptable levels of service and well within capacity during the weekday AM and PM peak hours.
The northbound and southbound left-turn movements at the unsignalized intersection of Highway 8 and Jones Road are reported to operate at LOS D during the AM and PM peak hours; however, both movements operate within capacity and no other critical movements are noted;
- ▶ **Site Trip Generation:** Full build-out of Block 1 is estimated to generate approximately 1,787 AM peak hour vehicle trips and 2,066 PM peak hour vehicle trips;
- ▶ **Site Trip Distribution and Assignments:** Trip distribution was estimated based on a review of existing traffic patterns as well as trip distribution data determined from 2016 TTS data. Site trips were assigned to the internal and external road networks in accordance with the trip distribution and logical routing choices;
- ▶ **Future Road Network:** Future road network improvements within the study area include two new collector roadways (Gordon Dean Avenue and Collector B), two local streets (Street C and Street D), the planned widening of both Barton Street and Highway 8 from two to four lanes. It is assumed that the planned improvements will be in place by 2031 to support the build-out of the Fruitland-Winona Secondary Plan area;
- ▶ **Horizon Years:** Year 2031 and 2036 were analyzed, representing the assumed full build-out/occupancy year and a period of five years beyond full build-out/occupancy year;
- ▶ **Background Traffic Forecasts:** A 2.0% per annum compounded growth rate was applied to the base year traffic volumes to derive the 2031 background traffic forecasts. A 4.5% per annum compounded growth rate was applied to the 2031 background traffic forecasts to derive the 2036 background traffic forecasts.

Block 2 site traffic and diverted truck traffic volumes to Gordon Dean Avenue were accounted for within the future background forecasts;



- ▶ **Background Traffic Conditions:** Under the 2031 and 2036 horizon years, the following critical movements are identified at the study area intersections during the AM and PM peak hours;

Barton Street and Fruitland Road (signalized)

- Southbound shared through/right-turn – v/c ratio of 0.94 during the AM peak hour and a v/c ratio of 1.12 during the PM peak hour under the 2036 horizon; and
- Eastbound left-turn – v/c ratio of 1.12 during the PM peak hour under the 2036 horizon.

Highway 8 and Jones Road (unsignalized)

- Southbound left-turn – LOS D/E under the 2031 and 2036 horizons; and
- Northbound left-turn – LOS D/E under the 2031 and 2036 horizons.

- ▶ **Total Traffic Conditions:** Total traffic analyses were conducted accounting for two scenarios related to Street C. Scenario 1 – Street C connects to Highway 8 and Scenario 2 – Street C does not connect to Highway 8.

Under the 2031 and 2036 horizon years, capacity issues identified under background conditions are forecast to continue to occur under total traffic conditions. Several critical movements were identified in addition to those identified under background conditions at multiple study area intersections.

The majority of study area intersections are forecast to operate similarly under both Scenario 1 and Scenario 2 conditions. One major difference is noted at the intersection of Fruitland Road and Sherwood Park Road/Collector B. Specifically, the westbound approach is forecast to operate over-capacity under Scenario 2 while it is reported to operate within capacity under Scenario 1. This is due to increased westbound left-turn movements at Fruitland Road and Sherwood Park Road/Collector B under Scenario 2 as Street C does not provide direct access to Highway 8;

Remedial Measures: Geometric and traffic control improvements are required to accommodate the forecast traffic volumes resulting from the build-out of the Fruitland-Winona Secondary Plan area and the Block 1 lands. **Figure ES.1** illustrates the recommended future lane configurations and traffic control for the study area intersections.

- Fruitland Road and Barton Street:



- Westbound left-turn: 30 metres of storage (based on the Barton Street EA study);
- Northbound left-turn: 85 metres of storage (remedial measure); and
- A permitted and protected left-turn phase for northbound, southbound, eastbound, and westbound left-turn movements (remedial measure).
- Barton Street and Sunnyhurst Avenue/Gordon Dean Avenue:
 - Westbound and eastbound left-turn: 20 metres of storage (based on the Barton Street EA study);
 - Northbound left-turn lane (based on the Gordon Dean Avenue Environmental Study); and
 - Traffic control signal (based on the Gordon Dean Avenue Environmental Study).
- Barton Street and Jones Road:
 - Westbound and eastbound left-turn: 30 metres of storage (based on the Barton Street EA study); and
 - Traffic control signal (based on the Barton Street EA study).
- Fruitland Road and Sherwood Park Road/Collector B:
 - Southbound left-turn: 35 metres of storage (remedial measure);
 - Westbound left-turn: 50 metres of storage (remedial measure); and
 - Traffic control signal (remedial measure).
- Highway 8 and Fruitland Road/Regalview Drive:
 - Northbound left-turn: 30 metres of storage (based on the Highway 8 EA study);
 - Southbound and westbound left-turn: 50 metres of storage (based on the Highway 8 EA study); and
 - Eastbound left-turn: 80 metres of storage (based on the Highway 8 EA study).
- Highway 8 and Jones Road:
 - Northbound, eastbound, and westbound left-turn: 30 metres of storage (based on the Highway 8 EA study);



- Southbound left-turn: 40 metres of storage (based on the Highway 8 EA study); and
 - Traffic control signal (remedial measure).
- Gordon Dean Avenue and Collector B:
 - Traffic control signal (based on the Gordon Dean Avenue Environmental Study); and
 - Northbound, southbound, eastbound, and westbound left-turn: 20 metres of storage (based on storage length at nearby intersections).
- Jones Road and Collector B:
 - Collector B operating under stop-control (assumed based on traffic forecasts and road classification).
- Highway 8 and Gordon Dean Avenue:
 - Eastbound left-turn: 50 metres of storage (based on the Highway 8 EA study); and
 - Traffic control signal (based on the Highway 8 EA study).
- Gordon Dean Avenue and Street C (north):
 - Street C operating under stop-control (assumed).
- Collector B and Street C:
 - Street C operating under stop-control (assumed).
- Gordon Dean Avenue and Street C (south):
 - Street C operating under stop-control (assumed).

The above remedial measures account for full development of the Fruitland-Winona Secondary Plan area which includes the Block 1 lands. As the Block 1 lands build-out, future transportation studies may be required if development occurs prior to the planned implementation of the EA improvements along Barton Street and Highway 8;

- ▶ **Street C Connection Scenarios:** From a traffic operational perspective Scenario 1 (Street C connection to Highway 8) and Scenario 2 (Street C no connection to Highway 8) result in similar traffic operational performance under the 2031 and 2036 horizons with recommended remedial measures.

From an access management perspective, Scenario 2 is considered the preferred scenario as it minimizes the number of direct access points on Highway 8; and



- ▶ **Access Review:** The proposed road network (Scenario 2) and intersections meet and satisfy the TAC GDGCR requirements in terms of intersection spacing and sight distance requirements.

5.2 Recommendations

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

- ▶ The City of Hamilton recognize the conclusions drawn above;
- ▶ Traffic conditions to be monitored within the study area, to determine appropriate timing for implementation of road network improvements and remedial measures in response to actual growth realized and actual site traffic generated; and
- ▶ The preferred Street C connection is Scenario 2, where Street C does not connect to Highway 8.

In support of draft plan approval, this report can be amended to document any staging of interim or ultimate network improvements.



Appendix A

Pre-Study Consultation



Stefan Hajgato

From: Fazio, Margaret <Margaret.Fazio@hamilton.ca>
Sent: Wednesday, October 6, 2021 12:14 PM
To: Steve Hader; Stefan Hajgato
Subject: FW: REQUEST FOR INFO RE Block 1 SS - TIS - TOR and Concept Plan Feedback

Importance: High

Hi Steve & Stefan,

Sorry it's taken this long to respond to your inquiries: - the answers in blue are below your questions in black. Please let me know if you have further questions.

Thank you,
Margaret

- Would it acceptable to factor our 2020 count data (pre-covid) to 2021 conditions at 2.0% per annum? Please clarify the reason for this question. Please also refer to the meeting on September 23, 2021, pertaining to population estimates.

- Which planner(s) at the City should we contact for background developments, as the study area is quite large?

Please specify what kind of developments you are referring to, and within which area, as well as approval status.

- Are standard drawings from the City available for larger (4-lane) roadways?

What is the reason for a requirement for the standard 4 lane road drawings as part of TIS?

- Gordon Dean EA has been completed (30% design).
- Barton EA is ongoing, incorporating intersections with Fruitland Road, Gordon Dean and Jones road.

Its Roll Plans and cross sections can be found in the PIC materials here:

<https://engage.hamilton.ca/bartonfiftyea>, although it's still in process of development/finalization. ESR is expected to go to Council in January 2022. 30 day review will be anticipated shortly thereafter.

Please advise if you require anything further.

- Highway 8 Phases 3 & 4 EA is ongoing (cross sections and roll plans are in process) and incorporates intersections of Highway 8 and Fruitland Road, Gordon Dean and Jones Road within your study area.

Please also refer to:

1. the City's ongoing Complete Better Livable Streets Guidelines as a reference.

<https://www.hamilton.ca/streets-transportation/streets-sidewalks/complete-livable-better-clb-streets>

- Are you able to provide Appendix D of Fruitland Block 2, which provides the road cross-sections they are proposing? I found the report online, but the appendices were not included:
<https://www.hamilton.ca/sites/default/files/media/browser/2018-08-23/block2ss-finalreport-sept2018.pdf>

The appendices are listed below the report on the project website:
<https://www.hamilton.ca/sites/default/files/media/browser/2018-08-23/block2ss-finalreportappendices-sept2018.pdf>

Thanks,

Stefan Hajgato, P.Eng.

*Transportation Engineer
(He/Him)*



Paradigm Transportation Solutions Limited

p: 519.896.3163 x209

From: Cornwell, Jeff <Jeff.Cornwell@hamilton.ca>

Sent: August 24, 2021 3:31 PM

To: Stefan Hajgato <shajgato@ptsl.com>; Molloy, Steve <Steve.Molloy@hamilton.ca>

Cc: Scott Catton <scatton@ptsl.com>; Transportation Planning <Transportation.Planning@hamilton.ca>; Fazio, Margaret <Margaret.Fazio@hamilton.ca>

Subject: RE: 210193 Block 1 SS - TIS - TOR and Concept Plan Feedback

Hi Stefan,

We need to have a discussion with the Senior PM who's looking at the development phasing of this area, who is on vacation this week. I believe there is a background TIS that looks at the anticipated volumes in this area that your study should build on. I can get back to you with further details in early September.

Regards,

Jeff Cornwell, C.E.T.

Project Manager, Transportation Planning Development Approvals
Transportation Planning
Planning and Economic Development Department
City of Hamilton



From: Stefan Hajgato <shajgato@ptsl.com>

Sent: August 23, 2021 4:02 PM

To: Cornwell, Jeff <Jeff.Cornwell@hamilton.ca>; Molloy, Steve <Steve.Molloy@hamilton.ca>

Cc: Scott Catton <scatton@ptsl.com>; Transportation Planning <Transportation.Planning@hamilton.ca>

Subject: RE: 210193 Block 1 SS - TIS - TOR and Concept Plan Feedback

Hi Jeff and Steve,

Just following up on my earlier emails:

- Would it acceptable to factor our 2020 count data (pre-covid) to 2021 conditions at 2.0% per annum?
- Which planner(s) at the City should we contact for background developments, as the study area is quite large?
- Are standard drawings from the City available for larger (4-lane) roadways?

- Are you able to provide Appendix D of Fruitland Block 2, which provides the road cross-sections they are proposing? I found the report online, but the appendices were not included:
<https://www.hamilton.ca/sites/default/files/media/browser/2018-08-23/block2ss-finalreport-sept2018.pdf>

Thanks,

Stefan Hajgato, P.Eng.

*Transportation Engineer
(He/Him)*



Paradigm Transportation Solutions Limited

p: 519.896.3163 x209

From: Stefan Hajgato
Sent: August 9, 2021 4:52 PM
To: 'Cornwell, Jeff' <Jeff.Cornwell@hamilton.ca>
Cc: Scott Catton <scatton@ptsl.com>
Subject: RE: 210193 Block 1 SS - TIS - TOR and Concept Plan Feedback

Hi Jeff,

We will collect new turning movement counts after Labour Day.

I looked through some of our old files and I unfortunately couldn't find any City file numbers.

We don't believe there is a single address for the block. We mentioned earlier in this email chain:
[The site is the Block 1 development lands bounded by Fruitland Road, Barton Street, Jones Road and Highway 8.](#)

For our intersections with 2020 (pre-covid) count data, would it be acceptable to factor them to 2021 conditions at 2.0% per annum?

In our ToR, Steve requested that we collect new traffic counts and perform a sensitivity analysis at the three intersections with 2017 count data. However, we did some digging and the Hwy 8 EA has 2018 count data (attached) at one of the three intersections with 2017 data. Would it be acceptable to factor the 2018 data to 2021 conditions and exclude that intersection from the sensitivity analysis?

Thanks,

Stefan Hajgato, P.Eng.

*Transportation Engineer
(He/Him)*



Paradigm Transportation Solutions Limited

p: 519.896.3163 x209

From: Cornwell, Jeff <Jeff.Cornwell@hamilton.ca>
Sent: August 9, 2021 2:59 PM
To: Stefan Hajgato <shajgato@ptsl.com>
Subject: RE: 210193 Block 1 SS - TIS - TOR and Concept Plan Feedback

Hi Stefan,

Let me get back to you, with some of the info. I need to determine what the municipal address is for this large site, and what the file numbers are for the development. If you have any of this info please share.

I can note that for any TIS's for the City we will not accept any August count data. All data must be collected after Labour Day.

Regards,

Jeff Cornwell, C.E.T.

Project Manager, Transportation Planning Development Approvals
Transportation Planning
Planning and Economic Development Department
City of Hamilton



From: Stefan Hajgato <shajgato@ptsl.com>
Sent: August 9, 2021 2:18 PM
To: Molloy, Steve <Steve.Molloy@hamilton.ca>
Cc: Transportation Planning <Transportation.Planning@hamilton.ca>; Scott Catton <scatton@ptsl.com>
Subject: RE: 210193 Block 1 SS - TIS - TOR and Concept Plan Feedback

Hi Steve,

Do you have any concerns with having new traffic volumes being collected this month?

Which planner(s) at the City should we contact for background developments, as the study area is quite large?

The City's Standard Road Drawings provides roadway cross-sections for two-lane roads only (PDF Page 20-22) here:

<https://www.hamilton.ca/sites/default/files/media/browser/2014-12-19/construction-material-specifications-standard-road-drawings-feb2021.pdf>

Could you please confirm that these are up to date, and if there are standard drawings available for larger (4-lane) roadways?

To remain consistent with Fruitland Block 2, are you able to provide Appendix D of their study which should contain the road cross-sections they are proposing? Appendix D does not appear to be available online. Here is the link to the study:

<https://www.hamilton.ca/sites/default/files/media/browser/2018-08-23/block2ss-finalreport-sept2018.pdf>

Thanks,

Stefan Hajgato, P.Eng.

Transportation Engineer
(He/Him)



Paradigm Transportation Solutions Limited

p: 519.896.3163 x209

From: Molloy, Steve <Steve.Molloy@hamilton.ca>

Sent: August 6, 2021 6:21 AM

To: Scott Catton <scatton@ptsl.com>; Stefan Hajgato <shajgato@ptsl.com>

Cc: Heather Hector <hhector@ptsl.com>; Transportation Planning <Transportation.Planning@hamilton.ca>

Subject: RE: Block 1 SS - TIS - TOR and Concept Plan Feedback

Good Morning,

Attached are comments on the scope of work. Any background development information and current applications within the area can be obtained from the planner on file.

Thanks,
Steve

From: Heather Hector <hhector@ptsl.com>

Sent: Monday, July 26, 2021 12:44 PM

To: Molloy, Steve <Steve.Molloy@hamilton.ca>

Cc: Scott Catton <scatton@ptsl.com>; Stefan Hajgato <shajgato@ptsl.com>

Subject: RE: Block 1 SS - TIS - TOR and Concept Plan Feedback

Good afternoon Steve,

The site is the Block 1 development lands bounded by Fruitland Road, Barton Street, Jones Road and Highway 8. I don't believe there is a single address for the Block.

Additionally, could you please ensure Scott and Stefan are copied on further correspondence? I will be on extended leave as of August 3.

Please let me know if you require further information.

Thanks,

Heather Hector, M.Eng., P.Eng., PTP

Transportation Engineer



Paradigm Transportation Solutions Limited

p: 416.479.9684 x502

m: 905.506.0454

e: hhector@ptsl.com

From: Molloy, Steve <Steve.Molloy@hamilton.ca>
Sent: July 23, 2021 1:20 PM
To: Heather Hector <hhector@ptsl.com>
Subject: RE: Block 1 SS - TIS - TOR and Concept Plan Feedback

Hi Heather,

My apologies for the delay, I was away on vacation and the person looking at the file is away until August. Do you know the municipal address for this site?

Thanks,
Steve

From: Heather Hector <hhector@ptsl.com>
Sent: Monday, July 12, 2021 11:33 AM
To: Fazio, Margaret <Margaret.Fazio@hamilton.ca>; Norman, Gavin <Gavin.Norman@hamilton.ca>; Molloy, Steve <Steve.Molloy@hamilton.ca>
Cc: Steve Hader <shader@urbantech.com>; Sarah Kunz <skunz@urbantech.com>; Janna Ormond <Jannaormond@urbantech.com>; Scott Catton <scatton@ptsl.com>; Stefan Hajgato <shajgato@ptsl.com>
Subject: RE: Block 1 SS - TIS - TOR and Concept Plan Feedback

Hello Margaret, Gavin and Steve,

Thanks for providing comments on the Terms of Reference. We will be using Synchro 9 for the analyses. We have a few outstanding questions for the City to address. Could you please:

- Confirm the study area and subject intersections are acceptable;
- Confirm use of older traffic counts as detailed in the TOR;
- Provide a list of background developments (aside from the Block 2 area) to be included in the forecasts; and
- Provide the Barton and Fifty Road TIS, Highway 8 EA TIS and synchro files.

Please let me know if you have any questions.

Regards,

Heather Hector, M.Eng., P.Eng., PTP
Transportation Engineer



Paradigm Transportation Solutions Limited

p: 416.479.9684 x502
m: 905.506.0454
e: hhector@ptsl.com

From: Janna Ormond <Jannaormond@urbantech.com>
Sent: July 9, 2021 3:12 PM
To: Scott Catton <scatton@ptsl.com>; Heather Hector <hhector@ptsl.com>; Paul Villard <paulv@geomorphix.com>; Clements, Glenn <glenn.clements@woodplc.com>; nick.schmidt@woodplc.com; andreas.stenzel@woodplc.com; Jim Dougan <jdougan@dougan.ca>

Cc: Steve Hader <shader@urbantech.com>; Sarah Kunz <skunz@urbantech.com>

Subject: FW: Block 1 SS - TIS - TOR and Concept Plan Feedback

Good afternoon,

Please find below the City of Hamilton feedback about the TIS and concept plan, to be discussed at Mondays meeting.

Thanks and have a great weekend.

Janna

Janna Ormond

Municipal Design Assistant

Urbantech® Consulting

A Division of Leighton-Zec West Ltd.

2030 Bristol Circle, Suite 105, Oakville, ON L6H 0H2

jannaormond@urbantech.com • www.urbantech.com

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From: Fazio, Margaret <Margaret.Fazio@hamilton.ca>

Sent: Friday, July 9, 2021 8:54 AM

To: Steve Hader <shader@urbantech.com>; Rob Merwin <rmerwin@urbantech.com>

Cc: Moniruzzaman, Monir <Monir.Moniruzzaman@hamilton.ca>; Norman, Gavin <Gavin.Norman@hamilton.ca>; Philip, Mohan <Mohan.Philip@hamilton.ca>; King, Chris <Chris.King@hamilton.ca>; Rahman, Mushfigur <Mushfigur.Rahman@hamilton.ca>; Ferguson, David <David.Ferguson@hamilton.ca>; Kiddie, Melissa <Melissa.Kiddie@hamilton.ca>; Mahood, Alissa <Alissa.Mahood@hamilton.ca>; Bender, Daryl <Daryl.Bender@hamilton.ca>; Anderton, Melanie <Melanie.Anderton@hamilton.ca>; Molloy, Steve <Steve.Molloy@hamilton.ca>

Subject: Block 1 SS - TIS - TOR and Concept Plan Feedback

Happy Friday!

Thank you for sending the TIS TOR, Concept Plan and Populations numbers for our feedback to date. This email will provide feedback for the TIS TOR and Concept Plan only. Apologies for this late response. We are working on the populations numbers feedback now – plan to provide a response for you a the end of July.

Concept Plan Comments:

1. Are there any changes in this concept plan from the first version?
 - **The acceptance of the concept plan is subject to servicing options therefore the review of the concept plan is premature until the preferred servicing options support the concept plan.**

Having said the above, we can offer the following comments/reminders right now:

2. RE: Land Use: Block 1 SS westerly land use appeals are in the process of finalization, but the easterly - bridging Block 2 remains under appeal – no hearing scheduled. As previously discussed, it would be prudent to consider the portion still under appeal, and provide two scenarios – one based on the Secondary Plan, and the other based on the appellants' opinion (i.e. as developable), as previously discussed. We are aware that the appellant in the lands east of Jones is not part of the Block 1 SS strategy, but this strategy must encompass all lands within it.
3. RE: Public Consultation with land owners outside of those who bought into Block 1 SS: A reminder to please ensure that any land owners whose lands are proposed to carry the SMW Pond locations and how all others would connect to them, need to have been informed and consulted with during the study process. Demonstration of efforts made in Public Consultation will be required to be provided as part of the study Report and report to Council.
4. RE Transportation:
 - Extending the MUP on the EW collector westerly to Fruitland Rd is desired (north side). Can the MUP on the EW collector stay on the north side of the street east of Jones Rd – the crossing is undesirable. Is there a reason for flipping sides?
 - Please indicate the planned bicycle path and pedestrian promenade along the south side of Barton (Fruitland to Block 2), per FWSP policies, and per PIC materials/roll plans <https://engage.hamilton.ca/bartonfiftyea>.
 - Please indicate the planned land taking along Highway 8. Melanie Anderton (City staff) is working on Hwy 8 cross-sections from Dewitt to Fifty Rd. <https://www.hamilton.ca/city-planning/master-plans-class-eas/highway-8-dewitt-road-fifty-road> and its main focus is road widening as per Fruitland-Winona Secondary Plan (FWSP). This study will be proposing a specific cross-section/ROW alignment, which we will keep in touch with in due course (currently anticipate going to PIC in Q3, 2021).

Traffic Impact Study Comments:

1. RE Fruitland Road – please include consideration for traffic projections and bike path, in light of this road being removed from the truck route only when Gordon Dean Ave. is constructed in its entire length, etc. fulfilling also other requirements as per previous correspondence.
2. Ensure that the connection to Block 2 via currently proposed mid-block local road is shown/ considered, i.e. some traffic will continue to travel easterly when that roadway is constructed. The Block 2 Concept Plan can be found here: <https://www.hamilton.ca/city-planning/master-plans-class-eas/block-servicing-strategies-stoney-creek-and-gordon-dean-class> - Related Reports Tab, Main Report, Pg. 119 (e), Fig 6.5.
3. Advise what kind of models will be used and if you require any information from us to inform your process from adjacent studies, etc. We have TIS for Barton and Fifty Road EA, Highway 8 EA and sensitivity analysis between the two – SYNCHRO.
4. Please follow & include the below.
 - City Development Guidelines <https://www.hamilton.ca/develop-property/policies-guidelines/comprehensive-development-guidelines-and-financial-policies>

- Ongoing Complete Better Livable Streets Guidelines <https://www.hamilton.ca/streets-transportation/streets-sidewalks/complete-livable-better-clb-streets> are incorporated into your analysis and recommendations.

Please advise if you have any questions/wish to meet to discuss, etc.

Please note I'll be on vacation as of July 12, returning July 26th. In my absence, depending on topic, if needed, please contact staff as follows:

- Additional Information/EA related info – Melanie Anderton
 - Transportation – Gavin Norman
 - Drainage, servicing – Monir Moniruzzaman.
- *Please cc me on all correspondence.

Thank you,

Margaret Fazio, B.Sc., EP, MCIP, RPP

Senior Project Manager, Infrastructure Planning

Growth Management, Planning and Economic Development Department

City of Hamilton, 71 Main Street West, 6th Floor, Hamilton, ON, Canada, L8R 4Y5

Tel: 905-546-2424 ext. 2218; Fax: 905-540-5611; e-mail: Margaret.Fazio@hamilton.ca

DURING COVID, I am working remotely and can also be reached via Jabber, WebEx and Microsoft Teams.



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From: [Shams, Omar](#)
To: [Heather Hector](#)
Cc: [Wenting Li](#); [Juhlke, Jill](#)
Subject: RE: (210193) Block 1 BSS - Growth Rate
Date: November 8, 2023 4:38:51 PM
Attachments: [image001.png](#)
[image002.png](#)

Hi Heather,

Without considering Block 1, you can use the following growth rates for your study:

- 2% AGR up to 2031
- 4.5% AGR 2031-2041

I hope this remains helpful, and let me know if you have any questions.

Best Regards,
Omar

Omar Shams, B-Tech, C.E.T. (He/Him)
Project Manager, Mobility Planning - New Initiatives
Planning and Economic Development
Transportation Planning and Parking, City of Hamilton
(905) 546-2424 Ext.7474



From: Heather Hector <hhector@ptsl.com>
Sent: October 24, 2023 10:59 AM
To: Shams, Omar <Omar.Shams@hamilton.ca>
Cc: Wenting Li <wli@ptsl.com>; Juhlke, Jill <Jill.Juhlke@hamilton.ca>
Subject: Re: (210193) Block 1 BSS - Growth Rate

Hi Omar,

Thanks for providing this information.

We are completing the traffic study for Block 1, therefore we require a growth rate that does not consider Block 1.

Could you please provide the revised rates only accounting for the build-out of Block 2?

Thanks,

Heather Hector, M.Eng., P.Eng., PTP

Project Manager, Associate

Paradigm Transportation Solutions Limited

p: 416.479.9684 x502

m: 905.506.0454

Out of Office Alert: I will be on extended leave commencing November 9, 2023 until November 2024. I will reach out directly to discuss transition of projects we are working on together.



From: Shams, Omar <Omar.Shams@hamilton.ca>
Sent: Tuesday, October 24, 2023 10:55 AM
To: Heather Hector <hhector@ptsl.com>
Cc: Wenting Li <wli@ptsl.com>; Juhlke, Jill <Jill.Juhlke@hamilton.ca>
Subject: RE: (210193) Block 1 BSS - Growth Rate

Good morning Heather,

I hope you are doing well.

Based on our strategic demand model, I recommend using the following Annual Growth Rates (AGR) for your analysis:

- 4% AGR up to 2031
- 7% AGR from 2031 – 2041

These growth rates consider the built-out of Blocks 1 and 2 of the Fruitland-Winnona secondary plan area.

Let me know if you have any questions in this regard.

Regards,
Omar

Omar Shams, B-Tech, C.E.T. (He/Him)
Project Manager, Mobility Planning - New Initiatives
Planning and Economic Development

Transportation Planning and Parking, City of Hamilton
(905) 546-2424 Ext.7474



From: Heather Hector <hhector@ptsl.com>
Sent: September 27, 2023 11:29 AM
To: Shams, Omar <Omar.Shams@hamilton.ca>
Cc: Wenting Li <wli@ptsl.com>; Juhlke, Jill <Jill.Juhlke@hamilton.ca>
Subject: Re: (210193) Block 1 BSS - Growth Rate

Good morning Omar,

Following up on my email from last week. Are you able to provide the growth rate for our study detailed below?

Let me know if you have any questions.

Regards,

Heather Hector, M.Eng., P.Eng., PTP
Project Manager, Associate
Paradigm Transportation Solutions Limited
p: 416.479.9684 x502
m: 905.506.0454
e: hhector@ptsl.com



From: Heather Hector
Sent: Tuesday, September 19, 2023 8:50 AM
To: omar.shams@hamilton.ca <omar.shams@hamilton.ca>
Cc: Wenting Li <wli@ptsl.com>; Juhlke, Jill <Jill.Juhlke@hamilton.ca>
Subject: (210193) Block 1 BSS - Growth Rate

Good morning Omar,

Paradigm has been working on the Block 1 Servicing Strategy Transportation Impact Study for since 2017. The Block 1 area is bounded by Highway 8, Fruitland Road, Barton Street and Jones Road. We are updating the study to address City comments from October 21, 2022. The City specifically requested one growth rate be used for all roads in the study area.

After speaking with Jill, she advised you would be the best person to provide a growth rate for the study. Could you please provide the rate, considering our study will have multiple

phases and forecast to 2032 (or beyond)? Additionally, could you please advise of background developments in the area, or if the growth rate considers build-out of the adjacent Block 2 lands.

Please let me know if you have any questions.

Thanks,

Heather Hector, M.Eng., P.Eng., PTP

Project Manager, Associate

Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge, ON N1R 8J8

p: 416.479.9684 x502

m: 905.506.0454

e: hhector@ptsl.com

w: www.ptsl.com



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Appendix B

Traffic Data



Barton St @ Fruitland Rd

Morning Peak Diagram

Specified Period

From: 6:30:00

To: 9:30:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Hamilton

Site #: 0000000001

Intersection: Barton St & Fruitland Rd

TFR File #: 1

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Barton St runs W/E

North Leg Total: 963

North Entering: 457

North Peds: 3

Peds Cross: $\times$

Heavys	9	9	5	23
Trucks	3	6	3	12
Cars	206	133	83	422
Totals	218	148	91	

Heavys 27

Trucks 7

Cars 472

Totals 506

East Leg Total: 491

East Entering: 234

East Peds: 1

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
12	13	380	405

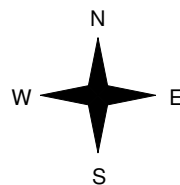


Barton St

Heavys	Trucks	Cars	Totals
9	4	198	211
9	5	137	151
2	0	27	29
20	9	362	



Fruitland Rd



Cars	Trucks	Heavys	Totals
58	0	14	72
141	9	3	153
6	3	0	9
205	12	17	



Barton St



Cars	Trucks	Heavys	Totals
233	8	16	257

Peds Cross: $\times$

West Peds: 5

West Entering: 391

West Leg Total: 796

Cars	166	Cars	33	216	13	262
Trucks	9	Trucks	1	3	0	4
Heavys	11	Heavys	0	4	2	6
Totals	186	Totals	34	223	15	



Peds Cross: $\times$

South Peds: 2

South Entering: 272

South Leg Total: 458

Comments

Barton St @ Fruitland Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 13:00:00

One Hour Peak

From: 12:00:00

To: 13:00:00

Municipality: Hamilton

Site #: 0000000001

Intersection: Barton St & Fruitland Rd

TFR File #: 1

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Barton St runs W/E

North Leg Total: 818

North Entering: 423

North Peds: 0

Peds Cross: $\times$

Heavys	5	3	12	20
Trucks	3	3	3	9
Cars	159	194	41	394
Totals	167	200	56	

Heavys 24

Trucks 18

Cars 353

Totals 395

East Leg Total: 542

East Entering: 289

East Peds: 0

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
8	10	379	397

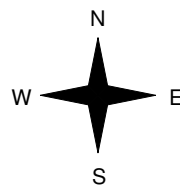


Barton St

Heavys	Trucks	Cars	Totals
8	7	163	178
2	1	176	179
0	0	30	30
10	8	369	



Fruitland Rd



Cars	Trucks	Heavys	Totals
36	5	11	52
195	7	2	204
30	0	3	33
261	12	16	

Barton St



Cars	Trucks	Heavys	Totals
234	4	15	253

Peds Cross: $\times$

West Peds: 6

West Entering: 387

West Leg Total: 784

Cars	254	Cars	25	154	17	196
Trucks	3	Trucks	0	6	0	6
Heavys	6	Heavys	1	5	1	7
Totals	263	Totals	26	165	18	



Peds Cross: $\times$

South Peds: 1

South Entering: 209

South Leg Total: 472

Comments

Barton St @ Fruitland Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Hamilton

Site #: 0000000001

Intersection: Barton St & Fruitland Rd

TFR File #: 1

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Barton St runs W/E

North Leg Total: 1030

North Entering: 498

North Peds: 6

Peds Cross: $\times$

Heavys	8	4	12	24
Trucks	3	7	2	12
Cars	164	233	65	462
Totals	175	244	79	

Heavys 12

Trucks 4

Cars 516

Totals 532

East Leg Total: 754

East Entering: 367

East Peds: 0

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
11	4	433	448

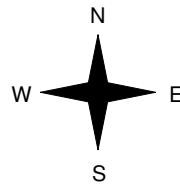


Barton St

Heavys	Trucks	Cars	Totals
2	4	289	295
3	4	281	288
0	0	51	51
5	8	621	



Fruitland Rd



Cars	Trucks	Heavys	Totals
80	0	8	88
248	1	3	252
27	0	0	27
355	1	11	

Barton St



Cars	Trucks	Heavys	Totals
366	6	15	387

Peds Cross: $\times$

West Peds: 4

West Entering: 634

West Leg Total: 1082

Cars	311	Cars	21	147	20	188
Trucks	7	Trucks	0	0	0	0
Heavys	4	Heavys	0	2	0	2
Totals	322	Totals	21	149	20	



Peds Cross: $\times$

South Peds: 1

South Entering: 190

South Leg Total: 512

Comments

Barton St @ Fruitland Rd

Total Count Diagram

Municipality: Hamilton
Site #: 0000000001
Intersection: Barton St & Fruitland Rd
TFR File #: 1
Count date: 29-Nov-2022

Weather conditions:
 Overcast/Dry
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Barton St runs W/E

North Leg Total: 6934
 North Entering: 3335
 North Peds: 15
 Peds Cross: $\times$

	Heavys	Trucks	Cars	Totals
West	52	21	1152	1225
East	36	29	1449	1514
South	65	23	508	596
North	153	73	3109	3255

	Heavys	Trucks	Cars	Totals
West	174	77	3348	3599

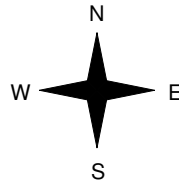
East Leg Total: 4366
 East Entering: 2196
 East Peds: 5
 Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
103	61	2714	2878



Barton St

Heavys	Trucks	Cars	Totals
46	29	1568	1643
46	23	1364	1433
15	5	246	266
107	57	3178	3342



Fruitland Rd

Cars	Trucks	Heavys	Totals
454	17	95	566
1362	37	47	1446
171	6	7	184
1987	60	149	2196

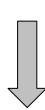
Barton St



Cars	Trucks	Heavys	Totals
2001	48	121	2170

Peds Cross: $\times$
 West Peds: 35
 West Entering: 3342
 West Leg Total: 6220

	Cars	Trucks	Heavys	Totals
West	1866	40	58	1964



	Cars	Trucks	Heavys	Totals
West	200	3	4	207
East	1326	31	33	1390
South	129	2	10	141
North	1655	36	47	1738

Peds Cross: $\times$
 South Peds: 18
 South Entering: 1738
 South Leg Total: 3702

Comments

Barton St @ Jones Rd

Morning Peak Diagram

Specified Period

From: 6:30:00

To: 9:30:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Hamilton

Site #: 0000000003

Intersection: Barton St & Jones Rd

TFR File #: 3

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

**** Non-Signalized Intersection ****

Major Road: Barton St runs W/E

North Leg Total: 139

North Entering: 53

North Peds: 2

Peds Cross: $\times$

Heavys	1	6	0	7
Trucks	5	4	0	9
Cars	8	15	14	37
Totals	14	25	14	



Heavys	4
Trucks	3
Cars	79
Totals	86

East Leg Total: 443

East Entering: 225

East Peds: 1

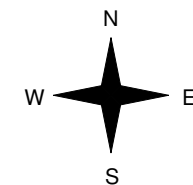
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
19	12	204	235



Barton St

Heavys	Trucks	Cars	Totals
3	2	18	23
14	2	180	196
3	0	10	13
20	4	208	



Jones Rd

Cars	Trucks	Heavys	Totals
17	0	1	18
180	7	18	205
2	0	0	2
199	7	19	

Barton St



Cars	Trucks	Heavys	Totals
202	2	14	218

Peds Cross: $\times$

West Peds: 0

West Entering: 232

West Leg Total: 467

Cars	27	Cars	16	44	8	68
Trucks	4	Trucks	0	1	0	1
Heavys	9	Heavys	0	0	0	0
Totals	40	Totals	16	45	8	



Peds Cross: $\times$

South Peds: 1

South Entering: 69

South Leg Total: 109

Comments

Barton St @ Jones Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 13:00:00

One Hour Peak

From: 11:45:00

To: 12:45:00

Municipality: Hamilton

Site #: 0000000003

Intersection: Barton St & Jones Rd

TFR File #: 3

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

**** Non-Signalized Intersection ****

Major Road: Barton St runs W/E

North Leg Total: 148

North Entering: 87

North Peds: 1

Peds Cross: $\times$

Heavys	3	0	2	5
Trucks	2	1	2	5
Cars	31	31	15	77
Totals	36	32	19	



Heavys	4
Trucks	1
Cars	56
Totals	61

East Leg Total: 459

East Entering: 236

East Peds: 1

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
16	10	239	265

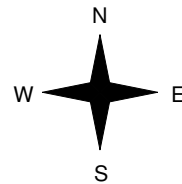


Barton St

Heavys	Trucks	Cars	Totals
2	0	20	22
12	3	184	199
0	0	16	16
14	3	220	



Jones Rd



Cars	Trucks	Heavys	Totals
11	1	1	13
198	8	13	219
4	0	0	4
213	9	14	



Barton St



Cars	Trucks	Heavys	Totals
204	5	14	223

Peds Cross: $\times$

West Peds: 0

West Entering: 237

West Leg Total: 502

Cars	51	Cars	10	25	5	40
Trucks	1	Trucks	0	0	0	0
Heavys	0	Heavys	0	1	0	1
Totals	52	Totals	10	26	5	



Peds Cross: $\times$

South Peds: 1

South Entering: 41

South Leg Total: 93

Comments

Barton St @ Jones Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Hamilton

Site #: 0000000003

Intersection: Barton St & Jones Rd

TFR File #: 3

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

**** Non-Signalized Intersection ****

Major Road: Barton St runs W/E

North Leg Total: 171

North Entering: 122

North Peds: 3

Peds Cross: $\times$

Heavys	1	0	3	4
Trucks	1	0	1	2
Cars	45	48	23	116
Totals	47	48	27	

Heavys	1
Trucks	0
Cars	48
Totals	49

East Leg Total: 658

East Entering: 312

East Peds: 1

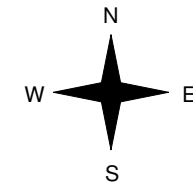
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
12	1	337	350



Barton St

Heavys	Trucks	Cars	Totals
0	0	19	19
13	6	294	313
0	0	19	19
13	6	332	



Jones Rd

Cars	Trucks	Heavys	Totals
15	0	1	16
278	0	11	289
6	1	0	7
299	1	12	

Barton St



Cars	Trucks	Heavys	Totals
323	7	16	346

Peds Cross: $\times$

West Peds: 1

West Entering: 351

West Leg Total: 701

Cars	73	Cars	14	14	6	34
Trucks	1	Trucks	0	0	0	0
Heavys	0	Heavys	0	0	0	0
Totals	74	Totals	14	14	6	



Peds Cross: $\times$

South Peds: 2

South Entering: 34

South Leg Total: 108

Comments

Barton St @ Jones Rd

Total Count Diagram

Municipality: Hamilton
Site #: 0000000003
Intersection: Barton St & Jones Rd
TFR File #: 3
Count date: 29-Nov-2022

Weather conditions:
 Overcast/Dry
Person(s) who counted:
 Cam

**** Non-Signalized Intersection ****

Major Road: Barton St runs W/E

North Leg Total: 1019
 North Entering: 572
 North Peds: 7
 Peds Cross: $\times$

	Heavys	Trucks	Cars	Totals
North	18	11	182	211
East	8	7	209	224
South	12	5	120	137
West	38	23	511	572



	Heavys	Trucks	Cars	Totals
North	21	12	414	447

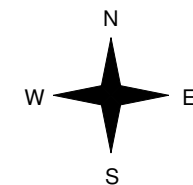
East Leg Total: 3759
 East Entering: 1850
 East Peds: 7
 Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
148	59	1829	2036



Barton St

Heavys	Trucks	Cars	Totals
8	6	132	146
100	34	1583	1717
8	1	116	125
116	41	1831	



Jones Rd



Cars	Trucks	Heavys	Totals
87	3	8	98
1540	46	127	1713
36	2	1	39
1663	51	136	

Barton St



Cars	Trucks	Heavys	Totals
1758	39	112	1909

Peds Cross: $\times$
 West Peds: 4
 West Entering: 1988
 West Leg Total: 4024

	Cars	Trucks	Heavys	Totals
West	361	10	17	388



	Cars	Trucks	Heavys	Totals
West	107	2	3	112
East	195	3	5	203
South	55	0	0	55
North	357	5	8	

Peds Cross: $\times$
 South Peds: 9
 South Entering: 370
 South Leg Total: 758

Comments

Hwy 8 @ Fruitland Rd

Morning Peak Diagram

Specified Period

From: 6:30:00

To: 9:30:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Hamilton

Site #: 0000000002

Intersection: Hwy 8 & Fruitland Rd

TFR File #: 2

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Hwy 8 runs W/E

North Leg Total: 402

North Entering: 178

North Peds: 5

Peds Cross: $\times$

Heavys	2	0	5	7
Trucks	6	0	2	8
Cars	101	9	53	163
Totals	109	9	60	

Heavys	6
Trucks	5
Cars	213
Totals	224

East Leg Total: 796

East Entering: 409

East Peds: 2

Peds Cross: $\times$

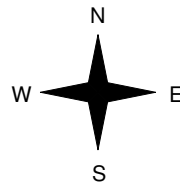
Heavys	Trucks	Cars	Totals
11	10	454	475

←

Hwy 8

Heavys	Trucks	Cars	Totals
1	1	131	133
11	1	304	316
1	0	10	11
13	2	445	

↑
→
↓



Fruitland Rd

Fruitland Rd

Cars	Trucks	Heavys	Totals
45	4	5	54
335	4	7	346
9	0	0	9
389	8	12	

Hwy 8

→

Cars	Trucks	Heavys	Totals
367	3	17	387

Peds Cross: $\times$

West Peds: 3

West Entering: 460

West Leg Total: 935

Cars	28
Trucks	0
Heavys	1
Totals	29

↓

Cars	18	37	10	65
Trucks	0	0	0	0
Heavys	2	0	1	3
Totals	20	37	11	

Peds Cross: $\times$

South Peds: 1

South Entering: 68

South Leg Total: 97

Comments

Hwy 8 @ Fruitland Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 13:00:00

One Hour Peak

From: 12:00:00

To: 13:00:00

Municipality: Hamilton

Site #: 0000000002

Intersection: Hwy 8 & Fruitland Rd

TFR File #: 2

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Hwy 8 runs W/E

North Leg Total: 424

North Entering: 220

North Peds: 4

Peds Cross: $\times$

Heavys	0	1	5	6
Trucks	2	0	0	2
Cars	148	13	51	212
Totals	150	14	56	

Heavys	8
Trucks	6
Cars	190
Totals	204

East Leg Total: 750

East Entering: 388

East Peds: 0

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
6	2	460	468

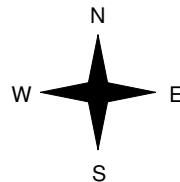


Hwy 8

Heavys	Trucks	Cars	Totals
1	2	125	128
3	3	291	297
0	0	12	12
4	5	428	



Fruitland Rd



Cars	Trucks	Heavys	Totals
56	3	6	65
308	0	6	314
8	1	0	9
372	4	12	

Hwy 8



Cars	Trucks	Heavys	Totals
351	3	8	362

Peds Cross: $\times$

West Peds: 1

West Entering: 437

West Leg Total: 905

Cars	33	Cars	4	9	9	22
Trucks	1	Trucks	0	1	0	1
Heavys	1	Heavys	0	1	0	1
Totals	35	Totals	4	11	9	



Peds Cross: $\times$

South Peds: 1

South Entering: 24

South Leg Total: 59

Comments

Hwy 8 @ Fruitland Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 15:00:00

To: 16:00:00

Municipality: Hamilton

Site #: 0000000002

Intersection: Hwy 8 & Fruitland Rd

TFR File #: 2

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Signalized Intersection **

Major Road: Hwy 8 runs W/E

North Leg Total: 483

North Entering: 292

North Peds: 4

Peds Cross: $\times$

Heavys	2	1	4	7
Trucks	4	0	2	6
Cars	186	25	68	279
Totals	192	26	74	

Heavys	9
Trucks	7
Cars	175
Totals	191

East Leg Total: 920

East Entering: 514

East Peds: 1

Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
10	8	639	657

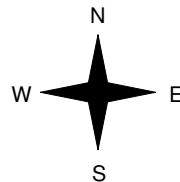


Hwy 8

Heavys	Trucks	Cars	Totals
3	3	113	119
4	4	315	323
0	0	11	11
7	7	439	



Fruitland Rd



Cars	Trucks	Heavys	Totals
47	4	5	56
434	4	7	445
13	0	0	13
494	8	12	

Hwy 8



Cars	Trucks	Heavys	Totals
392	6	8	406

Peds Cross: $\times$

West Peds: 1

West Entering: 453

West Leg Total: 1110

Cars	49	Cars	19	15	9	43
Trucks	0	Trucks	0	0	0	0
Heavys	1	Heavys	1	1	0	2
Totals	50	Totals	20	16	9	



Peds Cross: $\times$

South Peds: 1

South Entering: 45

South Leg Total: 95

Comments

Hwy 8 @ Fruitland Rd

Total Count Diagram

Municipality: Hamilton
Site #: 0000000002
Intersection: Hwy 8 & Fruitland Rd
TFR File #: 2
Count date: 29-Nov-2022

Weather conditions:
 Overcast/Dry
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Hwy 8 runs W/E

North Leg Total: 3321
 North Entering: 1758
 North Peds: 23
 Peds Cross: $\times$

	Heavys	Trucks	Cars	Totals
North	10	5	35	50
East	28	0	14	42
South	1124	136	406	1666
Totals	1162	141	455	



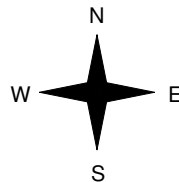
	Heavys	Trucks	Cars	Totals
North	43	33	1487	1563

East Leg Total: 5829
 East Entering: 3065
 East Peds: 5
 Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
68	53	3706	3827



Hwy 8



Heavys	Trucks	Cars	Totals
9	13	968	990
38	17	2171	2226
2	2	99	103
49	32	3238	



Fruitland Rd



Cars	Trucks	Heavys	Totals
372	19	32	423
2479	24	53	2556
84	1	1	86
2935	44	86	

Hwy 8



Cars	Trucks	Heavys	Totals
2657	32	75	2764

Peds Cross: $\times$
 West Peds: 12
 West Entering: 3319
 West Leg Total: 7146

	Cars	Trucks	Heavys	Totals
West	319	3	8	330
South	103	1	5	109
East	147	1	2	150
North	80	1	2	83
Totals	330	3	9	



Peds Cross: $\times$
 South Peds: 12
 South Entering: 342
 South Leg Total: 672

Comments

Hwy 8 @ Jones Rd

Morning Peak Diagram

Specified Period

From: 6:30:00

To: 9:30:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Hamilton

Site #: 0000000004

Intersection: Hwy 8 & Jones Rd

TFR File #: 4

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Hwy 8 runs W/E

North Leg Total: 95

North Entering: 28

North Peds: 4

Peds Cross: $\times$

Heavys	1	0	4	5
Trucks	2	0	0	2
Cars	17	0	4	21
Totals	20	0	8	

Heavys	3
Trucks	1
Cars	63
Totals	67

East Leg Total: 721

East Entering: 397

East Peds: 0

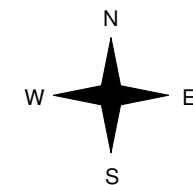
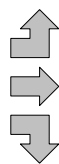
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
11	6	376	393



Hwy 8

Heavys	Trucks	Cars	Totals
3	1	38	42
13	6	297	316
0	0	0	0
16	7	335	



Jones Rd

Cars	Trucks	Heavys	Totals
25	0	0	25
358	4	10	372
0	0	0	0
383	4	10	

Hwy 8



Cars	Trucks	Heavys	Totals
301	6	17	324

Peds Cross: $\times$

West Peds: 0

West Entering: 358

West Leg Total: 751

Cars	0
Trucks	0
Heavys	0
Totals	0



Cars	1	0	0	1
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	1	0	0	

Peds Cross: $\times$

South Peds: 0

South Entering: 1

South Leg Total: 1

Comments

Hwy 8 @ Jones Rd

Mid-day Peak Diagram

Specified Period

From: 11:00:00

To: 13:00:00

One Hour Peak

From: 11:45:00

To: 12:45:00

Municipality: Hamilton

Site #: 0000000004

Intersection: Hwy 8 & Jones Rd

TFR File #: 4

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Hwy 8 runs W/E

North Leg Total: 99

North Entering: 55

North Peds: 1

Peds Cross: $\times$

Heavys	0	0	0	0
Trucks	1	0	0	1
Cars	31	3	20	54
Totals	32	3	20	



Heavys 3

Trucks 0

Cars 41

Totals 44

East Leg Total: 690

East Entering: 337

East Peds: 4

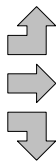
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
9	5	344	358

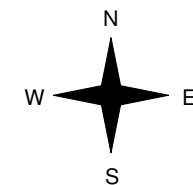


Hwy 8

Heavys	Trucks	Cars	Totals
2	0	31	33
9	1	322	332
0	0	1	1
11	1	354	



Jones Rd



Jones Rd

Cars	Trucks	Heavys	Totals
9	0	1	10
313	4	9	326
1	0	0	1
323	4	10	

Hwy 8



Cars	Trucks	Heavys	Totals
343	1	9	353

Peds Cross: $\times$

West Peds: 0

West Entering: 366

West Leg Total: 724

Cars	5
Trucks	0
Heavys	0
Totals	5



Cars	0	1	1	2
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	0	1	1	

Peds Cross: $\times$

South Peds: 0

South Entering: 2

South Leg Total: 7

Comments

Hwy 8 @ Jones Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 15:00:00

To: 16:00:00

Municipality: Hamilton

Site #: 0000000004

Intersection: Hwy 8 & Jones Rd

TFR File #: 4

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

** Non-Signalized Intersection **

Major Road: Hwy 8 runs W/E

North Leg Total: 121

North Entering: 81

North Peds: 5

Peds Cross: $\times$

Heavys	3	0	0	3
Trucks	2	0	2	4
Cars	49	0	25	74
Totals	54	0	27	



Heavys	2
Trucks	0
Cars	38
Totals	40

East Leg Total: 884

East Entering: 464

East Peds: 3

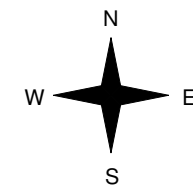
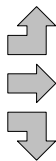
Peds Cross: $\times$

Heavys	Trucks	Cars	Totals
12	9	476	497



Hwy 8

Heavys	Trucks	Cars	Totals
1	0	20	21
7	5	378	390
0	0	3	3
8	5	401	



Jones Rd

Cars	Trucks	Heavys	Totals
18	0	1	19
426	7	9	442
3	0	0	3
447	7	10	

Hwy 8



Cars	Trucks	Heavys	Totals
406	7	7	420

Peds Cross: $\times$

West Peds: 0

West Entering: 414

West Leg Total: 911

Cars	6
Trucks	0
Heavys	0
Totals	6



Cars	1	0	3	4
Trucks	0	0	0	0
Heavys	0	0	0	0
Totals	1	0	3	

Peds Cross: $\times$

South Peds: 0

South Entering: 4

South Leg Total: 10

Comments

Hwy 8 @ Jones Rd

Total Count Diagram

Municipality: Hamilton

Site #: 0000000004

Intersection: Hwy 8 & Jones Rd

TFR File #: 4

Count date: 29-Nov-2022

Weather conditions:

Overcast/Dry

Person(s) who counted:

Cam

**** Non-Signalized Intersection ****

Major Road: Hwy 8 runs W/E

North Leg Total: 739

North Entering: 375

North Peds: 26

Peds Cross: $\bowtie$

Heavys	10	0	8	18
Trucks	7	0	4	11
Cars	218	4	124	346
Totals	235	4	136	

Heavys 26

Trucks 5

Cars 333

Totals 364

East Leg Total: 5473

East Entering: 2860

East Peds: 8

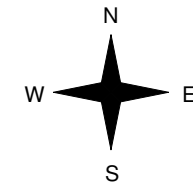
Peds Cross: $\bowtie$

Heavys	Trucks	Cars	Totals
82	39	2831	2952



Hwy 8

Heavys	Trucks	Cars	Totals
17	5	193	215
53	27	2383	2463
3	0	7	10
73	32	2583	



Jones Rd

Cars	Trucks	Heavys	Totals
138	0	7	145
2606	32	71	2709
6	0	0	6
2750	32	78	

Hwy 8



Cars	Trucks	Heavys	Totals
2521	31	61	2613

Peds Cross: $\bowtie$

West Peds: 1

West Entering: 2688

West Leg Total: 5640

Cars	17
Trucks	0
Heavys	3
Totals	20



Cars	7	2	14	23
Trucks	0	0	0	0
Heavys	1	2	0	3
Totals	8	4	14	

Peds Cross: $\bowtie$

South Peds: 1

South Entering: 26

South Leg Total: 46

Comments



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
Start Date: 09/16/2021
Page No: 1

Turning Movement Data

Start Time	Barton Street Eastbound					Barton Street Westbound					Sunnyhurst Avenue Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
6:30 AM	2	43	0	0	45	36	3	0	0	39	0	2	0	0	2	86
6:45 AM	4	60	0	0	64	36	0	0	0	36	0	4	0	2	4	104
Hourly Total	6	103	0	0	109	72	3	0	0	75	0	6	0	2	6	190
7:00 AM	2	33	0	0	35	35	0	0	0	35	0	1	0	0	1	71
7:15 AM	0	35	0	0	35	46	1	0	0	47	1	1	0	0	2	84
7:30 AM	2	41	0	0	43	70	0	0	0	70	0	1	0	0	1	114
7:45 AM	1	77	0	0	78	53	1	0	0	54	0	1	0	0	1	133
Hourly Total	5	186	0	0	191	204	2	0	0	206	1	4	0	0	5	402
8:00 AM	9	68	0	2	77	46	1	0	0	47	3	1	0	0	4	128
8:15 AM	4	59	0	0	63	50	1	0	0	51	0	2	0	0	2	116
8:30 AM	2	68	0	0	70	53	2	0	0	55	2	2	0	0	4	129
8:45 AM	3	66	0	0	69	60	2	0	0	62	2	4	0	0	6	137
Hourly Total	18	261	0	2	279	209	6	0	0	215	7	9	0	0	16	510
9:00 AM	3	77	0	0	80	73	2	0	0	75	0	6	0	1	6	161
9:15 AM	1	58	0	0	59	56	0	0	0	56	1	6	0	0	7	122
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	4	135	0	0	139	129	2	0	0	131	1	12	0	1	13	283
11:00 AM	1	49	0	0	50	56	3	0	0	59	2	3	0	0	5	114
11:15 AM	0	53	0	0	53	61	2	0	0	63	1	1	0	1	2	118
11:30 AM	0	58	0	1	58	58	2	0	0	60	0	3	0	1	3	121
11:45 AM	0	67	0	1	67	82	0	0	0	82	0	1	0	2	1	150
Hourly Total	1	227	0	2	228	257	7	0	0	264	3	8	0	4	11	503
12:00 PM	3	66	0	1	69	81	0	0	0	81	2	4	0	0	6	156
12:15 PM	1	76	0	0	77	80	0	0	0	80	0	1	0	0	1	158
12:30 PM	1	53	0	0	54	65	1	0	0	66	0	1	0	0	1	121
12:45 PM	0	67	0	0	67	67	0	0	0	67	1	3	0	1	4	138
Hourly Total	5	262	0	1	267	293	1	0	0	294	3	9	0	1	12	573
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	2	78	0	1	80	92	1	0	0	93	0	1	0	0	1	174
3:15 PM	4	73	0	4	77	63	1	0	1	64	1	5	0	0	6	147
3:30 PM	1	70	0	3	71	91	2	0	0	93	1	1	0	0	2	166
3:45 PM	3	58	0	0	61	85	0	0	0	85	3	2	0	0	5	151
Hourly Total	10	279	0	8	289	331	4	0	1	335	5	9	0	0	14	638
4:00 PM	1	65	0	0	66	75	0	0	0	75	0	4	0	0	4	145
4:15 PM	1	67	0	0	68	73	0	0	0	73	0	2	0	0	2	143
4:30 PM	2	92	0	3	94	97	0	0	0	97	2	11	0	1	13	204

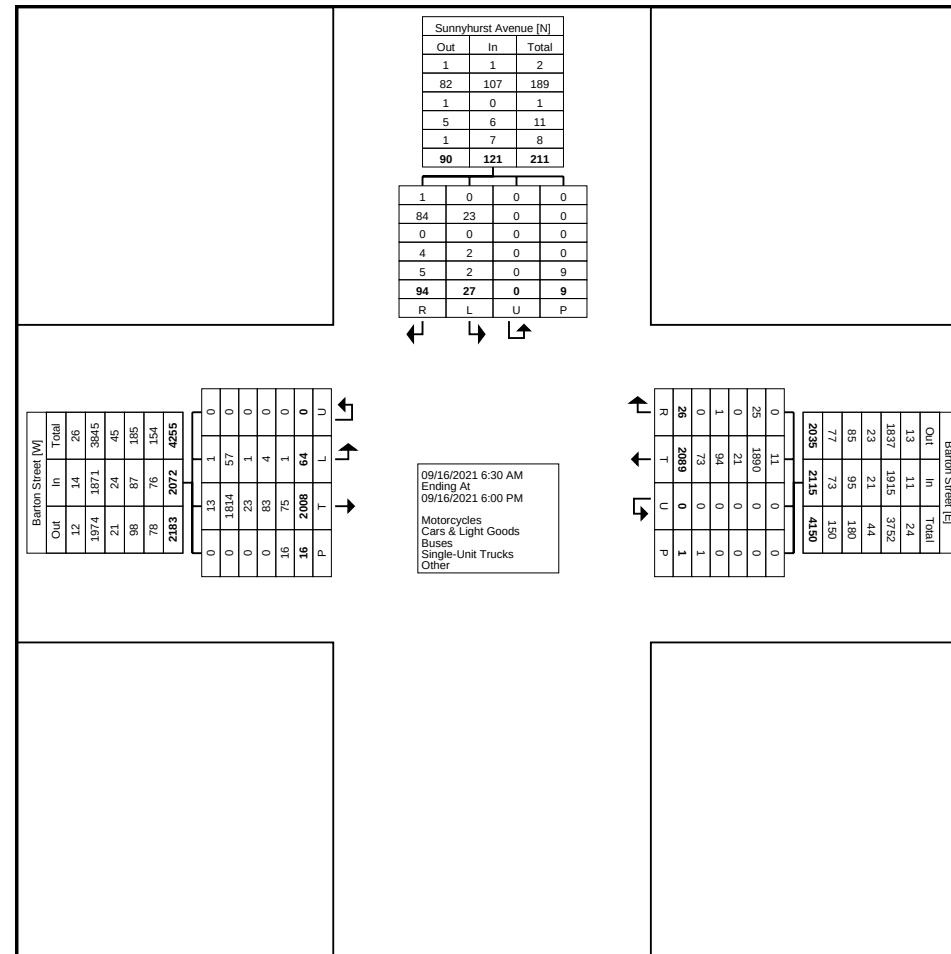
4:45 PM	5	63	0	0	68	73	0	0	0	73	1	4	0	0	5	146
Hourly Total	9	287	0	3	296	318	0	0	0	318	3	21	0	1	24	638
5:00 PM	1	65	0	0	66	107	0	0	0	107	1	3	0	0	4	177
5:15 PM	1	61	0	0	62	65	0	0	0	65	1	6	0	0	7	134
5:30 PM	2	82	0	0	84	49	1	0	0	50	1	4	0	0	5	139
5:45 PM	2	60	0	0	62	55	0	0	0	55	1	3	0	0	4	121
Hourly Total	6	268	0	0	274	276	1	0	0	277	4	16	0	0	20	571
Grand Total	64	2008	0	16	2072	2089	26	0	1	2115	27	94	0	9	121	4308
Approach %	3.1	96.9	0.0	-	-	98.8	1.2	0.0	-	-	22.3	77.7	0.0	-	-	-
Total %	1.5	46.6	0.0	-	48.1	48.5	0.6	0.0	-	49.1	0.6	2.2	0.0	-	2.8	-
Motorcycles	1	13	0	-	14	11	0	0	-	11	0	1	0	-	1	26
% Motorcycles	1.6	0.6	-	-	0.7	0.5	0.0	-	-	0.5	0.0	1.1	-	-	0.8	0.6
Cars & Light Goods	57	1814	0	-	1871	1890	25	0	-	1915	23	84	0	-	107	3893
% Cars & Light Goods	89.1	90.3	-	-	90.3	90.5	96.2	-	-	90.5	85.2	89.4	-	-	88.4	90.4
Buses	1	23	0	-	24	21	0	0	-	21	0	0	0	-	0	45
% Buses	1.6	1.1	-	-	1.2	1.0	0.0	-	-	1.0	0.0	0.0	-	-	0.0	1.0
Single-Unit Trucks	4	83	0	-	87	94	1	0	-	95	2	4	0	-	6	188
% Single-Unit Trucks	6.3	4.1	-	-	4.2	4.5	3.8	-	-	4.5	7.4	4.3	-	-	5.0	4.4
Articulated Trucks	1	73	0	-	74	72	0	0	-	72	2	5	0	-	7	153
% Articulated Trucks	1.6	3.6	-	-	3.6	3.4	0.0	-	-	3.4	7.4	5.3	-	-	5.8	3.6
Bicycles on Road	0	2	0	-	2	1	0	0	-	1	0	0	0	-	0	3
% Bicycles on Road	0.0	0.1	-	-	0.1	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	16	-	-	-	-	1	-	-	-	-	9	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	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: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
Start Date: 09/16/2021
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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: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
Start Date: 09/16/2021
Page No: 4

Turning Movement Peak Hour Data (8:30 AM)

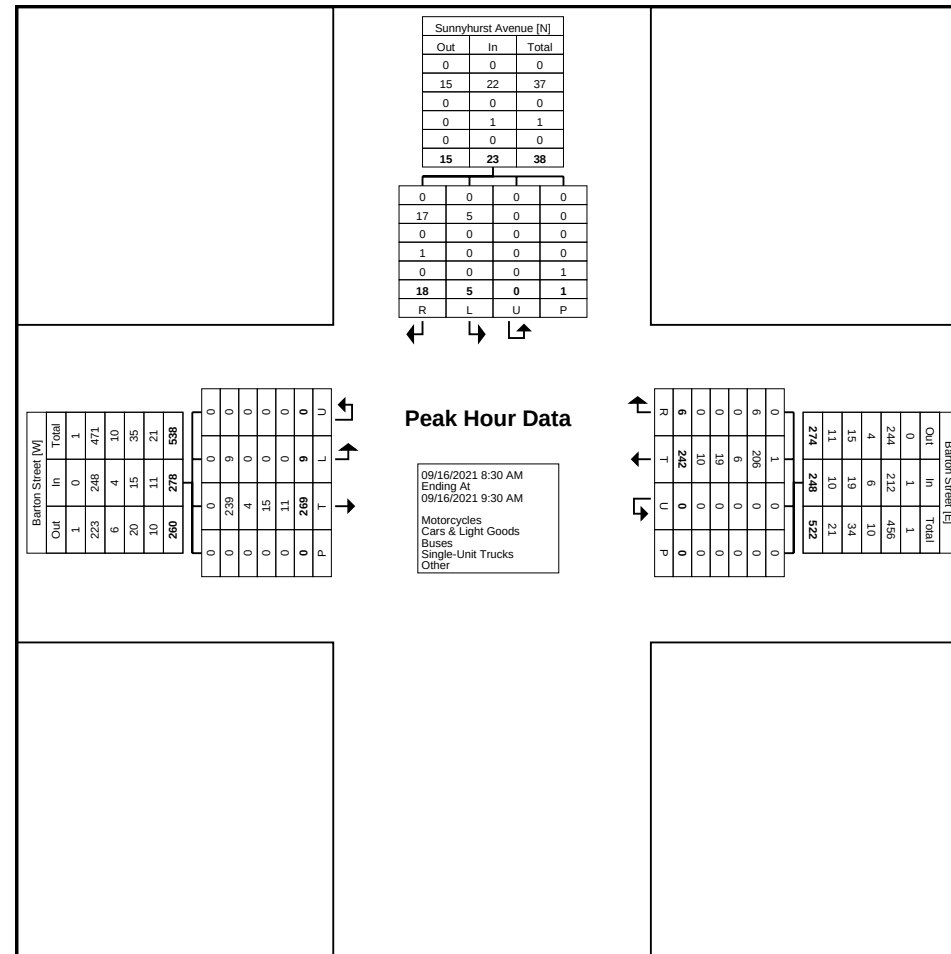
Start Time	Barton Street Eastbound					Barton Street Westbound					Sunnyhurst Avenue Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
8:30 AM	2	68	0	0	70	53	2	0	0	55	2	2	0	0	4	129
8:45 AM	3	66	0	0	69	60	2	0	0	62	2	4	0	0	6	137
9:00 AM	3	77	0	0	80	73	2	0	0	75	0	6	0	1	6	161
9:15 AM	1	58	0	0	59	56	0	0	0	56	1	6	0	0	7	122
Total	9	269	0	0	278	242	6	0	0	248	5	18	0	1	23	549
Approach %	3.2	96.8	0.0	-	-	97.6	2.4	0.0	-	-	21.7	78.3	0.0	-	-	-
Total %	1.6	49.0	0.0	-	50.6	44.1	1.1	0.0	-	45.2	0.9	3.3	0.0	-	4.2	-
PHF	0.750	0.873	0.000	-	0.869	0.829	0.750	0.000	-	0.827	0.625	0.750	0.000	-	0.821	0.852
Motorcycles	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Motorcycles	0.0	0.0	-	-	0.0	0.4	0.0	-	-	0.4	0.0	0.0	-	-	0.0	0.2
Cars & Light Goods	9	239	0	-	248	206	6	0	-	212	5	17	0	-	22	482
% Cars & Light Goods	100.0	88.8	-	-	89.2	85.1	100.0	-	-	85.5	100.0	94.4	-	-	95.7	87.8
Buses	0	4	0	-	4	6	0	0	-	6	0	0	0	-	0	10
% Buses	0.0	1.5	-	-	1.4	2.5	0.0	-	-	2.4	0.0	0.0	-	-	0.0	1.8
Single-Unit Trucks	0	15	0	-	15	19	0	0	-	19	0	1	0	-	1	35
% Single-Unit Trucks	0.0	5.6	-	-	5.4	7.9	0.0	-	-	7.7	0.0	5.6	-	-	4.3	6.4
Articulated Trucks	0	11	0	-	11	10	0	0	-	10	0	0	0	-	0	21
% Articulated Trucks	0.0	4.1	-	-	4.0	4.1	0.0	-	-	4.0	0.0	0.0	-	-	0.0	3.8
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
Start Date: 09/16/2021
Page No: 5



Turning Movement Peak Hour Data Plot (8:30 AM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
Start Date: 09/16/2021
Page No: 6

Turning Movement Peak Hour Data (11:30 AM)

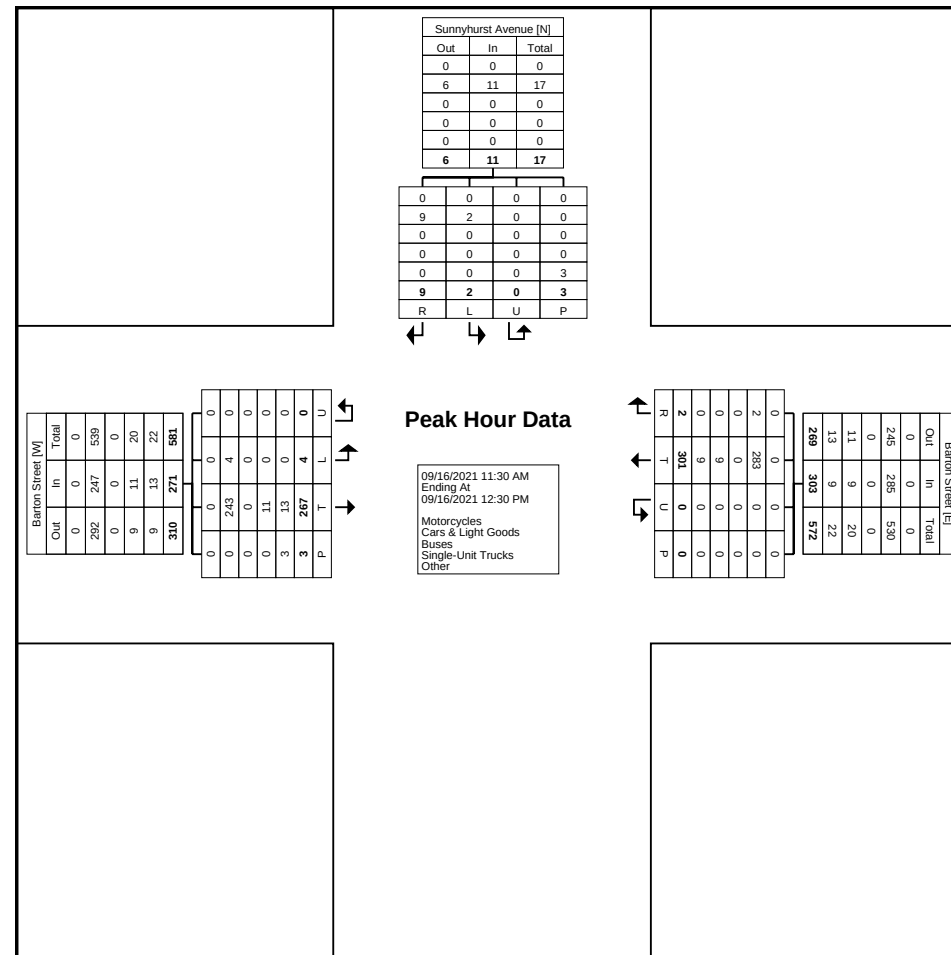
Start Time	Barton Street Eastbound					Barton Street Westbound					Sunnyhurst Avenue Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
11:30 AM	0	58	0	1	58	58	2	0	0	60	0	3	0	1	3	121
11:45 AM	0	67	0	1	67	82	0	0	0	82	0	1	0	2	1	150
12:00 PM	3	66	0	1	69	81	0	0	0	81	2	4	0	0	6	156
12:15 PM	1	76	0	0	77	80	0	0	0	80	0	1	0	0	1	158
Total	4	267	0	3	271	301	2	0	0	303	2	9	0	3	11	585
Approach %	1.5	98.5	0.0	-	-	99.3	0.7	0.0	-	-	18.2	81.8	0.0	-	-	-
Total %	0.7	45.6	0.0	-	46.3	51.5	0.3	0.0	-	51.8	0.3	1.5	0.0	-	1.9	-
PHF	0.333	0.878	0.000	-	0.880	0.918	0.250	0.000	-	0.924	0.250	0.563	0.000	-	0.458	0.926
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	4	243	0	-	247	283	2	0	-	285	2	9	0	-	11	543
% Cars & Light Goods	100.0	91.0	-	-	91.1	94.0	100.0	-	-	94.1	100.0	100.0	-	-	100.0	92.8
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	11	0	-	11	9	0	0	-	9	0	0	0	-	0	20
% Single-Unit Trucks	0.0	4.1	-	-	4.1	3.0	0.0	-	-	3.0	0.0	0.0	-	-	0.0	3.4
Articulated Trucks	0	13	0	-	13	8	0	0	-	8	0	0	0	-	0	21
% Articulated Trucks	0.0	4.9	-	-	4.8	2.7	0.0	-	-	2.6	0.0	0.0	-	-	0.0	3.6
Bicycles on Road	0	0	0	-	0	1	0	0	-	1	0	0	0	-	0	1
% Bicycles on Road	0.0	0.0	-	-	0.0	0.3	0.0	-	-	0.3	0.0	0.0	-	-	0.0	0.2
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	3	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
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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: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
Start Date: 09/16/2021
Page No: 8

Turning Movement Peak Hour Data (4:15 PM)

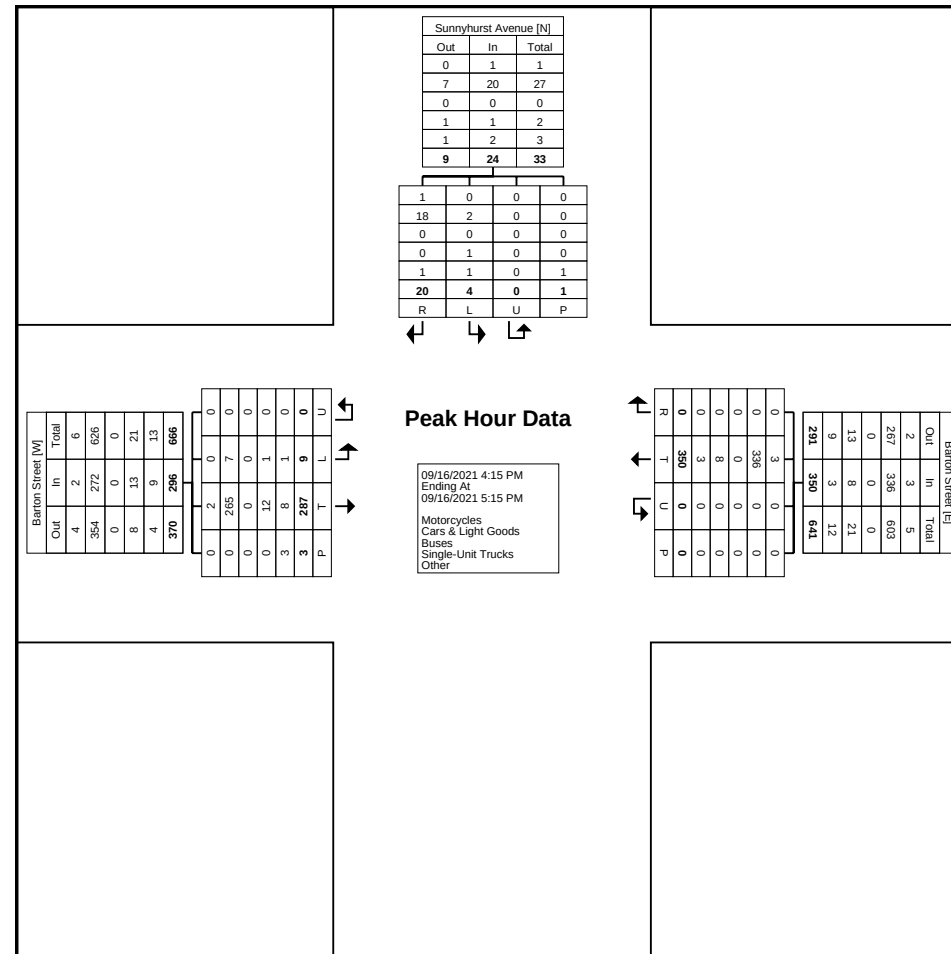
Start Time	Barton Street Eastbound					Barton Street Westbound					Sunnyhurst Avenue Southbound					Int. Total
	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Right	U-Turn	Peds	App. Total	
4:15 PM	1	67	0	0	68	73	0	0	0	73	0	2	0	0	2	143
4:30 PM	2	92	0	3	94	97	0	0	0	97	2	11	0	1	13	204
4:45 PM	5	63	0	0	68	73	0	0	0	73	1	4	0	0	5	146
5:00 PM	1	65	0	0	66	107	0	0	0	107	1	3	0	0	4	177
Total	9	287	0	3	296	350	0	0	0	350	4	20	0	1	24	670
Approach %	3.0	97.0	0.0	-	-	100.0	0.0	0.0	-	-	16.7	83.3	0.0	-	-	-
Total %	1.3	42.8	0.0	-	44.2	52.2	0.0	0.0	-	52.2	0.6	3.0	0.0	-	3.6	-
PHF	0.450	0.780	0.000	-	0.787	0.818	0.000	0.000	-	0.818	0.500	0.455	0.000	-	0.462	0.821
Motorcycles	0	2	0	-	2	3	0	0	-	3	0	1	0	-	1	6
% Motorcycles	0.0	0.7	-	-	0.7	0.9	-	-	-	0.9	0.0	5.0	-	-	4.2	0.9
Cars & Light Goods	7	265	0	-	272	336	0	0	-	336	2	18	0	-	20	628
% Cars & Light Goods	77.8	92.3	-	-	91.9	96.0	-	-	-	96.0	50.0	90.0	-	-	83.3	93.7
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
Single-Unit Trucks	1	12	0	-	13	8	0	0	-	8	1	0	0	-	1	22
% Single-Unit Trucks	11.1	4.2	-	-	4.4	2.3	-	-	-	2.3	25.0	0.0	-	-	4.2	3.3
Articulated Trucks	1	8	0	-	9	3	0	0	-	3	1	1	0	-	2	14
% Articulated Trucks	11.1	2.8	-	-	3.0	0.9	-	-	-	0.9	25.0	5.0	-	-	8.3	2.1
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	-	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	3	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Barton Street & Sunnyhurst
Avenue
Site Code: 210193
Start Date: 09/16/2021
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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@ptsll.com

Count Name: Fruitland Road & Sherwood Park Road
Site Code: 210193
Start Date: 09/16/2021
Page No: 1

Turning Movement Data

Start Time	Sherwood Park Road Eastbound					Fruitland Road Northbound					Fruitland Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
6:30 AM	7	2	0	1	9	2	56	0	0	58	16	0	0	0	16	83
6:45 AM	2	1	0	0	3	3	43	0	0	46	15	1	0	0	16	65
Hourly Total	9	3	0	1	12	5	99	0	0	104	31	1	0	0	32	148
7:00 AM	6	3	0	1	9	1	56	0	0	57	25	2	0	0	27	93
7:15 AM	2	2	0	3	4	1	58	0	0	59	25	4	0	0	29	92
7:30 AM	2	4	0	0	6	1	59	0	0	60	27	6	0	0	33	99
7:45 AM	2	6	0	1	8	3	61	0	0	64	40	1	0	0	41	113
Hourly Total	12	15	0	5	27	6	234	0	0	240	117	13	0	0	130	397
8:00 AM	3	5	0	4	8	1	63	0	0	64	37	3	0	0	40	112
8:15 AM	3	3	0	4	6	1	64	0	0	65	41	0	0	0	41	112
8:30 AM	5	1	0	3	6	1	67	0	0	68	45	1	0	0	46	120
8:45 AM	3	6	0	2	9	1	51	0	0	52	55	0	0	0	55	116
Hourly Total	14	15	0	13	29	4	245	0	0	249	178	4	0	0	182	460
9:00 AM	3	2	0	1	5	0	53	0	0	53	33	3	0	0	36	94
9:15 AM	4	4	0	2	8	4	47	0	0	51	32	1	0	0	33	92
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	7	6	0	3	13	4	100	0	0	104	65	4	0	0	69	186
11:00 AM	0	1	0	0	1	3	46	0	0	49	55	3	0	0	58	108
11:15 AM	1	2	0	2	3	1	51	0	0	52	46	1	0	0	47	102
11:30 AM	2	2	0	2	4	2	51	0	0	53	43	0	0	0	43	100
11:45 AM	1	1	0	1	2	2	48	0	0	50	44	4	0	0	48	100
Hourly Total	4	6	0	5	10	8	196	0	0	204	188	8	0	0	196	410
12:00 PM	3	4	0	0	7	3	47	0	0	50	58	4	0	0	62	119
12:15 PM	3	2	0	2	5	4	49	0	0	53	43	2	0	1	45	103
12:30 PM	5	2	0	2	7	5	51	0	0	56	45	4	0	0	49	112
12:45 PM	2	2	0	2	4	4	54	0	0	58	48	0	0	0	48	110
Hourly Total	13	10	0	6	23	16	201	0	0	217	194	10	0	1	204	444
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	1	3	0	1	4	4	45	0	0	49	73	3	0	0	76	129
3:15 PM	3	5	0	0	8	3	59	0	0	62	78	1	0	0	79	149
3:30 PM	2	4	0	1	6	2	54	0	0	56	60	2	0	0	62	124
3:45 PM	1	1	0	0	2	3	43	0	0	46	84	3	0	0	87	135
Hourly Total	7	13	0	2	20	12	201	0	0	213	295	9	0	0	304	537
4:00 PM	6	1	0	4	7	2	56	0	0	58	54	11	0	0	65	130
4:15 PM	6	6	0	0	12	7	52	0	0	59	73	3	0	0	76	147
4:30 PM	3	3	0	0	6	6	39	0	0	45	78	3	0	0	81	132

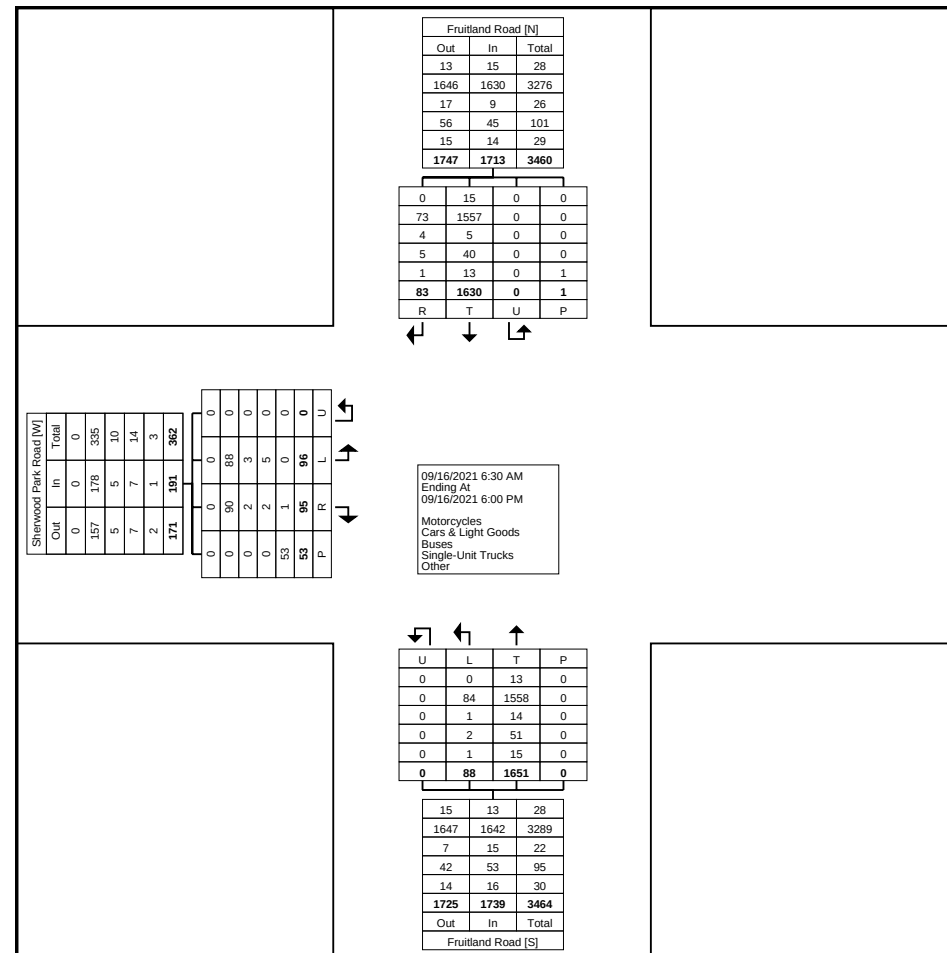
4:45 PM	1	5	0	3	6	3	37	0	0	40	67	3	0	0	70	116
Hourly Total	16	15	0	7	31	18	184	0	0	202	272	20	0	0	292	525
5:00 PM	3	5	0	1	8	3	43	0	0	46	76	7	0	0	83	137
5:15 PM	5	2	0	8	7	6	47	0	0	53	68	0	0	0	68	128
5:30 PM	4	5	0	0	9	3	50	0	0	53	67	3	0	0	70	132
5:45 PM	2	0	0	2	2	3	51	0	0	54	79	4	0	0	83	139
Hourly Total	14	12	0	11	26	15	191	0	0	206	290	14	0	0	304	536
Grand Total	96	95	0	53	191	88	1651	0	0	1739	1630	83	0	1	1713	3643
Approach %	50.3	49.7	0.0	-	-	5.1	94.9	0.0	-	-	95.2	4.8	0.0	-	-	-
Total %	2.6	2.6	0.0	-	5.2	2.4	45.3	0.0	-	47.7	44.7	2.3	0.0	-	47.0	-
Motorcycles	0	0	0	-	0	0	13	0	-	13	15	0	0	-	15	28
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.8	-	-	0.7	0.9	0.0	-	-	0.9	0.8
Cars & Light Goods	88	90	0	-	178	84	1558	0	-	1642	1557	73	0	-	1630	3450
% Cars & Light Goods	91.7	94.7	-	-	93.2	95.5	94.4	-	-	94.4	95.5	88.0	-	-	95.2	94.7
Buses	3	2	0	-	5	1	14	0	-	15	5	4	0	-	9	29
% Buses	3.1	2.1	-	-	2.6	1.1	0.8	-	-	0.9	0.3	4.8	-	-	0.5	0.8
Single-Unit Trucks	5	2	0	-	7	2	51	0	-	53	40	5	0	-	45	105
% Single-Unit Trucks	5.2	2.1	-	-	3.7	2.3	3.1	-	-	3.0	2.5	6.0	-	-	2.6	2.9
Articulated Trucks	0	1	0	-	1	1	12	0	-	13	13	0	0	-	13	27
% Articulated Trucks	0.0	1.1	-	-	0.5	1.1	0.7	-	-	0.7	0.8	0.0	-	-	0.8	0.7
Bicycles on Road	0	0	0	-	0	0	3	0	-	3	0	1	0	-	1	4
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.2	-	-	0.2	0.0	1.2	-	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	53	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



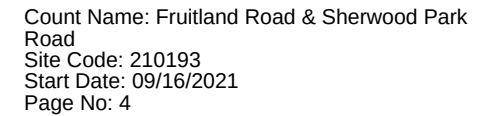
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Fruitland Road & Sherwood Park Road
Site Code: 210193
Start Date: 09/16/2021
Page No: 3



Turning Movement Data Plot

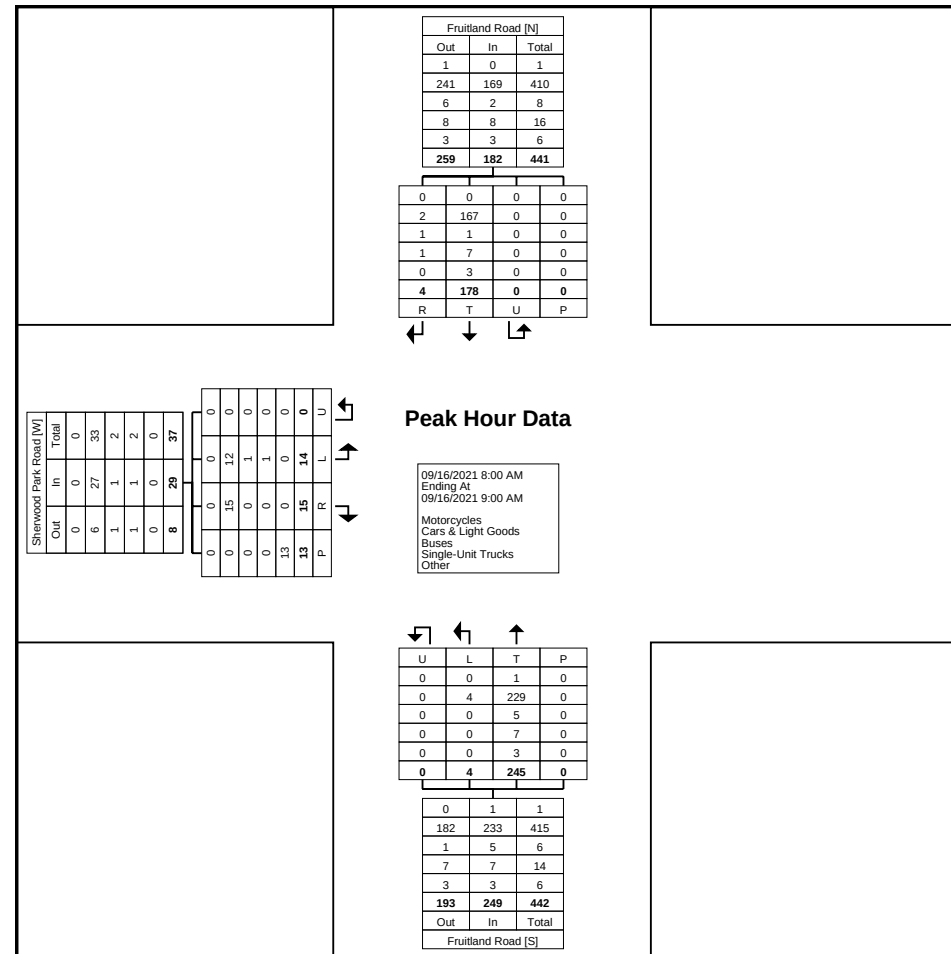
[illegible]



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Fruitland Road & Sherwood Park
Road
Site Code: 210193
Start Date: 09/16/2021
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: Fruitland Road & Sherwood Park Road
Site Code: 210193
Start Date: 09/16/2021
Page No: 6

Turning Movement Peak Hour Data (12:00 PM)

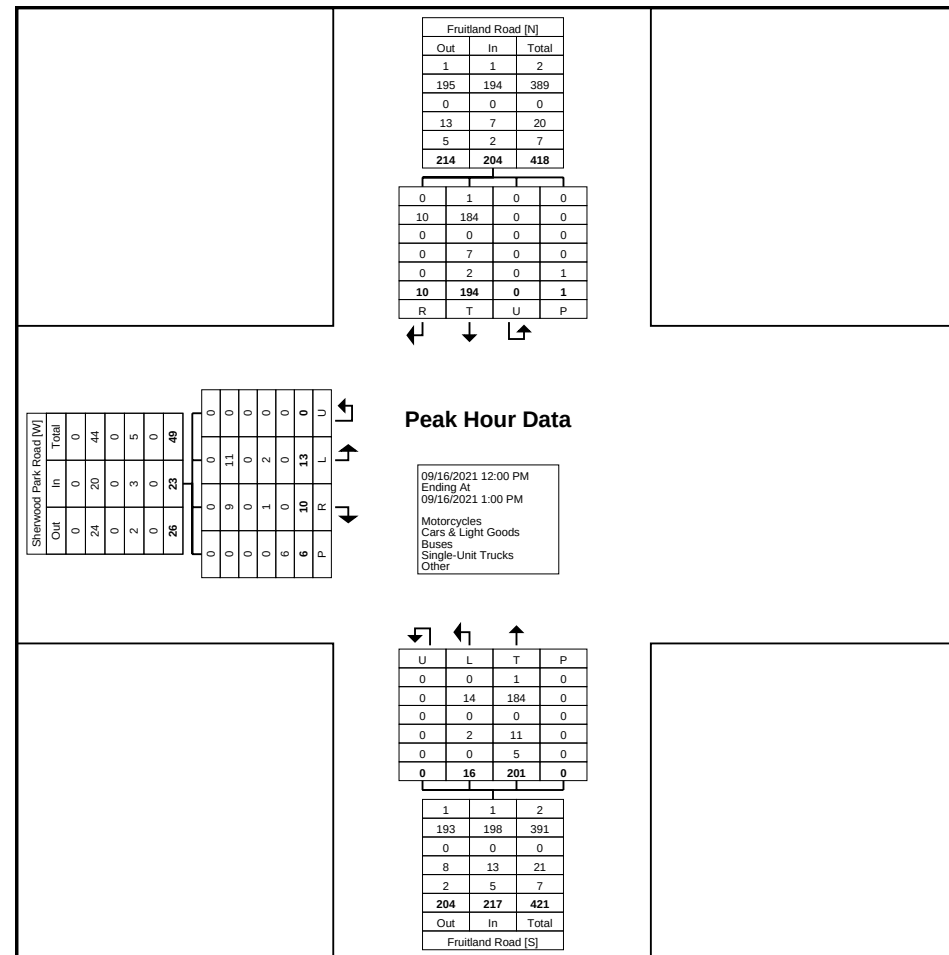
Start Time	Sherwood Park Road Eastbound					Fruitland Road Northbound					Fruitland Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	3	4	0	0	7	3	47	0	0	50	58	4	0	0	62	119
12:15 PM	3	2	0	2	5	4	49	0	0	53	43	2	0	1	45	103
12:30 PM	5	2	0	2	7	5	51	0	0	56	45	4	0	0	49	112
12:45 PM	2	2	0	2	4	4	54	0	0	58	48	0	0	0	48	110
Total	13	10	0	6	23	16	201	0	0	217	194	10	0	1	204	444
Approach %	56.5	43.5	0.0	-	-	7.4	92.6	0.0	-	-	95.1	4.9	0.0	-	-	-
Total %	2.9	2.3	0.0	-	5.2	3.6	45.3	0.0	-	48.9	43.7	2.3	0.0	-	45.9	-
PHF	0.650	0.625	0.000	-	0.821	0.800	0.931	0.000	-	0.935	0.836	0.625	0.000	-	0.823	0.933
Motorcycles	0	0	0	-	0	0	1	0	-	1	1	0	0	-	1	2
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.5	-	-	0.5	0.5	0.0	-	-	0.5	0.5
Cars & Light Goods	11	9	0	-	20	14	184	0	-	198	184	10	0	-	194	412
% Cars & Light Goods	84.6	90.0	-	-	87.0	87.5	91.5	-	-	91.2	94.8	100.0	-	-	95.1	92.8
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	2	1	0	-	3	2	11	0	-	13	7	0	0	-	7	23
% Single-Unit Trucks	15.4	10.0	-	-	13.0	12.5	5.5	-	-	6.0	3.6	0.0	-	-	3.4	5.2
Articulated Trucks	0	0	0	-	0	0	2	0	-	2	2	0	0	-	2	4
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	1.0	-	-	0.9	1.0	0.0	-	-	1.0	0.9
Bicycles on Road	0	0	0	-	0	0	3	0	-	3	0	0	0	-	0	3
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	1.5	-	-	1.4	0.0	0.0	-	-	0.0	0.7
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	6	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	-	-	-	-	-	100.0	-	-



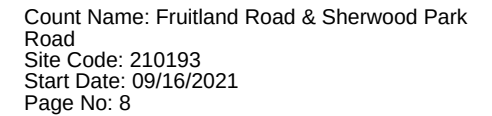
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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

Count Name: Fruitland Road & Sherwood Park
Road
Site Code: 210193
Start Date: 09/16/2021
Page No: 7



Turning Movement Peak Hour Data Plot (12:00 PM)



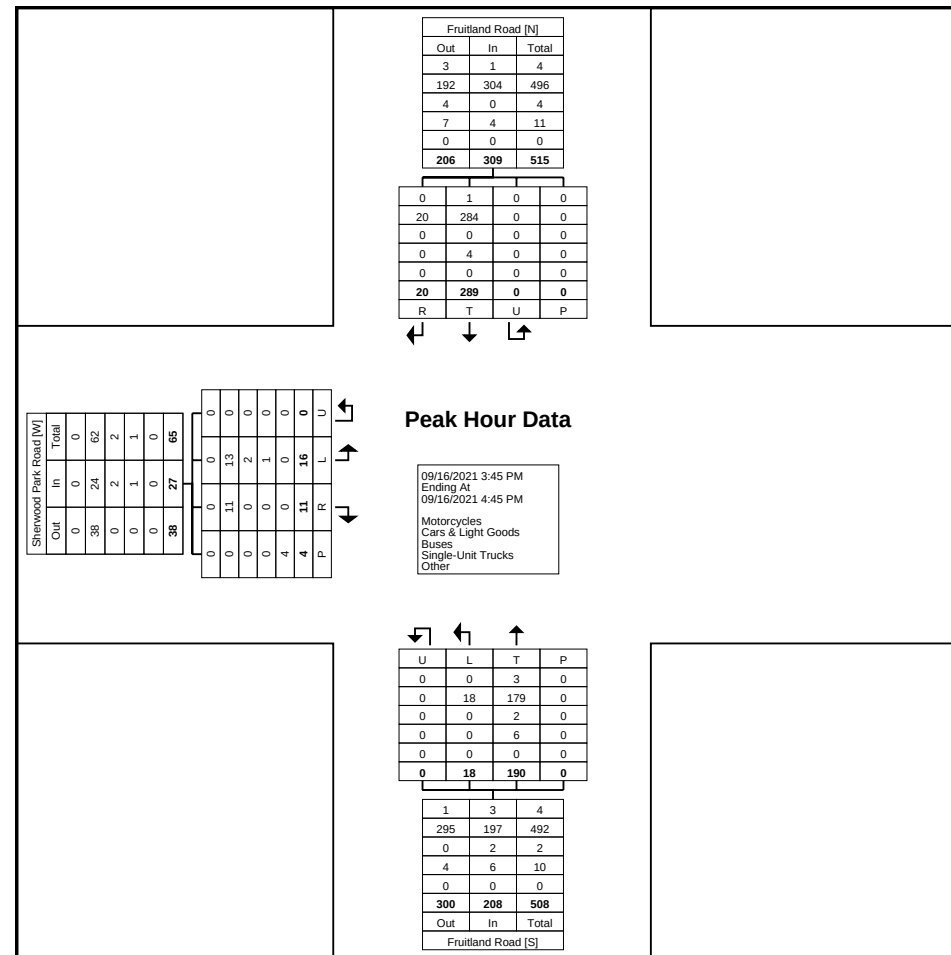
Start Time	Sherwood Park Road Eastbound					Fruitland Road Northbound					Fruitland Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
3:45 PM	1	1	0	0	2	3	43	0	0	46	84	3	0	0	87	135
4:00 PM	6	1	0	4	7	2	56	0	0	58	54	11	0	0	65	130
4:15 PM	6	6	0	0	12	7	52	0	0	59	73	3	0	0	76	147
4:30 PM	3	3	0	0	6	6	39	0	0	45	78	3	0	0	81	132
Total	16	11	0	4	27	18	190	0	0	208	289	20	0	0	309	544
Approach %	59.3	40.7	0.0	-	-	8.7	91.3	0.0	-	-	93.5	6.5	0.0	-	-	-
Total %	2.9	2.0	0.0	-	5.0	3.3	34.9	0.0	-	38.2	53.1	3.7	0.0	-	56.8	-
PHF	0.667	0.458	0.000	-	0.563	0.643	0.848	0.000	-	0.881	0.860	0.455	0.000	-	0.888	0.925
Motorcycles	0	0	0	-	0	0	3	0	-	3	1	0	0	-	1	4
% Motorcycles	0.0	0.0	-	-	0.0	0.0	1.6	-	-	1.4	0.3	0.0	-	-	0.3	0.7
Cars & Light Goods	13	11	0	-	24	18	179	0	-	197	284	20	0	-	304	525
% Cars & Light Goods	81.3	100.0	-	-	88.9	100.0	94.2	-	-	94.7	98.3	100.0	-	-	98.4	96.5
Buses	2	0	0	-	2	0	2	0	-	2	0	0	0	-	0	4
% Buses	12.5	0.0	-	-	7.4	0.0	1.1	-	-	1.0	0.0	0.0	-	-	0.0	0.7
Single-Unit Trucks	1	0	0	-	1	0	6	0	-	6	4	0	0	-	4	11
% Single-Unit Trucks	6.3	0.0	-	-	3.7	0.0	3.2	-	-	2.9	1.4	0.0	-	-	1.3	2.0
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	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians	-	-	-	4	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	0	-	-	-	-	0	-	-



Paradigm Transportation Solutions Limited
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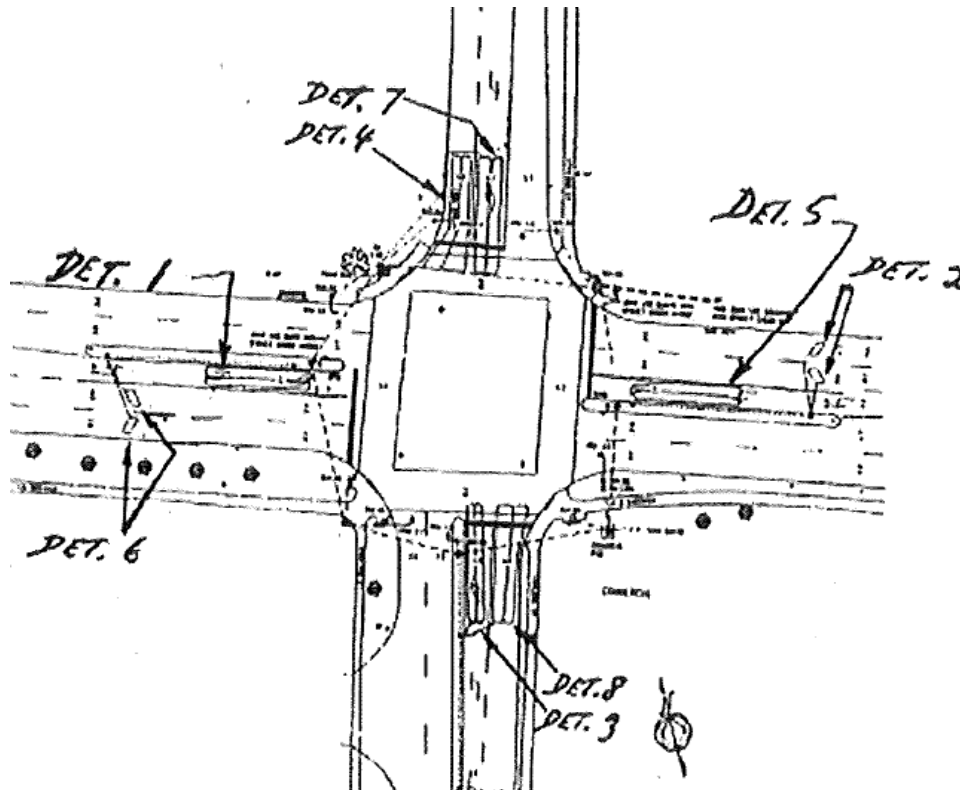
Count Name: Fruitland Road & Sherwood Park
Road
Site Code: 210193
Start Date: 09/16/2021
Page No: 9



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

City of Hamilton - Traffic Traffic Signal Controller Timing Data

Intersection: **Barton St at Fruitland Rd**
Controller Type: **3000E** Page **1** of **16**
Programmed By: **MF** Installed By: _____
Date: **Dec 20/18** Date: _____



Converted to Fixed Time
Phase 4/8 green extendable
TP 4 setup for QEW Incident

- φ1:
- φ2: Barton - WB, North Xwalk
- φ3:
- φ4: Fruitland - SB, West Xwalk
- φ5:
- φ6: Barton - EB, South Xwalk
- φ7:
- φ8: Fruitland - NB, East Xwalk

Flash Operation: Red: Barton
 Red: Fruitland

SEQUENCE/START-UP (MM-3-1-1)

START-UP PHASES/INTERVAL/SEQUENCE

(X = Enable for start-up phases. Must be compatible if more than one)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
START-UP	Phases				X				X								
	Interval	0	(0=Red, 1=Yel, 2= Grn, determines color of selected phases above on start-up)														
	Flash	10	(0-255 seconds start-up flash time)														
	Red	5.0	(0-25.5 secs = length of first red after start-up if start-up in yellow or red)														
	Sequence	3	(2=single ring, 3=dual ring, 4=123/567+48, 5=12/56+3478, 6=1234/56+78, 7=1234/5678, 8=dual quad, 9=12ph)														

PHASE RING ASSIGNMENTS

X = Phase assigned to ring (if used). Phases in different rings but same co-phase group can time together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RING	Ring 1		X		X												
	Ring 2						X		X								
	Ring 3																
	Ring 4																

CO-PHASE GRP 1-4 ASSIGNMENTS

X = phase assigned to co-phase group. All ph's assigned to rings must be assigned to co-phase group.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CO-PHASE	CO PH 1		X				X										
	CO PH 2				X				X								
	CO PH 3																
	CO PH 4																

		(X = ENABLE) TP1 PHASE RECALLS															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL				X				X								
	SOFT REC																
	NON-LOCK																
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

		(X = ENABLE) TP2 PHASE RECALLS															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL				X				X								
	SOFT REC																
	NON-LOCK																
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

		(X = ENABLE)															
		TP3 PHASE RECALLS															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL				X				X								
	SOFT REC																
	NON-LOCK																
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

		(X = ENABLE)															
		TP4 PHASE RECALLS															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL				X				X								
	SOFT REC																
	NON-LOCK																
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

(X = ENABLE)																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	CNA 1		X				X										
	CNA 2																
	CNA 3																
	CNA 4																
	WRM		X				X										
	INH MAX																
	PED RECY																
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

PHASE TIMES (MM-3-1-3-PGDN, etc.)

USE 1 TO ALL 4 TIMING PLANS

TP1																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		30		25		30		25								
	Passage		0.0		1.0		0.0		1.0								
	Yellow		3.7		3.3		3.7		3.3								
	Red		2.3		3.0		2.3		3.0								
	Walk		7		7		7		7								
	Ped Clr		19		22		19		22								
	Max 1		45		30		45		30								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

		TP2															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		30		25		30		25								
	Passage		0.0		1.0		0.0		1.0								
	Yellow		3.7		3.3		3.7		3.3								
	Red		2.3		3.0		2.3		3.0								
	Walk		7		7		7		7								
	Ped Clr		19		22		19		22								
	Max 1		45		30		45		30								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

		TP3															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		30		25		30		25								
	Passage		0.0		1.0		0.0		1.0								
	Yellow		3.7		3.3		3.7		3.3								
	Red		2.3		3.0		2.3		3.0								
	Walk		7		7		7		7								
	Ped Clr		19		22		19		22								
	Max 1		45		30		45		30								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

		TP4															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		30		30		30		30								
	Passage		0.0		3.0		0.0		3.0								
	Yellow		3.7		3.3		3.7		3.3								
	Red		2.3		3.0		2.3		3.0								
	Walk		7		12		7		12								
	Ped Clr		19		22		19		22								
	Max 1		60		60		60		60								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

DUAL ENTRY (MM-3-1-6)

DUAL ENTRY ENABLE:	Y	Y/N: Y=Enable Dual Entry. Note this is only one setting even though it appears on each controller screen.

PG1	PH/CALLS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DUAL ENTRY ASSIGN- MENTS	1						X										
	2						X										
	3								X								
	4								X								
	5		X														
	6		X														
	7				X												
	8				X												

Barton St at Fruitland Rd
VEHICLE DETECTOR ASSIGNMENTS (MM-3-1-4-1, PGDN etc.)

CONTROLLER DATA

12/20/18

(X = ASSIGN VEH DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET ASSIGN- MENTS	1																
	2																
	3								X								
	4				X												
	5																
	6																
	7				X												
	8								X								
	9																

PED DETECTOR ASSIGNMENTS (MM-3-1-4-2)

(X = ASSIGN PED DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED DET ASSIGN- MENTS	1																
	2																
	3																
	4				X				X								
	5																
	6																
	7																
	8				X				X								

Barton St at Fruitland Rd
ENHANCED OPTIONS
DYNAMIC OMITS (MM-3-1-9-1-1)

CONTROLLER DATA

12/20/18

DYNAM OMITS GP1 ENABLE:	N	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input required for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN- MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

(X = ENABLE)

GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. OMITS ASSIGN- MENTS	OMIT PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

DYNAMIC RECALLS (MM-3-1-9-1-2)

DYN. RECALL GP1 ENABLE:	N	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input required for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. RECALLS ASSIGN- MENTS	RCL PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

(X = ENABLE)

GRP1-2	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM. RECALLS ASSIGN- MENTS	RCL PHS																
	IF PH ON																
	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	GRN																

SELECTION SOURCE (MM-3-2-2)

Entries determine how parameters get selected

Cycle Source:	0	0=TOD, 1=CL, 2=INT
Split Source:	0	0=TOD, 1=CL, 2=INT
Offset Source:	0	0=TOD, 1=CL, 2=INT

Free Source:	0	0=TOD, 1=CL, 2=INT
Flash Source:	0	0=TOD, 1=CL, 2=INT
Inter-TOD Revert:	255	0-255 SECS

TOD = Time of day control by internal clock, CL = Closed loop (comm), INT = Interconnect. Inter-TOD Revert is time allowed after failed interconnect before unit reverts to TOD (Time Base) control.

COORD BASIC OPTIONS (MM-3-2-3)

Reference to End (vs. begin) of Main St.:	N	Y/N: Y = Offset references to end of main st. green. N = Beginning of Main st. green.
Use % (vs. secs) for Phase Allocation:	N	Y/N: Y = Phase allocations loaded as percent of 100. N = Allocations in seconds.
Use % (vs. secs) for Offset Entry:	N	Y/N: Y = Offset loaded as percent of 100. N = Offset loaded in seconds.
Use Fixed (vs. floating) Force Offs:	Y	Y/N: Y = Force offs are fixed to cycle. N=Force offs like max times, begin with green.
Permissive Type:	1	0-2: 0=Yield, 1= Single, 2= Multiple. See Permissives note below

C/S TO TIMING PLAN (MM-3-2-9-6)**USE THIS CHART WHEN 4 SPLITS/CYCLE = Y**

SPLIT TO TIME PLAN	CYCLE	1	2	3	4	5	6
	SPLIT 1	1	2	3	4		
	SPLIT 2						
	SPLIT 3						
	SPLIT 4						

(0-4 = TIME PLAN IMPLEMENTED
WHEN SPLIT IN EFFECT)

CYCLES & OFFSETS (MM-3-2-4)**NOTE:** FIRST SPECIFY OFSET SEEKING MODE AND 4 SPLITS CYCLE MODE (ENHANCED OPTIONS, OPERATING MODES)

CYCLE & OFFSETS	Cycle #	1/1	2/1	3/1	4/1		
	Length	80	90	90	120		
	Offset 1	54	2	78	0		Secs
	Offset 2		69				
	Offset 3						
	Offset 4						
	Offset 5						
	Max Dwell	32	32	32	32		

COORD PHASES (MM-3-2-5)

	CYCLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COORD PHASES	1-1		X				X										
	2-1		X				X										
	3-1		X				X										
	4-1		X				X										

ENTRY IN:	Secs	% or Secs: Not a controller entry--for reference only. Controller entry is under b

PHASE ALLO- CATION	PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	C1 S1		40		40		40		40								
	C1 S2																
	C1 S3																
	C1 S4																
	C2 S1		50		40		50		40								
	C2 S2																
	C2 S3																
	C2 S4																
	C3 S1		45		45		45		45								
	C3 S2																
	C3 S3																
	C3 S4																
	C4 S1		60		60		60		60								
	C4 S2																
	C4 S3																
	C4 S4																

OFFSET SEEKING MODE (MM-3-2-7)

Offset Seeking Mode:	0

Mode

- 0 Add only, cycle times 20% slow only to get in sync
- 1 Dwell, cycle timer stops at cycle 0 up to max dwell time to get in step
- 2 Short Route, cycle times 20% fast or slow--whichever gets in step fastest

OPERATING OPTIONS (MM-3-2-9-1)

Enhanced Perm:	Y	Y/N: See note		Invert Free In:	N	Y/N: See note
Central Override:	N	Y/N: See note		Split Matrix:	N	Y/N: See note
No PCL Offset Adjust:	N	Y/N: See note		4 Splits/Cycle:	Y	Y/N: See note
				No Early Coord Ped:	N	Y/N: See note

Yield Percent	1	0-10%: See note	
EGB%	0	0-100%: See note	
RGB%	0	0-100%: See note	
# Cycles to out of step:	0	0-255: 0=Disable	

CYCLE SYNC OPTIONS (MM-3-2-9-2)

Sync Source:	0	0-2, 0=TOD/CL/Interconnect, 1= City Zero, 2= Absolute

Charts below only For City Zero offsets or Absolute (0's). These are not daily reference times for Sync Source Option 0 (see TOD).

Cycle 1:	0	Cycle 2:	0	Cycle 3:	0
Cycle 4:	0	Cycle 5:	0	Cycle 6:	0

MANUAL/AUTO FORCE OFFS & PERMS

SET MANUAL MODE (MM-3-2-9-3-1)

Auto Perm and FO:	Y	Y/N: Y = Perms & Force offs auto-calculated from phase allocations. N = Manually entered
Ped Perm:	0	0-255: 0 = Auto calculated. 1-255 = secs each ped perm, starting with vehicle permissives

Barton St at Fruitland Rd
DAY PLANS (MM-3-3-1-#)

CONTROLLER DATA

12/20/18

	HH	MM	CIRCUIT PLAN	C	O	S	CKT	ON/OFF
1	00	00					11(FRE)	OFF
	00	00		1	1	1		
	09	30		2	2	1		
	20	00		1	1	1		
2	00	00					11(FRE)	OFF
	00	00		1	1	1		
	06	30		2	1	1		
	10	00		1	1	1		
	14	30		3	1	1		
	18	30		1	1	1		

WEEK PLANS (MM-3-3-3)

Plan	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1
2							
3							
4							
5							

CIRCUIT OVERRIDES (MM-3-3-6)

For each circuit specify TOD (time of day controlled), or manually ON or OFF. Default = TOD

CIRCUIT OVER- RIDES	Circuit	65	66	67	68	69	70	71	72
	Function	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
	State								
	Circuit	73	74	75	76	77	78	79	80
	Function	CN1	CN2	CN3	CN4	WRM	MIN	DIM	CVS
CIRCUIT OVER- RIDES	State	ON				ON			
	Circuit	113	114	115	116	117	118	119	120
	Function	UD1	UD2	UD3	UD4	UD5	UD6	UD7	UD8
	State								
	Circuit	121	122	123	124	125	126	127	128
	Function	PH2	DP2	DP3	3CD	EVL	EML	ASC	DCP
	State					ON	ON		

DAYLIGHT SAVINGS (MM-3-3-7)

DAY LIGHT SAVINGS	Spring		Fall	
	(0-12)	(0-5)	(0-12)	(0-5)
	Month	WOM	Month	WOM
	3	2	11	1

Enter Month and Week of Month for Spring Forward and Fall Back days (typical 4 - 1 and 10 - 5). Unit will adjust at 2AM on Sunday of week specified. Enter zero (or leave blank) if Daylight Savings not used.

SYNC REFERENCE MODE (MM-3-3-8)

Mode:	0	0 = Time dependent, 1 = C/O/S Event

	HH	MM	
Time Clock Reset:	00	00	TOD clock reset to by TBC input
Interrupter:	N		Y/N; Y = Interrupter pulses provided
Pulses:	0		0-6 = Number of interrupter pulses

TIME DEPENDENT CYCLE REFERENCES

	HH	MM
CYC 1:	00	00
CYC 4:	00	00

	HH	MM
CYC 2:	00	00
CYC 5:	00	00

	HH	MM
CYC 3:	00	00
CYC 6:	00	00

When mode = Time dependent, enter reference times of day for each cycle. Default = 00:00 = midnight = most commonly used reference.

When mode = C/O/S Event, cycle restarts on each COS change. Only use this mode for specific reasons. Time dependent most common used mode.

CLOSED LOOP ID	Master Type:	1	0 = None, 1 = 3000 Series Master, 2 = 3800 EL master
	Intersection ID		0-255
	Master Identification		0-255
	Allow Comm Xfer Between Ports 2 & 3		Y/N: Y = Incoming signal on Master port (2 or 3), gets echo'd on other port

COMM SET-UP (MM-3-5-2)

PG1 PORT ASSIGN	Master (CL) Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used to receive Master Comm)
	Monitor Port		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Monitor Data Upload)
	Central Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Direct Dial-up Modem)

PG2 PORT 2 SETUP	Data Rate:	1200	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG3 PORT 3 SETUP	Data Rate:	1200	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG4	Modem Set-up String:		Up to 40 charaters; A-Z, or # @ = , ! ; % \ &

PHONE NUMBERS (MM-3-5-3)

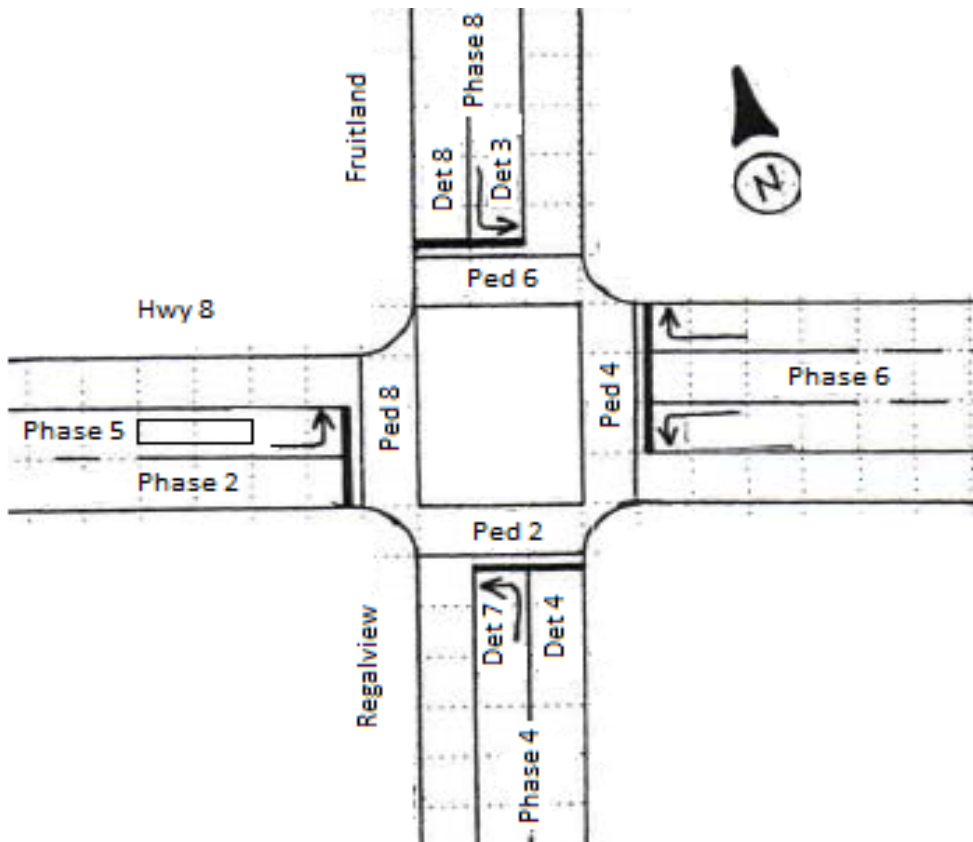
PHONE NUM- BERS	Tone:		Y/N
	Phone 1:		Number & control characters (W , ; # ' / T P) if used
	Phone 2:		Number & control characters (W , ; # ' / T P) if used

LOG DATA (MM-3-5-5)

PG1 SAMPLE	Volume Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 125 (EVL)
	MOE Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 126 (EML)

City of Hamilton - Traffic Traffic Signal Controller Timing Data

Intersection: Hwy 8 at Fruitland Rd_Regalveiw Dr
Controller Type: 3000E Page 1 of 16
Programmed By: MF Installed By: MF
Date: 1/28/20 Date: January 28, 2020
Modification: Proposed new EBLT



- φ1:
- φ2: Hwy 8 - EB, South Xwalk
- φ3:
- φ4: Regalview - NB, East Xwalk
- φ5: **Hwy 8 - EBLT**
- φ6: Hwy 8 - WB, North Xwalk
- φ7:
- φ8: Fruitland - SB, West Xwalk

Flash Operation: Red: Hwy 8
Red: Fruitland / Regalview

SEQUENCE/START-UP (MM-3-1-1)

START-UP PHASES/INTERVAL/SEQUENCE

(X = Enable for start-up phases. Must be compatible if more than one)

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
START-UP	Phases				X				X								
	Interval	0	(0=Red, 1=Yel, 2= Grn, determines color of selected phases above on start-up)														
	Flash	10	(0-255 seconds start-up flash time)														
	Red	5.0	(0-25.5 secs = length of first red after start-up if start-up in yellow or red)														
	Sequence	3	(2=single ring, 3=dual ring, 4=123/567+48, 5=12/56+3478, 6=1234/56+78, 7=1234/5678, 8=dual quad, 9=12ph)														

PHASE RING ASSIGNMENTS X = Phase assigned to ring (if used). Phases in different rings but same co-phase group can time together.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
RING	Ring 1		X		X												
	Ring 2					X	X		X								
	Ring 3																
	Ring 4																

CO-PHASE GRP 1-4 ASSIGNMENTS X = phase assigned to co-phase group. All ph's assigned to rings must be assigned to co-phase group.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CO-PHASE	CO PH 1		X			X	X										
	CO PH 2				X				X								
	CO PH 3																
	CO PH 4																

PHASE RECALLS/MODES; MIN, MAX, etc. (MM-3-1-2-1-PGDN, etc.)

USE 1 TO ALL 4 TIMING PLANS

		(X = ENABLE)															
		TP1 PHASE RECALLS															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK				X	X			X								
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

		(X = ENABLE)															
		TP2 PHASE RECALLS															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK				X	X			X								
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

(X = ENABLE)

TP3 PHASE RECALLS

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK				X	X			X								
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

(X = ENABLE)

TP4 PHASE RECALLS

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	MIN RCL																
	MAX RCL																
	PED RCL																
	SOFT REC																
	NON-LOCK				X	X			X								
	VEH OMIT																
	PED OMIT																
	WLK REST																
	MAX II																
	RED REST																
	NO SKIP																

PHASE RECALLS/MODES; CNA, INH MAX, PED OPTIONS, etc. (MM-3-1-2-2)

ONLY 1 PLAN PER UNIT

(X = ENABLE)																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE RECALLS	CNA 1		X				X										
	CNA 2																
	CNA 3																
	CNA 4																
	WRM		X				X										
	INH MAX																
	PED RECY																
	FL WALK																
	FDW->YEL																
	FDW->RED																
	COND PED																

PHASE TIMES (MM-3-1-3-PGDN, etc.)

USE 1 TO ALL 4 TIMING PLANS

TP1																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		30		10	5	30		10								
	Passage				3.0	1.0			3.0								
	Yellow		3.7		3.3	3.0	3.7		3.3								
	Red		2.1		2.8		2.1		2.8								
	Walk		7		7		7		7								
	Ped Clr		15		19		15		19								
	Max 1		30		30	10	30		30								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

		TP2															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		35		10	5	35		10								
	Passage				3.0	1.0			3.0								
	Yellow		3.7		3.3	3.0	3.7		3.3								
	Red		2.1		2.8		2.1		2.8								
	Walk		7		7		7		7								
	Ped Clr		15		19		15		19								
	Max 1		35		30	10	35		30								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

		TP3															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		35		10	5	35		10								
	Passage				3.0	1.0			3.0								
	Yellow		3.7		3.3	3.0	3.7		3.3								
	Red		2.1		2.8		2.1		2.8								
	Walk		7		7		7		7								
	Ped Clr		15		19		15		19								
	Max 1		35		30	10	35		30								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

		TP4															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PHASE TIMES	Initial		30		10	5	30		10								
	Passage				3.0	1.0			3.0								
	Yellow		3.7		3.3	3.0	3.7		3.3								
	Red		2.1		2.8		2.1		2.8								
	Walk		7		7		7		7								
	Ped Clr		15		19		15		19								
	Max 1		30		30	10	30		30								
	Max 2																
	Mx 3 Lim																
	Mx 3 Adh																
	TBR																
	TTR																
	Min Gap																
	AI/Act																
	Max In																

DUAL ENTRY (MM-3-1-6)

DUAL ENTRY ENABLE:	Y	Y/N: Y=Enable Dual Entry. Note this is only one setting even though it appears on each controller screen.

PG1	PH/CALLS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DUAL ENTRY ASSIGN- MENTS	1						X										
	2						X										
	3								X								
	4								X								
	5		X														
	6		X														
	7				X												
	8				X												

VEHICLE DETECTOR ASSIGNMENTS (MM-3-1-4-1, PGDN etc.)

(X = ASSIGN VEH DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET ASSIGN- MENTS	1																
	2																
	3								X								
	4				X												
	5					X											
	6																
	7				X												
	8								X								

PED DETECTOR ASSIGNMENTS (MM-3-1-4-2)

(X = ASSIGN PED DETECTOR TO THAT PHASE)

	DET/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PED DET ASSIGN- MENTS	1																
	2																
	3																
	4				X				X								
	5																
	6																
	7																
	8				X				X								

DETECTOR MODES (MM-3-1-4-3)

	DET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET	Mode	0	0	0	2	0	0	0	2								
MODES																	

	DET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
VEH DET	Lock																
LOCKS																	

DETECTOR TIMES (MM-3-1-4-4)

	DET	1	2	3	4	5	6	7	8
DET	Delay	0	0	0	2	0	0	0	2
TIMES	Str/Stp								

	DET	9	10	11	12	13	14	15	16
DET	Delay	0	0	0	0	0	0	0	0
TIMES	Str/Stp								

DYNAMIC OMITTS (MM-3-1-9-1-1)

DYNAM OMITTS GP1 ENABLE:	Y	Y/N: Y=Enable. Note: This is one setting but appears on each screen. No input required for GP1.

(X = ENABLE)

GRP1-1	FUNC/PH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DYNAM.	OMIT PHS					X											
OMITS	IF PH ON		X				X										
ASSIGN-	OR O/L	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MENTS	GRN																

SELECTION SOURCE (MM-3-2-2)

Entries determine how parameters get selected

Cycle Source:	0	0=TOD, 1=CL, 2=INT
Split Source:	0	0=TOD, 1=CL, 2=INT
Offset Source:	0	0=TOD, 1=CL, 2=INT

Free Source:	0	0=TOD, 1=CL, 2=INT
Flash Source:	0	0=TOD, 1=CL, 2=INT
Inter-TOD Revert:	255	0-255 SECS

TOD = Time of day control by internal clock, CL = Closed loop (comm), INT = Interconnect. Inter-TOD Revert is time allowed after failed interconnect before unit reverts to TOD (Time Base) control.

COORD BASIC OPTIONS (MM-3-2-3)

Reference to End (vs. begin) of Main St.:	N	Y/N: Y = Offset references to end of main st. green. N = Beginning of Main st. green.
Use % (vs. secs) for Phase Allocation:	N	Y/N: Y = Phase allocations loaded as percent of 100. N = Allocations in seconds.
Use % (vs. secs) for Offset Entry:	N	Y/N: Y = Offset loaded as percent of 100. N = Offset loaded in seconds.
Use Fixed (vs. floating) Force Offs:	Y	Y/N: Y = Force offs are fixed to cycle. N=Force offs like max times, begin with green.
Permissive Type:	0	0-2: 0=Yield, 1= Single, 2= Multiple. See Permissives note below

C/S TO TIMING PLAN (MM-3-2-9-6)**USE THIS CHART WHEN 4 SPLITS/CYCLE = Y**

	CYCLE	1	2	3	4	5	6
SPLIT TO TIME PLAN	SPLIT 1	1	2	3	4		
	SPLIT 2						
	SPLIT 3						
	SPLIT 4						

(0-4 = TIME PLAN IMPLEMENTED
WHEN SPLIT IN EFFECT)

CYCLES & OFFSETS (MM-3-2-4)**NOTE:** FIRST SPECIFY OFSET SEEKING MODE AND 4 SPLITS CYCLE MODE (ENHANCED OPTIONS, OPERATING MODES)

CYCLE & OFFSETS	Cycle #	1/1	2/1	3/1	4/1		
	Length						
	Offset 1						Secs
	Offset 2						
	Offset 3						
	Offset 4						
	Offset 5						
	Max Dwell	32	32	32	32		

COORD PHASES (MM-3-2-5)

	CYCLE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
COORD PHASES	1-1																
	2-1																
	3-1																
	4-1																

Hwy 8 at Fruitland_Regalview
PHASE ALLOCATION (MM-3-2-6)

CONTROLLER DATA

1/28/20

ENTRY IN:	Secs	% or Secs: Not a controller entry--for reference only. Controller entry is under

PHASE ALLO- CATION	PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	C1 S1																
	C1 S2																
	C1 S3																
	C1 S4																
	C2 S1																
	C2 S2																
	C2 S3																
	C2 S4																
	C3 S1																
	C3 S2																
	C3 S3																
	C3 S4																
	C4 S1																
	C4 S2																
	C4 S3																
	C4 S4																

OFFSET SEEKING MODE (MM-3-2-7)

Offset Seeking Mode:	0

Mode

- 0 Add only, cycle times 20% slow only to get in sync
- 1 Dwell, cycle timer stops at cycle 0 up to max dwell time to get in step
- 2 Short Route, cycle times 20% fast or slow--whichever gets in step fastest

OPERATING OPTIONS (MM-3-2-9-1)

Enhanced Perm:	Y	Y/N: See note		Invert Free In:	N	Y/N: See note
Central Override:	N	Y/N: See note		Split Matrix:	N	Y/N: See note
No PCL Offset Adjust:	N	Y/N: See note		4 Splits/Cycle:	Y	Y/N: See note
				No Early Coord Ped:	N	Y/N: See note

Yield Percent	0	0-10%: See note	
EGB%	0	0-100%: See note	
RGB%	0	0-100%: See note	
# Cycles to out of step:	0	0-255: 0=Disable	

CYCLE SYNC OPTIONS (MM-3-2-9-2)

Sync Source:	0	0-2, 0=TOD/CL/Interconnect, 1= City Zero, 2= Absolute

Charts below only For City Zero offsets or Absolute (0's). These are not daily reference times for Sync Source Option 0 (see TOD).

Cycle 1:	0
Cycle 4:	0

Cycle 2:	0
Cycle 5:	0

Cycle 3:	0
Cycle 6:	0

MANUAL/AUTO FORCE OFFS & PERMS

SET MANUAL MODE (MM-3-2-9-3-1)

Auto Perm and FO:	Y	Y/N: Y = Perms & Force offs auto-calculated from phase allocations. N = Manually entered
Ped Perm:	0	0-255: 0 = Auto calculated. 1-255 = secs each ped perm, starting with vehicle permissives

DAY PLANS (MM-3-3-1-#)

	HH	MM	CIRCUIT PLAN	C	O	S	CKT	ON/OFF
1	00	00					11(FRE)	ON
	00	00					16(TP4)	ON
2	00	00					11(FRE)	ON
	06	30					14(TP2)	ON
	10	00					14(TP2)	OFF
	14	30					15(TP3)	ON
	18	30					15(TP3)	OFF

WEEK PLANS (MM-3-3-3)

Plan	SUN	MON	TUE	WED	THU	FRI	SAT
1	1	2	2	2	2	2	1
2							
3							
4							
5							

CIRCUIT OVERRIDES (MM-3-3-6)

For each circuit specify TOD (time of day controlled), or manually ON or OFF. Default = TOD

CIRCUIT OVER- RIDES	Circuit	65	66	67	68	69	70	71	72
	Function	LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8
	State								
	Circuit	73	74	75	76	77	78	79	80
	Function	CN1	CN2	CN3	CN4	WRM	MIN	DIM	CVS
	State	ON				ON			
CIRCUIT OVER- RIDES	Circuit	113	114	115	116	117	118	119	120
	Function	UD1	UD2	UD3	UD4	UD5	UD6	UD7	UD8
	State								
	Circuit	121	122	123	124	125	126	127	128
	Function	PH2	DP2	DP3	3CD	EVL	EML	ASC	DCP
	State					ON	ON		

DAYLIGHT SAVINGS (MM-3-3-7)

DAY LIGHT SAVINGS	Spring		Fall	
	(0-12)	(0-5)	(0-12)	(0-5)
	Month	WOM	Month	WOM
	3	2	11	1

Enter Month and Week of Month for Spring Forward and Fall Back days
(typical 4 - 1 and 10 - 5). Unit will adjust at 2AM on Sunday of week specified.
Enter zero (or leave blank) if Daylight Savings not used.

SYNC REFERENCE MODE (MM-3-3-8)

Mode:	0	0 = Time dependent, 1 = C/O/S Event

	HH	MM	
Time Clock Reset:	00	00	TOD clock reset to by TBC input
Interrupter:	N		Y/N; Y = Interrupter pulses provided
Pulses:	0		0-6 = Number of interrupter pulses

TIME DEPENDENT CYCLE REFERENCES		HH	MM		HH	MM		HH	MM		
	CYC 1:	00	00		CYC 2:	00	00		CYC 3:	00	00
	CYC 4:	00	00		CYC 5:	00	00		CYC 6:	00	00

When mode = Time dependent, enter reference times of day for each cycle. Default = 00:00 = midnight = most commonly used reference.

When mode = C/O/S Event, cycle restarts on each COS change. Only use this mode for specific reasons. Time dependent most common used mode.

CLOSED LOOP ID	Master Type:	1	0 = None, 1 = 3000 Series Master, 2 = 3800 EL master
	Intersection ID		0-255
	Master Identification		0-255
	Allow Comm Xfer Between Ports 2 & 3		Y/N: Y = Incoming signal on Master port (2 or 3), gets echo'd on other port

COMM SET-UP (MM-3-5-2)

PG1 PORT ASSIGN	Master (CL) Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used to receive Master Comm)
	Monitor Port		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Monitor Data Upload)
	Central Port:		0 = None, 2 = Port 2, 3 = Port 3 (Port to be used for Direct Dial-up Modem)

PG2 PORT 2 SETUP	Data Rate:	9600	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG3 PORT 3 SETUP	Data Rate:	1200	1200, 2400, 4800, 9600, 14400, 19200
	Parity	0	0 = None, 1 = Odd, 2=Even
	Data bits	1	0 = 7 bits, 1 = 8 bits

PG4	Modem Set-up String:		Up to 40 charaters; A-Z, or # @ = , ! ; % \ &

PHONE NUMBERS (MM-3-5-3)

PHONE NUM- BERS	Tone:		Y/N
	Phone 1:		Number & control characters (W , ; # ' / T P) if used
	Phone 2:		Number & control characters (W , ; # ' / T P) if used

LOG DATA (MM-3-5-5)

PG1 SAMPLE	Volume Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 125 (EVL)
	MOE Log Sample period:	60	0, 6, 10, 15, 20, 30, 60 minutes, Enabled by TOD Ckt. 126 (EML)

Appendix C

Base Year Traffic Operations Reports



Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

Base Year AM Peak Hour

	↖	→	↗	←	↖	↑	↗	↓
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	259	222	11	276	42	291	112	449
v/c Ratio	0.49	0.13	0.02	0.17	0.29	0.52	0.41	0.79
Control Delay	17.9	9.4	11.6	7.8	27.5	27.6	28.1	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	9.4	11.6	7.8	27.5	27.6	28.1	32.6
Queue Length 50th (m)	25.0	7.4	0.8	7.5	5.4	40.3	15.1	56.6
Queue Length 95th (m)	46.5	13.4	3.3	13.8	11.7	51.6	24.6	72.9
Internal Link Dist (m)		518.7		497.4		466.4		267.6
Turn Bay Length (m)	80.0		40.0		35.0		50.0	
Base Capacity (vph)	527	1715	443	1648	171	659	320	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.13	0.02	0.17	0.25	0.44	0.35	0.69
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

Base Year AM Peak Hour

	↖	→	↗	↖	←	↖	↗	↑	↗	↖	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗		↖	↖↗		↖	↖↗		↖	↖↗	
Traffic Volume (vph)	215	154	30	9	156	73	35	227	15	93	151	222
Future Volume (vph)	215	154	30	9	156	73	35	227	15	93	151	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3	3.3	4.0	3.5
Total Lost time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1584	3121		1263	2956		1691	1754		1728	1574	
Flt Permitted	0.58	1.00		0.61	1.00		0.26	1.00		0.47	1.00	
Satd. Flow (perm)	970	3121		815	2956		457	1754		855	1574	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	259	186	36	11	188	88	42	273	18	112	182	267
RTOR Reduction (vph)	0	16	0	0	40	0	0	3	0	0	64	0
Lane Group Flow (vph)	259	206	0	11	236	0	42	288	0	112	385	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	3%	13%	9%	10%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	49.0	49.0		49.0	49.0		28.7	28.7		28.7	28.7	
Effective Green, g (s)	49.0	49.0		49.0	49.0		28.7	28.7		28.7	28.7	
Actuated g/C Ratio	0.54	0.54		0.54	0.54		0.32	0.32		0.32	0.32	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	528	1699		443	1609		145	559		272	501	
v/s Ratio Prot		0.07			0.08			0.16			c0.24	
v/s Ratio Perm	c0.27			0.01			0.09			0.13		
v/c Ratio	0.49	0.12		0.02	0.15		0.29	0.52		0.41	0.77	
Uniform Delay, d1	12.7	10.0		9.5	10.1		23.0	25.0		24.0	27.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.2	0.1		0.1	0.2		1.1	0.8		1.0	7.0	
Delay (s)	16.0	10.1		9.6	10.3		24.1	25.8		25.0	34.6	
Level of Service	B	B		A	B		C	C		C	C	
Approach Delay (s)		13.3			10.3			25.6			32.7	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		21.8								C		
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		90.0								12.3		
Intersection Capacity Utilization		113.6%								H		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
2: Barton Street & Sunnyhurst Avenue

210193 - Block 1 Servicing Strategy
Base Year AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↙	↘
Traffic Volume (veh/h)	9	280	252	6	5	19
Future Volume (Veh/h)	9	280	252	6	5	19
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	11	329	296	7	6	22
Pedestrians					1	
Lane Width (m)					3.3	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	304				652	300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	304				652	300
tC, single (s)	4.1				6.4	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.4
p0 queue free %	99				99	97
cM capacity (veh/h)	1267				432	729
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	340	303	28			
Volume Left	11	0	6			
Volume Right	0	7	22			
cSH	1267	1700	635			
Volume to Capacity	0.01	0.18	0.04			
Queue Length 95th (m)	0.2	0.0	1.0			
Control Delay (s)	0.3	0.0	10.9			
Lane LOS	A		B			
Approach Delay (s)	0.3	0.0	10.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization		32.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
Base Year AM Peak Hour

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	200	13	2	209	18	16	46	8	14	26	14
Future Volume (vph)	23	200	13	2	209	18	16	46	8	14	26	14
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Hourly flow rate (vph)	28	247	16	2	258	22	20	57	10	17	32	17
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	291	282	87	66								
Volume Left (vph)	28	2	20	17								
Volume Right (vph)	16	22	10	17								
Hadj (s)	0.16	0.15	0.00	0.41								
Departure Headway (s)	4.9	4.9	5.4	5.9								
Degree Utilization, x	0.39	0.38	0.13	0.11								
Capacity (veh/h)	705	708	583	544								
Control Delay (s)	11.0	10.8	9.2	9.6								
Approach Delay (s)	11.0	10.8	9.2	9.6								
Approach LOS	B	B	A	A								
Intersection Summary												
Delay			10.6									
Level of Service			B									
Intersection Capacity Utilization		38.7%		ICU Level of Service						A		
Analysis Period (min)		15										

HCM Unsignalized Intersection Capacity Analysis
4: Fruitland Road & Sherwood Park Road

210193 - Block 1 Servicing Strategy
Base Year AM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	W		W	W	W	
Traffic Volume (veh/h)	17	11	19	198	301	21
Future Volume (Veh/h)	17	11	19	198	301	21
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)	18	12	20	213	324	23
Pedestrians	4					
Lane Width (m)	3.8					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	592	340	351			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	592	340	351			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	96	98	98			
cM capacity (veh/h)	433	705	1215			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	30	20	213	347		
Volume Left	18	20	0	0		
Volume Right	12	0	0	23		
cSH	512	1215	1700	1700		
Volume to Capacity	0.06	0.02	0.13	0.20		
Queue Length 95th (m)	1.4	0.4	0.0	0.0		
Control Delay (s)	12.5	8.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.5	0.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			27.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
Base Year AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	134	366	12	14	504	63	22	28	83	248
v/c Ratio	0.22	0.28	0.01	0.02	0.46	0.08	0.28	0.12	0.48	0.60
Control Delay	4.3	4.9	0.3	5.8	8.2	2.2	35.9	58.6	36.7	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	4.9	0.3	5.8	8.2	2.2	35.9	58.6	36.7	6.6
Queue Length 50th (m)	4.4	16.5	0.0	0.8	40.0	0.0	3.5	2.8	13.5	4.6
Queue Length 95th (m)	11.5	34.6	0.3	3.8	79.1	4.5	10.0	9.4	25.4	23.9
Internal Link Dist (m)		245.7			488.7			176.2		531.3
Turn Bay Length (m)	75.0		10.0	65.0		70.0	20.0		25.0	
Base Capacity (vph)	626	1313	1085	610	1103	802	192	573	418	692
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.28	0.01	0.02	0.46	0.08	0.11	0.05	0.20	0.36
Intersection Summary										

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
Base Year AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑	↱	↰	↑	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	121	329	11	13	454	57	20	16	9	75	27	196
Future Volume (vph)	121	329	11	13	454	57	20	16	9	75	27	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.5	3.5	3.3	3.3	4.0	3.3
Total Lost time (s)	3.0	5.8	5.8	5.8	5.8	5.8	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1660	1801	1474	1743	1801	1263	1698	1699		1613	1639	
Flt Permitted	0.39	1.00	1.00	0.54	1.00	1.00	0.32	1.00		0.74	1.00	
Satd. Flow (perm)	681	1801	1474	996	1801	1263	577	1699		1255	1639	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		0.90	0.90	
Adj. Flow (vph)	134	366	12	14	504	63	22	18	10	83	30	218
RTOR Reduction (vph)	0	0	3	0	0	24	0	9	0	0	188	0
Lane Group Flow (vph)	134	366	9	14	504	39	22	19	0	83	60	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	65.6	65.6	65.6	55.1	55.1	55.1	12.4	12.4		12.4	12.4	
Effective Green, g (s)	65.6	65.6	65.6	55.1	55.1	55.1	12.4	12.4		12.4	12.4	
Actuated g/C Ratio	0.73	0.73	0.73	0.61	0.61	0.61	0.14	0.14		0.14	0.14	
Clearance Time (s)	3.0	5.8	5.8	5.8	5.8	5.8	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	578	1314	1075	610	1103	774	79	234		173	226	
v/s Ratio Prot	0.02	c0.20			c0.28			0.01			0.04	
v/s Ratio Perm	0.15		0.01	0.01		0.03	0.04			c0.07		
v/c Ratio	0.23	0.28	0.01	0.02	0.46	0.05	0.28	0.08		0.48	0.27	
Uniform Delay, d1	4.3	4.1	3.3	6.8	9.4	6.9	34.7	33.8		35.8	34.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5	0.0	0.1	1.4	0.1	1.9	0.2		2.1	0.6	
Delay (s)	4.5	4.6	3.3	6.9	10.7	7.1	36.7	33.9		37.9	35.3	
Level of Service	A	A	A	A	B	A	D	C		D	D	
Approach Delay (s)	4.6				10.2			35.1			36.0	
Approach LOS	A				B			D			D	
Intersection Summary												
HCM 2000 Control Delay		14.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.44										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		89.9%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
Base Year AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	398	3	3	451	19	1	0	3	28	0	55
Future Volume (Veh/h)	21	398	3	3	451	19	1	0	3	28	0	55
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	442	3	3	501	21	1	0	3	31	0	61
Pedestrians				3						5		
Lane Width (m)				3.2						4.0		
Walking Speed (m/s)				1.2						1.2		
Percent Blockage				0						0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	527			445			1058	1022	446	1016	1014	516
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	527			445			1058	1022	446	1016	1014	516
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	98			100			99	100	100	85	100	89
cM capacity (veh/h)	1020			1126			177	231	615	204	233	542
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	23	445	3	522	1	3	31	61				
Volume Left	23	0	3	0	1	0	31	0				
Volume Right	0	3	0	21	0	3	0	61				
cSH	1020	1700	1126	1700	177	615	204	542				
Volume to Capacity	0.02	0.26	0.00	0.31	0.01	0.00	0.15	0.11				
Queue Length 95th (m)	0.5	0.0	0.1	0.0	0.1	0.1	3.9	2.8				
Control Delay (s)	8.6	0.0	8.2	0.0	25.4	10.9	25.7	12.5				
Lane LOS	A		A		D	B	D	B				
Approach Delay (s)	0.4		0.0		14.5		16.9					
Approach LOS					B		C					
Intersection Summary												
Average Delay	1.7											
Intersection Capacity Utilization	39.8%			ICU Level of Service			A					
Analysis Period (min)	15											

Queuing and Blocking Report

210193 - Block 1 Servicing Strategy
Base Year AM Peak Hour

Intersection: 3: Jones Road & Barton Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	34.6	35.2	18.5	24.7
Average Queue (m)	18.1	16.2	9.2	11.7
95th Queue (m)	27.5	27.0	16.6	22.1
Link Distance (m)	343.2	363.5	902.9	246.2
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy
Base Year PM Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Group Flow (vph)	317	364	29	366	22	181	85	450
v/c Ratio	0.65	0.20	0.06	0.21	0.13	0.30	0.24	0.77
Control Delay	25.1	11.5	12.9	10.2	20.7	21.4	22.0	32.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	11.5	12.9	10.2	20.7	21.4	22.0	32.8
Queue Length 50th (m)	35.3	14.3	2.2	12.6	2.7	21.9	10.6	62.3
Queue Length 95th (m)	#89.1	27.1	7.8	24.9	7.0	31.9	18.4	82.6
Internal Link Dist (m)		518.7		497.4		466.4		267.6
Turn Bay Length (m)	80.0		40.0		35.0		50.0	
Base Capacity (vph)	490	1786	503	1733	214	774	458	741
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.20	0.06	0.21	0.10	0.23	0.19	0.61

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis 1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy
Base Year PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	301	294	52	28	257	90	21	152	20	81	249	179
Future Volume (vph)	301	294	52	28	257	90	21	152	20	81	249	179
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3	4.0	3.5	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.96		1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3343		1683	3205		1742	1789		1598	1660	
Flt Permitted	0.53	1.00		0.53	1.00		0.27	1.00		0.63	1.00	
Satd. Flow (perm)	922	3343		947	3205		499	1789		1067	1660	
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)	317	309	55	29	271	95	22	160	21	85	262	188
RTOR Reduction (vph)	0	13	0	0	32	0	0	6	0	0	33	0
Lane Group Flow (vph)	317	351	0	29	334	0	22	175	0	85	417	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	47.8	47.8		47.8	47.8		29.9	29.9		29.9	29.9	
Effective Green, g (s)	47.8	47.8		47.8	47.8		29.9	29.9		29.9	29.9	
Actuated g/C Ratio	0.53	0.53		0.53	0.53		0.33	0.33		0.33	0.33	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	489	1775		502	1702		165	594		354	551	
v/s Ratio Prot		0.10			0.10			0.10			c0.25	
v/s Ratio Perm	c0.34			0.03			0.04			0.08		
v/c Ratio	0.65	0.20		0.06	0.20		0.13	0.29		0.24	0.76	
Uniform Delay, d1	15.1	11.1		10.2	11.0		21.0	22.2		21.8	26.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	0.2		0.2	0.3		0.4	0.3		0.4	5.9	
Delay (s)	21.6	11.3		10.4	11.3		21.4	22.5		22.2	32.7	
Level of Service	C	B		B	B		C	C		C	C	
Approach Delay (s)		16.1			11.2			22.4			31.0	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		20.1										
HCM 2000 Volume to Capacity ratio		0.69										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			12.3				
Intersection Capacity Utilization		115.5%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 2: Barton Street & Sunnyside Avenue

210193 - Block 1 Servicing Strategy
Base Year PM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰
Traffic Volume (veh/h)	9	299	364	0	4	21
Future Volume (Veh/h)	9	299	364	0	4	21
Sign Control	Free	Free			Stop	
Grade	0%	0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	11	365	444	0	5	26
Pedestrians		3			1	
Lane Width (m)		3.5			3.3	
Walking Speed (m/s)		1.2			1.2	
Percent Blockage		0			0	
Right turn flare (veh)						
Median type	None	None				
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	445				832	448
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	445				832	448
tC, single (s)	4.3				6.9	6.2
tC, 2 stage (s)						
tF (s)	2.4				4.0	3.3
p0 queue free %	99				98	96
cM capacity (veh/h)	1016				279	603
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	376	444	31			
Volume Left	11	0	5			
Volume Right	0	0	26			
cSH	1016	1700	508			
Volume to Capacity	0.01	0.26	0.06			
Queue Length 95th (m)	0.2	0.0	1.5			
Control Delay (s)	0.4	0.0	12.6			
Lane LOS	A		B			
Approach Delay (s)	0.4	0.0	12.6			
Approach LOS			B			
Intersection Summary						
Average Delay		0.6				
Intersection Capacity Utilization		33.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
Base Year PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	319	19	7	295	16	14	14	6	28	49	48
Future Volume (vph)	19	319	19	7	295	16	14	14	6	28	49	48
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)	23	384	23	8	355	19	17	17	7	34	59	58
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	430	382	41	151								
Volume Left (vph)	23	8	17	34								
Volume Right (vph)	23	19	7	58								
Hadj (s)	0.07	0.05	-0.02	-0.10								
Departure Headway (s)	5.1	5.2	6.3	5.9								
Degree Utilization, x	0.61	0.55	0.07	0.25								
Capacity (veh/h)	679	672	466	535								
Control Delay (s)	15.8	14.2	9.8	10.9								
Approach Delay (s)	15.8	14.2	9.8	10.9								
Approach LOS	C	B	A	B								
Intersection Summary												
Delay				14.2								
Level of Service				B								
Intersection Capacity Utilization				42.3%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
4: Fruitland Road & Sherwood Park Road

210193 - Block 1 Servicing Strategy
Base Year PM Peak Hour

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	11	19	198	301	21
Future Volume (Veh/h)	17	11	19	198	301	21
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)	18	12	20	213	324	23
Pedestrians	4					
Lane Width (m)	3.8					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	592	340	351			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	592	340	351			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	96	98	98			
cM capacity (veh/h)	433	705	1215			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	30	20	213	347		
Volume Left	18	20	0	0		
Volume Right	12	0	0	23		
cSH	512	1215	1700	1700		
Volume to Capacity	0.06	0.02	0.13	0.20		
Queue Length 95th (m)	1.4	0.4	0.0	0.0		
Control Delay (s)	12.5	8.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.5	0.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			27.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Queues

5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy

Base Year PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	134	366	12	14	504	63	22	28	83	248
v/c Ratio	0.22	0.28	0.01	0.02	0.46	0.08	0.28	0.12	0.48	0.60
Control Delay	4.1	5.2	0.2	8.8	12.0	2.3	42.4	24.6	44.4	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.1	5.2	0.2	8.8	12.0	2.3	42.4	24.6	44.4	13.6
Queue Length 50th (m)	4.4	16.5	0.0	0.8	40.0	0.0	3.5	2.8	13.5	4.6
Queue Length 95th (m)	11.5	34.6	0.3	3.8	79.1	4.5	10.0	9.4	25.4	23.9
Internal Link Dist (m)	245.7			488.7			176.2			531.3
Turn Bay Length (m)	75.0		10.0	65.0		70.0	20.0		25.0	
Base Capacity (vph)	626	1313	1085	610	1103	802	192	573	418	692
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.28	0.01	0.02	0.46	0.08	0.11	0.05	0.20	0.36
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy

Base Year PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕		↔	↕	
Traffic Volume (vph)	121	329	11	13	454	57	20	16	9	75	27	196
Future Volume (vph)	121	329	11	13	454	57	20	16	9	75	27	196
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.5	3.5	3.3	3.3	4.0	3.3
Total Lost time (s)	3.0	5.8	5.8	5.8	5.8	5.8	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1660	1801	1474	1743	1801	1263	1698	1699		1613	1639	
Flt Permitted	0.39	1.00	1.00	0.54	1.00	1.00	0.32	1.00		0.74	1.00	
Satd. Flow (perm)	681	1801	1474	996	1801	1263	577	1699		1255	1639	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	134	366	12	14	504	63	22	18	10	83	30	218
RTOR Reduction (vph)	0	0	3	0	0	24	0	9	0	0	188	0
Lane Group Flow (vph)	134	366	9	14	504	39	22	19	0	83	60	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2		2	6		6	4			8		
Actuated Green, G (s)	65.6	65.6	65.6	55.1	55.1	55.1	12.4	12.4		12.4	12.4	
Effective Green, g (s)	65.6	65.6	65.6	55.1	55.1	55.1	12.4	12.4		12.4	12.4	
Actuated g/C Ratio	0.73	0.73	0.73	0.61	0.61	0.61	0.14	0.14		0.14	0.14	
Clearance Time (s)	3.0	5.8	5.8	5.8	5.8	5.8	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	578	1314	1075	610	1103	774	79	234		173	226	
v/s Ratio Prot	0.02	c0.20			c0.28			0.01			0.04	
v/s Ratio Perm	0.15		0.01	0.01		0.03	0.04			c0.07		
v/c Ratio	0.23	0.28	0.01	0.02	0.46	0.05	0.28	0.08		0.48	0.27	
Uniform Delay, d1	4.3	4.1	3.3	6.8	9.4	6.9	34.7	33.8		35.8	34.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.5	0.0	0.1	1.4	0.1	1.9	0.2		2.1	0.6	
Delay (s)	4.5	4.6	3.3	6.9	10.7	7.1	36.7	33.9		37.9	35.3	
Level of Service	A	A	A	A	B	A	D	C		D	D	
Approach Delay (s)	4.6				10.2			35.1			36.0	
Approach LOS	A				B			D			D	
Intersection Summary												
HCM 2000 Control Delay	14.9			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	89.9			Sum of lost time (s)			14.9					
Intersection Capacity Utilization	89.9%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
Base Year PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	398	3	3	451	19	1	0	3	28	0	55
Future Volume (Veh/h)	21	398	3	3	451	19	1	0	3	28	0	55
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	442	3	3	501	21	1	0	3	31	0	61
Pedestrians				3						5		
Lane Width (m)				3.2						4.0		
Walking Speed (m/s)				1.2						1.2		
Percent Blockage				0						0		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	527			445			1058	1022	446	1016	1014	516
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	527			445			1058	1022	446	1016	1014	516
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	98			100			99	100	100	85	100	89
cM capacity (veh/h)	1020			1126			177	231	615	204	233	542
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	23	445	3	522	1	3	31	61				
Volume Left	23	0	3	0	1	0	31	0				
Volume Right	0	3	0	21	0	3	0	61				
cSH	1020	1700	1126	1700	177	615	204	542				
Volume to Capacity	0.02	0.26	0.00	0.31	0.01	0.00	0.15	0.11				
Queue Length 95th (m)	0.5	0.0	0.1	0.0	0.1	0.1	3.9	2.8				
Control Delay (s)	8.6	0.0	8.2	0.0	25.4	10.9	25.7	12.5				
Lane LOS	A	A		D		B	D	B				
Approach Delay (s)	0.4	0.0		14.5		16.9						
Approach LOS				B			C					
Intersection Summary												
Average Delay				1.7								
Intersection Capacity Utilization				39.8%	ICU Level of Service			A				
Analysis Period (min)				15								

Queuing and Blocking Report

210193 - Block 1 Servicing Strategy
Base Year PM Peak Hour

Intersection: 3: Jones Road & Barton Street

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	40.1	35.2	15.0	25.9
Average Queue (m)	20.8	17.8	5.6	11.7
95th Queue (m)	31.4	27.9	14.2	18.8
Link Distance (m)	343.2	363.5	902.9	246.2
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Appendix D

Block 1 Population Summary Spreadsheet



Residential POPULATION SUMMARY-Block 1 Maximum Density						
Area ID	Area Classification	Area (ha)	City Max Density		Population 3 ppu	
			Units/ha	Total Units	(ppl/ha)	Total Population
Barton Street East						
B1	Arterial Commercial	1.6	n/a		0	0
B2	Medium Density Residential 2	1.01	75	76	225	227
B3	Medium Density Residential 2	4.46	75	335	225	1004
Subtotal		7.07		411		1231
Fruitland Road						
F1	Low Density Residential 3	0.4	60	24	180	72
F2	Low Density Residential 3	1.6	60	96	180	288
F3	Low Density Residential 3	1.5	60	90	180	270
F4	Institutional	0.21	n/a		0	0
Subtotal		3.71		210		630
Jones Road						
J1	Medium Density Residential 2	0.89	75	67	225	200
J2	Park	0.05	n/a		0	0
J3	Medium Density Residential 2	1.43	75	107	225	322
J4	Medium Density Residential 2	1.59	75	119	225	358
J5	Commercial	2.19	n/a		0	0
Subtotal		6.15		294		880
North West Quadrant						
NW1	Low Density Residential 2	4.8	40	192	120	576
NW2	Low Density Residential 3	0.6	60	36	180	108
NW3	Low Density Residential 3	1.70	60	102	180	306
NW4	Medium Density Residential 2	3.37	75	253	225	758
Subtotal		10.47		583		1748
North East Quadrant						
NE1	Park	7.18	n/a		0	0
NE2	Medium Density Residential 2	2.04	75	153	225	459
NE3	Institutional	2.16	n/a		0	0
Subtotal		11.38		153		459
South West Quadrant						
SW1	Low Density Residential 3	0.98	60	59	180	176
SW2	Medium Density Residential 2	4.81	40	192	120	577
SW3	Low Density Residential 2	2.6	40	104	120	312
SW4	Park	2.5	n/a		0	0
SW5	Low Density Residential 3	3.84	60	230	180	691
SW6	Low Density Residential 2	2.44	40	98	120	293
SW7	Medium Density Residential 2	3.53	75	265	225	794
SW8	Commercial	0.76	n/a		0	0
SW9	Commercial	0.35	n/a		0	0
SW10	Low Density Residential 3	0.46	60	28	180	83
Subtotal		22.27		976		2926
South East Quadrant						
SE1	Medium Density Residential 2	2.50	75	188	225	563
SE2	Low Density Residential 3	2.08	60	125	180	374
SE3	Low Density Residential 2	2.89	40	116	120	347
SE4	Park (Cemetery)	5.09	n/a		0	0
SE5	Commercial	2.14	n/a		0	0
SE6	Institutional	1.80	n/a		0	0
SE7	Low Density Residential 3	0.63	60	38	180	113
Subtotal		17.13		466		1397
Total		78.18		3093		9271
Notes: 1 Non-residential populations have been omitted from this population summary. 2 60 Denotes City max density per Appendix B-Secondary Plan Residential Density Chart. 3 3.0 Denotes Urbantech ppu assumed. This is a conservative figure and representative of all built forms. 4 In Comparison to 6-14-21 Population Summary this analysis adds 927 to the Resi population. 5 Latest Update 10/10/23						
Sensitivity Analysis						
If ppu is 2.5 population is			7,733			
If ppu is 3.5 population is			10,826			

Appendix E

2016 TTS Queries and Outputs



AM Inbound

Mon Oct 23 2023 11:01:33 GMT-0400 (Eastern Daylight Time) - Run Time: 3087ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: Planning district of origin - pd_orig

Filters:
(2006 GTA zone of destination - gta06_dest in 5077,5071,5061,5076,5090,5096
and
Start time of trip - start_time in 599-900)

Trip 2016

ROW: gta06_dest

COLUMN: pd_orig

gta06_dest	pd_orig	total	Jurisdiction	Study Direc	Percent
5061	6	21	Toronto	North	0.51%
5061	38	11	Milton	North	0.27%
5061	40	30	Burlington	North	0.73%
5061	44	44	Glanbrook	West	1.07%
5061	45	546	Stoney Creek	Internal	13.31%
5061	46	179	Hamilton	West	4.36%
5061	51	97	Grimsby	North	2.36%
5061	52	16	Lincoln	East	0.39%
5061	55	19	St. Catharines	North	0.46%
5061	65	24	Cambridge	West	0.59%
5061	72	28	Guelph/Eramosa	North	0.68%
5071	45	115	Stoney Creek	Internal	2.80%
5071	46	12	Hamilton	West	0.29%
5076	39	37	Oakville	North	0.90%
5076	44	14	Glanbrook	West	0.34%
5076	45	548	Stoney Creek	Internal	13.36%
5076	46	51	Hamilton	West	1.24%
5077	40	34	Burlington	North	0.83%
5077	41	127	Flamborough	West	3.10%
5077	45	311	Stoney Creek	Internal	7.58%
5077	46	96	Hamilton	West	2.34%
5077	51	59	Grimsby	North	1.44%
5077	52	13	Lincoln	East	0.32%
5077	62	15	Wainfleet	North	0.37%
5090	39	13	Oakville	North	0.32%
5090	40	16	Burlington	North	0.39%
5090	45	757	Stoney Creek	Internal	18.65%
5090	46	521	Hamilton	West	12.70%
5090	51	118	Grimsby	North	2.88%
5090	58	67	Welland	East	1.63%
5096	40	26	Burlington	North	0.63%
5096	41	30	Flamborough	West	0.73%
5096	45	90	Stoney Creek	Internal	2.19%
5096	46	17	Hamilton	West	0.41%

PM Inbound

Mon Oct 23 2023 11:02:20 GMT-0400 (Eastern Daylight Time) - Run Time: 2243ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: Planning district of origin - pd_orig

Filters:
(2006 GTA zone of destination - gta06_dest in 5077,5071,5061,5076,5090,5096
and
Start time of trip - start_time in 1599-1900)

Trip 2016

ROW: gta06_dest

COLUMN: pd_orig

gta06_dest	pd_orig	total	Jurisdiction	Study Direc	Percent
5061	1	24	Toronto	North	0.17%
5061	8	25	Toronto	North	0.38%
5061	36	25	Mississauga	North	0.38%
5061	40	58	Burlington	North	0.89%
5061	43	55	Ancaster	West	0.85%
5061	44	47	Glanbrook	West	0.72%
5061	45	524	Stoney Creek	Internal	8.06%
5061	46	448	Hamilton	West	6.89%
5061	51	145	Grimsby	North	2.23%
5061	52	46	Lincoln	East	0.71%
5061	55	55	St. Catharines	North	0.85%
5061	70	14	City of Guelph	North	0.22%
5071	1	36	Toronto	North	0.55%
5071	7	33	Toronto	North	0.51%
5071	10	18	Toronto	North	0.28%
5071	33	115	Vaughan	North	1.77%
5071	36	68	Mississauga	North	1.05%
5071	40	57	Burlington	North	0.88%
5071	45	206	Stoney Creek	Internal	3.17%
5071	46	414	Hamilton	West	6.37%
5071	51	37	Grimsby	North	0.57%
5071	55	32	St. Catharines	North	0.49%
5071	65	18	Cambridge	West	0.28%
5071	124	40	Brant County	West	0.62%
5071	998	49	External	East	0.75%
5076	38	35	Milton	North	0.54%
5076	40	176	Burlington	North	2.71%
5076	43	37	Ancaster	West	0.57%
5076	45	217	Stoney Creek	Internal	3.34%
5076	46	258	Hamilton	West	3.97%
5076	51	38	Grimsby	North	0.58%
5076	55	23	St. Catharines	North	0.35%
5076	65	26	Cambridge	West	0.40%
5076	125	18	Haldimand and Norfolk	West	0.28%
5077	3	26	Vaughan	North	0.40%
5077	40	26	Burlington	North	0.40%
5077	45	155	Stoney Creek	Internal	2.38%
5077	46	154	Hamilton	West	2.37%
5090	24	63	Clarington	North	0.97%
5090	39	105	Oakville	North	1.62%
5090	40	145	Burlington	North	2.23%
5090	44	118	Glanbrook	West	1.82%
5090	45	770	Stoney Creek	Internal	11.85%
5090	46	185	Hamilton	West	2.85%
5090	51	78	Grimsby	North	1.20%
5090	52	68	Lincoln	East	1.05%
5096	33	50	Vaughan	North	0.77%
5096	36	42	Mississauga	North	0.65%
5096	39	50	Oakville	North	0.77%
5096	40	131	Burlington	North	2.02%
5096	42	41	Dundas	North	0.63%
5096	43	26	Ancaster	West	0.40%
5096	45	486	Stoney Creek	Internal	7.48%
5096	46	235	Hamilton	West	3.62%
5096	51	43	Grimsby	North	0.66%
5096	55	33	St. Catharines	North	0.51%
5096	122	31	Perth County	West	0.48%
5096	998	22	External	East	0.34%

6500

AM Outbound

Mon Oct 23 2023 11:03:46 GMT-0400 (Eastern Daylight Time) - Run Time: 2895ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: Planning district of destination - pd_dest

Filters:
(2006 GTA zone of origin - gta06_orig in 5077,5071,5061,5076,5090,5096
and
Start time of trip - start_time in 599-900)

Trip 2016

ROW: gta06_orig

COLUMN: pd_dest

gta06_orig	pd_dest	total	Jurisdiction	Study Direc	Percent
5061	1	17	Toronto	North	0.24%
5061	8	25	Toronto	North	0.36%
5061	36	25	Mississauga	North	0.36%
5061	39	58	Oakville	North	0.82%
5061	40	128	Burlington	North	1.82%
5061	43	55	Ancaster	West	0.78%
5061	45	1011	Stoney Creek	Internal	14.38%
5061	46	331	Hamilton	West	4.71%
5061	51	67	Grimsby	North	0.95%
5061	52	46	Lincoln	East	0.65%
5061	55	55	St. Catharines	North	0.78%
5061	70	14	City of Guelph	North	0.20%
5071	1	36	Toronto	North	0.51%
5071	7	33	Toronto	North	0.47%
5071	10	35	Toronto	North	0.50%
5071	36	106	Mississauga	North	1.51%
5071	40	57	Burlington	North	0.81%
5071	45	572	Stoney Creek	Internal	8.13%
5071	46	308	Hamilton	West	4.38%
5071	55	32	St. Catharines	North	0.46%
5071	65	18	Cambridge	West	0.26%
5071	998	49	External	East	0.70%
5076	38	35	Milton	North	0.50%
5076	39	24	Oakville	North	0.34%
5076	40	151	Burlington	North	2.15%
5076	43	37	Ancaster	West	0.53%
5076	44	14	Glanbrook	West	0.20%
5076	45	586	Stoney Creek	Internal	8.33%
5076	46	160	Hamilton	West	2.28%
5076	51	38	Grimsby	North	0.54%
5076	61	24	West Lincoln	East	0.34%
5076	125	18	Haldimand and Norfolk	West	0.26%
5076	147	20	Brantford	West	0.28%
5076	998	19	External	East	0.27%
5077	13	26	Vaughan	North	0.37%
5077	40	26	Burlington	North	0.37%
5077	43	32	Ancaster	West	0.46%
5077	44	26	Glanbrook	West	0.37%
5077	45	95	Stoney Creek	Internal	1.35%
5077	46	38	Hamilton	West	0.54%
5090	22	15	Whitby	North	0.21%
5090	24	63	Clarington	North	0.90%
5090	39	95	Oakville	North	1.35%
5090	40	209	Burlington	North	2.97%
5090	44	44	Glanbrook	West	0.63%
5090	45	412	Stoney Creek	Internal	5.86%
5090	46	297	Hamilton	West	4.22%
5096	1	14	Toronto	North	0.20%
5096	9	42	Toronto	North	0.60%
5096	36	42	Mississauga	North	0.60%
5096	40	120	Burlington	North	1.71%
5096	42	41	Dundas	North	0.58%
5096	45	646	Stoney Creek	Internal	9.19%
5096	46	299	Hamilton	West	4.25%
5096	51	138	Grimsby	North	1.96%
5096	55	33	St. Catharines	North	0.47%
5096	57	36	Niagara Falls	North	0.51%
5096	61	17	West Lincoln	East	0.24%
5096	998	22	External	East	0.31%

7032

PM Outbound

Mon Oct 23 2023 11:03:27 GMT-0400 (Eastern Daylight Time) - Run Time: 2630ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: Planning district of destination - pd_dest

Filters:
(2006 GTA zone of origin - gta06_orig in 5077,5071,5061,5076,5090,5096
and
Start time of trip - start_time in 1599-1900)

Trip 2016

ROW: gta06_orig

COLUMN: pd_dest

gta06_orig	pd_dest	total	Jurisdiction	Study Direc	Percent
5061	6	21	Toronto	North	0.64%
5061	38	11	Milton	North	0.34%
5061	40	30	Burlington	North	0.92%
5061	45	442	Stoney Creek	Internal	13.55%
5061	46	232	Hamilton	West	7.11%
5061	51	128	Grimsby	North	3.92%
5061	52	16	Lincoln	East	0.49%
5061	61	45	West Lincoln	East	1.38%
5061	70	28	City of Guelph	North	0.86%
5071	36	18	Mississauga	North	0.55%
5071	39	17	Oakville	North	0.52%
5071	40	42	Burlington	North	1.29%
5071	45	119	Stoney Creek	Internal	3.65%
5071	46	95	Hamilton	West	2.91%
5071	51	115	Grimsby	North	3.52%
5076	39	18	Oakville	North	0.55%
5076	40	23	Burlington	North	0.70%
5076	45	191	Stoney Creek	Internal	5.85%
5076	46	156	Hamilton	West	4.78%
5077	39	14	Oakville	North	0.43%
5077	45	264	Stoney Creek	Internal	8.09%
5077	46	73	Hamilton	West	2.24%
5077	51	23	Grimsby	North	0.70%
5077	64	13	Kitchener	North	0.40%
5090	44	74	Glanbrook	West	2.27%
5090	45	377	Stoney Creek	Internal	11.55%
5090	46	137	Hamilton	West	4.20%
5090	51	97	Grimsby	North	2.97%
5090	52	28	Lincoln	East	0.86%
5090	58	40	Welland	East	1.23%
5090	61	36	West Lincoln	East	1.10%
5096	40	14	Burlington	North	0.43%
5096	45	147	Stoney Creek	Internal	4.51%
5096	46	121	Hamilton	West	3.71%
5096	52	58	Lincoln	East	1.78%

3263

	AM In	AM Out	PM In	PM Out
North	12.77%	26.11%	28.42%	18.76%
East	2.34%	2.52%	2.85%	6.83%
South	0.02%	0.00%	0.00%	0.00%
West	27.18%	24.13%	32.46%	27.21%
Total	42.30%	52.76%	63.72%	52.80%
Internal	57.70%	47.24%	36.28%	47.20%
	100%	100%	100%	100%

PD	District
1	Toronto
2	Toronto
3	Toronto
4	Toronto
5	Toronto
6	Toronto
7	Toronto
8	Toronto
9	Toronto
10	Toronto
11	Toronto
12	Toronto
13	Toronto
14	Toronto
15	Toronto
16	Toronto
17	Brack
18	Unbridge
19	Scugog
20	Pickering
21	Ajax
22	Whitby
23	Oshawa
24	Clarington
25	Georgina
26	East Gwillibury
27	Newmarket
28	Aurora
29	Richmond Hill
30	Whitchurch-Stouffville
31	Markham
32	King
33	Vaughan
34	Caledon
35	Brampton
36	Mississauga
37	Hallam Hills
38	Milton
39	Oakville
40	Burlington
41	Flamborough
42	Dundas
43	Ancaster
44	Glenbrook
45	Scouey Creek
46	Hamilton
47	Unassigned
48	Unassigned
49	Unassigned
50	Unassigned
51	Grimsey
52	Lincoln
53	Pelham
54	NOTL
55	St. Catharines
56	Thorold
57	Piara Falls
58	Welland
59	Port Colborne
60	Fort Erie
61	West Lincoln
62	Wainfleet
63	Waterloo
64	Kitchener
65	Cambridge
66	North Dumfries
67	Wilmet
68	Wellseley
69	Woolwich
70	City of Guelph
71	Puslinch
72	Guelph/Eramosa
73	Centre Wellington
74	Elso
75	Nichol
76	Fergus
77	West Garafaxa
78	Eramosa
79	Erie
80	Orangeville
81	Barrie
82	Insifili
83	Bradford-West Gwillibury
84	Tecumseh
85	Adala-Toronto
86	Esca
87	Clearview
88	Springwaters
89	Kawatha Lakes
90	OPS
91	Manners
92	Mariposa
93	Elton
94	Carden
95	Dalton
96	L-D-1
97	Somersville
98	Bexley
99	Fenelon
100	Varadero
101	Bobacene
102	Emly
103	Peterborough
104	East Lakeshore-North Monaghan
105	North Monaghan
106	Otonabee
107	Otonabee
108	Asphodel-Norwood
109	Drummer-Douro
110	Douro
111	Lakefield-South-Ennismore
112	Ennismore
113	Northumberland County
114	Rest of Peterborough County
115	Hastings County
116	Haliburton County
117	Muskoka District
118	Rest of Simcoe
119	Dufferin County
120	Grey County
121	Wellington County
122	Peart County
123	Oxford County
124	Brant County
125	Halldand and Norfolk County
126	Unassigned
127	Collingwood
128	Wasaga Beach
129	Tiny
130	Penetangulishene
131	Midland
132	Tay
133	Oro-Medonte
134	Simcoe
135	Ramens
136	Orilla
137	Unassigned
138	Unassigned
139	Unassigned
140	Mulmur
141	Shelburne
142	Amaranth
143	Melanchar
144	Mono
145	East Luther Grand Valley
146	East Garfara
147	Brantford
888	No Usual Place of Work or School
997	External Undefined
988	External
999	Unknow

AM Inbound

Mon Oct 23 2023 12:11:27 GMT-0400 (Eastern Daylight Time) - Run Time: 2727ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
(2006 GTA zone of destination - gta06_dest In 5077,5061,5071,5076,5090,5096
and
Start time of trip - start_time In 599-900
and
Planning district of origin - pd_orig In 45.)

Trip 2016				
ROW : gta06_dest				
COLUMN : gta06_orig				
gta06_dest gta06_orig total				
	Study Dire%	Weighting	From TTS (I	57.70%
5061 5061 175	East	7.40%	4.27%	
5061 5076 14	West	0.59%	0.34%	
5061 5077 27	South	1.14%	0.66%	
5061 5080 33	West	1.39%	0.80%	
5061 5096 39	West	1.65%	0.95%	
5061 5100 64	East	2.70%	1.56%	
5061 5238 195	North	8.24%	4.76%	
5071 5076 115	West	4.86%	2.80%	
5076 5053 16	West	0.68%	0.39%	
5076 5061 14	East	0.59%	0.34%	
5076 5071 239	South	10.19%	5.83%	
5076 5076 130	West	5.49%	3.17%	
5076 5081 16	West	0.68%	0.39%	
5076 5086 48	West	2.03%	1.17%	
5076 5090 68	West	2.87%	1.66%	
5076 5100 18	East	0.76%	0.44%	
5077 5032 90	West	3.80%	2.19%	
5077 5041 95	West	4.02%	2.32%	
5077 5106 60	West	2.54%	1.46%	
5077 5238 65	North	2.75%	1.59%	
5090 5030 128	East	5.41%	3.12%	
5090 5061 31	East	1.31%	0.76%	
5090 5071 37	South	1.56%	0.90%	
5090 5076 32	West	1.35%	0.78%	
5090 5086 17	West	0.72%	0.41%	
5090 5088 63	East	2.66%	1.54%	
5090 5090 39	West	1.65%	0.95%	
5090 5093 55	West	2.32%	1.34%	
5090 5096 43	West	1.82%	1.05%	
5090 5100 92	East	3.89%	2.24%	
5090 5106 94	West	3.97%	2.29%	
5090 5113 46	West	1.94%	1.12%	
5090 5119 27	West	1.14%	0.66%	
5090 5237 33	West	1.39%	0.80%	
5090 5238 18	North	0.76%	0.44%	
5096 5061 39	East	1.65%	0.95%	
5096 5071 17	South	0.72%	0.41%	
5096 5093 18	West	0.76%	0.44%	
5096 5106 16	West	0.68%	0.39%	
2366				

PM Inbound

Mon Oct 23 2023 12:12:06 GMT-0400 (Eastern Daylight Time) - Run Time: 2714ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of origin - gta06_orig

Filters:
(2006 GTA zone of destination - gta06_dest In 5077,5061,5071,5076,5090,5096
and
Start time of trip - start_time In 1599-1900
and
Planning district of origin - pd_orig In 45.)

Trip 2016				
ROW : gta06_dest				
COLUMN : gta06_orig				
gta06_dest gta06_orig total				
	Study Dire%	Weighting	From TTS (PD)	36.28%
5061 5071 58	South	2.46%	0.89%	
5061 5086 37	West	1.57%	0.57%	
5061 5093 167	West	7.09%	2.57%	
5061 5096 35	West	1.49%	0.54%	
5061 5106 43	West	1.83%	0.66%	
5061 5108 47	North	2.09%	0.72%	
5061 5119 64	West	2.72%	0.99%	
5061 5136 55	West	2.34%	0.85%	
5061 5238 19	North	0.81%	0.29%	
5071 5026 18	West	0.76%	0.28%	
5071 5079 21	West	0.89%	0.32%	
5071 5096 17	West	0.72%	0.26%	
5071 5106 58	West	2.46%	0.89%	
5071 5119 75	West	3.18%	1.16%	
5071 5128 16	West	0.68%	0.25%	
5076 5080 15	West	0.64%	0.23%	
5076 5081 31	West	1.32%	0.48%	
5076 5099 27	West	1.15%	0.42%	
5076 5100 42	East	1.78%	0.65%	
5076 5108 46	North	1.95%	0.71%	
5076 5113 23	West	0.98%	0.35%	
5076 5238 31	North	1.32%	0.48%	
5077 5061 34	East	1.44%	0.52%	
5077 5081 9	West	0.38%	0.14%	
5077 5090 25	West	1.06%	0.39%	
5077 5093 19	West	0.81%	0.29%	
5077 5099 41	West	1.74%	0.63%	
5077 5113 27	West	1.15%	0.42%	
5090 5026 75	West	3.18%	1.16%	
5090 5071 28	North	1.19%	0.43%	
5090 5076 68	West	2.89%	1.05%	
5090 5077 52	South	2.21%	0.80%	
5090 5090 24	West	1.02%	0.37%	
5090 5093 72	West	3.06%	1.11%	
5090 5106 68	West	2.89%	1.05%	
5090 5108 59	North	2.51%	0.91%	
5090 5113 283	West	12.02%	4.36%	
5090 5136 41	West	1.74%	0.63%	
5096 5061 39	East	1.66%	0.60%	
5096 5088 51	East	2.17%	0.79%	
5096 5090 24	West	1.02%	0.37%	
5096 5096 43	West	1.83%	0.66%	
5096 5099 51	West	2.17%	0.79%	
5096 5100 96	East	4.03%	1.46%	
5096 5106 24	West	1.02%	0.37%	
5096 5108 57	North	2.42%	0.88%	
5096 5136 101	West	4.29%	1.56%	
2355				

AM Outbound

Mon Oct 23 2023 12:10:26 GMT-0400 (Eastern Daylight Time) - Run Time: 2933ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
(2006 GTA zone of origin - gta06_orig In 5077,5061,5071,5076,5090,5096
and
Start time of trip - start_time In 599-900
and
Planning district of destination - pd_dest In 45.)

Trip 2016				
ROW : gta06_orig				
COLUMN : gta06_dest				
gta06_orig gta06_dest total				
	Study Dire%	Weighting	From TTS (I	47.24%
5061 5061 175	East	5.27%	2.49%	
5061 5076 14	West	0.42%	0.20%	
5061 5088 168	East	5.06%	2.39%	
5061 5090 31	West	0.93%	0.44%	
5061 5093 324	West	9.76%	4.61%	
5061 5096 39	West	1.18%	0.56%	
5061 5100 16	East	0.48%	0.23%	
5061 5106 96	West	2.89%	1.37%	
5061 5108 94	North	2.83%	1.34%	
5061 5136 55	West	1.66%	0.78%	
5071 5026 18	West	0.54%	0.26%	
5071 5076 239	West	7.20%	3.40%	
5071 5079 21	West	0.63%	0.30%	
5071 5081 16	West	0.48%	0.23%	
5071 5090 37	West	1.11%	0.53%	
5071 5093 144	West	4.34%	2.05%	
5071 5096 17	West	0.51%	0.24%	
5071 5099 14	West	0.42%	0.20%	
5071 5108 21	North	0.63%	0.30%	
5071 5119 44	West	1.33%	0.63%	
5076 5061 14	East	0.42%	0.20%	
5076 5071 115	South	3.46%	1.64%	
5076 5076 130	West	3.92%	1.85%	
5076 5081 93	West	2.80%	1.32%	
5076 5086 48	West	1.45%	0.68%	
5076 5090 32	West	0.96%	0.46%	
5076 5093 72	West	2.17%	1.02%	
5076 5108 46	North	1.39%	0.65%	
5076 5113 35	West	1.05%	0.50%	
5077 5061 27	East	0.81%	0.38%	
5077 5093 27	West	0.81%	0.38%	
5077 5099 41	West	1.24%	0.58%	
5090 5026 75	West	2.26%	1.07%	
5090 5076 68	West	2.05%	0.97%	
5090 5088 44	East	1.33%	0.63%	
5090 5090 39	West	1.18%	0.56%	
5090 5093 47	West	1.42%	0.67%	
5090 5100 43	East	1.30%	0.61%	
5090 5119 95	West	2.88%	1.35%	
5096 5061 39	East	1.18%	0.56%	
5096 5081 20	West	0.60%	0.28%	
5096 5088 51	East	1.54%	0.73%	
5096 5090 43	West	1.30%	0.61%	
5096 5093 151	West	4.55%	2.15%	
5096 5100 95	East	2.86%	1.35%	
5096 5108 139	North	4.19%	1.98%	
5096 5113 32	West	0.96%	0.46%	
5096 5128 24	West	0.72%	0.34%	
5096 5136 51	West	1.54%	0.73%	
3319				

PM Outbound

Mon Oct 23 2023 12:08:10 GMT-0400 (Eastern Daylight Time) - Run Time: 2480ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
Column: 2006 GTA zone of destination - gta06_dest

Filters:
(2006 GTA zone of origin - gta06_orig In 5077,5061,5071,5076,5090,5096
and
Start time of trip - start_time In 1599-1900
and
Planning district of destination - pd_dest In 45.)

Trip 2016				
ROW : gta06_orig				
COLUMN : gta06_dest				
gta06_orig gta06_dest total				
	Study Dire%	Weighting	From TTS (PD)	47.20%
5061 5077 34	South	2.21%	1.04%	
5061 5079 34	West	2.21%	1.04%	
5061 5086 73	West	4.74%	2.24%	
5061 5093 80	West	5.19%	2.45%	
5061 5096 39	West	2.53%	1.20%	
5061 5099 42	West	2.73%	1.29%	
5061 5100 17	East	1.10%	0.52%	
5061 5238 124	North	8.05%	3.80%	
5071 5061 58	East	3.77%	1.78%	
5071 5090 28	West	1.82%	0.86%	
5071 5106 32	West	2.08%	0.98%	
5076 5086 61	West	3.96%	1.87%	
5076 5090 68	West	4.42%	2.08%	
5076 5238 63	North	4.09%	1.93%	
5077 5041 95	West	6.17%	2.91%	
5077 5086 26	West	1.69%	0.80%	
5077 5090 52	West	3.38%	1.59%	
5077 5093 19	West	1.23%	0.58%	
5077 5100 11	East	0.71%	0.34%	
5077 5106 60	West	3.90%	1.84%	
5090 5077 25	South	1.62%	0.77%	
5090 5088 63	East	4.09%	1.93%	
5090 5090 24	West	1.56%	0.74%	
5090 5096 24	West	1.56%	0.74%	
5090 5099 18	West	1.17%	0.55%	
5090 5106 68	West	4.42%	2.08%	
5090 5108 20	North	1.30%	0.61%	
5090 5237 98	West	6.36%	3.00%	
5090 5238 38	North	2.47%	1.16%	
5096 5061 35	East	2.27%	1.07%	
5096 5071 17	South	1.10%	0.52%	
5096 5096 43	West	2.79%	1.32%	
5096 5099 51	West	3.31%	1.56%	
1540				

TTS Results

Into/Out of Stoney	AM	AM	PM	PM
	In	Out	In	Out
North	12.77%	26.11%	28.42%	18.76%
East	2.34%	2.52%	2.85%	6.83%
South	0.00%	0.00%	0.00%	0.00%
West	27.18%	24.13%	32.46%	27.21%
Total	42.30%	52.76%	63.72%	52.80%

Within Stoney	AM	AM	PM	PM
	In	Out	In	Out
North	6.78%	4.27%	3.99%	7.51%
East	15.22%	9.56%	4.02%	5.64%
South	7.80%	1.64%	2.13%	2.33%
West	27.90%	31.77%	26.14%	31.72%
Total	57.70%	47.24%	36.28%	47.20%

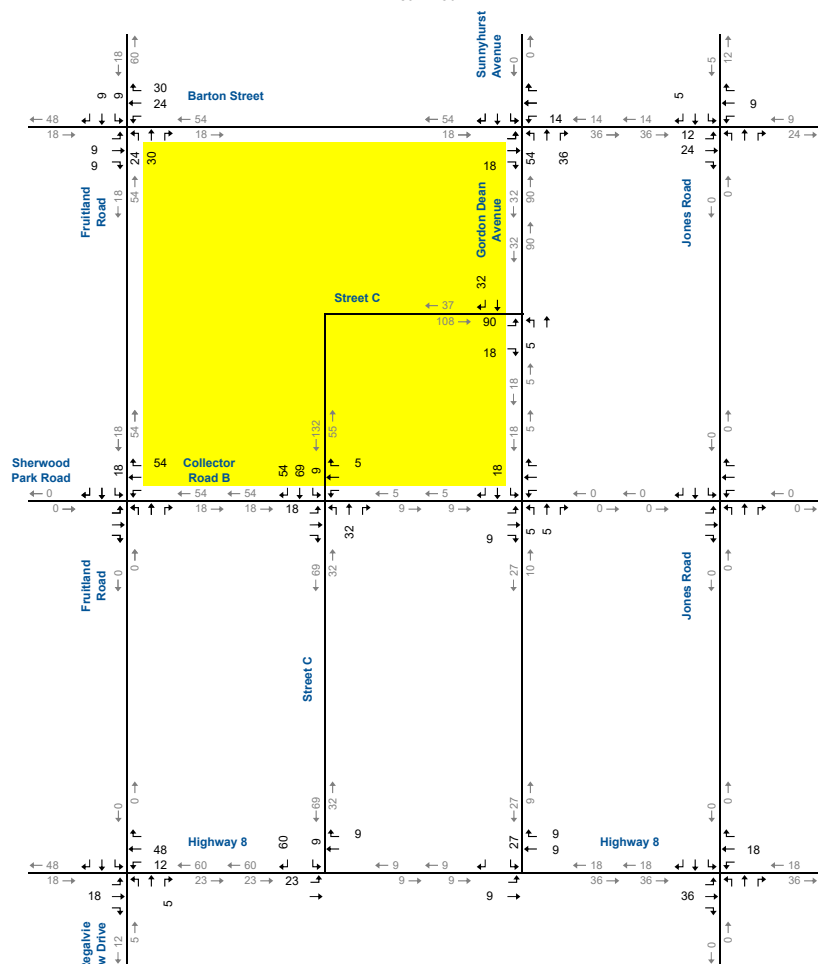
All TTS Zones	AM	AM	PM	PM
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	100%	100%	100%	100%

Appendix F

Block 1 Site Traffic Components



AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	24	30	0	9	9	0	0	9	9	0	24	30
900	2	54	0	36	0	0	0	0	0	18	14	0	0
900	3	0	0	0	0	0	5	12	24	0	0	9	0
900	4	0	0	0	18	0	0	0	0	0	0	0	54
900	5	0	0	5	0	0	0	0	18	0	12	48	0
900	6	0	0	0	0	0	0	0	36	0	0	18	0
900	7	5	5	0	0	18	0	0	0	9	0	0	0
900	8	0	0	0	0	0	0	0	0	0	0	0	0
900	9				27			0	9			9	9
900	10	5	0			0	32	90		18			
900	11	0	32	0	9	69	54	18	0	0	0	0	5
900	12				9		60	23	0				9

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Highway 8 and Street C

Site Statistics

B1	Commercial	1.6	ha	172223	SF	25%	Coverage
B2	Medium Density Reside	76	units				
F1	Low Density Residential	24	units				
F2	Low Density Residential	96	units				
NW1	Low Density Residential	192	units				
NW2	Low Density Residential	36	units				
NW3	Low Density Residential	102	units				
NW4	Medium Density Reside	253	units				

Trip Generation

Land Use	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	450	39	123	162	135	79	214
221: M	329	31	102	133	79	50	129
820: S	43055.75	22	14	36	70	76	146
Total Net Trips		92	239	331	284	205	489

AM Peak Hour PM Peak Hour

In Out In Out

24% 76% 63% 37%

23% 77% 61% 39%

62% 38% 48% 52%

equations used due to variables within data range

equations used due to variables within data range

used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
	via Barton Street	20%	20%	25%	15%
West	via Highway 8	20%	20%	15%	25%

Trip Assignment Peak Hour		
	In	Out
North	via Fr 18	59.8
	via Jd 5	12
South	via R 5	12
	via B 9	23.9
East	via H 18	35.9
	via B 18	47.8
West	via H 18	47.8
	via B 18	47.8
Total	92	239

B/H/C F/G

50% 50% split between Barton St and Fruitland Rd

50% 50% split between Gordon Dean Ave and Street C

50% 50% split between Barton St and Fruitland Rd

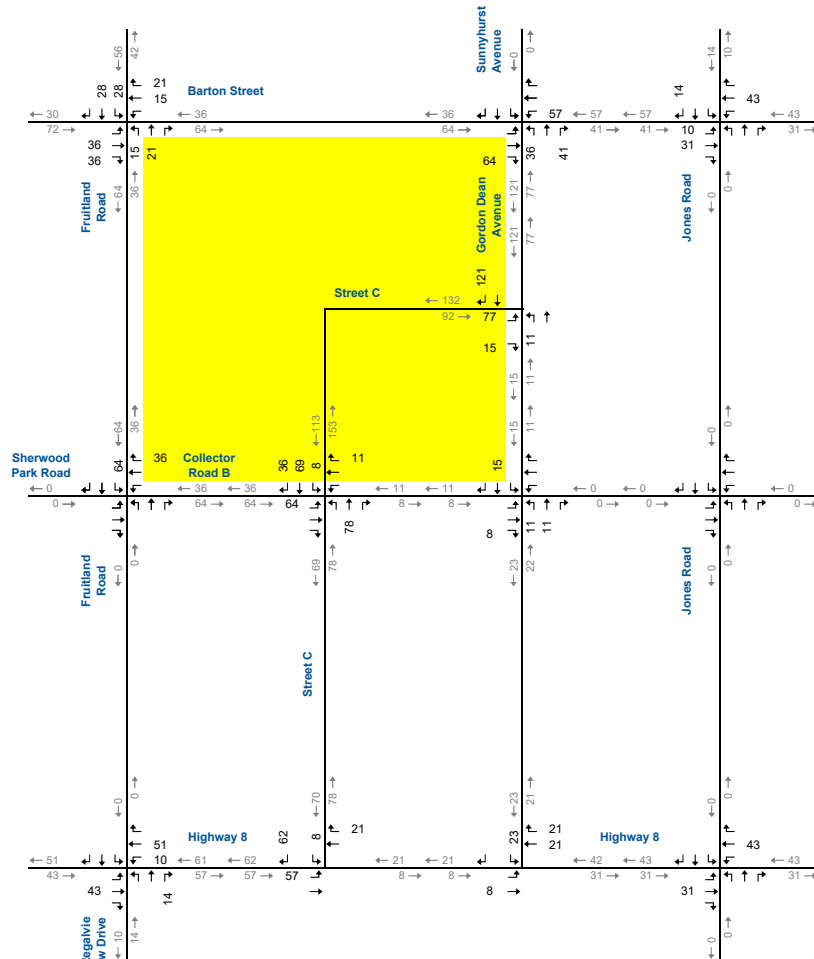
All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		####	####	###	100%

Check In Out

Intern 92 240

Exterr 91 240

PM Peak Hour



TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	15	21	0	28	28	0	0	36	36	0	15	21
1700	2	36	0	41	0	0	0	0	0	64	57	0	0
1700	3	0	0	0	0	0	14	10	31	0	0	43	0
1700	4	0	0	0	64	0	0	0	0	0	0	0	36
1700	5	0	0	14	0	0	0	0	43	0	10	51	0
1700	6	0	0	0	0	0	0	0	31	0	0	43	0
1700	7	11	11	0	0	15	0	0	0	8	0	0	0
1700	8	0	0	0	0	0	0	0	0	0	0	0	0
1700	9				23			0	8			21	21
1700	10	11	0			0	121	77		15			
1700	11	0	78	0	8	69	36	64	0	0	0	0	11
1700	12				8		62	57	0			0	21

Intersection

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Site Statistics

B1	Commercial	1.6	ha	172223	SF	25%	Coverage
B2	Medium Density Reside	76	units				
F1	Low Density Residential	24	units				
F2	Low Density Residential	96	units				
NW1	Low Density Residential	192	units				
NW2	Low Density Residential	36	units				
NW3	Low Density Residential	102	units				
NW4	Medium Density Reside	253	units				

Trip Generation

Ind Us	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	450	39	123	162	135	79	214
221: M	329	31	102	133	79	50	129
820: S	43055.75	22	14	36	70	76	146
Total Net Trips		92	239	331	284	205	489

AM Peak Hour PM Peak Hour

In Out In Out

24% 76% 63% 37%

23% 77% 61% 39%

62% 38% 48% 52%

equations used due to variables within data range

equations used due to variables within data range

used rates (commercial size not within data range)

Trip Distribution	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	via Fruitland Road	20% 25%	20% 20%	
South	via Jones Road	5% 5%	5% 5%	
East	via Regalview Drive	5% 5%	5% 5%	
West	via Barton Street	10% 10%	15% 15%	
via Highway 8	20% 15%	15% 15%		
via Barton Street	20% 20%	25% 15%		
via Highway 8	20% 20%	15% 25%		

Trip Assign	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	via Fr	57 41		
South	via Jd	14 10		
East	via R	14 10		
West	via B	43 31		
via H	43 31			
via B	71 31			
via H	43 51			
Total	284	205		

B/H/C F/G

50% 50% split between Barton St and Fruitland Rd

50% 50% split between Gordon Dean Ave and Street C

50% 50% split between Barton St and Fruitland Rd

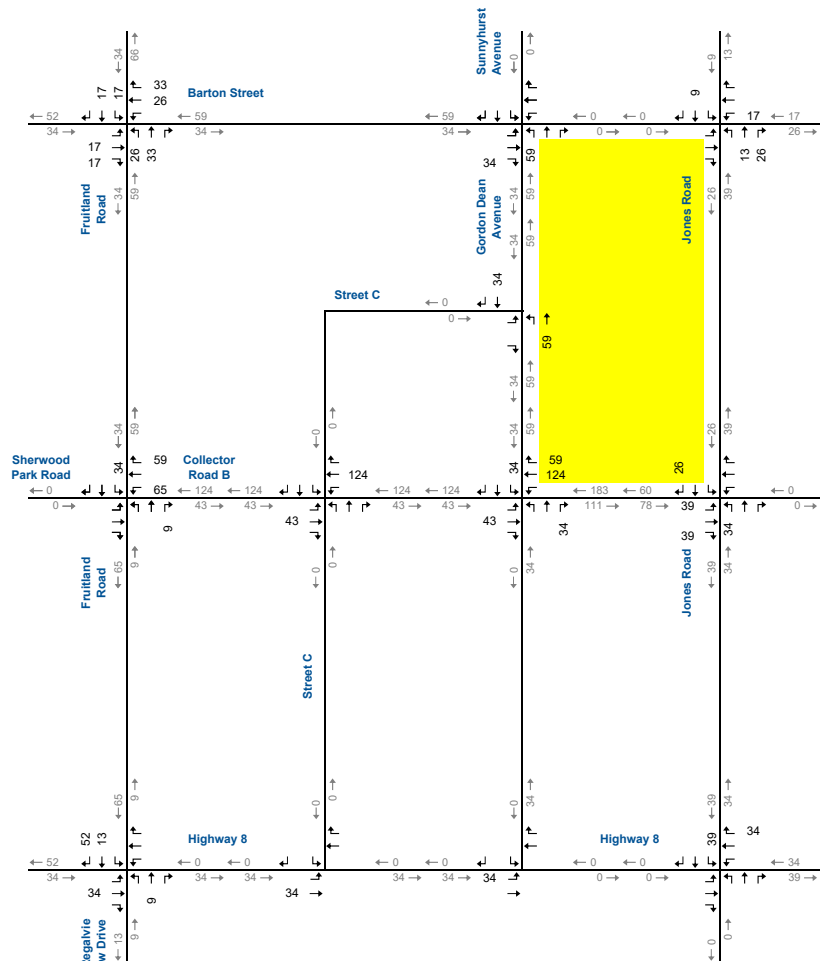
All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check In Out

Intern 285 205

Exterr 285 205

AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	26	33	0	17	17	0	0	17	17	0	26	33
900	2	59	0	0	0	0	0	0	0	34	0	0	0
900	3	0	13	26	0	9	0	0	0	0	17	0	0
900	4	0	0	9	34	0	0	0	0	0	65	0	59
900	5	0	9	0	0	13	52	0	34	0	0	0	0
900	6	0	0	0	39	0	0	0	0	0	0	0	34
900	7	0	0	34	34	0	0	0	43	0	0	124	59
900	8	34	0	0	0	0	26	39	0	39	0	0	0
900	9	0	0	0	0	0	34	0	0	0	0	0	0
900	10	0	59	0	0	34	0	0	0	0	0	0	0
900	11	0	0	0	0	0	0	43	0	0	124	0	0
900	12	0	0	0	0	0	0	34	0	0	0	0	0

Intersection

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- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Highway 8 and Street C

Site Statistics

- B3 Medium Density Reside 335 units
 NE1 Park
 NE2 Medium Density Reside 153 units
 NE3 School 310 tudents

Trip Generation

and Us	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
221: M	488	47	156	203	117	74	191
520: E	310	124	105	229	23	27	50
Total Net Trips		171	261	432	140	101	241

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
 equations used due to variables within data range
 used rates (only rates available)
 used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
	via Barton Street	20%	20%	25%	15%
West	via Highway 8	20%	20%	15%	25%

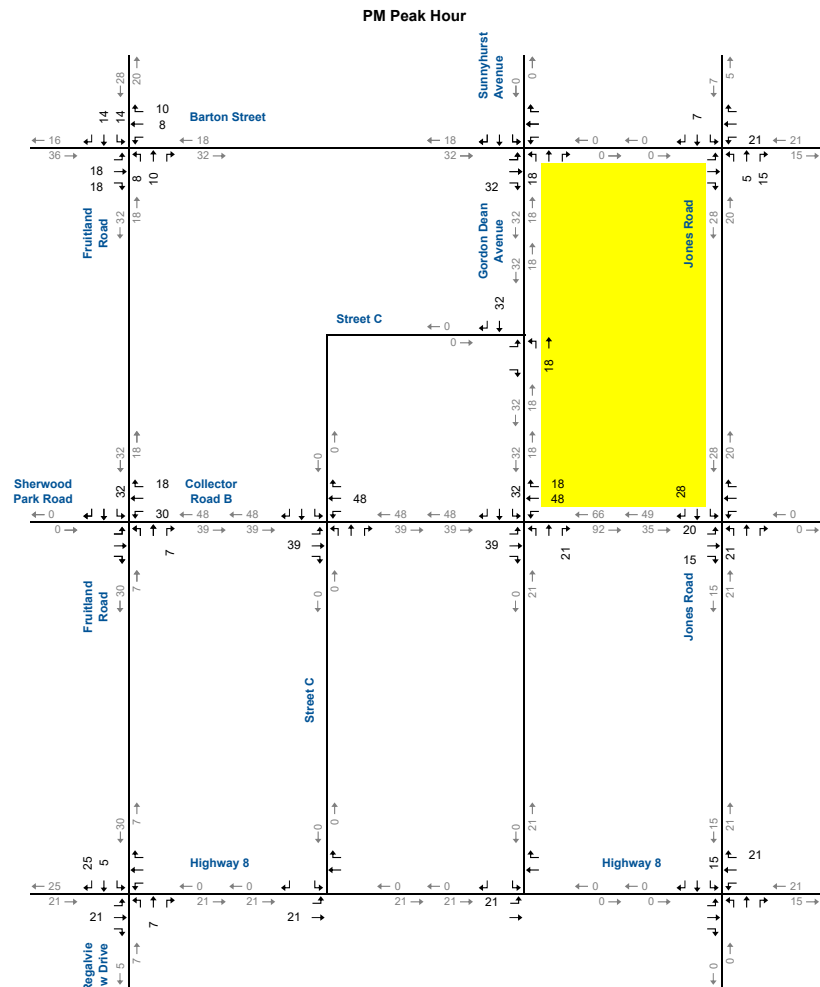
Trip AssignM Peak Hour		In	Out
North	via Fr	34	65.3
	via Jd	9	13.1
South	via R	9	13.1
	via B	17	26.1
East	via H	34	39.2
	via B	34	52.2
West	via H	34	52.2
Total		171	261

B F
 50% 50% split between Barton St and Fruitland Rd

50% 50% split between Barton St and Fruitland Rd

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check	In	Out
Intern	171	261
Exterr	171	261



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	8	10	0	14	14	0	0	18	18	0	8	10
1700	2	18	0	0	0	0	0	0	0	32	0	0	0
1700	3	0	5	15	0	7	0	0	0	0	21	0	0
1700	4	0	0	7	32	0	0	0	0	0	30	0	18
1700	5	0	7	0	0	5	25	0	21	0	0	0	0
1700	6	0	0	0	15	0	0	0	0	0	0	0	21
1700	7	0	0	21	32	0	0	0	39	0	0	48	18
1700	8	21	0	0	0	0	28	20	0	15	0	0	0
1700	9				0	0	21	0				0	0
1700	10	0	18			32	0	0		0			
1700	11	0	0	0	0	0	0	39	0	0	48	0	0
1700	12				0	0	0	21				0	0

- # Intersection
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Trip Generation

and Us	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
221: M	488	47	156	203	117	74	191
520: E	310	124	105	229	23	27	50
Total Net Trips		171	261	432	140	101	241

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
 equations used due to variables within data range
 used rates (only rates available)
 used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
	via Barton Street	20%	20%	25%	15%
West	via Highway 8	20%	20%	15%	25%

Trip Assign		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fr	28	20		
	via Jd	7	5		
South	via R	7	5		
	via B	21	15		
East	via H	21	15		
	via B	35	15		
West	via H	21	25		
Total		140	101		

B F
 50% 50% split between Barton St and Fruitland Rd

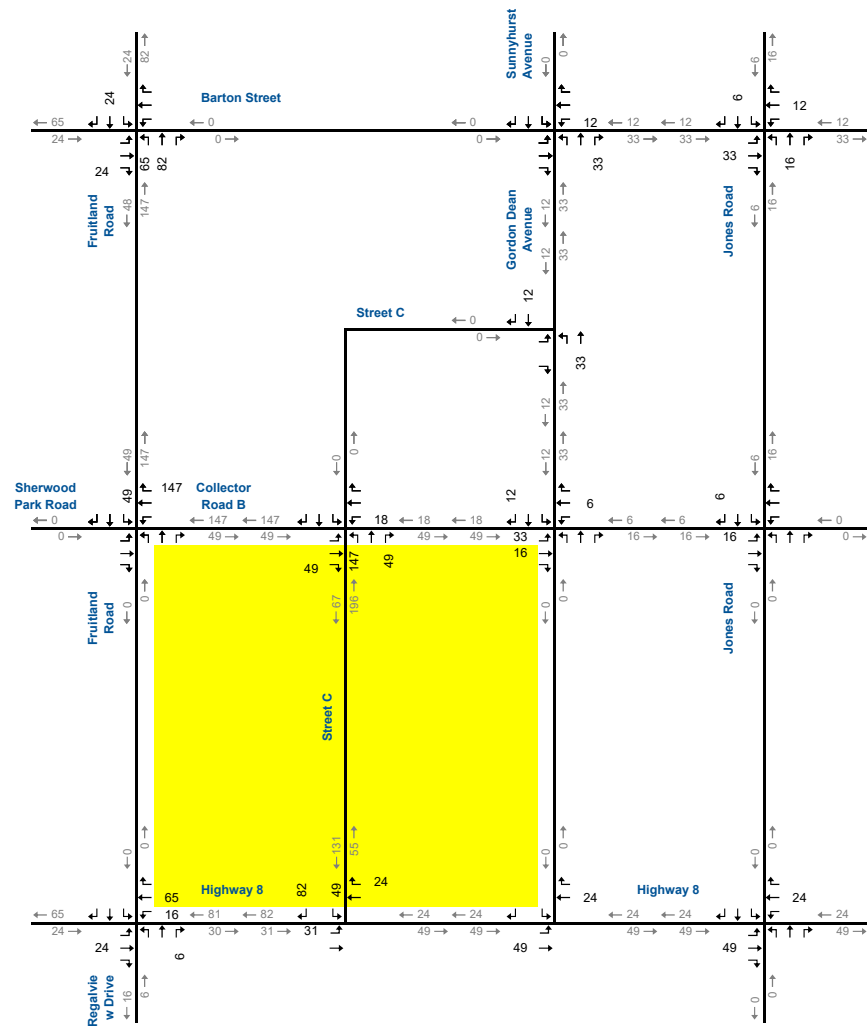
50% 50% split between Barton St and Fruitland Rd

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		####	####	###	100%

North	25%	30%	25%	25%
East	30%	25%	30%	30%
South	5%	5%	5%	5%
West	40%	40%	40%	40%

Check	In	Out
Intern	141	101
Exterr	141	101

AM Peak Hour



TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	65	82	0	0	24	0	0	0	24	0	0	0
900	2	0	0	33	0	0	0	0	0	0	12	0	0
900	3	0	16	0	0	6	0	0	33	0	0	12	0
900	4	0	0	0	49	0	0	0	0	0	0	0	147
900	5	0	0	6	0	0	0	0	24	0	16	65	0
900	6	0	0	0	0	0	0	0	49	0	0	0	24
900	7	0	0	0	0	0	12	33	16	0	0	6	0
900	8	0	0	0	0	0	6	16	0	0	0	0	0
900	9	0	0	0	0	0	0	49	0	0	24	0	0
900	10	0	33	0	0	12	0	0	0	0	0	0	0
900	11	147	0	49	0	0	0	0	0	49	18	0	0
900	12	0	0	0	49	82	31	0	0	0	0	24	0

- # Intersection
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Site Statistics

F3	Low Density Residential	90	units
F4	School	30	students
SW1	Low Density Residential	59	units
SW2	Medium Density Reside	192	units
SW3	Low Density Residential	104	units
SW4	Park		
SW5	Low Density Residential	230	units
SW6	Low Density Residential	98	units
SW7	Medium Density Reside	265	units
SW8	Commercial	0.76	ha
SW9	Commercial	0.35	ha
SW10	Low Density Residential	28	units

81805.72 sf 25% coverage
37673.69 sf 25% coverage

Trip Generation

and Us	Variable	Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	609	51	161	212	178	104	282
221: M	457	43	146	189	108	70	179
520: E	30	12	10	22	2	3	5
820: S	29869.8525	16	8	25	48	53	102
Total Net Trips		122	326	448	338	230	568

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

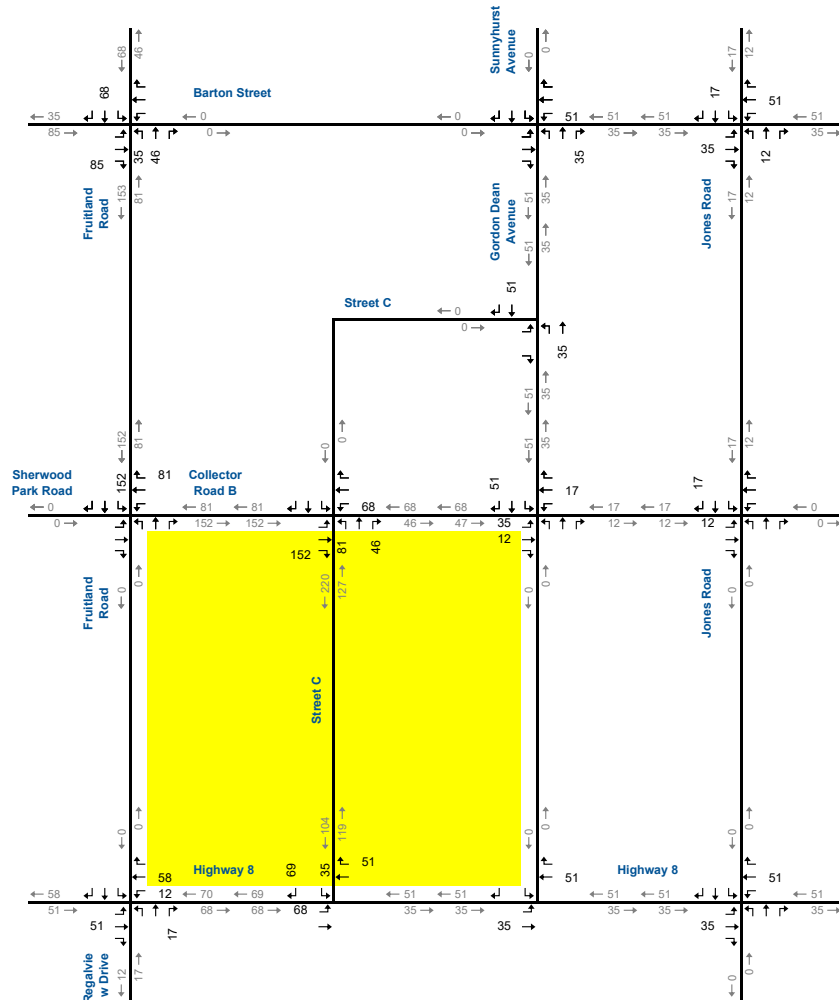
Trip Distribution		M Peak Ho		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
East	via Barton Street	10%	10%	15%	15%
	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

Trip Assign		M Peak Ho	
		In	Out
North	via Fr	24	82
	via Jc	6	16
South	via R	6	16
East	via B	12	33
	via H	24	49
West	via B	24	65
	via H	24	65
Total		122	326

Check In Out
Intern 122 327
Exterr 120 326

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		####	####	###	100%

PM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	35	46	0	0	68	0	0	0	85	0	0	0
1700	2	0	0	35	0	0	0	0	0	0	51	0	0
1700	3	0	12	0	0	17	0	0	35	0	0	51	0
1700	4	0	0	0	152	0	0	0	0	0	0	0	81
1700	5	0	0	17	0	0	0	0	51	0	12	58	0
1700	6	0	0	0	0	0	0	0	35	0	0	51	0
1700	7	0	0	0	0	0	51	35	12	0	0	17	0
1700	8	0	0	0	0	0	17	12	0	0	0	0	0
1700	9				0		0	0	35			51	0
1700	10	0	35				51	0	0				0
1700	11	81	0	46	0	0	0	0	0	152	68	0	0
1700	12				35		69	68	0			0	51

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Highway 8 and Street C

Site Statistics

F3	Low Density Residential	90	units			
F4	School	30	students			
SW1	Low Density Residential	59	units			
SW2	Medium Density Reside	192	units			
SW3	Low Density Residential	104	units			
SW4	Park					
SW5	Low Density Residential	230	units			
SW6	Low Density Residential	98	units			
SW7	Medium Density Reside	265	units			
SW8	Commercial	0.76	ha	81805.72	sf	25% coverage
SW9	Commercial	0.35	ha	37673.69	sf	25% coverage
SW10	Low Density Residential	28	units			

Trip Generation

and Us	Variable	Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	609	51	161	212	178	104	282
221: M	457	43	146	189	109	70	179
520: E	30	12	10	22	2	3	5
820: S	29869.8525	16	9	25	49	53	102
Total Net Trips		122	326	448	338	230	568

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

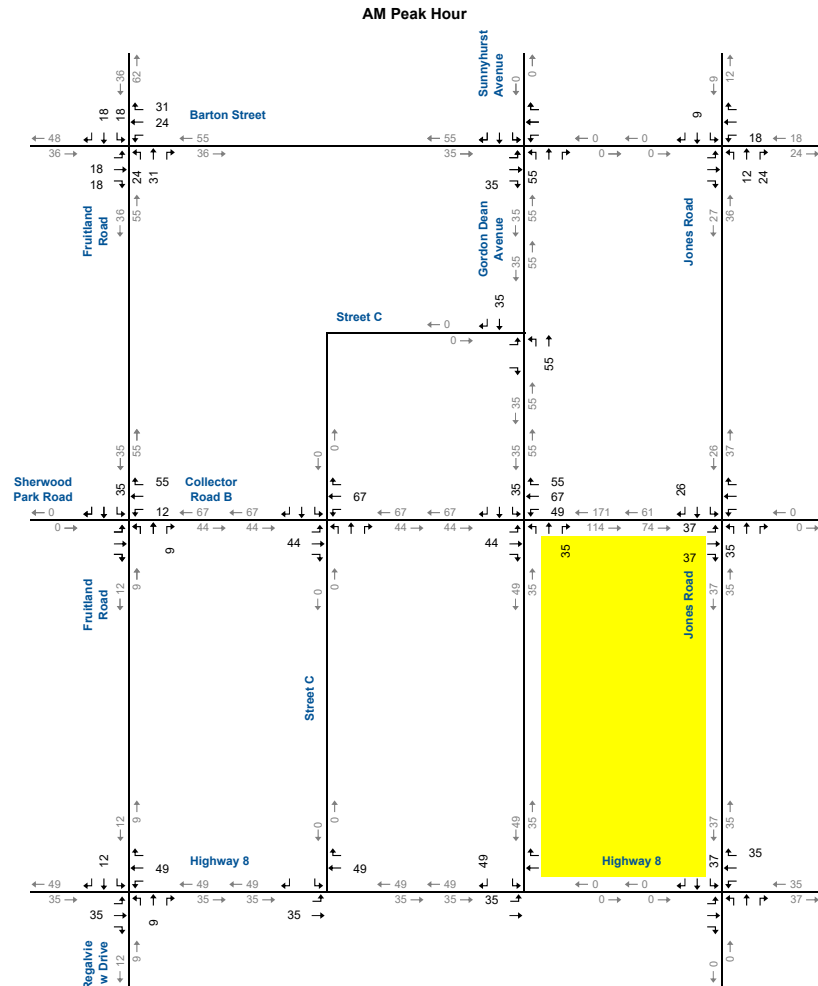
Trip Distribution		M Peak Ho		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
East	via Barton Street	10%	10%	15%	15%
	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

Trip Assign		M Peak Ho	
		In	Out
North	via F	68	46
	via J	17	12
South	via R	17	12
East	via B	51	35
	via H	51	35
West	via B	85	35
	via H	51	58

Total 338 230

Check In Out
Intern 339 231
Exterr 340 233

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		####	####	###	100%



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	24	31	0	18	18	0	0	18	18	0	24	31
900	2	55	0	0	0	0	0	0	0	35	0	0	0
900	3	0	12	24	0	9	0	0	0	0	18	0	0
900	4	0	0	9	35	0	0	0	0	0	12	0	55
900	5	0	9	0	0	12	0	0	35	0	0	49	0
900	6	0	0	0	37	0	0	0	0	0	0	0	35
900	7	0	0	35	35	0	0	0	44	0	49	67	55
900	8	35	0	0	0	0	26	37	0	37	0	0	0
900	9				0	49	35	0				0	0
900	10	0	55			35	0	0		0			
900	11	0	0	0	0	0	0	44	0	0	67	0	
900	12				0	0	0	35			49	0	

- # Intersection
- 1 Barton St and Fruitland Rd
 - 2 Barton St and Sunnyhurst Ave
 - 3 Barton St and Jones Rd
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 - 5 Highway 8 and Regalview Dr/Fruitland Rd
 - 6 Highway 8 and Jones Rd
 - 7 Gordon Dean Avenue and Collector Road B
 - 8 Collector Road B and Jones Road
 - 9 Highway 8 and Gordon Dean Avenue
 - 10 Gordon Dean Avenue and Street C (north leg)
 - 11 Collector Road B and Street C
 - 12 Highway 8 and Street C

Site Statistics

SE1	Medium Density Reside	188	units
SE2	Low Density Residential	125	
SE3	Low Density Residential	116	units
SE4	Park		
SE5	Commercial	2.14	ha
SE6	School	260	tudents
SE7	Low Density Residential	38	

Trip Generation

Land Use	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	279	26	83	109	89	52	141
221: M	188	16	55	71	45	29	74
520: E	260	104	88	192	19	23	42
820: S	57586.925	30	18	48	94	102	196
Total Net Trips		176	244	420	247	206	453

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
	via Barton Street	20%	20%	25%	15%
West	via Highway 8	20%	20%	15%	25%

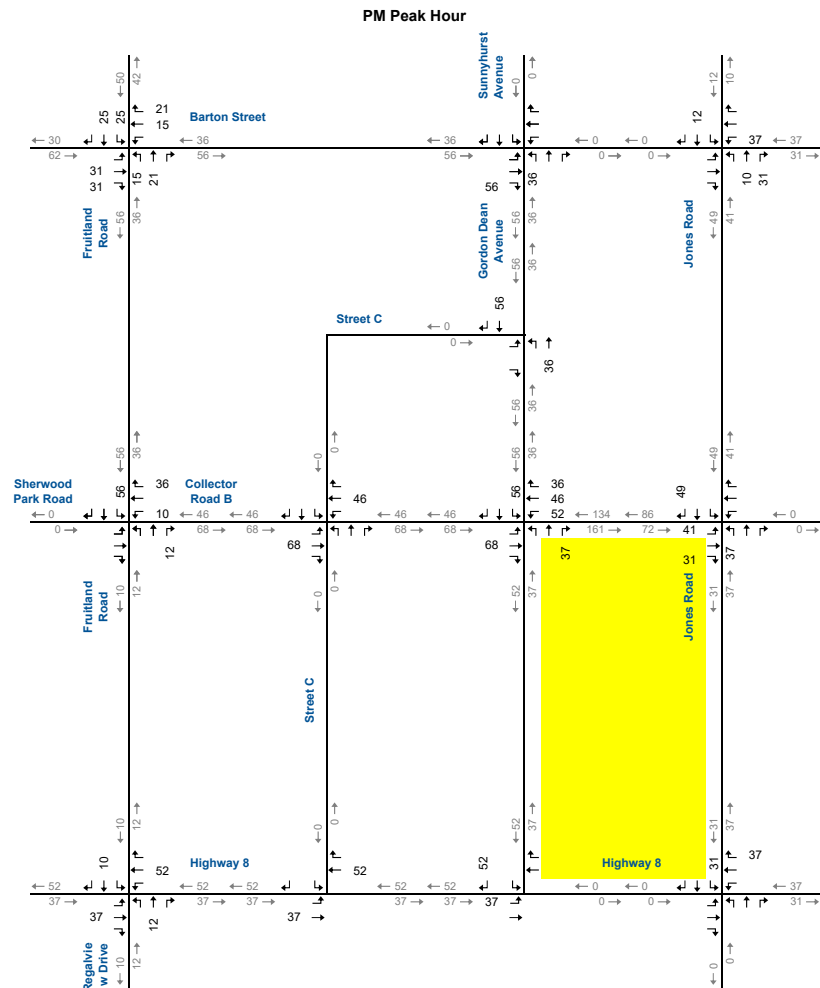
Trip Assignment		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fr	35	61		
	via Jd	9	12.2		
South	via R	9	12.2		
	via B	18	24.4		
East	via H	35	36.6		
	via B	35	48.8		
West	via H	35	48.8		
	via B	35	48.8		
Total		176	244		

F B
50% 50% split between Fruitland Rd and Barton St

50% 50% split between Fruitland Rd and Barton St

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check	In	Out
Intern	175	245
Exterr	178	244



TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	15	21	0	25	25	0	0	31	31	0	15	21
1700	2	36	0	0	0	0	0	0	0	56	0	0	0
1700	3	0	10	31	0	12	0	0	0	0	37	0	0
1700	4	0	0	12	56	0	0	0	0	0	10	0	36
1700	5	0	12	0	0	10	0	0	37	0	0	52	0
1700	6	0	0	0	31	0	0	0	0	0	0	0	37
1700	7	0	0	37	56	0	0	0	68	0	52	46	36
1700	8	37	0	0	0	0	49	41	0	31	0	0	0
1700	9				0	52	37	0				0	0
1700	10	0	36			56	0	0		0			
1700	11	0	0	0	0	0	0	0	68	0	0	46	0
1700	12				0	0	0	0	37			52	0

Intersection

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- 12 Highway 8 and Street C

Site Statistics

SE1	Medium Density Reside	188	units
SE2	Low Density Residential	125	
SE3	Low Density Residential	116	units
SE4	Park		
SE5	Commercial	2.14	ha
SE6	School	260	tudents
SE7	Low Density Residential	38	

Trip Generation

Land Use	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	279	26	83	109	89	52	141
221: M	188	16	55	71	45	29	74
520: E	260	104	88	192	19	23	42
820: S	57586.925	30	18	48	94	102	196
Total Net Trips		176	244	420	247	206	453

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
	via Barton Street	20%	20%	25%	15%
West	via Highway 8	20%	20%	15%	25%

Trip Assignment		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fr	49	41		
	via Jd	12	10		
South	via R	12	10		
	via B	37	31		
East	via H	37	31		
	via B	62	31		
West	via H	37	52		
Total		247	206		

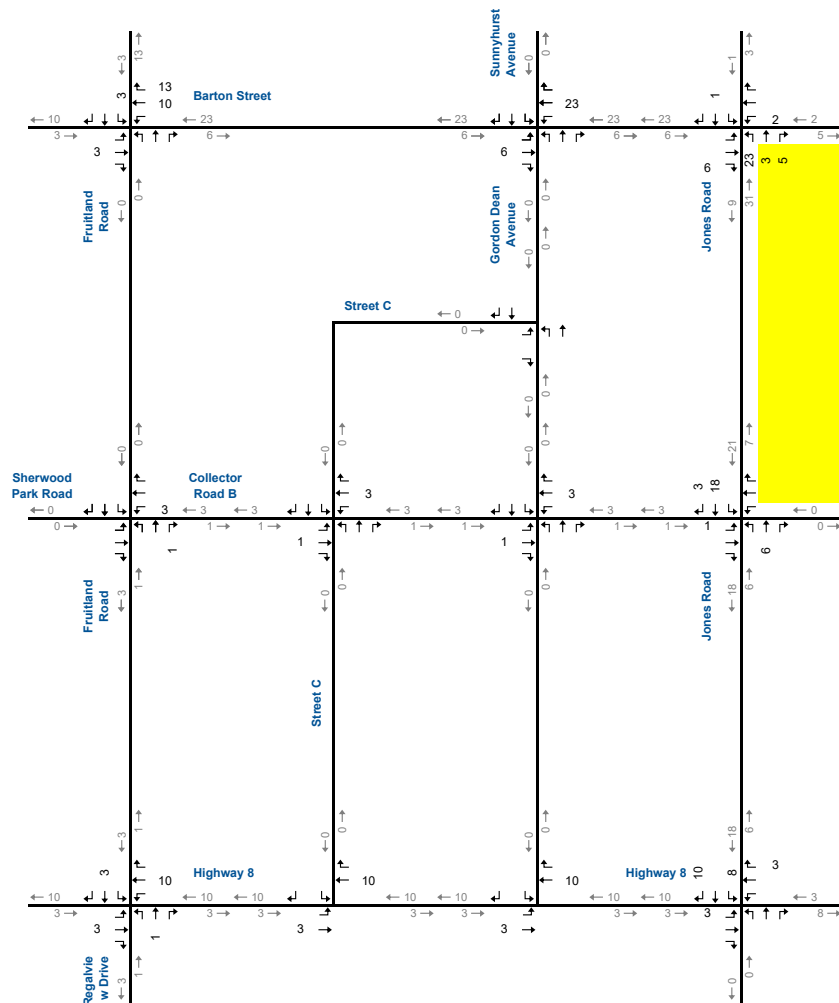
F B
50% 50% split between Fruitland Rd and Barton St

50% 50% split between Fruitland Rd and Barton St

All TTS Zones		AM		PM	
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		####	####	###	100%

Check In Out
Intern 247 206
Exterr 247 206

AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	0	0	0	3	0	0	0	3	0	0	10	13
900	2	0	0	0	0	0	0	0	6	0	0	23	0
900	3	23	3	5	0	1	0	0	0	6	2	0	0
900	4	0	0	1	0	0	0	0	0	0	3	0	0
900	5	0	1	0	0	3	0	0	3	0	0	10	0
900	6	0	0	0	8	0	10	3	0	0	0	0	3
900	7	0	0	0	0	0	0	0	1	0	0	3	0
900	8	0	6	0	0	18	3	1	0	0	0	0	0
900	9				0	0	0	3				10	0
900	10	0	0		0	0	0	0				0	
900	11	0	0	0	0	0	0	0	1	0	0	3	0
900	12				0	0	0	3				10	0

Intersection

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- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Highway 8 and Street C

Site Statistics

- J1 Medium Density Reside 67 units
J3 Medium Density Reside 107 units

Trip Generation

In	Us	Variable	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
221	M	174	15	50	65	41	27	68
Total Net Trips			15	50	65	41	27	68

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
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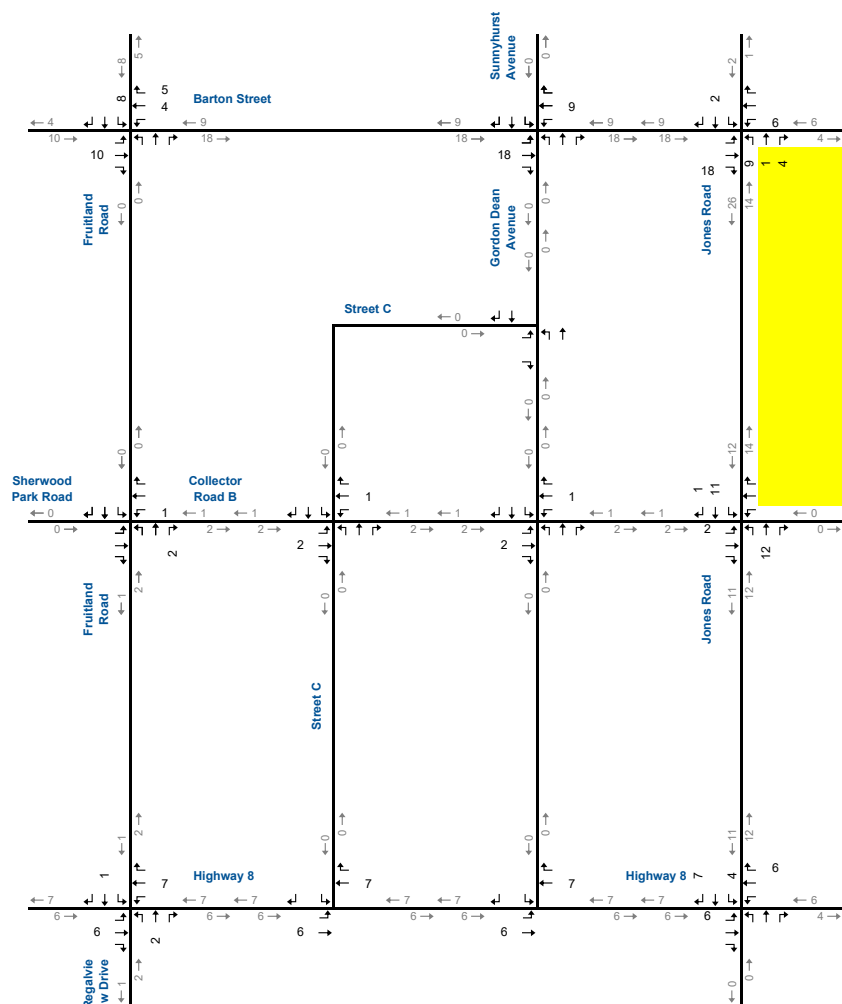
Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
East	via Barton Street	10%	10%	15%	15%
	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

Trip Assign		M Peak Hour	
		In	Out
North	via F	3	12.5
	via J	1	3
South	via R	1	3
East	via B	2	5
	via H	3	8
West	via B	3	10
	via H	3	10
Total		15	50

Check In Out
Intern 16 52
Exterr 16 52

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		####	####	###	100%

PM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	0	0	0	8	0	0	0	10	0	0	4	5
1700	2	0	0	0	0	0	0	0	18	0	0	9	0
1700	3	9	1	4	0	2	0	0	0	18	6	0	0
1700	4	0	0	2	0	0	0	0	0	0	1	0	0
1700	5	0	2	0	0	1	0	0	6	0	0	7	0
1700	6	0	0	0	4	0	7	6	0	0	0	0	6
1700	7	0	0	0	0	0	0	0	2	0	0	1	0
1700	8	0	12	0	0	11	1	2	0	0	0	0	0
1700	9				0	0	0	6			7	0	
1700	10	0	0		0	0	0	0					
1700	11	0	0	0	0	0	0	2	0	0	1	0	
1700	12				0	0	0	6			7	0	

Intersection

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- 6 Highway 8 and Jones Rd
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- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Highway 8 and Street C

Site Statistics

- J1 Medium Density Reside 67 units
J3 Medium Density Reside 107 units

Trip Generation

In	Us	Variable	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
221	M	174	15	50	65	41	27	68
Total Net Trips			15	50	65	41	27	68

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
East	via Barton Street	10%	10%	15%	15%
	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		###	###	###	100%

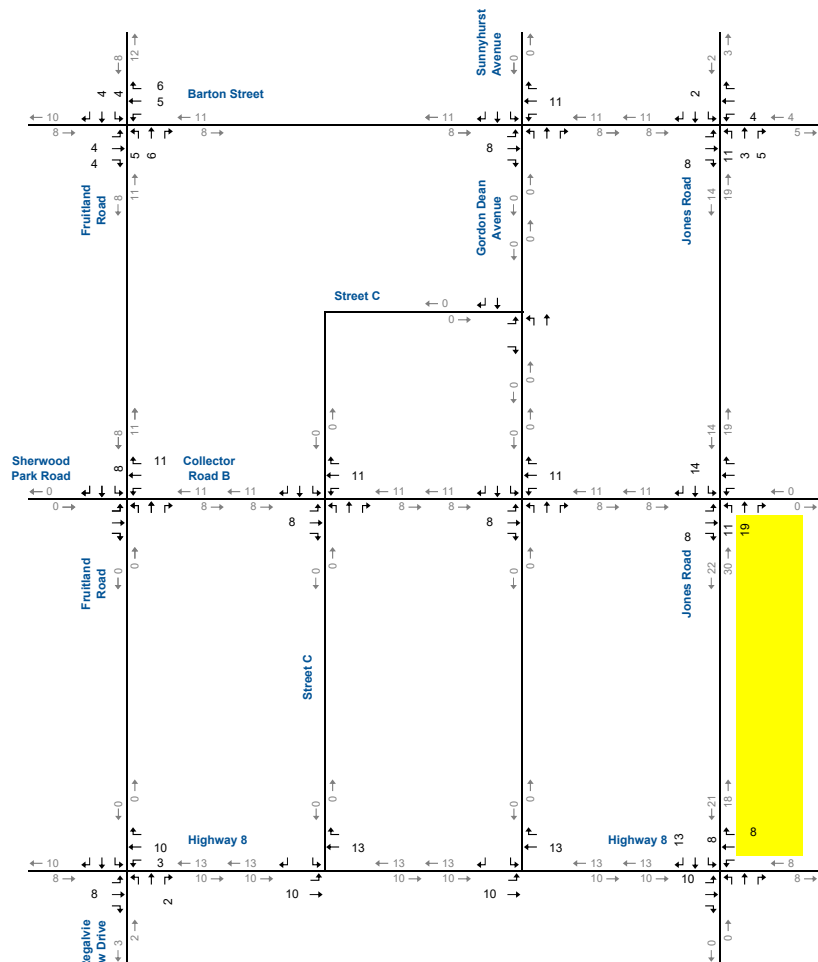
AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Assign		M Peak Hour	
		In	Out
North	via F	8	5
	via J	2	1
South	via R	2	1
East	via B	6	4
	via H	6	4
West	via B	10	4
	via H	6	7
Total		41	27

Check	In	Out
Intern	40	26
Exterr	40	26

AM Peak Hour



TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	5	6	0	4	4	0	0	4	4	0	5	6
900	2	0	0	0	0	0	0	0	8	0	0	11	0
900	3	11	3	5	0	2	0	0	0	8	4	0	0
900	4	0	0	0	8	0	0	0	0	0	0	0	11
900	5	0	0	2	0	0	0	0	8	0	3	10	0
900	6	0	0	0	8	0	13	10	0	0	0	0	8
900	7	0	0	0	0	0	0	0	8	0	0	11	0
900	8	11	19	0	0	14	0	0	0	8	0	0	0
900	9				0	0	0	10				13	0
900	10	0	0		0	0	0		0				
900	11	0	0	0	0	0	0	8	0	0	11	0	
900	12				0	0	0	10				13	0

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Highway 8 and Street C

Site Statistics

J4 Medium Density Reside 119 units
J5 Commercial 2.19 ha 235729.6 sf 25% coverage

Trip Generation

Land Use	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
221: M	119	9	32	41	29	18	47
820: S	58932.4	31	19	50	96	104	200
Total Net Trips		40	51	91	125	122	247

Trip Distribution	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	via Fruitland Road	20% 25%	20% 20%	
South	via Jones Road	5% 5%	5% 5%	
East	via Regalview Drive	5% 5%	5% 5%	
West	via Barton Street	10% 10%	15% 15%	
via Highway 8	20% 15%	15% 15%		
via Barton Street	20% 20%	25% 15%		
via Highway 8	20% 20%	15% 25%		

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

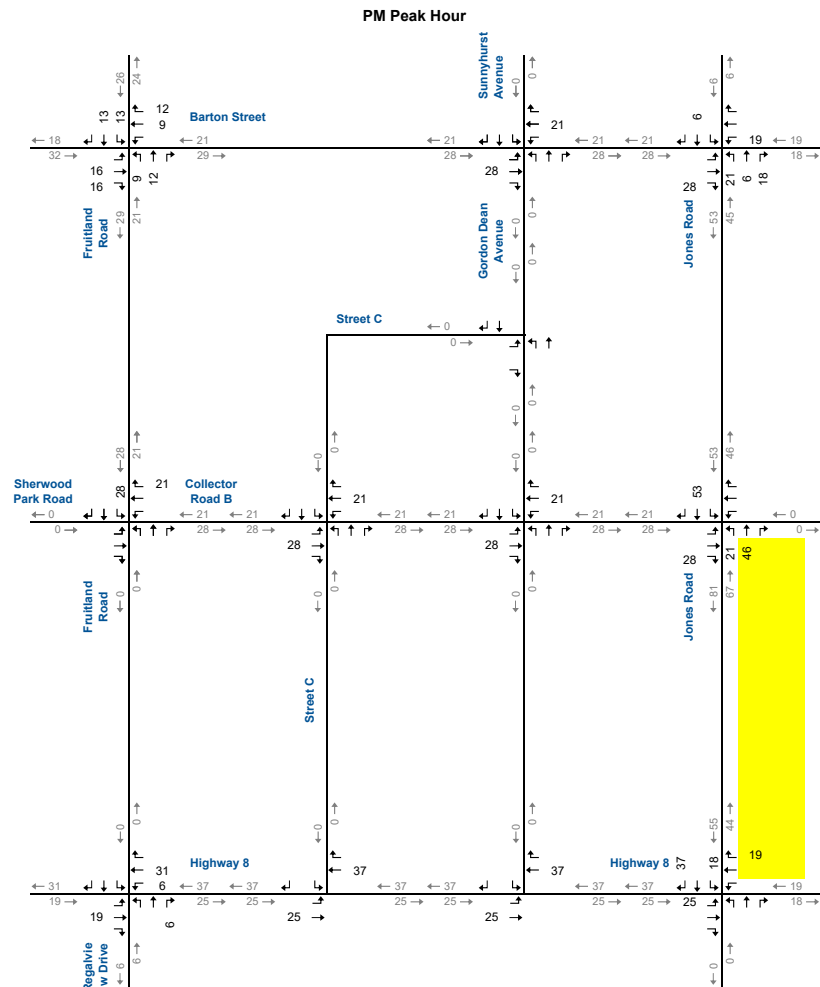
equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Assignment	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	via Fr	8 13		
South	via Jd	2 3		
East	via B	2 3		
West	via H	4 5		
via H	8 8			
via B	8 10			
via H	8 10			
Total	40	51		

Check In Out
Intern 40 51
Exterr 40 51

F/G B/I
50% 50% split between Fruitland Rd and Barton St

50% 50% split between Fruitland Rd and Barton St



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	9	12	0	13	13	0	0	16	16	0	9	12
1700	2	0	0	0	0	0	0	0	28	0	0	21	0
1700	3	21	6	18	0	6	0	0	0	28	19	0	0
1700	4	0	0	0	28	0	0	0	0	0	0	0	21
1700	5	0	0	6	0	0	0	0	19	0	6	31	0
1700	6	0	0	0	18	0	37	25	0	0	0	0	19
1700	7	0	0	0	0	0	0	0	28	0	0	21	0
1700	8	21	46	0	0	53	0	0	0	28	0	0	0
1700	9				0	0	0	25				37	0
1700	10	0	0		0	0	0		0				
1700	11	0	0	0	0	0	0	0	28	0	0	21	0
1700	12				0	0	0	25				37	0

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Highway 8 and Street C

Site Statistics

J4 Medium Density Reside 119 units
 J5 Commercial 2.19 ha 235729.6 sf 25% coverage

Trip Generation

and Us	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
221: M	119	9	32	41	25	18	47
820: S	58932.4	31	19	50	96	104	200
Total Net Trips		40	51	91	125	122	247

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
 equations used due to variables within data range
 used rates (only rates available)
 used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
	via Barton Street	20%	20%	25%	15%
West	via Highway 8	20%	20%	15%	25%

Trip Assignment		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fr	25	24		
	via Jd	6	6		
South	via Rl	6	6		
	via Bl	19	18		
East	via Hl	19	18		
	via Bl	31	18		
West	via Hl	19	31		
Total		125	122		

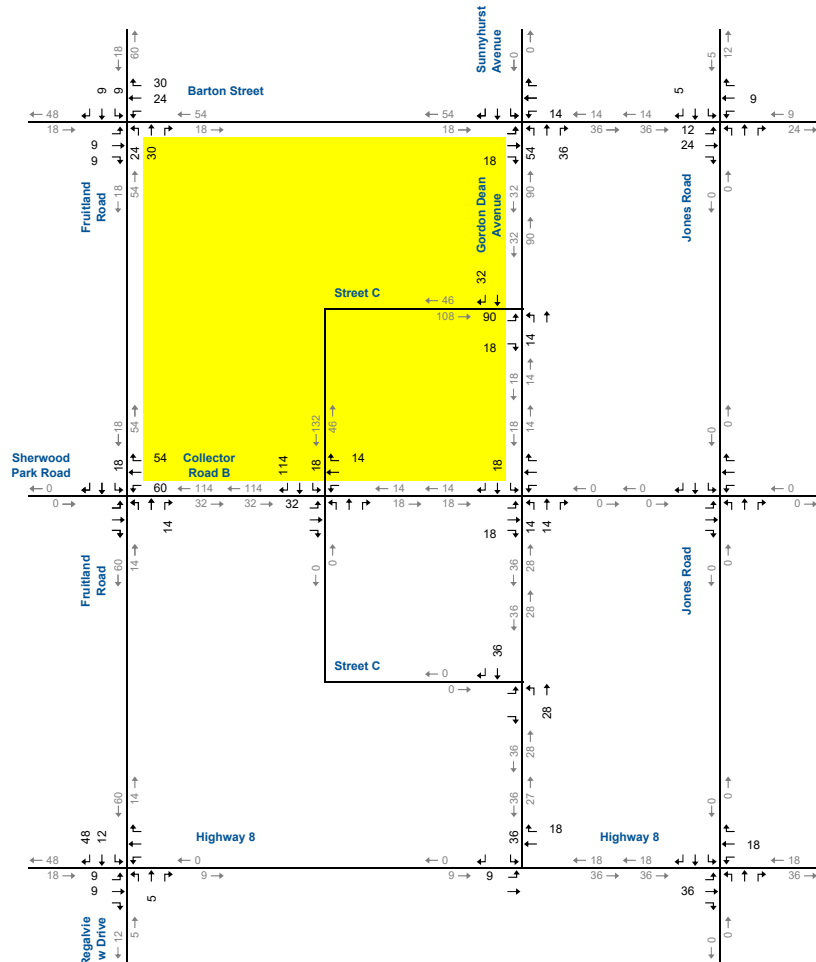
F/G B/I
 50% 50% split between Fruitland Rd and Barton St

50% 50% split between Fruitland Rd and Barton St

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	69%	59%
Total	####	####	###	100%

Check In Out
 Intern 125 122
 Extern 127 121

AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	24	30	0	9	9	0	0	9	9	0	24	30
900	2	54	0	36	0	0	0	0	0	18	14	0	0
900	3	0	0	0	0	0	5	12	24	0	0	9	0
900	4	0	0	14	18	0	0	0	0	0	60	0	54
900	5	0	5	0	0	12	48	9	9	0	0	0	0
900	6	0	0	0	0	0	0	0	36	0	0	18	0
900	7	14	14	0	0	18	0	0	0	18	0	0	0
900	8	0	0	0	0	0	0	0	0	0	0	0	0
900	9				36			9	0			0	18
900	10	14	0			0	32	90		18			
900	11	0	0	0	18	0	114	32	0	0	0	0	14
900	12	0	28			36	0	0		0			

- # Intersection
- 1 Barton St and Fruitland Rd
 - 2 Barton St and Sunnyhurst Ave
 - 3 Barton St and Jones Rd
 - 4 Sherwood Park Rd and Fruitland Rd
 - 5 Highway 8 and Regalview Dr/Fruitland Rd
 - 6 Highway 8 and Jones Rd
 - 7 Gordon Dean Avenue and Collector Road B
 - 8 Collector Road B and Jones Road
 - 9 Highway 8 and Gordon Dean Avenue
 - 10 Gordon Dean Avenue and Street C (north leg)
 - 11 Collector Road B and Street C
 - 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

B1	Commercial	1.6	ha	172223	SF	25%	Coverage
B2	Medium Density Reside	76	units				
F1	Low Density Residential	24	units				
F2	Low Density Residential	96	units				
NW1	Low Density Residential	192	units				
NW2	Low Density Residential	36	units				
NW3	Low Density Residential	102	units				
NW4	Medium Density Reside	253	units				

Trip Generation

Ind Us	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	450	39	123	162	135	79	214
221: M	329	31	102	133	79	50	129
820: S	43055.75	22	14	36	70	76	146
Total Net Trips		92	239	331	284	205	489

AM Peak Hour PM Peak Hour

In Out In Out

24% 76% 63% 37%

23% 77% 61% 39%

equations used due to variables within data range

equations used due to variables within data range

62% 38% 48% 52%

used rates (commercial size not within data range)

Trip Distribution	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	20%	25%	20%	20%
via Fruitland Road	5%	5%	5%	5%
via Jones Road	5%	5%	5%	5%
South	10%	10%	15%	15%
via Regalview Drive	5%	5%	5%	5%
via Barton Street	10%	10%	15%	15%
East	20%	15%	15%	15%
via Highway 8	20%	15%	15%	15%
West	20%	20%	25%	15%
via Barton Street	20%	20%	25%	15%
via Highway 8	20%	20%	15%	25%

Trip Assign	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	18	59.8		
via Fr	18	59.8		
via Jd	5	12		
South	18	12		
via R	18	12		
East	9	23.9		
via B	9	23.9		
via H	18	35.9		
West	18	47.8		
via B	18	47.8		
via H	18	47.8		
Total	92	239		

B/H/C F/G

50% 50% split between Barton St and Fruitland Rd

50% 50% split between Collector B and Gordon Dean Ave

50% 50% split between Barton St and Fruitland Rd

50% 50% split between Highway 8 and Fruitland Rd

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check In Out

Intern 92 240

Exterr 91 240

The map displays a network of streets in Sunnyvale, CA. A yellow-shaded rectangular area is highlighted, bounded by Barton Street to the north, Collector Road B to the east, and Fruitland Road to the south. The area is labeled 'Sunnyvale' in the top right corner. Key streets shown include Highway 8, Fruitland Road, Jones Road, Barton Street, Collector Road B, Street C, and Gordon Dean Avenue. Street numbers are marked along various roads, and lane markings are indicated by arrows. The map also shows surrounding areas like Sunnyvale and San Jose.

#	Intersection
1	Barton St and Fruitland Rd
2	Barton St and Sunnyshurst Ave
3	Barton St and Jones Rd
4	Sherwood Park Rd and Fruitland Rd
5	Highway 8 and Regalview Dr/Fruitland Rd
6	Highway 8 and Jones Rd
7	Gordon Dean Avenue and Collector Road B
8	Collector Road B and Jones Road
9	Highway 8 and Gordon Dean Avenue
10	Gordon Dean Avenue and Street C (north leg)
11	Collector Road B and Street C
12	Gordon Dean Avenue and Street C (south leg)

B1	Commercial	1.6	ha	172223	SF	25%	Coverage
B2	Medium Density Reside	76	units				
F1	Low Density Residential	24	units				
F2	Low Density Residential	96	units				
NW1	Low Density Residential	192	units				
NW2	Low Density Residential	36	units				
NW3	Low Density Residential	102	units				
NW4	Medium Density Reside	253	units				

In and S	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	450	39	123	162	135	79	214
221: M	329	31	102	133	79	50	129
820: S	43055.75	22	14	36	70	76	146
Total Net Trips		92	239	331	284	205	489

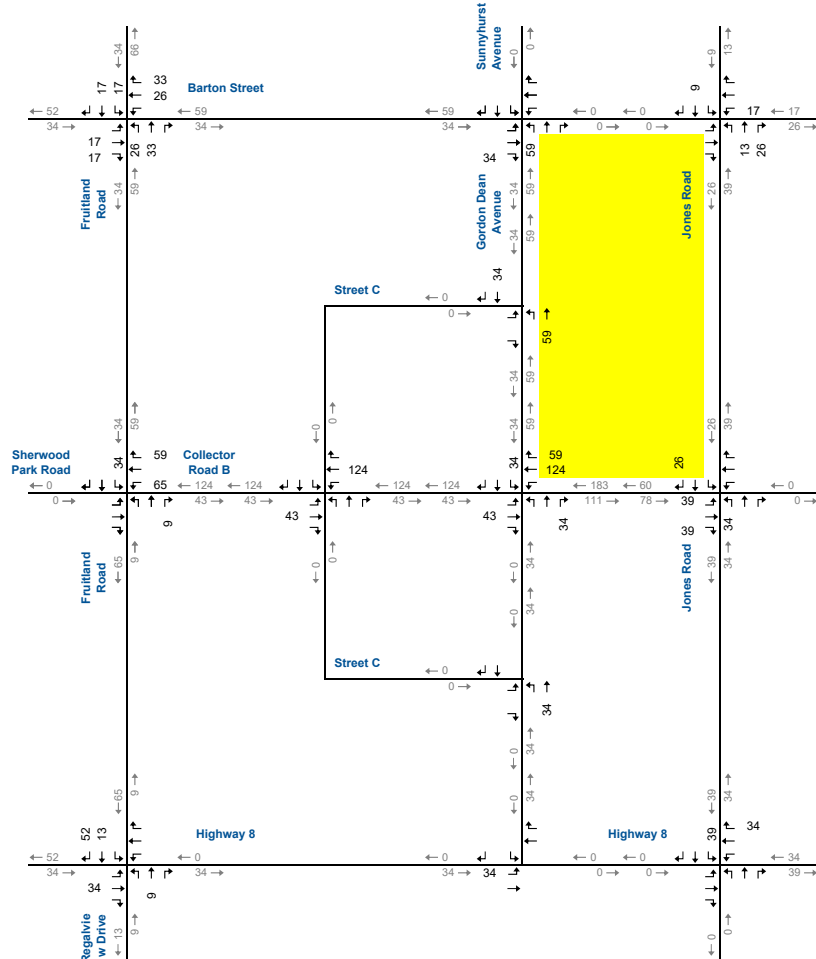
AM Peak Hour		PM Peak Hour		
In	Out	In	Out	
24%	76%	63%	37%	equations used due to variables within data range
23%	77%	61%	39%	equations used due to variables within data range
62%	38%	48%	52%	used rates (commercial size not within data range)

B/H/C	F/G	
50%	50%	split between Barton St and Fruitland Rd
50%	50%	split between Collector B and Gordon Dean Ave
50%	50%	split between Barton St and Fruitland Rd
50%	50%	split between Highway 8 and Fruitland Rd

All TTS Zones	AM In	AM Out	PM In	PM Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check	In	Out
Intern	284	204
Exterr	284	205

AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	26	33	0	17	17	0	0	17	17	0	26	33
900	2	59	0	0	0	0	0	0	0	34	0	0	0
900	3	0	13	26	0	9	0	0	0	0	17	0	0
900	4	0	0	9	34	0	0	0	0	0	65	0	59
900	5	0	9	0	0	13	52	0	34	0	0	0	0
900	6	0	0	0	39	0	0	0	0	0	0	0	34
900	7	0	0	34	34	0	0	0	43	0	0	124	59
900	8	34	0	0	0	0	26	39	0	39	0	0	0
900	9	0	0	0	0	0	34	0	0	0	0	0	0
900	10	0	59	0	34	0	0	0	0	0	0	0	0
900	11	0	0	0	0	0	0	43	0	0	124	0	0
900	12	0	34	0	0	0	0	0	0	0	0	0	0

- # Intersection
- 1 Barton St and Fruitland Rd
 - 2 Barton St and Sunnyhurst Ave
 - 3 Barton St and Jones Rd
 - 4 Sherwood Park Rd and Fruitland Rd
 - 5 Highway 8 and Regalview Dr/Fruitland Rd
 - 6 Highway 8 and Jones Rd
 - 7 Gordon Dean Avenue and Collector Road B
 - 8 Collector Road B and Jones Road
 - 9 Highway 8 and Gordon Dean Avenue
 - 10 Gordon Dean Avenue and Street C (north leg)
 - 11 Collector Road B and Street C
 - 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

B3	Medium Density Reside	335 units
NE1	Park	
NE2	Medium Density Reside	153 units
NE3	School	310 tudents

Trip Generation

and Us	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
221: M	488	47	156	203	117	74	191
520: E	310	124	105	229	23	27	50
Total Net Trips		171	261	432	140	101	241

AM Peak Hour	PM Peak Hour
In Out	In Out
24% 76%	63% 37%
23% 77%	61% 39%
54% 46%	46% 54%
62% 38%	48% 52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Distribution	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	via Fruitland Road	20% 25%	20% 20%	
North	via Jones Road	5% 5%	5% 5%	
South	via Regalview Drive	5% 5%	5% 5%	
South	via Barton Street	10% 10%	15% 15%	
East	via Highway 8	20% 15%	15% 15%	
West	via Barton Street	20% 20%	25% 15%	
West	via Highway 8	20% 20%	15% 25%	

Trip Assign	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North	via Fr	34 65.3		
North	via Jd	9 13.1		
South	via R	9 13.1		
South	via B	17 26.1		
East	via H	34 39.2		
West	via B	34 52.2		
West	via H	34 52.2		
Total		171 261		

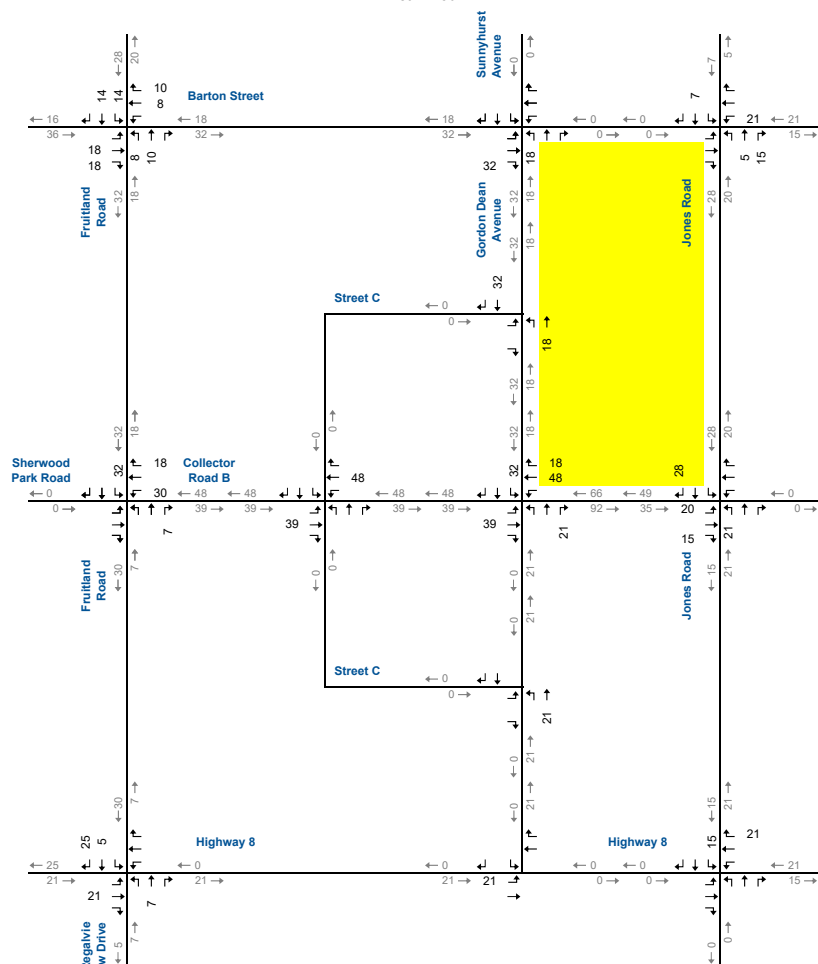
B F
50% 50% split between Barton St and Fruitland Rd

50% 50% split between Barton St and Fruitland Rd

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check	In	Out
Intern	171	261
Exterr	171	261

PM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	8	10	0	14	14	0	0	18	18	0	8	10
1700	2	18	0	0	0	0	0	0	0	32	0	0	0
1700	3	0	5	15	0	7	0	0	0	0	21	0	0
1700	4	0	0	7	32	0	0	0	0	0	30	0	18
1700	5	0	7	0	0	5	25	0	21	0	0	0	0
1700	6	0	0	0	15	0	0	0	0	0	0	0	21
1700	7	0	0	21	32	0	0	0	39	0	0	48	18
1700	8	21	0	0	0	0	28	20	0	15	0	0	0
1700	9	0	0	0	0	0	21	0	0	0	0	0	0
1700	10	0	18	0	0	32	0	0	0	0	0	0	0
1700	11	0	0	0	0	0	0	0	39	0	0	48	0
1700	12	0	21	0	0	0	0	0	0	0	0	0	0

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

B3 Medium Density Reside 335 units
 NE1 Park
 NE2 Medium Density Reside 153 units
 NE3 School 310 tudents

Trip Generation

and Us	Variable	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
221: M	488	47	156	203	117	74	191
520: E	310	124	105	229	23	27	50
Total Net Trips		171	261	432	140	101	241

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
 equations used due to variables within data range
 used rates (only rates available)
 used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
	via Barton Street	20%	20%	25%	15%
West	via Highway 8	20%	20%	15%	25%

Trip AssignM Peak Hour		In	Out
		In	Out
North	via Fr	28	20
	via Jd	7	5
South	via R	7	5
	via B	21	15
East	via H	21	15
	via B	35	15
West	via H	21	25
	via B	21	25
Total		140	101

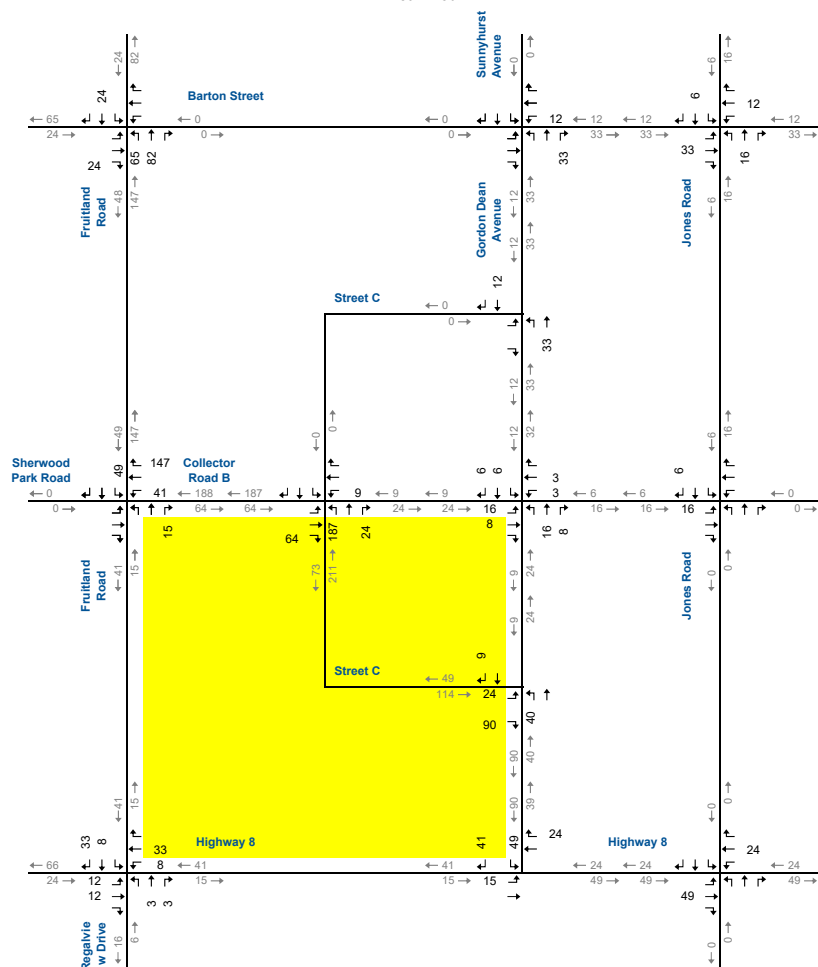
B F
 50% 50% split between Barton St and Fruitland Rd

50% 50% split between Barton St and Fruitland Rd

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check In Out
 Intern 141 101
 Exterr 141 101

AM Peak Hour



TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	65	82	0	0	24	0	0	0	24	0	0	0
900	2	0	0	33	0	0	0	0	0	0	12	0	0
900	3	0	16	0	0	6	0	0	33	0	0	12	0
900	4	0	0	15	49	0	0	0	0	0	41	0	147
900	5	0	3	3	0	8	33	12	12	0	8	33	0
900	6	0	0	0	0	0	0	0	49	0	0	24	0
900	7	0	16	8	0	6	6	16	8	0	3	3	0
900	8	0	0	0	0	0	6	16	0	0	0	0	0
900	9				49		41	15	0			0	24
900	10	0	33			12	0	0		0			
900	11	187	0	24	0	0	0	0	0	64	9	0	0
900	12	40	0			0	9	24		90			

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

F3	Low Density Residential	90	units			
F4	School	30	students			
SW1	Low Density Residential	59	units			
SW2	Medium Density Reside	192	units			
SW3	Low Density Residential	104	units			
SW4	Park					
SW5	Low Density Residential	230	units			
SW6	Low Density Residential	98	units			
SW7	Medium Density Reside	265	units			
SW8	Commercial	0.76	ha	81805.72	sf	25% coverage
SW9	Commercial	0.35	ha	37673.69	sf	25% coverage
SW10	Low Density Residential	28	units			

Trip Generation

Land Use	Variable	Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	609	51	161	212	178	104	282
221: M	457	43	146	189	109	70	179
520: E	30	12	10	22	2	3	5
820: S	29869.8525	16	9	25	49	53	102
Total Net Trips		122	326	448	338	230	568

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Distribution	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North via Fruitland Road	20%	25%	20%	20%
via Jones Road	5%	5%	5%	5%
South via Regalview Drive	5%	5%	5%	5%
East via Barton Street	10%	10%	15%	15%
via Highway 8	20%	15%	15%	15%
West via Barton Street	20%	20%	25%	15%
via Highway 8	20%	20%	15%	25%

Trip Assignment	M Peak Hour	
	In	Out
North via Fr	24	82
via Jd	6	16
South via R	6	16
via B	12	33
East via H	24	49
via B	24	65
West via H	24	65
Total	122	326

C/F G/H

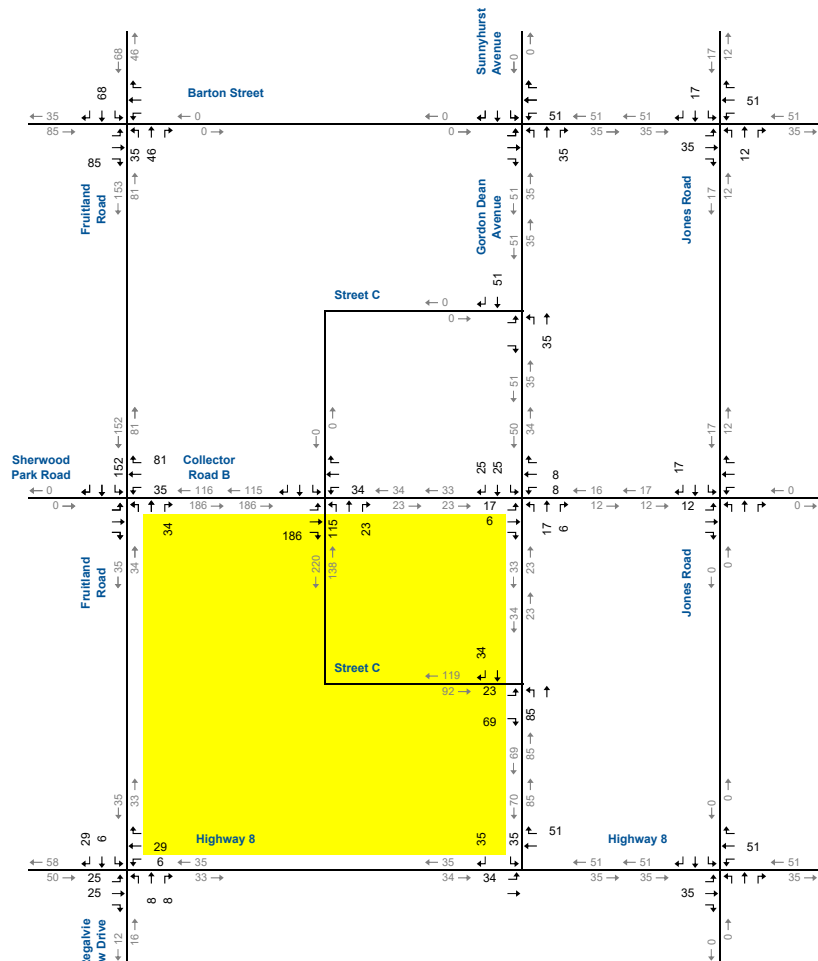
50% 50% split between Collector B and Gordon Dean Ave
50% 50% split between Fruitland Rd and Highway 8
50% 50% split between Collector B and Gordon Dean Ave

50% 50% split between Fruitland Rd and Highway 8

All TTS Zones	AM	AM	PM	PM
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	#####	#####	###	100%

Check	In	Out
Intern	122	325
Exterr	120	327

PM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	35	46	0	0	68	0	0	0	85	0	0	0
1700	2	0	0	35	0	0	0	0	0	0	51	0	0
1700	3	0	12	0	0	17	0	0	35	0	0	51	0
1700	4	0	0	34	152	0	0	0	0	0	35	0	81
1700	5	0	8	8	0	6	29	25	25	0	6	29	0
1700	6	0	0	0	0	0	0	0	35	0	0	51	0
1700	7	0	17	6	0	25	25	17	6	0	8	8	0
1700	8	0	0	0	0	0	17	12	0	0	0	0	0
1700	9				35		35	34	0			0	51
1700	10	0	35			51	0	0	0				
1700	11	115	0	23	0	0	0	0	0	186	34	0	0
1700	12	85	0			0	34	23		69			

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

F3	Low Density Residential	90	units			
F4	School	30	students			
SW1	Low Density Residential	59	units			
SW2	Medium Density Reside	192	units			
SW3	Low Density Residential	104	units			
SW4	Park					
SW5	Low Density Residential	230	units			
SW6	Low Density Residential	98	units			
SW7	Medium Density Reside	265	units			
SW8	Commercial	0.76	ha	81805.72	sf	25% coverage
SW9	Commercial	0.35	ha	37673.69	sf	25% coverage
SW10	Low Density Residential	28	units			

Trip Generation

Land Use	Variable	Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
220: M	609	51	161	212	178	104	282
221: M	457	43	140	189	109	70	179
520: E	30	12	10	22	2	3	5
820: S	29869.8525	16	9	25	49	53	102
Total Net Trips		122	326	448	338	230	568

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Distribution	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North via Fruitland Road	20%	25%	20%	20%
via Jones Road	5%	5%	5%	5%
South via Regalview Drive	5%	5%	5%	5%
East via Barton Street	10%	10%	15%	15%
via Highway 8	20%	15%	15%	15%
West via Barton Street	20%	20%	25%	15%
via Highway 8	20%	20%	15%	25%

Trip Assignment	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
North via Fr	68	46		
via Jd	17	12		
South via R	17	12		
via B	51	35		
East via H	51	35		
via B	85	35		
West via H	51	58		
Total	338	230		

C/F G/H

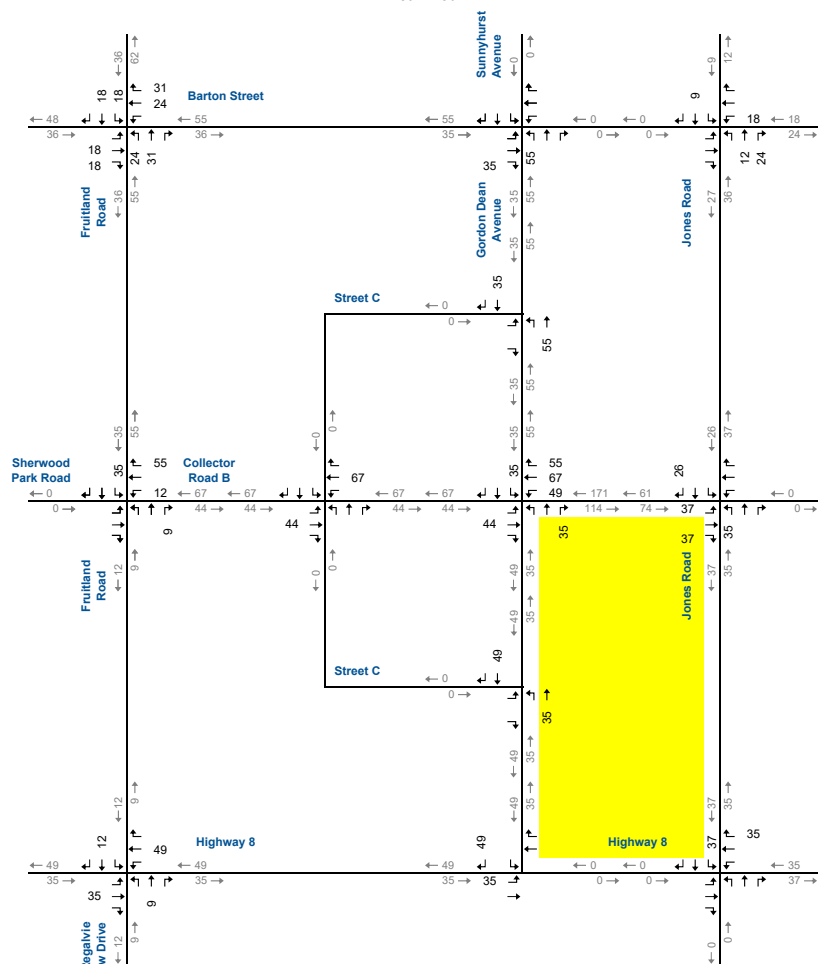
50% 50% split between Collector B and Gordon Dean Ave
50% 50% split between Fruitland Rd and Highway 8
50% 50% split between Collector B and Gordon Dean Ave

50% 50% split between Fruitland Rd and Highway 8

All TTS Zones	AM	AM	PM	PM
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	####	100%

Check	In	Out
Intern	339	230
Exterr	338	233

AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	24	31	0	18	18	0	0	18	18	0	24	31
900	2	55	0	0	0	0	0	0	0	35	0	0	0
900	3	0	12	24	0	9	0	0	0	0	18	0	0
900	4	0	0	9	35	0	0	0	0	0	12	0	55
900	5	0	9	0	0	12	0	0	35	0	0	49	0
900	6	0	0	0	37	0	0	0	0	0	0	0	35
900	7	0	0	35	35	0	0	0	44	0	49	67	55
900	8	35	0	0	0	0	26	37	0	37	0	0	0
900	9	0	0	0	0	49	35	0	0	0	0	0	0
900	10	0	55	0	35	0	0	0	0	0	0	0	0
900	11	0	0	0	0	0	0	44	0	0	0	67	0
900	12	0	35	0	49	0	0	0	0	0	0	0	0

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

SE1	Medium Density Reside	188	units
SE2	Low Density Residential	125	
SE3	Low Density Residential	116	units
SE4	Park		
SE5	Commercial	2.14	ha
SE6	School	260	tudents
SE7	Low Density Residential	38	

Trip Generation

In	Us	Variable	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
220	M	279	26	83	109	89	52	141
221	M	188	16	55	71	45	29	74
520	E	260	104	88	192	19	23	42
820	S	57586.925	30	18	48	94	102	196
Total Net Trips			176	244	420	247	206	453

AM Peak Hour PM Peak Hour

In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Distribution	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
via Fruitland Road	20%	25%	20%	20%
via Jones Road	5%	5%	5%	5%
via Regalview Drive	5%	5%	5%	5%
via Barton Street	10%	10%	15%	15%
via Highway 8	20%	15%	15%	15%
via Barton Street	20%	20%	25%	15%
via Highway 8	20%	20%	15%	25%

Trip Assignment	M Peak Hour		PM Peak Hour	
	In	Out	In	Out
via Fruitland Road	35	61		
via Jones Road	9	12.2		
via Regalview Drive	9	12.2		
via Barton Street	18	24.4		
via Highway 8	35	36.6		
via Barton Street	35	48.8		
via Highway 8	35	48.8		
Total	176	244		

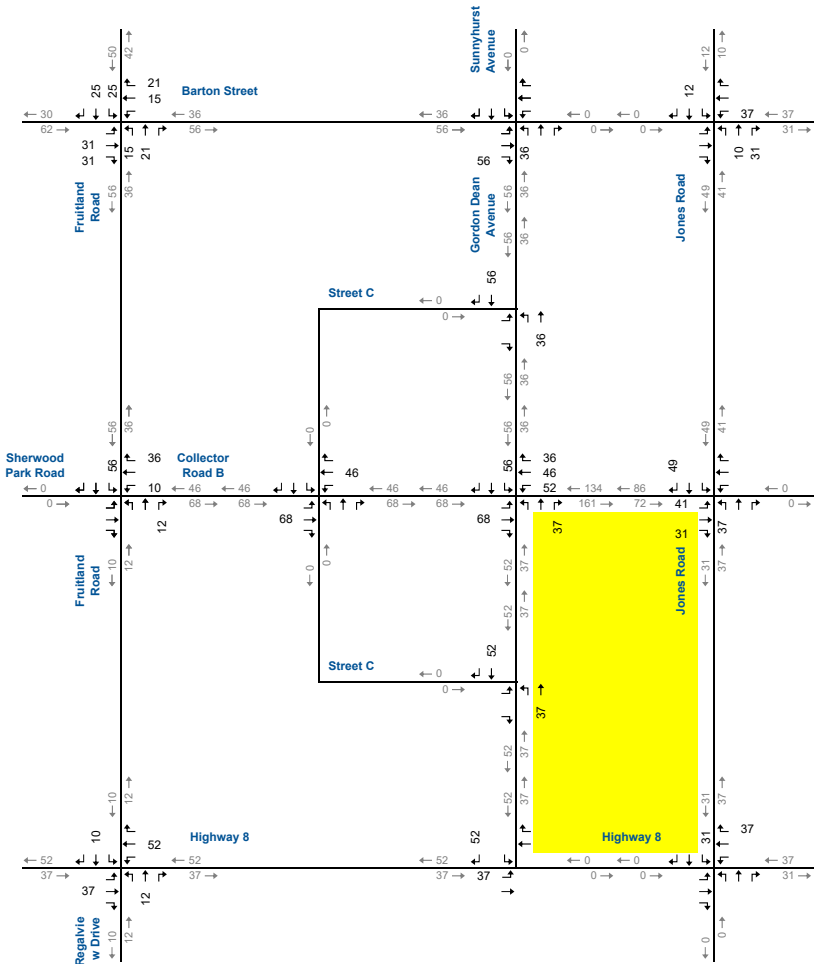
F B
50% 50% split between Fruitland Rd and Barton St

50% 50% split between Fruitland Rd and Barton St

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check	In	Out
Intern	175	245
Extern	178	244

PM Peak Hour



TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	15	21	0	25	25	0	0	31	31	0	15	21
1700	2	36	0	0	0	0	0	0	0	56	0	0	0
1700	3	0	10	31	0	12	0	0	0	0	37	0	0
1700	4	0	0	12	56	0	0	0	0	0	10	0	36
1700	5	0	12	0	0	10	0	0	37	0	0	52	0
1700	6	0	0	0	31	0	0	0	0	0	0	0	37
1700	7	0	0	37	56	0	0	0	68	0	52	46	36
1700	8	37	0	0	0	0	49	41	0	31	0	0	0
1700	9				0	52	37	0				0	0
1700	10	0	36			56	0	0		0			
1700	11	0	0	0	0	0	0	0	68	0	0	46	0
1700	12	0	37			52	0	0		0			

- # Intersection
- 1 Barton St and Fruitland Rd
 - 2 Barton St and Sunnyhurst Ave
 - 3 Barton St and Jones Rd
 - 4 Sherwood Park Rd and Fruitland Rd
 - 5 Highway 8 and Regalview Dr/Fruitland Rd
 - 6 Highway 8 and Jones Rd
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 - 8 Collector Road B and Jones Road
 - 9 Highway 8 and Gordon Dean Avenue
 - 10 Gordon Dean Avenue and Street C (north leg)
 - 11 Collector Road B and Street C
 - 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

SE1	Medium Density Reside	188	units
SE2	Low Density Residential	125	
SE3	Low Density Residential	116	units
SE4	Park		
SE5	Commercial	2.14	ha
SE6	School	260	tudents
SE7	Low Density Residential	38	

Trip Generation

In	Us	Variable	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
220	M	279	26	83	109	89	52	141
221	M	188	16	55	71	45	29	74
520	E	260	104	88	192	19	23	42
820	S	57586.925	30	18	48	94	102	196
Total Net Trips			176	244	420	247	206	453

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
	via Barton Street	10%	10%	15%	15%
East	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

Trip Assignment		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fr	49	41		
	via Jd	12	10		
South	via R	12	10		
	via B	37	31		
East	via H	37	31		
	via B	62	31		
West	via H	37	52		
Total		247	206		

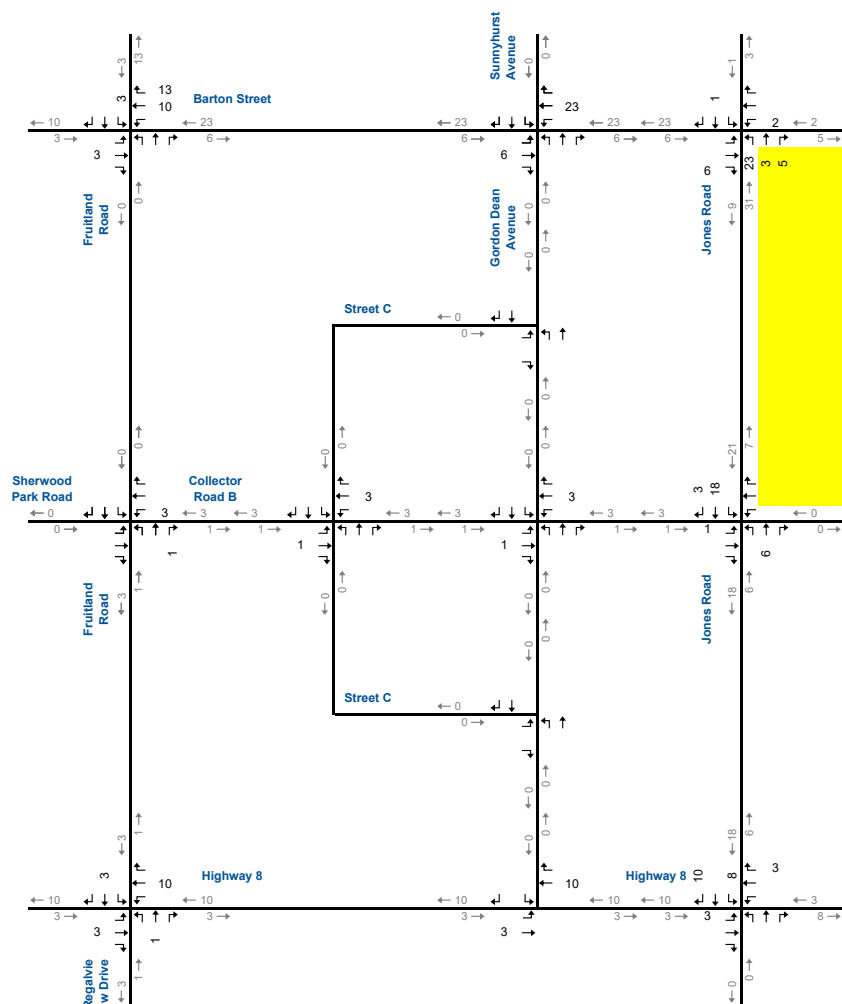
F B
50% 50% split between Fruitland Rd and Barton St

50% 50% split between Fruitland Rd and Barton St

All TTS Zones	AM		PM	
	In	Out	In	Out
North	20%	30%	32%	26%
East	18%	12%	7%	12%
South	8%	2%	2%	2%
West	55%	56%	59%	59%
Total	####	####	###	100%

Check	In	Out
Intern	247	206
Exterr	247	206

AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	0	0	0	3	0	0	0	3	0	0	10	13
900	2	0	0	0	0	0	0	0	6	0	0	23	0
900	3	23	3	5	0	1	0	0	0	6	2	0	0
900	4	0	0	1	0	0	0	0	0	0	3	0	0
900	5	0	1	0	0	3	0	0	3	0	0	10	0
900	6	0	0	0	8	0	10	3	0	0	0	0	3
900	7	0	0	0	0	0	0	0	1	0	0	3	0
900	8	0	6	0	0	18	3	1	0	0	0	0	0
900	9				0		0	0	3			10	0
900	10	0	0			0	0	0		0			
900	11	0	0	0	0	0	0	0	1	0	0	3	0
900	12	0	0			0	0	0		0			

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
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- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

- J1 Medium Density Reside 67 units
J3 Medium Density Reside 107 units

Trip Generation

In	Us	Variable	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
221	M	174	15	50	65	41	27	68
Total Net Trips			15	50	65	41	27	68

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

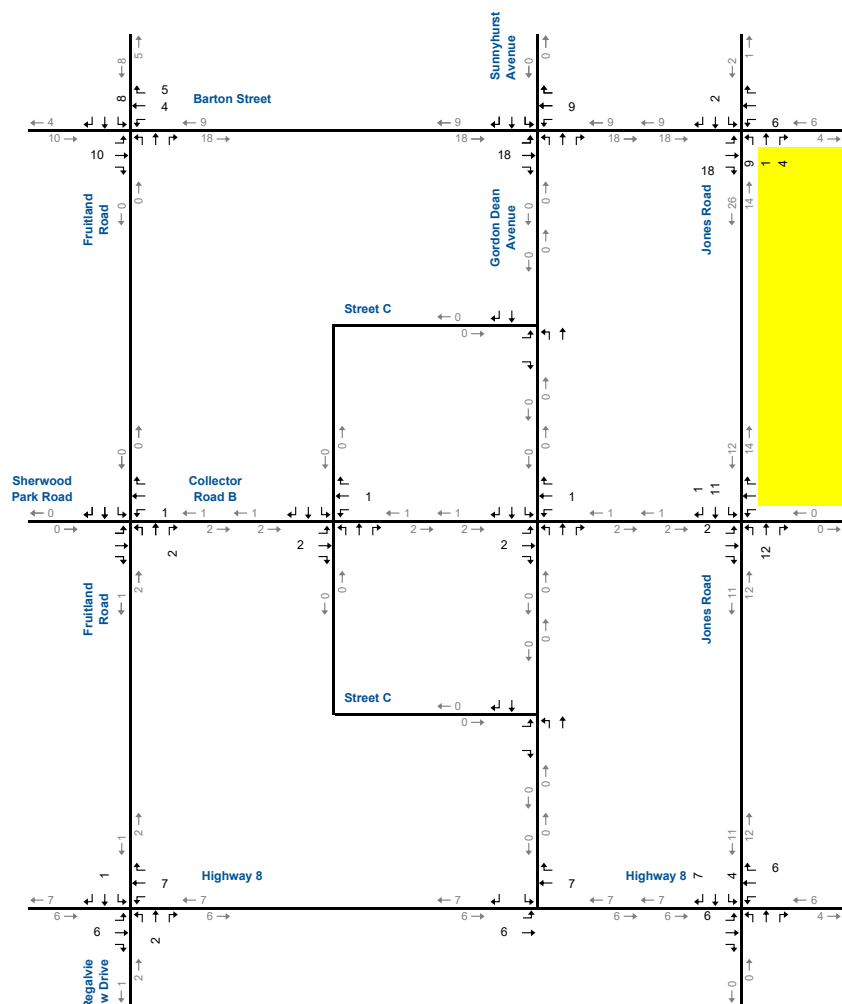
Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
East	via Barton Street	10%	10%	15%	15%
	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		###	###	###	100%

Trip Assign		M Peak Hour	
		In	Out
North	via F	3	12.5
	via J	1	3
South	via R	1	3
East	via B	2	5
	via H	3	8
West	via B	3	10
	via H	3	10
Total		15	50

Check In Out
Intern 16 52
Exterr 16 52

PM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
1700	1	0	0	0	8	0	0	0	10	0	0	4	5
1700	2	0	0	0	0	0	0	0	18	0	0	9	0
1700	3	9	1	4	0	2	0	0	0	18	6	0	0
1700	4	0	0	2	0	0	0	0	0	0	1	0	0
1700	5	0	2	0	0	1	0	0	6	0	0	7	0
1700	6	0	0	0	4	0	7	6	0	0	0	0	6
1700	7	0	0	0	0	0	0	0	2	0	0	1	0
1700	8	0	12	0	0	11	1	2	0	0	0	0	0
1700	9				0			0	6			7	0
1700	10	0	0					0	0	0			
1700	11	0	0	0	0	0	0	0	2	0	0	1	0
1700	12	0	0					0	0	0			

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

- J1 Medium Density Reside 67 units
J3 Medium Density Reside 107 units

Trip Generation

In	Us	Variable	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
221	M	174	15	50	65	41	27	68
Total Net Trips			15	50	65	41	27	68

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
East	via Barton Street	10%	10%	15%	15%
	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		###	###	###	100%

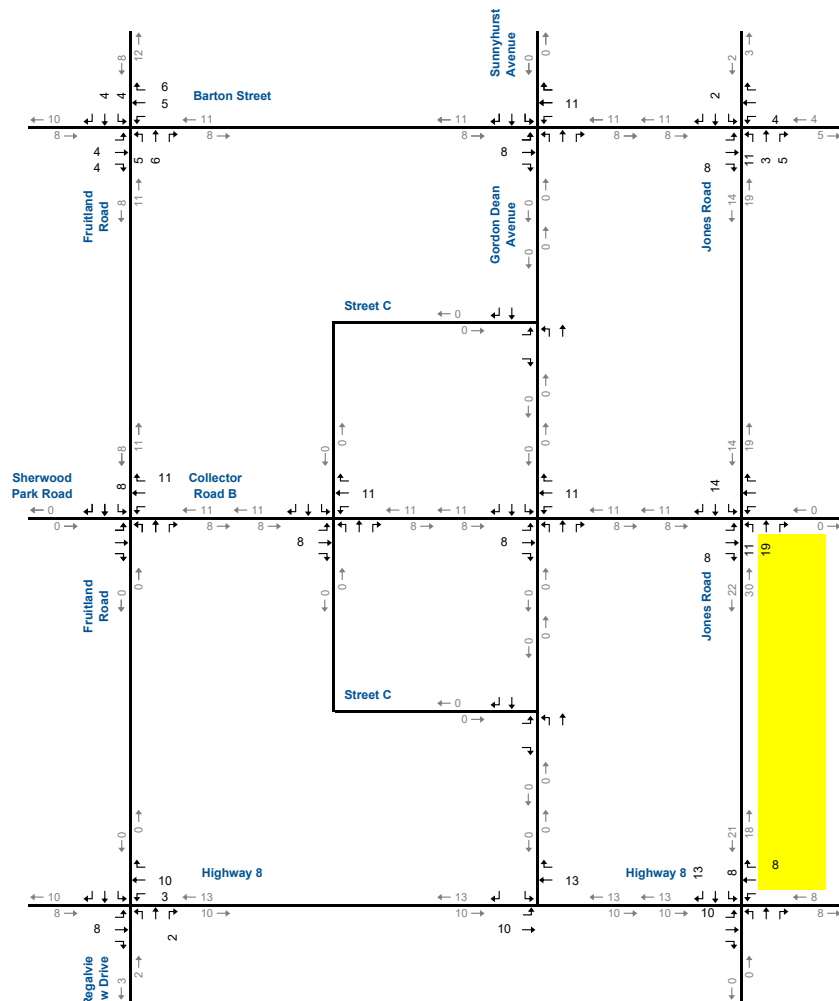
AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Assign		M Peak Hour	
		In	Out
North	via F	8	5
	via J	2	1
South	via R	2	1
East	via B	6	4
	via H	6	4
West	via B	10	4
	via H	6	7
Total		41	27

Check	In	Out
Intern	40	26
Exterr	40	26

AM Peak Hour



TIME	INT	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1	5	6	0	4	4	0	0	4	4	0	5	6
900	2	0	0	0	0	0	0	0	8	0	0	11	0
900	3	11	3	5	0	2	0	0	0	8	4	0	0
900	4	0	0	0	8	0	0	0	0	0	0	0	11
900	5	0	0	2	0	0	0	0	8	0	3	10	0
900	6	0	0	0	8	0	13	10	0	0	0	0	8
900	7	0	0	0	0	0	0	0	8	0	0	11	0
900	8	11	19	0	0	14	0	0	0	8	0	0	0
900	9				0		0	0	10			13	0
900	10	0	0		0	0	0		0				
900	11	0	0	0	0	0	0	8	0	0	11	0	
900	12	0	0		0	0	0		0				

Intersection

- 1 Barton St and Fruitland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruitland Rd
- 5 Highway 8 and Regalview Dr/Fruitland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue
- 10 Gordon Dean Avenue and Street C (north leg)
- 11 Collector Road B and Street C
- 12 Gordon Dean Avenue and Street C (south leg)

Site Statistics

J4 Medium Density Reside 119 units
J5 Commercial 2.19 ha 235729.6 sf 25% coverage

Trip Generation

In	Us	Variable	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
221	M	119	9	32	41	29	18	47
820	S	58932.4	31	19	50	96	104	200
Total Net Trips			40	51	91	125	122	247

Trip Distribution		M Peak Hour		PM Peak Hour	
		In	Out	In	Out
North	via Fruitland Road	20%	25%	20%	20%
	via Jones Road	5%	5%	5%	5%
South	via Regalview Drive	5%	5%	5%	5%
East	via Barton Street	10%	10%	15%	15%
	via Highway 8	20%	15%	15%	15%
West	via Barton Street	20%	20%	25%	15%
	via Highway 8	20%	20%	15%	25%

All TTS Zones		AM	AM	PM	PM
		In	Out	In	Out
North		20%	30%	32%	26%
East		18%	12%	7%	12%
South		8%	2%	2%	2%
West		55%	56%	59%	59%
Total		####	####	###	100%

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

equations used due to variables within data range
equations used due to variables within data range
used rates (only rates available)
used rates (commercial size not within data range)

Trip Assign		M Peak Hour	
		In	Out
North	via F	8	13
	via J4	2	3
South	via R	2	3
East	via B	4	5
	via H	8	8
West	via B	8	10
	via H	8	10
Total		40	51

Check In Out
Intern 40 51
Exterr 40 51

F/G B/J
50% 50% split between Fruitland Rd and Barton St
50% 50% split between Fruitland Rd and Barton St

[illegible]

#	Intersection
1	Barton St and Fruitland Rd
2	Barton St and Sunnyshurst Ave
3	Barton St and Jones Rd
4	Sherwood Park Rd and Fruitland Rd
5	Highway 8 and Regalview Dr/Fruitland Rd
6	Highway 8 and Jones Rd
7	Gordon Dean Avenue and Collector Road B
8	Collector Road B and Jones Road
9	Highway 8 and Gordon Dean Avenue
10	Gordon Dean Avenue and Street C (north leg)
11	Collector Road B and Street C
12	Gordon Dean Avenue and Street C (south leg)

Trip Generation

AM Peak Hour		PM Peak Hour	
In	Out	In	Out
24%	76%	63%	37%
23%	77%	61%	39%
54%	46%	46%	54%
62%	38%	48%	52%

Trip Assignment		Peak Hours	
		In	Out
North	via Fr	25	24
	via Jc	6	6
South	via R	6	6
East	via B	19	18
	via H	19	18
West	via B	31	18
	via H	19	31
Total		125	122

50% 50% split between Fruitland Rd and Barton St

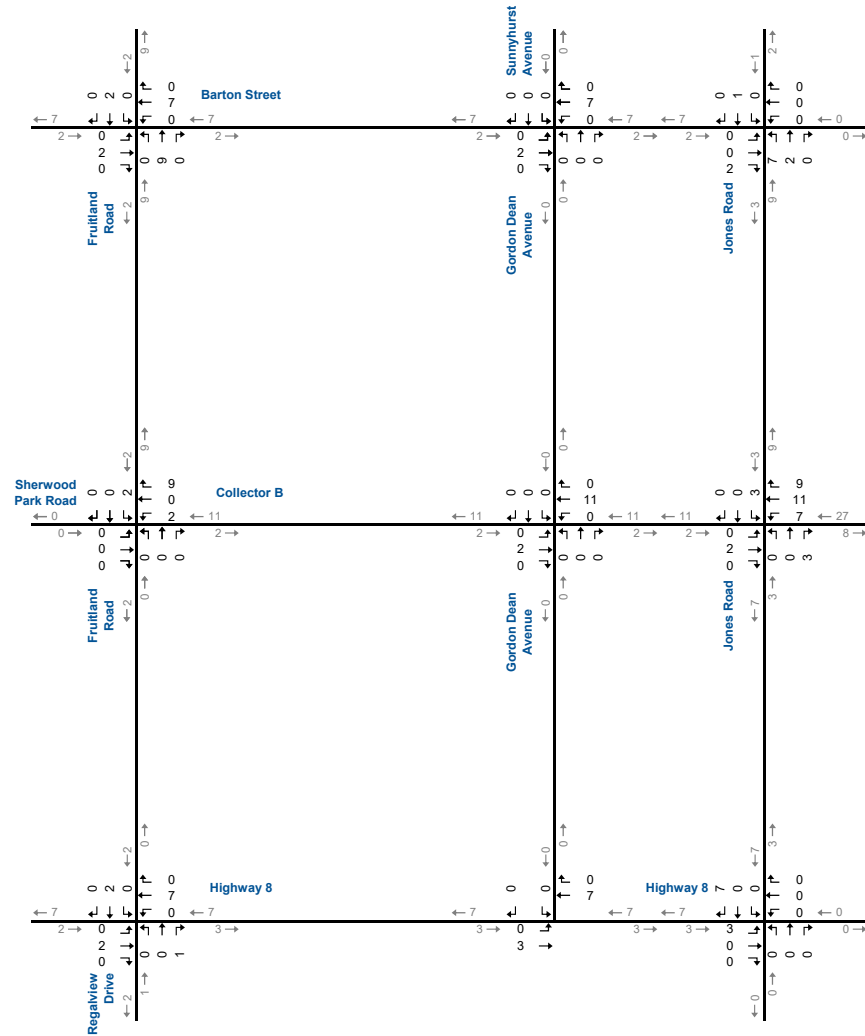
Check	In	Out
Intern	125	122
Exterr	127	121

Appendix G

Block 2 Site Traffic



AM Peak Hour



TIME	INTID	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
900	1		9			2			2			7	
900	2								2			7	
900	3	7	2			1				2			
900	4			2							2		9
900	5			1		2			2			7	
900	6						7	3					
900	7								2			11	
900	8			3	3				2		7	11	9
900	9								3			7	

Intersection

- 1 Barton St and Fruittland Rd
- 2 Barton St and Sunnyhurst Ave
- 3 Barton St and Jones Rd
- 4 Sherwood Park Rd and Fruittland Rd
- 5 Highway 8 and Regalview Dr/Fruittland Rd
- 6 Highway 8 and Jones Rd
- 7 Gordon Dean Avenue and Collector Road B
- 8 Collector Road B and Jones Road
- 9 Highway 8 and Gordon Dean Avenue

Land Use Code	Units/GFA	Formula	AM Peak Hour						PM Peak Hour					
			Rate	%	In	%	Out	Total	Rate	%	In	%	Out	Total
210: Single Family Housing	80 Units		25%	15	75%	46	61		63%	51	37%	30	81	

Trip Distribution		AM Peak Hour	
Direction		In	Out
N via Fruittland	20%	25%	
N via Jones	5%	5%	
S via Regalview	5%	5%	
E via Barton	10%	10%	
E via Highway 8	20%	15%	
W via Barton	20%	20%	
W via Highway 8	20%	20%	

Assumption

Low Density Res 2
40 uph
2.0 ha
80 units
75% Use Jones

check In Out
intern 8 27
extern 8 27

Direction	In		Out	
	Round	Raw	Round	Raw
N via Fruittland	2	2.3	9	8.6
N via Jones	1	0.6	2	1.7
S via Regalview	1	0.6	2	1.7
E via Barton	4	4.4	3	3.5
E via Highway 8	2	2.3	5	5.2
W via Barton	2	2.3	7	6.9
W via Highway 8	2	2.3	7	6.9
Total	8		27	

Appendix B – Secondary Plan Residential Density Chart

RESIDENTIAL CATEGORIES FOR ALL FUTURE & EXISTING SECONDARY PLANS		
Volume 1	Built Form	Density
R1 0 – 60 uph	Low Density 1 Includes only singles	0-20 units per hectare (uph)
	Low Density 1 (for existing Secondary Plans ONLY) (a) Includes single detached at a maximum density of 18 units per hectare. (b) Includes single detached at a maximum density of 15 units per hectare.	0 - 20 uph
	Low Density 2 Includes singles, semi, duplex, triplex, and street town homes	
	Low Density 2 (for existing Secondary Plans ONLY) (a) Includes only single and semi detached dwellings (b) Includes single, semi, and duplex dwellings (c) Includes street, block, and courtyard townhouses, as well as other innovative ground oriented attached housing forms (d) Includes single and semi detached dwellings, row houses, and stacked and bickied townhouses, as well as innovative forms of attached housing (e) Includes single and semi detached dwellings, duplex, triplex dwellings, cluster homes (f) Includes single and semi detached dwellings, duplex, and triplex (g) Single detached, semi-detached and duplex dwellings, converted dwellings, shared accommodation, rooming and boarding houses and other similar forms of housing (h) Street and block townhouse dwellings, and other forms of multiple dwellings such as duplexes, triplexes and stacked townhouses	20 - 40 uph

#	Intersection
1	Barton St and Fruitland Rd
2	Barton St and Sunnyhurst Ave
3	Barton St and Jones Rd
4	Sherwood Park Rd and Fruitland Rd
5	Highway 8 and Regalview Dr/Fruitland Rd
6	Highway 8 and Jones Rd
7	Gordon Dean Avenue and Collector Road B
8	Collector Road B and Jones Road
9	Highway 8 and Gordon Dean Avenue

Trip Distribution	PM Peak Hour	
	In	Out
N via Fruitland	20%	20%
N via Jones	5%	5%
S via Regalview	5%	5%
E via Barton	15%	15%
E via Highway 8	15%	15%
W via Barton	25%	15%
W via Highway 8	15%	25%

assumption
Low Density Res 2
40 uph
2.0 ha
80 units
75% Use Jones

check In	Out
intern	28 16
exterr	28 16

RESIDENTIAL CATEGORIES FOR ALL FUTURE & EXISTING SECONDARY PLANS

Volume 1	Built Form	Density
	Low Density 1 Includes only singles Low Density 1 (For existing Secondary Plans ONLY) (a) Includes single detached at a maximum density of 18 units per hectare (b) Includes single detached at a maximum density of 15 units per hectare	0-20 units per hectare (uph) 0-20 uph
	Low Density 2 Includes singles, semi, duplex, triplex, and street town houses Low Density 2 (For existing Secondary Plans ONLY) (a) Includes only single and semi detached dwellings (b) Includes single, semi, and duplex dwellings (c) Includes street, block, and courtyard townhouses, as well as other innovative ground oriented attached housing forms (d) Includes single and semi detached dwellings, row houses, and stacked and stacked townhouses, as well as innovative forms of attached housing (e) Includes single and semi detached dwellings; duplex, link dwellings; cluster houses	20 - 40 uph
R1 0-60 uph	(f) Includes single and semi detached dwellings, duplex, and triplex (g) Single detached, semi-detached and duplex dwellings, converted dwellings, senior accommodation, rooming and boarding houses and other similar forms of housing (h) Street and block townhouses dwellings, and other forms of multiple dwellings such as duplexes, triplexes and stacked townhouses	

Appendix H

Future Background Traffic Operations Reports



Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Background AM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	304	262	8	230	113	47	341	153	508
v/c Ratio	0.59	0.16	0.02	0.26	0.16	0.33	0.55	0.62	0.83
Control Delay	23.2	11.9	27.9	27.4	14.8	26.3	25.7	35.0	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	11.9	27.9	27.4	14.8	26.3	25.7	35.0	32.4
Queue Length 50th (m)	35.1	10.7	0.9	27.3	0.0	5.7	44.9	21.1	61.5
Queue Length 95th (m)	62.7	18.1	4.1	46.2	15.7	12.2	55.2	33.3	77.2
Internal Link Dist (m)	518.7		497.4			466.4		267.6	
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	517	1610	415	888	722	174	758	299	719
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.16	0.02	0.26	0.16	0.27	0.45	0.51	0.71
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	252	185	32	7	191	94	39	267	16	127	161	261
Future Volume (vph)	252	185	32	7	191	94	39	267	16	127	161	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frft	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3128		1309	1740	1308	1689	1757		1545	1523	
Flt Permitted	0.61	1.00		0.59	1.00	1.00	0.23	1.00		0.43	1.00	
Satd. Flow (perm)	1015	3128		813	1740	1308	406	1757		696	1523	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	304	223	39	8	230	113	47	322	19	153	194	314
RTOR Reduction (vph)	0	14	0	0	0	55	0	3	0	0	74	0
Lane Group Flow (vph)	304	248	0	8	230	58	47	338	0	153	434	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	13%	9%	10%	6%	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	45.9	45.9		45.9	45.9	45.9	31.8	31.8		31.8	31.8	
Effective Green, g (s)	45.9	45.9		45.9	45.9	45.9	31.8	31.8		31.8	31.8	
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.35	0.35		0.35	0.35	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	517	1595		414	887	667	143	620		245	538	
v/s Ratio Prot		0.08			0.13			0.19			c0.29	
v/s Ratio Perm	c0.30			0.01		0.04	0.12			0.22		
v/c Ratio	0.59	0.16		0.02	0.26	0.09	0.33	0.55		0.62	0.81	
Uniform Delay, d1	15.4	11.7		10.9	12.5	11.3	21.3	23.3		24.1	26.3	
Progression Factor	1.00	1.00		1.98	1.89	4.46	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	0.2		0.1	0.7	0.3	1.3	1.0		4.9	8.7	
Delay (s)	20.3	11.9		21.7	24.2	50.7	22.6	24.3		29.0	35.0	
Level of Service	C	B		C	C	D	C	C		C	C	
Approach Delay (s)	16.4			32.6			24.1			33.6		
Approach LOS	B			C			C			C		
Intersection Summary												
HCM 2000 Control Delay		26.6								C		
HCM 2000 Volume to Capacity ratio		0.68										
Actuated Cycle Length (s)		90.0								12.3		
Intersection Capacity Utilization		116.1%								H		
Analysis Period (min)		15										
c Critical Lane Group												

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Background AM Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	13	410	5	359	11	2	33
v/c Ratio	0.02	0.21	0.01	0.19	0.03	0.00	0.07
Control Delay	4.5	5.1	10.2	12.6	19.2	0.0	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	5.1	10.2	12.6	19.2	0.0	11.1
Queue Length 50th (m)	0.5	8.3	0.5	23.1	1.7	0.0	0.8
Queue Length 95th (m)	m1.1	10.4	m2.5	31.5	6.0	0.0	6.5
Internal Link Dist (m)		497.4		340.1		463.5	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	598	1908	555	1861	414	806	482
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	0.02	0.21	0.01	0.19	0.03	0.00	0.07
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	11	328	20	4	298	7	9	0	2	6	0	22
Future Volume (vph)	11	328	20	4	298	7	9	0	2	6	0	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5		
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		1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00		
Frt	1.00	0.99		1.00	1.00		1.00	0.85		0.89		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.99		
Satd. Flow (prot)	1782	3203		1750	3128		1750	1566		1551		
Flt Permitted	0.54	1.00		0.51	1.00		0.74	1.00		0.97		
Satd. Flow (perm)	1008	3203		934	3128		1355	1566		1519		
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)	13	386	24	5	351	8	11	0	2	7	0	26
RTOR Reduction (vph)	0	5	0	0	2	0	0	1	0	0	18	0
Lane Group Flow (vph)	13	405	0	5	357	0	11	1	0	0	15	0
Confl. Peds. (#/hr)	1						1					
Heavy Vehicles (%)	0%	11%	2%	2%	14%	0%	2%	2%	2%	0%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Effective Green, g (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.31	0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	599	1904		555	1859		414	478			464	
v/s Ratio Prot		c0.13			0.11			0.00				
v/s Ratio Perm	0.01			0.01			0.01				c0.01	
v/c Ratio	0.02	0.21		0.01	0.19		0.03	0.00			0.03	
Uniform Delay, d1	7.5	8.5		7.4	8.4		21.9	21.7			21.9	
Progression Factor	0.58	0.59		1.37	1.48		0.86	1.00			1.00	
Incremental Delay, d2	0.1	0.2		0.0	0.1		0.1	0.0			0.1	
Delay (s)	4.4	5.2		10.2	12.5		18.9	21.7			22.0	
Level of Service	A	A		B	B		B	C			C	
Approach Delay (s)		5.2			12.4			19.4			22.0	
Approach LOS		A			B			B			C	
Intersection Summary												
HCM 2000 Control Delay		9.2			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.15										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		24.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	33	311	2	329	113	80
v/c Ratio	0.09	0.21	0.00	0.22	0.16	0.14
Control Delay	8.5	8.9	13.0	14.4	22.7	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	8.9	13.0	14.4	22.7	12.4
Queue Length 50th (m)	3.4	16.6	0.2	16.3	15.0	5.7
Queue Length 95th (m)	6.4	18.5	1.3	21.7	25.5	12.2
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	376	1496	471	1463	726	566
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	0.21	0.00	0.22	0.16	0.14
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	27	234	18	2	245	22	26	56	10	17	31	17
Future Volume (vph)	27	234	18	2	245	22	26	56	10	17	31	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
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			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.99			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1426	3233		1742	3156			1761			1342	
Flt Permitted	0.54	1.00		0.56	1.00			0.92			0.93	
Satd. Flow (perm)	817	3233		1023	3156			1645			1265	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	33	289	22	2	302	27	32	69	12	21	38	21
RTOR Reduction (vph)	0	6	0	0	8	0	0	4	0	0	12	0
Lane Group Flow (vph)	33	305	0	2	321	0	0	109	0	0	68	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	22%	8%	23%	0%	12%	6%	0%	2%	0%	0%	40%	43%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	41.5	41.5		41.5	41.5			39.5			39.5	
Effective Green, g (s)	41.5	41.5		41.5	41.5			39.5			39.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46			0.44			0.44	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	376	1490		471	1455			721			555	
v/s Ratio Prot		0.09			c0.10							
v/s Ratio Perm	0.04			0.00				c0.07			0.05	
v/c Ratio	0.09	0.20		0.00	0.22			0.15			0.12	
Uniform Delay, d1	13.6	14.4		13.1	14.6			15.2			15.0	
Progression Factor	0.57	0.61		1.00	1.00			1.54			1.00	
Incremental Delay, d2	0.5	0.3		0.0	0.4			0.4			0.5	
Delay (s)	8.3	9.1		13.1	14.9			23.9			15.4	
Level of Service	A	A		B	B			C			B	
Approach Delay (s)		9.1			14.9			23.9			15.4	
Approach LOS		A			B			C			B	
Intersection Summary												
HCM 2000 Control Delay			13.8							B		
HCM 2000 Volume to Capacity ratio			0.19									
Actuated Cycle Length (s)			90.0							9.0		
Intersection Capacity Utilization			44.9%							A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	18	2	0	9	5	288	0	2	193	5
Future Volume (Veh/h)	17	0	18	2	0	9	5	288	0	2	193	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	18	0	19	2	0	9	5	300	0	2	201	5
Pedestrians	13											
Lane Width (m)	3.3											
Walking Speed (m/s)	1.2											
Percent Blockage	1											
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	540	530	216	534	533	300	219			300		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	540	530	216	534	533	300	219			300		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	98	100	100	99	100			100		
cM capacity (veh/h)	420	447	820	441	446	740	1349			1261		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	37	11	5	300	2	206						
Volume Left	18	2	5	0	2	0						
Volume Right	19	9	0	0	0	5						
cSH	561	659	1349	1700	1261	1700						
Volume to Capacity	0.07	0.02	0.00	0.18	0.00	0.12						
Queue Length 95th (m)	1.6	0.4	0.1	0.0	0.0	0.0						
Control Delay (s)	11.9	10.6	7.7	0.0	7.9	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	11.9	10.6	0.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay	1.1											
Intersection Capacity Utilization	26.4%			ICU Level of Service				A				
Analysis Period (min)	15											

Queues
5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	183	459	13	566	28	67	70	153
v/c Ratio	0.28	0.19	0.02	0.28	0.22	0.27	0.46	0.48
Control Delay	4.3	4.1	8.9	9.1	37.6	30.0	45.4	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	4.1	8.9	9.1	37.6	30.0	45.4	13.3
Queue Length 50th (m)	6.0	9.6	0.8	20.0	4.4	8.0	11.4	2.3
Queue Length 95th (m)	13.6	17.2	3.5	34.1	10.8	17.3	21.6	15.9
Internal Link Dist (m)	245.7		488.7		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	669	2443	544	1997	321	586	376	583
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.19	0.02	0.28	0.09	0.11	0.19	0.26
Intersection Summary								

HCM Signalized Intersection Capacity Analysis
5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	157	382	13	11	432	55	24	44	14	60	13	119
Future Volume (vph)	157	382	13	11	432	55	24	44	14	60	13	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.96		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1708	3331		1743	3269		1528	1728		1501	1474	
Flt Permitted	0.41	1.00		0.49	1.00		0.60	1.00		0.71	1.00	
Satd. Flow (perm)	733	3331		895	3269		962	1728		1127	1474	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	183	444	15	13	502	64	28	51	16	70	15	138
RTOR Reduction (vph)	0	2	0	0	7	0	0	14	0	0	119	0
Lane Group Flow (vph)	183	457	0	13	559	0	28	53	0	70	34	0
Confl. Peds. (#/hr)	5		1	1		5	3		2	2		3
Heavy Vehicles (%)	2%	4%	9%	0%	3%	17%	10%	0%	9%	12%	0%	7%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	65.9	65.9		54.7	54.7		12.1	12.1		12.1	12.1	
Effective Green, g (s)	65.9	65.9		54.7	54.7		12.1	12.1		12.1	12.1	
Actuated g/C Ratio	0.73	0.73		0.61	0.61		0.13	0.13		0.13	0.13	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	626	2441		544	1989		129	232		151	198	
v/s Ratio Prot	c0.03	0.14			0.17			0.03			0.02	
v/s Ratio Perm	c0.19			0.01			0.03			c0.06		
v/c Ratio	0.29	0.19		0.02	0.28		0.22	0.23		0.46	0.17	
Uniform Delay, d1	3.7	3.7		7.0	8.3		34.7	34.7		35.9	34.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.1	0.4		0.8	0.5		2.2	0.4	
Delay (s)	4.0	3.9		7.1	8.7		35.5	35.2		38.2	34.9	
Level of Service	A	A		A	A		D	D		D	C	
Approach Delay (s)		3.9			8.6			35.3			35.9	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay		12.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		93.1%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	53	378	0	0	445	30	1	0	0	10	0	31
Future Volume (Veh/h)	53	378	0	0	445	30	1	0	0	10	0	31
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)	64	455	0	0	536	36	1	0	0	12	0	37
Pedestrians												4
Lane Width (m)												4.0
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	576			455			888	1159	228	914	1141	290
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	576			455			888	1159	228	914	1141	290
tC, single (s)	4.3			4.1			7.5	6.5	6.9	8.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	93			100			100	100	100	92	100	94
cM capacity (veh/h)	937			1116			216	183	781	156	188	667
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	64	303	152	0	357	215	1	0	12	37		
Volume Left	64	0	0	0	0	0	1	0	12	0		
Volume Right	0	0	0	0	0	36	0	0	0	37		
cSH	937	1700	1700	1700	1700	1700	216	1700	156	667		
Volume to Capacity	0.07	0.18	0.09	0.00	0.21	0.13	0.00	0.00	0.08	0.06		
Queue Length 95th (m)	1.6	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.8	1.3		
Control Delay (s)	9.1	0.0	0.0	0.0	0.0	0.0	21.8	0.0	30.0	10.7		
Lane LOS	A							C	A	D	B	
Approach Delay (s)	1.1			0.0			21.8	15.4				
Approach LOS							C	C				
Intersection Summary												
Average Delay	1.2											
Intersection Capacity Utilization	33.8%			ICU Level of Service				A				
Analysis Period (min)	15											

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Background AM Peak Hour

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	2	12	12	26
v/c Ratio	0.02	0.10	0.00	0.01
Control Delay	39.5	40.5	0.0	0.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	39.5	40.5	0.0	0.8
Queue Length 50th (m)	0.3	2.0	0.0	0.0
Queue Length 95th (m)	m0.6	7.0	m0.0	1.0
Internal Link Dist (m)	493.7	348.3	536.6	463.5
Turn Bay Length (m)				
Base Capacity (vph)	810	810	3296	3296
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.00	0.01	0.00	0.01
Intersection Summary				
m	Volume for 95th percentile queue is metered by upstream signal.			

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Background AM Peak Hour

	↖	→	↗	↖	←	↗	↖	↑	↗	↖	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	0	2	0	0	11	0	0	11	0	0	24	0
Future Volume (vph)	0	2	0	0	11	0	0	11	0	0	24	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Flt		1.00			1.00			1.00			1.00	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1801			1801			3421			3421	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1801			1801			3421			3421	
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)	0	2	0	0	12	0	0	12	0	0	26	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	12	0	0	12	0	0	26	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.5			1.5			79.5			79.5	
Effective Green, g (s)		1.5			1.5			79.5			79.5	
Actuated g/C Ratio		0.02			0.02			0.88			0.88	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		30			30			3021			3021	
v/s Ratio Prot		0.00			c0.01			0.00			c0.01	
v/s Ratio Perm												
v/c Ratio		0.07			0.40			0.00			0.01	
Uniform Delay, d1		43.6			43.8			0.6			0.6	
Progression Factor		1.02			1.00			0.00			1.19	
Incremental Delay, d2		0.8			8.5			0.0			0.0	
Delay (s)		45.1			52.3			0.0			0.7	
Level of Service		D			D			A			A	
Approach Delay (s)		45.1			52.3			0.0			0.7	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay				14.2				HCM 2000 Level of Service			B	
HCM 2000 Volume to Capacity ratio				0.02								
Actuated Cycle Length (s)				90.0				Sum of lost time (s)			9.0	
Intersection Capacity Utilization				15.8%				ICU Level of Service			A	
Analysis Period (min)				15								
c	Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	0	2	0	7	11	9	0	83	3	3	48	0	
Future Volume (Veh/h)	0	2	0	7	11	9	0	83	3	3	48	0	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	2	0	8	12	10	0	90	3	3	52	0	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None						None						
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	166	151	52	150	150	92	52	93					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	166	151	52	150	150	92	52	93					
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1					
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					
p0 queue free %	100	100	100	99	98	99	100	100					
cM capacity (veh/h)	780	739	1016	814	741	966	1554	1501					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	2	30	93	55									
Volume Left	0	8	0	3									
Volume Right	0	10	3	0									
cSH	739	825	1554	1501									
Volume to Capacity	0.00	0.04	0.00	0.00									
Queue Length 95th (m)	0.1	0.8	0.0	0.0									
Control Delay (s)	9.9	9.5	0.0	0.4									
Lane LOS	A	A		A									
Approach Delay (s)	9.9	9.5	0.0	0.4									
Approach LOS	A	A											
Intersection Summary													
Average Delay				1.8									
Intersection Capacity Utilization				19.2%			ICU Level of Service			A			
Analysis Period (min)				15									

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	2	493	540	13	13
v/c Ratio	0.01	0.32	0.35	0.02	0.02
Control Delay	14.0	16.6	16.9	7.4	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	16.6	16.9	7.4	4.3
Queue Length 50th (m)	0.2	27.4	30.4	1.8	0.0
Queue Length 95th (m)	1.4	38.4	42.1	3.8	0.0
Internal Link Dist (m)		488.7	385.6	536.6	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	322	1539	1536	769	696
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	0.01	0.32	0.35	0.02	0.02
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Background AM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↩	↩↩	↩↩	↩	↩	↩
Traffic Volume (vph)	2	454	488	9	12	12
Future Volume (vph)	2	454	488	9	12	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3412		1711	1531
Flt Permitted	0.40	1.00	1.00		0.95	1.00
Satd. Flow (perm)	716	3421	3412		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	493	530	10	13	13
RTOR Reduction (vph)	0	0	2	0	0	7
Lane Group Flow (vph)	2	493	538	0	13	6
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	322	1539	1535		769	688
v/s Ratio Prot		0.14	c0.16		c0.01	
v/s Ratio Perm	0.00					0.00
v/c Ratio	0.01	0.32	0.35		0.02	0.01
Uniform Delay, d1	13.7	15.9	16.2		13.7	13.7
Progression Factor	1.00	1.00	1.00		0.53	0.61
Incremental Delay, d2	0.0	0.6	0.6		0.0	0.0
Delay (s)	13.7	16.5	16.8		7.3	8.4
Level of Service	B	B	B		A	A
Approach Delay (s)		16.4	16.8		7.9	
Approach LOS		B	B		A	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	25.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	372	437	34	320	131	26	198	116	519
v/c Ratio	0.83	0.26	0.08	0.35	0.17	0.17	0.30	0.34	0.84
Control Delay	39.9	13.6	28.3	32.2	19.7	20.2	19.6	22.5	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.9	13.6	28.3	32.2	19.7	20.2	19.6	22.5	35.9
Queue Length 50th (m)	52.5	20.3	5.7	55.0	13.1	2.9	22.2	14.0	71.7
Queue Length 95th (m)	#115.2	33.4	14.4	78.9	27.8	8.1	34.2	24.8	101.5
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	449	1685	451	920	775	179	773	399	723
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.26	0.08	0.35	0.17	0.15	0.26	0.29	0.72

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	353	354	61	32	304	124	25	164	24	110	284	209
Future Volume (vph)	353	354	61	32	304	124	25	164	24	110	284	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3345		1743	1842	1421	1741	1786		1428	1613	
Flt Permitted	0.52	1.00		0.49	1.00	1.00	0.23	1.00		0.62	1.00	
Satd. Flow (perm)	898	3345		902	1842	1421	417	1786		929	1613	
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)	372	373	64	34	320	131	26	173	25	116	299	220
RTOR Reduction (vph)	0	14	0	0	0	66	0	6	0	0	33	0
Lane Group Flow (vph)	372	424	0	34	320	66	26	192	0	116	486	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	45.0	45.0		45.0	45.0	45.0	32.7	32.7		32.7	32.7	
Effective Green, g (s)	45.0	45.0		45.0	45.0	45.0	32.7	32.7		32.7	32.7	
Actuated g/C Ratio	0.50	0.50		0.50	0.50	0.50	0.36	0.36		0.36	0.36	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	449	1672		451	921	710	151	648		337	586	
v/s Ratio Prot		0.13			0.17			0.11			c0.30	
v/s Ratio Perm	c0.41			0.04		0.05	0.06			0.12		
v/c Ratio	0.83	0.25		0.08	0.35	0.09	0.17	0.30		0.34	0.83	
Uniform Delay, d1	19.2	12.9		11.7	13.6	11.8	19.5	20.4		20.8	26.1	
Progression Factor	1.00	1.00		1.96	2.04	6.34	1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.0	0.4		0.3	1.0	0.3	0.5	0.3		0.6	9.5	
Delay (s)	35.2	13.2		23.2	28.8	75.1	20.0	20.7		21.5	35.6	
Level of Service	D	B		C	C	E	C	C		C	D	
Approach Delay (s)		23.4			40.9			20.6			33.0	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay		29.9										
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		90.0										
Intersection Capacity Utilization		119.2%										
Analysis Period (min)		15										
c Critical Lane Group												

Queues

2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	SBT
Lane Group Flow (vph)	13	457	524	23	35
v/c Ratio	0.03	0.23	0.25	0.06	0.08
Control Delay	6.1	6.9	12.9	19.8	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	6.9	12.9	19.8	10.6
Queue Length 50th (m)	0.8	14.3	34.8	3.5	0.7
Queue Length 95th (m)	2.3	16.6	42.4	9.4	6.2
Internal Link Dist (m)		497.4	340.1		346.5
Turn Bay Length (m)	20.0				
Base Capacity (vph)	402	1977	2060	413	445
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	0.03	0.23	0.25	0.06	0.08
Intersection Summary					

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	11	360	15	0	430	0	19	0	0	5	0	24
Future Volume (vph)	11	360	15	0	430	0	19	0	0	5	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5			4.5		4.5			4.5		
Lane Util. Factor	1.00	0.95			0.95		1.00			1.00		
Frpb, ped/bikes	1.00	1.00			1.00		1.00			0.99		
Flpb, ped/bikes	1.00	1.00			1.00		1.00			1.00		
Frt	1.00	0.99			1.00		1.00			0.89		
Flt Protected	0.95	1.00			1.00		0.95			0.99		
Satd. Flow (prot)	1461	3323			3466		1750			1415		
Flt Permitted	0.44	1.00			1.00		0.73			0.98		
Satd. Flow (perm)	677	3323			3466		1353			1394		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	439	18	0	524	0	23	0	0	6	0	29
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	20	0
Lane Group Flow (vph)	13	454	0	0	524	0	23	0	0	0	15	0
Confl. Peds. (#/hr)	1					1						3
Heavy Vehicles (%)	22%	7%	2%	2%	3%	0%	2%	2%	2%	50%	2%	5%
Turn Type	Perm	NA		Perm	NA		Perm			Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5			53.5		27.5			27.5		
Effective Green, g (s)	53.5	53.5			53.5		27.5			27.5		
Actuated g/C Ratio	0.59	0.59			0.59		0.31			0.31		
Clearance Time (s)	4.5	4.5			4.5		4.5			4.5		
Vehicle Extension (s)	3.0	3.0			3.0		3.0			3.0		
Lane Grp Cap (vph)	402	1975			2060		413			425		
v/s Ratio Prot		0.14			c0.15							
v/s Ratio Perm	0.02						c0.02			0.01		
v/c Ratio	0.03	0.23			0.25		0.06			0.03		
Uniform Delay, d1	7.5	8.6			8.7		22.1			21.9		
Progression Factor	0.76	0.78			1.42		0.87			1.00		
Incremental Delay, d2	0.1	0.3			0.1		0.3			0.2		
Delay (s)	5.9	7.0			12.5		19.5			22.1		
Level of Service	A	A			B		B			C		
Approach Delay (s)		7.0			12.5		19.5			22.1		
Approach LOS		A			B		B			C		
Intersection Summary												
HCM 2000 Control Delay			10.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.19									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			9.0		
Intersection Capacity Utilization			34.5%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues 210193 - Block 1 Servicing Strategy
3: Jones Road & Barton Street 2031 Background PM Peak Hour

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	28	491	10	439	54	177
v/c Ratio	0.07	0.33	0.03	0.29	0.08	0.25
Control Delay	8.1	9.6	14.4	16.0	20.3	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	9.6	14.4	16.0	20.3	12.4
Queue Length 50th (m)	2.1	19.0	0.9	23.5	6.4	13.2
Queue Length 95th (m)	5.0	23.1	3.5	30.4	14.1	23.0
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	381	1508	309	1533	707	722
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	0.33	0.03	0.29	0.08	0.25
Intersection Summary						

HCM Signalized Intersection Capacity Analysis 3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	23	374	33	8	345	19	20	18	7	32	59	56
Future Volume (vph)	23	374	33	8	345	19	20	18	7	32	59	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5		
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	0.99		1.00	0.99			0.98		0.95		
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.99		
Satd. Flow (prot)	1738	3335		1527	3397			1756		1636		
Flt Permitted	0.46	1.00		0.43	1.00			0.87		0.94		
Satd. Flow (perm)	847	3335		689	3397			1562		1550		
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	28	451	40	10	416	23	24	22	8	39	71	67
RTOR Reduction (vph)	0	7	0	0	4	0	0	4	0	0	24	0
Lane Group Flow (vph)	28	484	0	10	435	0	0	50	0	0	153	0
Confl. Peds. (#/hr)	3		2	2		3	1		1	1		1
Heavy Vehicles (%)	0%	6%	0%	14%	4%	6%	0%	0%	0%	15%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	40.5	40.5		40.5	40.5			40.5		40.5		
Effective Green, g (s)	40.5	40.5		40.5	40.5			40.5		40.5		
Actuated g/C Ratio	0.45	0.45		0.45	0.45			0.45		0.45		
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5		4.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0		
Lane Grp Cap (vph)	381	1500		310	1528			702		697		
v/s Ratio Prot		c0.15			0.13							
v/s Ratio Perm	0.03			0.01			0.03			c0.10		
v/c Ratio	0.07	0.32		0.03	0.28			0.07		0.22		
Uniform Delay, d1	14.1	15.9		13.8	15.6			14.1		15.1		
Progression Factor	0.53	0.57		1.00	1.00			1.58		1.00		
Incremental Delay, d2	0.4	0.6		0.2	0.5			0.2		0.7		
Delay (s)	7.9	9.7		14.0	16.1			22.5		15.8		
Level of Service	A	A		B	B			C		B		
Approach Delay (s)		9.6			16.0			22.5		15.8		
Approach LOS		A			B			C		B		
Intersection Summary												
HCM 2000 Control Delay		13.5			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.27										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		41.6%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔		↔	↔	
Traffic Volume (veh/h)	20	0	13	1	0	5	22	213	0	8	337	24
Future Volume (Veh/h)	20	0	13	1	0	5	22	213	0	8	337	24
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	22	0	14	1	0	5	24	229	0	9	362	26
Pedestrians		4										
Lane Width (m)		3.3										
Walking Speed (m/s)		1.2										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	679	674	379	671	687	229	392			229		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	679	674	379	671	687	229	392			229		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	100	98	100	100	99	98			99		
cM capacity (veh/h)	333	365	670	354	359	810	1174			1339		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	36	6	24	229	9	388						
Volume Left	22	1	24	0	9	0						
Volume Right	14	5	0	0	0	26						
cSH	414	667	1174	1700	1339	1700						
Volume to Capacity	0.09	0.01	0.02	0.13	0.01	0.23						
Queue Length 95th (m)	2.1	0.2	0.5	0.0	0.2	0.0						
Control Delay (s)	14.5	10.4	8.1	0.0	7.7	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	14.5	10.4	0.8		0.2							
Approach LOS	B	B										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			31.2%				ICU Level of Service			A		
Analysis Period (min)			15									

Queues

5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy

2031 Background PM Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	150	457	19	668	27	36	90	281
v/c Ratio	0.27	0.19	0.04	0.33	0.36	0.14	0.52	0.65
Control Delay	4.7	4.5	9.5	10.1	47.0	21.9	45.3	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	4.5	9.5	10.1	47.0	21.9	45.3	14.3
Queue Length 50th (m)	5.2	10.2	1.2	25.5	4.3	3.0	14.5	5.2
Queue Length 95th (m)	13.3	19.9	4.9	46.0	11.6	10.2	26.9	26.0
Internal Link Dist (m)		245.7		488.7		176.2		531.3
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	584	2460	539	2003	171	560	401	674
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.19	0.04	0.33	0.16	0.06	0.22	0.42
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy

2031 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	135	399	13	17	545	56	24	18	14	81	31	222
Future Volume (vph)	135	399	13	17	545	56	24	18	14	81	31	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.93		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1660	3405		1743	3323		1603	1649		1558	1529	
Flt Permitted	0.36	1.00		0.49	1.00		0.31	1.00		0.73	1.00	
Satd. Flow (perm)	623	3405		896	3323		515	1649		1203	1529	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	150	443	14	19	606	62	27	20	16	90	34	247
RTOR Reduction (vph)	0	1	0	0	6	0	0	14	0	0	211	0
Lane Group Flow (vph)	150	456	0	19	662	0	27	22	0	90	70	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	64.9	64.9		54.0	54.0		13.1	13.1		13.1	13.1	
Effective Green, g (s)	64.9	64.9		54.0	54.0		13.1	13.1		13.1	13.1	
Actuated g/C Ratio	0.72	0.72		0.60	0.60		0.15	0.15		0.15	0.15	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	540	2458		538	1996		75	240		175	222	
v/s Ratio Prot	c0.02	0.13			c0.20			0.01			0.05	
v/s Ratio Perm	0.18			0.02			0.05			c0.07		
v/c Ratio	0.28	0.19		0.04	0.33		0.36	0.09		0.51	0.32	
Uniform Delay, d1	4.1	4.0		7.3	9.0		34.6	33.3		35.5	34.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.1	0.4		2.9	0.2		2.5	0.8	
Delay (s)	4.4	4.2		7.4	9.4		37.6	33.4		38.0	35.2	
Level of Service	A	A		A	A		D	C		D	D	
Approach Delay (s)	4.2				9.3			35.2			35.9	
Approach LOS	A				A			D			D	
Intersection Summary												
HCM 2000 Control Delay		14.2								B		
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		89.9								14.9		
Intersection Capacity Utilization		93.1%								F		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			 			 	
Traffic Volume (veh/h)	33	466	4	4	528	23	1	0	4	32	0	71
Future Volume (Veh/h)	33	466	4	4	528	23	1	0	4	32	0	71
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	37	518	4	4	587	26	1	0	4	36	0	79
Pedestrians					3						5	
Lane Width (m)					3.3						4.0	
Walking Speed (m/s)					1.2						1.2	
Percent Blockage					0						0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	618			522			974	1220	264	953	1209	312
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	618			522			974	1220	264	953	1209	312
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.6	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	96			100			99	100	99	82	100	88
cM capacity (veh/h)	934			1055			177	173	739	196	176	661
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	37	345	177	4	391	222	1	4	36	79		
Volume Left	37	0	0	4	0	0	1	0	36	0		
Volume Right	0	0	4	0	0	26	0	4	0	79		
cSH	934	1700	1700	1055	1700	1700	177	739	196	661		
Volume to Capacity	0.04	0.20	0.10	0.00	0.23	0.13	0.01	0.01	0.18	0.12		
Queue Length 95th (m)	0.9	0.0	0.0	0.1	0.0	0.0	0.1	0.1	4.9	3.0		
Control Delay (s)	9.0	0.0	0.0	8.4	0.0	0.0	25.4	9.9	27.4	11.2		
Lane LOS	A			A			D	A	D	B		
Approach Delay (s)	0.6			0.1			13.0		16.3			
Approach LOS							B		C			
Intersection Summary												
Average Delay				1.8								
Intersection Capacity Utilization			37.1%		ICU Level of Service					A		
Analysis Period (min)			15									

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	9	7	21	16
v/c Ratio	0.07	0.06	0.01	0.00
Control Delay	31.5	40.0	0.0	0.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.5	40.0	0.0	0.9
Queue Length 50th (m)	1.5	1.1	0.0	0.0
Queue Length 95th (m)	m2.6	5.2	m0.0	0.6
Internal Link Dist (m)	493.7	348.3	536.6	463.5
Turn Bay Length (m)				
Base Capacity (vph)	838	838	3299	3299
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.01	0.00
Intersection Summary				
m Volume for 95th percentile queue is metered by upstream signal.				

HCM Signalized Intersection Capacity Analysis
7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	0	8	0	0	6	0	0	19	0	0	15	0
Future Volume (vph)	0	8	0	0	6	0	0	19	0	0	15	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			1.00			1.00			1.00	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1801			1801			3421			3421	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1801			1801			3421			3421	
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)	0	9	0	0	7	0	0	21	0	0	16	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	9	0	0	7	0	0	21	0	0	16	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.4			1.4			79.6			79.6	
Effective Green, g (s)		1.4			1.4			79.6			79.6	
Actuated g/C Ratio		0.02			0.02			0.88			0.88	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		28			28			3025			3025	
v/s Ratio Prot		c0.00			0.00			c0.01			0.00	
v/s Ratio Perm												
v/c Ratio		0.32			0.25			0.01			0.01	
Uniform Delay, d1		43.8			43.8			0.6			0.6	
Progression Factor		0.78			1.00			0.00			1.21	
Incremental Delay, d2		5.3			4.7			0.0			0.0	
Delay (s)		39.7			48.4			0.0			0.7	
Level of Service		D			D			A			A	
Approach Delay (s)		39.7			48.4			0.0			0.7	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		13.4			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.01										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		15.8%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱		↰	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	0	8	0	6	6	4	0	41	8	12	88	0
Future Volume (Veh/h)	0	8	0	6	6	4	0	41	8	12	88	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	0	7	7	4	0	45	9	13	96	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	179	176	96	176	172	50	96			54		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	179	176	96	176	172	50	96			54		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	99	99	100	100			99		
cM capacity (veh/h)	769	711	960	774	716	1019	1498			1551		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	18	54	109								
Volume Left	0	7	0	13								
Volume Right	0	4	9	0								
cSH	711	791	1498	1551								
Volume to Capacity	0.01	0.02	0.00	0.01								
Queue Length 95th (m)	0.3	0.5	0.0	0.2								
Control Delay (s)	10.1	9.7	0.0	0.9								
Lane LOS	B	A		A								
Approach Delay (s)	10.1	9.7	0.0	0.9								
Approach LOS	B	A										
Intersection Summary												
Average Delay		1.9										
Intersection Capacity Utilization		24.7%						ICU Level of Service		A		
Analysis Period (min)		15										

Queues
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

	EBL	EBT	WBT	SBL	SBR
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	9	528	675	8	9
v/c Ratio	0.03	0.34	0.44	0.01	0.01
Control Delay	14.5	16.9	18.0	4.1	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.5	16.9	18.0	4.1	2.8
Queue Length 50th (m)	0.8	29.7	39.9	0.5	0.0
Queue Length 95th (m)	3.5	41.2	53.8	1.7	0.2
Internal Link Dist (m)	488.7	385.6	536.6		
Turn Bay Length (m)	50.0				
Base Capacity (vph)	259	1539	1536	769	693
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	0.03	0.34	0.44	0.01	0.01
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Background PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	8	486	610	11	7	8
Future Volume (vph)	8	486	610	11	7	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3412		1711	1531
Flt Permitted	0.32	1.00	1.00		0.95	1.00
Satd. Flow (perm)	577	3421	3412		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	528	663	12	8	9
RTOR Reduction (vph)	0	0	2	0	0	5
Lane Group Flow (vph)	9	528	673	0	8	4
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	259	1539	1535		769	688
v/s Ratio Prot		0.15	c0.20		c0.00	
v/s Ratio Perm	0.02					0.00
v/c Ratio	0.03	0.34	0.44		0.01	0.01
Uniform Delay, d1	13.8	16.1	17.0		13.7	13.6
Progression Factor	1.00	1.00	1.00		0.30	0.36
Incremental Delay, d2	0.3	0.6	0.9		0.0	0.0
Delay (s)	14.1	16.7	17.9		4.1	4.9
Level of Service	B	B	B		A	A
Approach Delay (s)		16.7	17.9		4.5	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay			17.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.22			
Actuated Cycle Length (s)			90.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			28.9%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Background AM Peak Hour

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	378	325	11	284	142	59	422	190	633
v/c Ratio	0.89	0.22	0.03	0.35	0.21	0.58	0.61	0.81	0.95
Control Delay	47.9	13.6	24.2	25.8	11.3	46.7	25.6	52.3	47.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	13.6	24.2	25.8	11.3	46.7	25.6	52.3	47.4
Queue Length 50th (m)	58.0	15.4	1.2	30.1	0.2	7.5	54.1	27.5	86.0
Queue Length 95th (m)	#98.2	21.4	4.5	49.7	15.4	#22.2	73.8	#55.5	#131.6
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	426	1483	358	816	689	106	719	242	686
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.22	0.03	0.35	0.21	0.56	0.59	0.79	0.92

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	314	230	40	9	236	118	49	331	19	158	200	325
Future Volume (vph)	314	230	40	9	236	118	49	331	19	158	200	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1584	3128		1309	1740	1308	1691	1758		1545	1523	
Flt Permitted	0.54	1.00		0.56	1.00	1.00	0.15	1.00		0.36	1.00	
Satd. Flow (perm)	908	3128		765	1740	1308	260	1758		593	1523	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	378	277	48	11	284	142	59	399	23	190	241	392
RTOR Reduction (vph)	0	15	0	0	0	75	0	2	0	0	67	0
Lane Group Flow (vph)	378	310	0	11	284	67	59	420	0	190	566	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	3%	13%	9%	10%	6%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	42.2	42.2		42.2	42.2	42.2	35.5	35.5		35.5	35.5	
Effective Green, g (s)	42.2	42.2		42.2	42.2	42.2	35.5	35.5		35.5	35.5	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47	0.39	0.39		0.39	0.39	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	425	1466		358	815	613	102	693		233	600	
v/s Ratio Prot		0.10			0.16			0.24			c0.37	
v/s Ratio Perm	c0.42			0.01		0.05	0.23			0.32		
v/c Ratio	0.89	0.21		0.03	0.35	0.11	0.58	0.61		0.82	0.94	
Uniform Delay, d1	21.8	14.1		12.9	15.2	13.4	21.4	21.7		24.3	26.3	
Progression Factor	1.00	1.00		1.73	1.54	3.85	1.00	1.00		1.00	1.00	
Incremental Delay, d2	23.2	0.3		0.2	1.2	0.4	7.7	1.5		19.3	23.6	
Delay (s)	45.0	14.4		22.5	24.6	51.9	29.1	23.2		43.6	49.9	
Level of Service	D	B		C	C	D	C	C		D	D	
Approach Delay (s)	30.9				33.4			23.9			48.4	
Approach LOS	C				C			C			D	

Intersection Summary

HCM 2000 Control Delay	35.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	122.1%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Background AM Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	16	509	5	446	13	4	41
v/c Ratio	0.03	0.27	0.01	0.24	0.03	0.01	0.08
Control Delay	4.5	5.0	10.5	13.2	18.8	0.0	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	5.0	10.5	13.2	18.8	0.0	10.7
Queue Length 50th (m)	0.6	9.1	0.5	28.6	2.0	0.0	1.1
Queue Length 95th (m)	m1.3	11.7	m2.2	38.0	6.5	0.0	7.4
Internal Link Dist (m)		497.4		340.1		463.5	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	540	1908	490	1860	410	745	485
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	0.03	0.27	0.01	0.24	0.03	0.01	0.08
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰		↰	↰		↰	↰	↰
Traffic Volume (vph)	14	408	25	4	370	9	11	0	3	8	0	27
Future Volume (vph)	14	408	25	4	370	9	11	0	3	8	0	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5		
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		1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00		
Frt	1.00	0.99		1.00	1.00		1.00	0.85		0.85		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95		
Satd. Flow (prot)	1783	3203		1750	3128		1750	1566		1553		
Flt Permitted	0.48	1.00		0.45	1.00		0.73	1.00		0.97		
Satd. Flow (perm)	910	3203		826	3128		1345	1566		1515		
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	480	29	5	435	11	13	0	4	9	0	32
RTOR Reduction (vph)	0	5	0	0	2	0	0	3	0	0	22	0
Lane Group Flow (vph)	16	504	0	5	444	0	13	1	0	0	19	0
Confl. Peds. (#/hr)	1						1					
Heavy Vehicles (%)	0%	11%	2%	2%	14%	0%	2%	2%	2%	0%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Effective Green, g (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.31	0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	540	1904		491	1859		410	478			462	
v/s Ratio Prot		c0.16			0.14			0.00				
v/s Ratio Perm	0.02			0.01			0.01				c0.01	
v/c Ratio	0.03	0.26		0.01	0.24		0.03	0.00			0.04	
Uniform Delay, d1	7.5	8.8		7.4	8.6		21.9	21.7			22.0	
Progression Factor	0.57	0.54		1.39	1.49		0.84	1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.0	0.1		0.1	0.0			0.2	
Delay (s)	4.4	5.0		10.3	12.9		18.5	21.7			22.1	
Level of Service	A	A		B	B		B	C			C	
Approach Delay (s)		5.0			12.9			19.3			22.1	
Approach LOS		A			B			B			C	
Intersection Summary												
HCM 2000 Control Delay		9.4			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.19										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		28.3%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Background AM Peak Hour

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	42	386	4	410	138	99
v/c Ratio	0.12	0.24	0.01	0.26	0.21	0.19
Control Delay	7.2	7.4	11.7	13.3	25.1	14.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.2	7.4	11.7	13.3	25.1	14.3
Queue Length 50th (m)	3.5	18.0	0.3	19.6	19.4	7.9
Queue Length 95th (m)	7.1	19.6	1.7	25.1	30.9	15.6
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	365	1606	460	1567	665	521
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	0.24	0.01	0.26	0.21	0.19
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	34	292	21	3	305	27	31	69	12	21	38	21
Future Volume (vph)	34	292	21	3	305	27	31	69	12	21	38	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5			4.5		4.5
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		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00		1.00
Frt	1.00	0.99		1.00	0.99		0.99			0.99		0.96
Flt Protected	0.95	1.00		0.95	1.00		0.99			0.99		0.99
Satd. Flow (prot)	1426	3237		1742	3156		1761			1342		1342
Flt Permitted	0.49	1.00		0.51	1.00		0.91			0.92		0.92
Satd. Flow (perm)	739	3237		932	3156		1629			1249		1249
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	42	360	26	4	377	33	38	85	15	26	47	26
RTOR Reduction (vph)	0	6	0	0	7	0	0	5	0	0	14	0
Lane Group Flow (vph)	42	380	0	4	403	0	0	133	0	0	85	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	22%	8%	23%	0%	12%	6%	0%	2%	0%	0%	40%	43%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.5	44.5		44.5	44.5			36.5			36.5	
Effective Green, g (s)	44.5	44.5		44.5	44.5			36.5			36.5	
Actuated g/C Ratio	0.49	0.49		0.49	0.49			0.41			0.41	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	365	1600		460	1560			660			506	
v/s Ratio Prot		0.12			c0.13							
v/s Ratio Perm	0.06			0.00			c0.08				0.07	
v/c Ratio	0.12	0.24		0.01	0.26		0.20				0.17	
Uniform Delay, d1	12.2	13.0		11.6	13.2		17.3				17.1	
Progression Factor	0.52	0.55		1.00	1.00		1.47				1.00	
Incremental Delay, d2	0.6	0.3		0.0	0.4		0.7				0.7	
Delay (s)	6.9	7.6		11.6	13.6		26.1				17.8	
Level of Service	A	A		B	B		C				B	
Approach Delay (s)	7.5			13.6			26.1				17.8	
Approach LOS	A			B			C				B	
Intersection Summary												
HCM 2000 Control Delay		13.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.23										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		45.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
4: Fruitland Road & Sherwood Park Road/Collector B 2036 Background AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	23	2	0	9	6	358	0	2	241	6
Future Volume (Veh/h)	21	0	23	2	0	9	6	358	0	2	241	6
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	22	0	24	2	0	9	6	373	0	2	251	6
Pedestrians	13											
Lane Width (m)	3.3											
Walking Speed (m/s)	1.2											
Percent Blockage	1											
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	665	656	267	664	659	373	270			373		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	665	656	267	664	659	373	270			373		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	97	99	100	99	100			100		
cM capacity (veh/h)	345	379	769	358	377	673	1292			1185		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	46	11	6	373	2	257						
Volume Left	22	2	6	0	2	0						
Volume Right	24	9	0	0	0	6						
cSH	484	580	1292	1700	1185	1700						
Volume to Capacity	0.09	0.02	0.00	0.22	0.00	0.15						
Queue Length 95th (m)	2.3	0.4	0.1	0.0	0.0	0.0						
Control Delay (s)	13.2	11.3	7.8	0.0	8.0	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	13.2	11.3	0.1		0.1							
Approach LOS	B	B										
Intersection Summary												
Average Delay	1.1											
Intersection Capacity Utilization	31.2%			ICU Level of Service				A				
Analysis Period (min)	15											

Queues 210193 - Block 1 Servicing Strategy
5: Regalview Drive/Fruitland Road & Highway 8 2036 Background AM Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Group Flow (vph)	227	572	15	704	35	84	87	189
v/c Ratio	0.40	0.24	0.03	0.37	0.30	0.31	0.54	0.52
Control Delay	5.8	4.8	10.6	11.1	39.6	29.1	47.0	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	4.8	10.6	11.1	39.6	29.1	47.0	12.4
Queue Length 50th (m)	8.4	13.6	1.0	28.6	5.5	10.1	14.1	2.6
Queue Length 95th (m)	18.5	23.8	4.2	48.5	12.6	19.9	25.1	16.8
Internal Link Dist (m)	245.7		488.7		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	584	2403	470	1923	267	589	370	605
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.24	0.03	0.37	0.13	0.14	0.24	0.31
Intersection Summary								

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Background AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (vph)	195	476	16	13	537	69	30	55	17	75	15	148
Future Volume (vph)	195	476	16	13	537	69	30	55	17	75	15	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.96		1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1709	3331		1743	3268		1528	1728		1501	1471	
Flt Permitted	0.34	1.00		0.44	1.00		0.50	1.00		0.70	1.00	
Satd. Flow (perm)	606	3331		802	3268		802	1728		1110	1471	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	227	553	19	15	624	80	35	64	20	87	17	172
RTOR Reduction (vph)	0	2	0	0	7	0	0	16	0	0	147	0
Lane Group Flow (vph)	227	570	0	15	697	0	35	68	0	87	42	0
Confl. Peds. (#/hr)	5		1	1		5	3		2	2		3
Heavy Vehicles (%)	2%	4%	9%	0%	3%	17%	10%	0%	9%	12%	0%	7%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	64.8	64.8		52.7	52.7		13.2	13.2		13.2	13.2	
Effective Green, g (s)	64.8	64.8		52.7	52.7		13.2	13.2		13.2	13.2	
Actuated g/C Ratio	0.72	0.72		0.59	0.59		0.15	0.15		0.15	0.15	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	548	2400		470	1915		117	253		162	215	
v/s Ratio Prot	c0.04	0.17			0.21			0.04			0.03	
v/s Ratio Perm	c0.26			0.02			0.04			c0.08		
v/c Ratio	0.41	0.24		0.03	0.36		0.30	0.27		0.54	0.20	
Uniform Delay, d1	4.4	4.2		7.8	9.8		34.2	34.1		35.5	33.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		0.1	0.5		1.4	0.6		3.4	0.4	
Delay (s)	4.9	4.5		8.0	10.3		35.7	34.6		38.9	34.1	
Level of Service	A	A		A	B		D	C		D	C	
Approach Delay (s)	4.6			10.3			34.9			35.6		
Approach LOS	A			B			C			D		
Intersection Summary												
HCM 2000 Control Delay		13.1										
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		97.8%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Background AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	471	0	0	554	37	1	0	0	12	0	37
Future Volume (Veh/h)	66	471	0	0	554	37	1	0	0	12	0	37
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)	80	567	0	0	667	45	1	0	0	14	0	45
Pedestrians												4
Lane Width (m)												4.0
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	716			567			1106	1443	284	1137	1420	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	716			567			1106	1443	284	1137	1420	360
tC, single (s)	4.3			4.1			7.5	6.5	6.9	8.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	90			100			99	100	100	86	100	92
cM capacity (veh/h)	826			1015			143	120	719	100	124	598
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	80	378	189	0	445	267	1	0	14	45		
Volume Left	80	0	0	0	0	0	1	0	14	0		
Volume Right	0	0	0	0	0	45	0	0	0	45		
cSH	826	1700	1700	1700	1700	1700	143	1700	100	598		
Volume to Capacity	0.10	0.22	0.11	0.00	0.26	0.16	0.01	0.01	0.14	0.08		
Queue Length 95th (m)	2.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	3.5	1.8		
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	0.0	30.3	0.0	47.0	11.5		
Lane LOS	A							D	A	E	B	
Approach Delay (s)	1.2			0.0			30.3	19.9				
Approach LOS							D	C				
Intersection Summary												
Average Delay	1.4											
Intersection Capacity Utilization	37.5%			ICU Level of Service			A					
Analysis Period (min)	15											

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Background AM Peak Hour

	→	←	↑	↓
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	2	12	15	32
v/c Ratio	0.02	0.10	0.00	0.01
Control Delay	40.5	40.5	0.0	0.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	40.5	40.5	0.0	0.8
Queue Length 50th (m)	0.3	2.0	0.0	0.0
Queue Length 95th (m)	m0.6	7.0	m0.0	1.1
Internal Link Dist (m)	493.7	348.3	536.6	463.5
Turn Bay Length (m)				
Base Capacity (vph)	810	810	3296	3296
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.00	0.01	0.00	0.01
Intersection Summary				
m	Volume for 95th percentile queue is metered by upstream signal.			

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Background AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	2	0	0	11	0	0	14	0	0	29	0
Future Volume (vph)	0	2	0	0	11	0	0	14	0	0	29	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Flt		1.00			1.00			1.00			1.00	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1801			1801			3421			3421	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1801			1801			3421			3421	
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)	0	2	0	0	12	0	0	15	0	0	32	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	12	0	0	15	0	0	32	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.5			1.5			79.5			79.5	
Effective Green, g (s)		1.5			1.5			79.5			79.5	
Actuated g/C Ratio		0.02			0.02			0.88			0.88	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		30			30			3021			3021	
v/s Ratio Prot		0.00			c0.01			0.00			c0.01	
v/s Ratio Perm												
v/c Ratio		0.07			0.40			0.00			0.01	
Uniform Delay, d1		43.6			43.8			0.6			0.6	
Progression Factor		1.05			1.00			0.00			1.21	
Incremental Delay, d2		0.6			8.5			0.0			0.0	
Delay (s)		46.2			52.3			0.0			0.8	
Level of Service		D			D			A			A	
Approach Delay (s)		46.2			52.3			0.0			0.8	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay	12.2				HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio	0.02											
Actuated Cycle Length (s)	90.0				Sum of lost time (s)				9.0			
Intersection Capacity Utilization	15.8%				ICU Level of Service				A			
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2036 Background AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	2	0	7	11	9	0	103	3	3	59	0
Future Volume (Veh/h)	0	2	0	7	11	9	0	103	3	3	59	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	2	0	8	12	10	0	112	3	3	64	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	200	185	64	184	184	114	64	115				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	200	185	64	184	184	114	64	115				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	100	100	100	99	98	99	100	100				
cM capacity (veh/h)	740	708	1000	774	709	939	1538	1474				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	2	30	115	67								
Volume Left	0	8	0	3								
Volume Right	0	10	3	0								
cSH	708	791	1538	1474								
Volume to Capacity	0.00	0.04	0.00	0.00								
Queue Length 95th (m)	0.1	0.9	0.0	0.0								
Control Delay (s)	10.1	9.7	0.0	0.3								
Lane LOS	B	A		A								
Approach Delay (s)	10.1	9.7	0.0	0.3								
Approach LOS	B	A										
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				19.8%			ICU Level of Service			A		
Analysis Period (min)				15								

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Background AM Peak Hour

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	3	614	669	15	16
v/c Ratio	0.01	0.40	0.44	0.02	0.02
Control Delay	14.0	17.6	18.0	5.6	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.0	17.6	18.0	5.6	3.7
Queue Length 50th (m)	0.3	35.7	39.5	1.3	0.0
Queue Length 95th (m)	1.8	48.5	53.3	3.6	0.0
Internal Link Dist (m)	488.7		385.6	536.6	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	261	1539	1536	769	697
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	0.01	0.40	0.44	0.02	0.02
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Background AM Peak Hour

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↩	↩↩	↩↩		↩	↩
Traffic Volume (vph)	3	565	604	11	14	15
Future Volume (vph)	3	565	604	11	14	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3412		1711	1531
Flt Permitted	0.32	1.00	1.00		0.95	1.00
Satd. Flow (perm)	582	3421	3412		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	614	657	12	15	16
RTOR Reduction (vph)	0	0	2	0	0	9
Lane Group Flow (vph)	3	614	667	0	15	7
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	261	1539	1535		769	688
v/s Ratio Prot		0.18	c0.20		c0.01	
v/s Ratio Perm	0.01					0.00
v/c Ratio	0.01	0.40	0.43		0.02	0.01
Uniform Delay, d1	13.7	16.6	16.9		13.7	13.7
Progression Factor	1.00	1.00	1.00		0.40	0.56
Incremental Delay, d2	0.1	0.8	0.9		0.0	0.0
Delay (s)	13.8	17.4	17.8		5.5	7.7
Level of Service	B	B	B		A	A
Approach Delay (s)		17.3	17.8		6.7	
Approach LOS		B	B		A	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.23		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	462	542	42	398	162	33	247	144	646
v/c Ratio	1.12	0.31	0.10	0.41	0.20	0.41	0.40	0.52	1.12
Control Delay	104.9	12.0	29.5	36.8	19.6	40.7	24.2	31.7	101.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.9	12.0	29.5	36.8	19.6	40.7	24.2	31.7	101.7
Queue Length 50th (m)	~91.5	24.4	7.1	69.9	15.5	4.3	30.6	19.4	~122.7
Queue Length 95th (m)	#147.1	34.3	16.6	97.8	30.7	#15.6	50.5	38.2	#186.1
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	413	1762	412	961	819	81	615	279	579
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.12	0.31	0.10	0.41	0.20	0.41	0.40	0.52	1.12

Intersection Summary	
~	Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis
1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	439	439	76	40	378	154	31	204	30	137	352	261
Future Volume (vph)	439	439	76	40	378	154	31	204	30	137	352	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	3344		1743	1842	1421	1742	1785		1428	1613	
Flt Permitted	0.46	1.00		0.43	1.00	1.00	0.13	1.00		0.54	1.00	
Satd. Flow (perm)	792	3344		789	1842	1421	239	1785		817	1613	
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)	462	462	80	42	398	162	33	215	32	144	371	275
RTOR Reduction (vph)	0	16	0	0	0	77	0	6	0	0	30	0
Lane Group Flow (vph)	462	526	0	42	398	85	33	241	0	144	616	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	47.0	47.0		47.0	47.0	47.0	30.7	30.7		30.7	30.7	
Effective Green, g (s)	47.0	47.0		47.0	47.0	47.0	30.7	30.7		30.7	30.7	
Actuated g/C Ratio	0.52	0.52		0.52	0.52	0.52	0.34	0.34		0.34	0.34	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	413	1746		412	961	742	81	608		278	550	
v/s Ratio Prot		0.16			0.22			0.14			c0.38	
v/s Ratio Perm	c0.58			0.05		0.06	0.14			0.18		
v/c Ratio	1.12	0.30		0.10	0.41	0.11	0.41	0.40		0.52	1.12	
Uniform Delay, d1	21.5	12.2		10.8	13.1	10.9	22.7	22.6		23.7	29.6	
Progression Factor	1.00	1.00		2.57	2.64	9.65	1.00	1.00		1.00	1.00	
Incremental Delay, d2	80.6	0.4		0.5	1.3	0.3	3.3	0.4		1.6	76.0	
Delay (s)	102.1	12.6		28.4	35.9	105.7	26.0	23.0		25.4	105.7	
Level of Service	F	B		C	D	F	C	C		C	F	
Approach Delay (s)		53.8			54.1			23.4			91.0	
Approach LOS		D			D			C			F	
Intersection Summary												
HCM 2000 Control Delay		61.7										
HCM 2000 Volume to Capacity ratio		1.12										
Actuated Cycle Length (s)		90.0										
Intersection Capacity Utilization		126.0%										
Analysis Period (min)		15										
c Critical Lane Group												

Queues

2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Lane Group	EBL	EBT	WBT	NBL	SBT
Lane Group Flow (vph)	17	567	652	28	44
v/c Ratio	0.05	0.29	0.32	0.07	0.10
Control Delay	5.7	6.7	13.1	19.6	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.7	6.7	13.1	19.6	9.9
Queue Length 50th (m)	0.9	19.5	43.5	4.3	0.8
Queue Length 95th (m)	m2.0	18.0	51.6	10.6	6.9
Internal Link Dist (m)		497.4	340.1		346.5
Turn Bay Length (m)	20.0				
Base Capacity (vph)	341	1978	2060	409	452
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	0.29	0.32	0.07	0.10
Intersection Summary					
m Volume for 95th percentile queue is metered by upstream signal.					

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	1	1	2	1	1	2	1	1	2	1
Traffic Volume (vph)	14	446	19	0	535	0	23	0	0	6	0	30
Future Volume (vph)	14	446	19	0	535	0	23	0	0	6	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5			4.5		4.5			4.5		
Lane Util. Factor	1.00	0.95			0.95		1.00			1.00		
Frpb, ped/bikes	1.00	1.00			1.00		1.00			0.99		
Flpb, ped/bikes	1.00	1.00			1.00		1.00			1.00		
Frt	1.00	0.99			1.00		1.00			0.89		
Flt Protected	0.95	1.00			1.00		0.95			0.99		
Satd. Flow (prot)	1462	3322			3466		1750			1420		
Flt Permitted	0.37	1.00			1.00		0.73			0.98		
Satd. Flow (perm)	574	3322			3466		1342			1398		
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	17	544	23	0	652	0	28	0	0	7	0	37
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	0	0	26	0
Lane Group Flow (vph)	17	564	0	0	652	0	28	0	0	0	18	0
Confl. Peds. (#/hr)	1					1						3
Heavy Vehicles (%)	22%	7%	2%	2%	3%	0%	2%	2%	2%	50%	2%	5%
Turn Type	Perm	NA		Perm	NA		Perm			Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5			53.5		27.5			27.5		
Effective Green, g (s)	53.5	53.5			53.5		27.5			27.5		
Actuated g/C Ratio	0.59	0.59			0.59		0.31			0.31		
Clearance Time (s)	4.5	4.5			4.5		4.5			4.5		
Vehicle Extension (s)	3.0	3.0			3.0		3.0			3.0		
Lane Grp Cap (vph)	341	1974			2060		410			427		
v/s Ratio Prot		0.17			c0.19							
v/s Ratio Perm	0.03						c0.02			0.01		
v/c Ratio	0.05	0.29			0.32		0.07			0.04		
Uniform Delay, d1	7.6	8.9			9.1		22.2			22.0		
Progression Factor	0.69	0.71			1.37		0.85			1.00		
Incremental Delay, d2	0.3	0.3			0.1		0.3			0.2		
Delay (s)	5.6	6.7			12.6		19.2			22.2		
Level of Service	A	A			B		B			C		
Approach Delay (s)	6.7				12.6		19.2			22.2		
Approach LOS	A				B		B			C		
Intersection Summary												
HCM 2000 Control Delay		10.4			HCM 2000 Level of Service		B					
HCM 2000 Volume to Capacity ratio		0.23										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)		9.0					
Intersection Capacity Utilization		37.3%			ICU Level of Service		A					
Analysis Period (min)		15										
c Critical Lane Group												

Queues 210193 - Block 1 Servicing Strategy
3: Jones Road & Barton Street 2036 Background PM Peak Hour

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	34	607	12	547	67	220
v/c Ratio	0.10	0.38	0.04	0.34	0.10	0.32
Control Delay	8.7	9.8	13.5	15.4	21.0	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	9.8	13.5	15.4	21.0	15.1
Queue Length 50th (m)	2.7	26.7	1.1	29.2	8.1	19.0
Queue Length 95th (m)	6.5	31.6	3.7	36.5	16.8	31.0
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	345	1583	277	1608	657	682
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	0.38	0.04	0.34	0.10	0.32
Intersection Summary						

HCM Signalized Intersection Capacity Analysis 3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	28	466	38	10	430	24	24	22	9	40	73	70
Future Volume (vph)	28	466	38	10	430	24	24	22	9	40	73	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5		4.5		
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	0.99		1.00	0.99			0.98		0.95		
Flt Protected	0.95	1.00		0.95	1.00			0.98		0.99		
Satd. Flow (prot)	1739	3338		1528	3397			1753		1635		
Flt Permitted	0.40	1.00		0.37	1.00			0.85		0.93		
Satd. Flow (perm)	732	3338		587	3397			1523		1538		
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	34	561	46	12	518	29	29	27	11	48	88	84
RTOR Reduction (vph)	0	7	0	0	4	0	0	6	0	0	25	0
Lane Group Flow (vph)	34	600	0	12	543	0	0	61	0	0	195	0
Confl. Peds. (#/hr)	3		2	2		3	1		1	1		1
Heavy Vehicles (%)	0%	6%	0%	14%	4%	6%	0%	0%	0%	15%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	42.5	42.5		42.5	42.5			38.5			38.5	
Effective Green, g (s)	42.5	42.5		42.5	42.5			38.5			38.5	
Actuated g/C Ratio	0.47	0.47		0.47	0.47			0.43			0.43	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	345	1576		277	1604			651			657	
v/s Ratio Prot		c0.18			0.16							
v/s Ratio Perm	0.05			0.02				0.04			c0.13	
v/c Ratio	0.10	0.38		0.04	0.34			0.09			0.30	
Uniform Delay, d1	13.1	15.3		12.8	14.9			15.3			16.9	
Progression Factor	0.59	0.60		1.00	1.00			1.53			1.00	
Incremental Delay, d2	0.6	0.7		0.3	0.6			0.3			1.2	
Delay (s)	8.4	9.9		13.1	15.5			23.7			18.0	
Level of Service	A	A		B	B			C			B	
Approach Delay (s)		9.8			15.4			23.7			18.0	
Approach LOS		A			B			C			B	
Intersection Summary												
HCM 2000 Control Delay		13.8			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		45.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰		↰	↰	↰
Traffic Volume (veh/h)	24	0	17	1	0	5	27	265	0	8	420	30
Future Volume (Veh/h)	24	0	17	1	0	5	27	265	0	8	420	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	26	0	18	1	0	5	29	285	0	9	452	32
Pedestrians		4										
Lane Width (m)		3.3										
Walking Speed (m/s)		1.2										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	838	833	472	831	849	285	488			285		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	838	833	472	831	849	285	488			285		
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	90	100	97	100	100	99	97			99		
cM capacity (veh/h)	257	293	594	272	287	754	1082			1277		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	44	6	29	285	9	484						
Volume Left	26	1	29	0	9	0						
Volume Right	18	5	0	0	0	32						
cSH	335	582	1082	1700	1277	1700						
Volume to Capacity	0.13	0.01	0.03	0.17	0.01	0.28						
Queue Length 95th (m)	3.4	0.2	0.6	0.0	0.2	0.0						
Control Delay (s)	17.4	11.2	8.4	0.0	7.8	0.0						
Lane LOS	C	B	A		A							
Approach Delay (s)	17.4	11.2	0.8		0.1							
Approach LOS	C	B										
Intersection Summary												
Average Delay		1.3										
Intersection Capacity Utilization		37.1%			ICU Level of Service			A				
Analysis Period (min)		15										

Queues

5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy

2036 Background PM Peak Hour

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	187	569	23	831	33	43	112	350
v/c Ratio	0.40	0.24	0.05	0.44	0.44	0.15	0.57	0.69
Control Delay	6.9	5.6	11.8	12.9	50.6	20.3	44.9	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.9	5.6	11.8	12.9	50.6	20.3	44.9	13.8
Queue Length 50th (m)	7.4	14.6	1.5	37.0	5.2	3.6	18.1	6.8
Queue Length 95th (m)	18.8	28.3	6.5	68.1	13.3	11.0	31.0	29.8
Internal Link Dist (m)		245.7		488.7		176.2		531.3
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	493	2394	459	1904	152	563	399	713
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.24	0.05	0.44	0.22	0.08	0.28	0.49
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy

2036 Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	168	496	16	21	678	70	30	22	17	101	38	277
Future Volume (vph)	168	496	16	21	678	70	30	22	17	101	38	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.93		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	3405		1743	3321		1604	1650		1558	1528	
Flt Permitted	0.28	1.00		0.44	1.00		0.27	1.00		0.73	1.00	
Satd. Flow (perm)	488	3405		804	3321		456	1650		1196	1528	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	187	551	18	23	753	78	33	24	19	112	42	308
RTOR Reduction (vph)	0	2	0	0	6	0	0	16	0	0	255	0
Lane Group Flow (vph)	187	567	0	23	825	0	33	27	0	112	95	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	63.2	63.2		51.4	51.4		14.8	14.8		14.8	14.8	
Effective Green, g (s)	63.2	63.2		51.4	51.4		14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.70	0.70		0.57	0.57		0.16	0.16		0.16	0.16	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	457	2393		459	1898		75	271		196	251	
v/s Ratio Prot	c0.04	0.17			c0.25			0.02			0.06	
v/s Ratio Perm	0.25			0.03			0.07			c0.09		
v/c Ratio	0.41	0.24		0.05	0.43		0.44	0.10		0.57	0.38	
Uniform Delay, d1	5.2	4.8		8.5	11.0		33.8	31.9		34.6	33.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.2		0.2	0.7		4.1	0.2		4.0	1.0	
Delay (s)	5.8	5.0		8.7	11.7		37.9	32.1		38.6	34.4	
Level of Service	A	A		A	B		D	C		D	C	
Approach Delay (s)	5.2			11.6			34.6			35.4		
Approach LOS	A			B			C			D		
Intersection Summary												
HCM 2000 Control Delay		15.3								B		
HCM 2000 Volume to Capacity ratio		0.46										
Actuated Cycle Length (s)		89.9								14.9		
Intersection Capacity Utilization		98.0%								F		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	39	581	4	4	658	28	1	0	4	40	0	86		
Future Volume (Veh/h)	39	581	4	4	658	28	1	0	4	40	0	86		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	43	646	4	4	731	31	1	0	4	44	0	96		
Pedestrians					3					5				
Lane Width (m)					3.3					4.0				
Walking Speed (m/s)					1.2					1.2				
Percent Blockage					0					0				
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	767				650				1204	1509	328	1176	1496	386
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	767				650				1204	1509	328	1176	1496	386
tC, single (s)	4.2				4.1				7.5	6.5	6.9	7.6	6.5	7.1
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	95				100				99	100	99	67	100	84
cM capacity (veh/h)	819				946				114	114	672	133	116	590
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2				
Volume Total	43	431	219	4	487	275	1	4	44	96				
Volume Left	43	0	0	4	0	0	1	0	44	0				
Volume Right	0	0	4	0	0	31	0	4	0	96				
cSH	819	1700	1700	946	1700	1700	114	672	133	590				
Volume to Capacity	0.05	0.25	0.13	0.00	0.29	0.16	0.01	0.01	0.33	0.16				
Queue Length 95th (m)	1.2	0.0	0.0	0.1	0.0	0.0	0.2	0.1	10.0	4.3				
Control Delay (s)	9.6	0.0	0.0	8.8	0.0	0.0	37.0	10.4	45.1	12.3				
Lane LOS	A	A			E			B	E	B				
Approach Delay (s)	0.6	0.0			15.7			22.6						
Approach LOS				C			C							
Intersection Summary														
Average Delay	2.3													
Intersection Capacity Utilization	41.3%			ICU Level of Service			A							
Analysis Period (min)	15													

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	9	7	25	21
v/c Ratio	0.07	0.06	0.01	0.01
Control Delay	31.1	40.0	0.0	1.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.1	40.0	0.0	1.5
Queue Length 50th (m)	1.2	1.1	0.0	0.0
Queue Length 95th (m)	m1.8	5.2	m0.0	1.3
Internal Link Dist (m)	493.7	348.3	536.6	463.5
Turn Bay Length (m)				
Base Capacity (vph)	838	838	3299	3299
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.01	0.01	0.01	0.01
Intersection Summary				
m Volume for 95th percentile queue is metered by upstream signal.				

HCM Signalized Intersection Capacity Analysis
7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	0	8	0	0	6	0	0	23	0	0	19	0
Future Volume (vph)	0	8	0	0	6	0	0	23	0	0	19	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frt		1.00			1.00			1.00			1.00	
Flt Protected		1.00			1.00			1.00			1.00	
Satd. Flow (prot)		1801			1801			3421			3421	
Flt Permitted		1.00			1.00			1.00			1.00	
Satd. Flow (perm)		1801			1801			3421			3421	
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)	0	9	0	0	7	0	0	25	0	0	21	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	9	0	0	7	0	0	25	0	0	21	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		1.4			1.4			79.6			79.6	
Effective Green, g (s)		1.4			1.4			79.6			79.6	
Actuated g/C Ratio		0.02			0.02			0.88			0.88	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		28			28			3025			3025	
v/s Ratio Prot		c0.00			0.00			c0.01			0.01	
v/s Ratio Perm												
v/c Ratio		0.32			0.25			0.01			0.01	
Uniform Delay, d1		43.8			43.8			0.6			0.6	
Progression Factor		0.78			1.00			0.00			2.14	
Incremental Delay, d2		2.8			4.7			0.0			0.0	
Delay (s)		37.1			48.4			0.0			1.3	
Level of Service		D			D			A			A	
Approach Delay (s)		37.1			48.4			0.0			1.3	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		11.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.01										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		15.8%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰			↰			↰			↰	
Traffic Volume (veh/h)	0	8	0	6	6	4	0	51	8	12	109	0
Future Volume (Veh/h)	0	8	0	6	6	4	0	51	8	12	109	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	9	0	7	7	4	0	55	9	13	118	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	211	208	118	208	204	60	118			64		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211	208	118	208	204	60	118			64		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	100	99	99	100	100			99		
cM capacity (veh/h)	733	683	934	737	687	1006	1470			1538		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	18	64	131								
Volume Left	0	7	0	13								
Volume Right	0	4	9	0								
cSH	683	761	1470	1538								
Volume to Capacity	0.01	0.02	0.00	0.01								
Queue Length 95th (m)	0.3	0.5	0.0	0.2								
Control Delay (s)	10.3	9.8	0.0	0.8								
Lane LOS	B	A		A								
Approach Delay (s)	10.3	9.8	0.0	0.8								
Approach LOS	B	A										
Intersection Summary												
Average Delay		1.7										
Intersection Capacity Utilization		25.8%			ICU Level of Service			A				
Analysis Period (min)		15										

Queues
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

	EBL	EBT	WBT	SBL	SBR
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	11	655	838	10	11
v/c Ratio	0.06	0.43	0.55	0.01	0.02
Control Delay	15.1	17.9	19.7	3.3	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	17.9	19.7	3.3	2.7
Queue Length 50th (m)	1.0	38.6	52.8	0.8	0.0
Queue Length 95th (m)	4.1	52.2	69.8	1.6	0.0
Internal Link Dist (m)	488.7	385.6	536.6		
Turn Bay Length (m)	50.0				
Base Capacity (vph)	194	1539	1536	769	695
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	0.43	0.55	0.01	0.02
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Background PM Peak Hour

	EBL	EBT	WBT	WBR	SBL	SBR
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Traffic Volume (vph)	10	603	758	13	9	10
Future Volume (vph)	10	603	758	13	9	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3413		1711	1531
Flt Permitted	0.24	1.00	1.00		0.95	1.00
Satd. Flow (perm)	433	3421	3413		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	655	824	14	10	11
RTOR Reduction (vph)	0	0	1	0	0	6
Lane Group Flow (vph)	11	655	837	0	10	5
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	194	1539	1535		769	688
v/s Ratio Prot		0.19	c0.25		c0.01	
v/s Ratio Perm	0.03					0.00
v/c Ratio	0.06	0.43	0.55		0.01	0.01
Uniform Delay, d1	14.0	16.8	18.0		13.7	13.7
Progression Factor	1.00	1.00	1.00		0.24	0.37
Incremental Delay, d2	0.6	0.9	1.4		0.0	0.0
Delay (s)	14.5	17.7	19.4		3.3	5.0
Level of Service	B	B	B		A	A
Approach Delay (s)		17.6	19.4		4.2	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay		18.4		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.28				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		33.0%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

Appendix I

Future Total Traffic Operations Reports (Scenario 1)



Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	304	411	8	339	248	222	559	214	595
v/c Ratio	1.04	0.33	0.03	0.50	0.38	1.00	0.67	0.94	0.77
Control Delay	95.1	15.5	20.3	27.2	8.2	88.2	22.9	73.3	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.1	15.5	20.3	27.2	8.2	88.2	22.9	73.3	24.5
Queue Length 50th (m)	~56.8	19.1	0.9	46.9	3.9	36.2	70.0	33.2	69.7
Queue Length 95th (m)	#92.3	26.6	m2.8	65.1	16.8	#72.2	91.9	#68.2	96.3
Internal Link Dist (m)		518.7		497.4		466.4		267.6	
Turn Bay Length (m)	80.0		30.0			35.0		50.0	
Base Capacity (vph)	291	1242	262	676	659	222	840	227	777
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.33	0.03	0.50	0.38	1.00	0.67	0.94	0.77

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	252	236	105	7	281	206	184	448	16	178	233	261
Future Volume (vph)	252	236	105	7	281	206	184	448	16	178	233	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1585	3048		1309	1740	1308	1690	1767		1545	1545	
Flt Permitted	0.45	1.00		0.49	1.00	1.00	0.26	1.00		0.29	1.00	
Satd. Flow (perm)	749	3048		674	1740	1308	470	1767		480	1545	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	304	284	127	8	339	248	222	540	19	214	281	314
RTOR Reduction (vph)	0	57	0	0	0	150	0	2	0	0	45	0
Lane Group Flow (vph)	304	354	0	8	339	98	222	557	0	214	550	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	13%	9%	10%	6%	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	35.0	35.0		35.0	35.0	35.0	42.7	42.7		42.7	42.7	
Effective Green, g (s)	35.0	35.0		35.0	35.0	35.0	42.7	42.7		42.7	42.7	
Actuated g/C Ratio	0.39	0.39		0.39	0.39	0.39	0.47	0.47		0.47	0.47	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	291	1185		262	676	508	222	838		227	733	
v/s Ratio Prot		0.12			0.19			0.32			0.36	
v/s Ratio Perm	c0.41			0.01		0.07	c0.47			0.45		
v/c Ratio	1.04	0.30		0.03	0.50	0.19	1.00	0.67		0.94	0.75	
Uniform Delay, d1	27.5	19.0		17.0	20.9	18.2	23.6	18.2		22.5	19.3	
Progression Factor	1.00	1.00		1.15	1.15	2.35	1.00	1.00		1.00	1.00	
Incremental Delay, d2	64.9	0.6		0.2	2.6	0.8	60.4	2.0		43.7	4.3	
Delay (s)	92.4	19.7		19.8	26.6	43.6	84.1	20.2		66.2	23.7	
Level of Service	F	B		B	C	D	F	C		E	C	
Approach Delay (s)		50.6			33.6			38.3			34.9	
Approach LOS		D			C			D			C	

Intersection Summary

HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	13	529	35	399	207	84	33
v/c Ratio	0.02	0.28	0.07	0.21	0.50	0.11	0.07
Control Delay	4.5	3.9	5.5	5.5	36.4	0.3	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	3.9	5.5	5.5	36.4	0.3	11.1
Queue Length 50th (m)	0.5	8.6	1.4	8.8	25.8	0.0	0.8
Queue Length 95th (m)	m1.0	m7.0	3.5	11.5	45.2	0.0	6.5
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	573	1913	478	1861	414	795	477
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	0.02	0.28	0.07	0.21	0.50	0.11	0.07
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰			↱	
Traffic Volume (vph)	11	342	108	30	332	7	176	0	71	6	0	22
Future Volume (vph)	11	342	108	30	332	7	176	0	71	6	0	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
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			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1782	3162		1750	3128		1750	1566			1551	
Flt Permitted	0.51	1.00		0.44	1.00		0.74	1.00			0.96	
Satd. Flow (perm)	964	3162		805	3128		1355	1566			1505	
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)	13	402	127	35	391	8	207	0	84	7	0	26
RTOR Reduction (vph)	0	34	0	0	2	0	0	58	0	0	18	0
Lane Group Flow (vph)	13	495	0	35	397	0	207	26	0	0	15	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	11%	2%	2%	14%	0%	2%	2%	2%	0%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Effective Green, g (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.31	0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	573	1879		478	1859		414	478			459	
v/s Ratio Prot		c0.16			0.13			0.02				
v/s Ratio Perm	0.01			0.04			c0.15				0.01	
v/c Ratio	0.02	0.26		0.07	0.21		0.50	0.05			0.03	
Uniform Delay, d1	7.5	8.8		7.7	8.5		25.6	22.1			21.9	
Progression Factor	0.57	0.48		0.65	0.62		1.22	1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.1		4.2	0.2			0.1	
Delay (s)	4.4	4.5		5.1	5.3		35.5	22.3			22.1	
Level of Service	A	A		A	A		D	C			C	
Approach Delay (s)	4.5			5.3			31.6				22.1	
Approach LOS	A			A			C				C	
Intersection Summary												
HCM 2000 Control Delay		11.3			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		44.7%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	48	399	53	355	286	117
v/c Ratio	0.16	0.32	0.16	0.29	0.35	0.18
Control Delay	21.2	19.7	19.9	19.5	10.9	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.2	19.7	19.9	19.5	10.9	10.0
Queue Length 50th (m)	5.4	22.9	5.8	21.0	19.9	7.9
Queue Length 95th (m)	11.6	30.1	12.2	27.3	28.9	14.6
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	292	1237	333	1217	823	652
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	0.32	0.16	0.29	0.35	0.18
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	39	291	32	43	266	22	60	102	70	17	57	21
Future Volume (vph)	39	291	32	43	266	22	60	102	70	17	57	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5			4.5		4.5
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		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00		1.00
Frt	1.00	0.98		1.00	0.99		0.96			0.96		0.97
Flt Protected	0.95	1.00		0.95	1.00		0.99			0.99		0.99
Satd. Flow (prot)	1426	3204		1743	3158		1717			1323		1323
Flt Permitted	0.51	1.00		0.47	1.00		0.90			0.93		0.93
Satd. Flow (perm)	764	3204		870	3158		1561			1240		1240
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	48	359	40	53	328	27	74	126	86	21	70	26
RTOR Reduction (vph)	0	9	0	0	7	0	0	17	0	0	12	0
Lane Group Flow (vph)	48	390	0	53	348	0	0	269	0	0	105	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	22%	8%	23%	0%	12%	6%	0%	2%	0%	0%	40%	43%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	34.5	34.5		34.5	34.5			46.5			46.5	
Effective Green, g (s)	34.5	34.5		34.5	34.5			46.5			46.5	
Actuated g/C Ratio	0.38	0.38		0.38	0.38			0.52			0.52	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	292	1228		333	1210			806			640	
v/s Ratio Prot		c0.12			0.11							
v/s Ratio Perm	0.06			0.06			c0.17			0.09		
v/c Ratio	0.16	0.32		0.16	0.29		0.33			0.16		
Uniform Delay, d1	18.3	19.5		18.2	19.2		12.7			11.5		
Progression Factor	1.05	1.00		1.00	1.00		0.86			1.00		
Incremental Delay, d2	1.2	0.7		1.0	0.6		1.1			0.6		
Delay (s)	20.4	20.2		19.2	19.8		12.0			12.0		
Level of Service	C	C		B	B		B			B		
Approach Delay (s)	20.3			19.8			12.0			12.0		
Approach LOS	C			B			B			B		
Intersection Summary												
HCM 2000 Control Delay		17.5			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		50.1%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
4: Fruitland Road & Sherwood Park Road/Collector B 2031 Total AM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	18	82	0	335	5	288	18	147	193	5
Future Volume (Veh/h)	17	0	18	82	0	335	5	288	18	147	193	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	18	0	19	85	0	349	5	300	19	153	201	5
Pedestrians		13										
Lane Width (m)		3.3										
Walking Speed (m/s)		1.2										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1182	852	216	846	844	310	219			319		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1182	852	216	846	844	310	219			319		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	75	100	98	66	100	52	100			88		
cM capacity (veh/h)	73	257	820	247	259	731	1349			1241		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	37	434	5	319	153	206						
Volume Left	18	85	5	0	153	0						
Volume Right	19	349	0	19	0	5						
cSH	137	528	1349	1700	1241	1700						
Volume to Capacity	0.27	0.82	0.00	0.19	0.12	0.12						
Queue Length 95th (m)	7.7	61.2	0.1	0.0	3.2	0.0						
Control Delay (s)	40.6	35.9	7.7	0.0	8.3	0.0						
Lane LOS	E	E	A		A							
Approach Delay (s)	40.6	35.9	0.1		3.5							
Approach LOS	E	E										
Intersection Summary												
Average Delay	15.9											
Intersection Capacity Utilization	60.7%			ICU Level of Service					B			
Analysis Period (min)	15											

Queues 210193 - Block 1 Servicing Strategy
5: Regalview Drive/Fruitland Road & Highway 8 2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Group Flow (vph)	183	602	49	778	28	103	70	247
v/c Ratio	0.35	0.25	0.10	0.39	0.39	0.40	0.46	0.65
Control Delay	5.2	4.7	10.0	10.6	50.1	30.2	44.7	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	4.7	10.0	10.6	50.1	30.2	44.7	17.2
Queue Length 50th (m)	6.1	13.6	3.0	30.5	4.5	12.2	11.4	7.5
Queue Length 95th (m)	14.9	24.7	9.7	52.4	11.3	23.2	21.1	24.3
Internal Link Dist (m)	245.7		263.5		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	552	2430	469	1995	171	584	364	636
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.25	0.10	0.39	0.16	0.18	0.19	0.39
Intersection Summary								

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	157	505	13	42	614	55	24	62	27	60	41	171
Future Volume (vph)	157	505	13	42	614	55	24	62	27	60	41	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1709	3337		1743	3301		1529	1700		1501	1510	
Flt Permitted	0.31	1.00		0.42	1.00		0.32	1.00		0.69	1.00	
Satd. Flow (perm)	556	3337		779	3301		515	1700		1091	1510	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	183	587	15	49	714	64	28	72	31	70	48	199
RTOR Reduction (vph)	0	1	0	0	5	0	0	22	0	0	171	0
Lane Group Flow (vph)	183	601	0	49	773	0	28	81	0	70	76	0
Confl. Peds. (#/hr)	5		1	1		5	3		2	2		3
Heavy Vehicles (%)	2%	4%	9%	0%	3%	17%	10%	0%	9%	12%	0%	7%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	65.5	65.5		54.2	54.2		12.5	12.5		12.5	12.5	
Effective Green, g (s)	65.5	65.5		54.2	54.2		12.5	12.5		12.5	12.5	
Actuated g/C Ratio	0.73	0.73		0.60	0.60		0.14	0.14		0.14	0.14	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	511	2431		469	1990		71	236		151	209	
v/s Ratio Prot	c0.03	0.18			c0.23			0.05			0.05	
v/s Ratio Perm	0.23			0.06			0.05			c0.06		
v/c Ratio	0.36	0.25		0.10	0.39		0.39	0.34		0.46	0.36	
Uniform Delay, d1	4.2	4.0		7.6	9.3		35.3	35.0		35.6	35.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.4	0.6		3.6	0.9		2.2	1.1	
Delay (s)	4.6	4.3		8.0	9.8		38.8	35.8		37.9	36.2	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)	4.4			9.7			36.5			36.5		
Approach LOS	A			A			D			D		
Intersection Summary												
HCM 2000 Control Delay		13.5										
HCM 2000 Volume to Capacity ratio		0.40										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		93.1%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	66	462	0	0	487	110	1	0	0	100	0	54
Future Volume (Veh/h)	66	462	0	0	487	110	1	0	0	100	0	54
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)	80	557	0	0	587	133	1	0	0	120	0	65
Pedestrians												4
Lane Width (m)												4.0
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	724			557			1076	1441	278	1096	1374	364
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	724			557			1076	1441	278	1096	1374	364
tC, single (s)	4.3			4.1			7.5	6.5	6.9	8.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	90			100			99	100	100	0	100	89
cM capacity (veh/h)	820			1024			145	120	725	108	132	595
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	80	371	186	0	391	329	1	0	120	65		
Volume Left	80	0	0	0	0	0	1	0	120	0		
Volume Right	0	0	0	0	0	133	0	0	0	65		
cSH	820	1700	1700	1700	1700	1700	145	1700	108	595		
Volume to Capacity	0.10	0.22	0.11	0.00	0.23	0.19	0.01	0.01	1.12	0.11		
Queue Length 95th (m)	2.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	56.5	2.7		
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0	30.0	0.0	196.6	11.8		
Lane LOS	A							D	A	F	B	
Approach Delay (s)	1.2			0.0				30.0	131.7			
Approach LOS							D		F			
Intersection Summary												
Average Delay	16.3											
Intersection Capacity Utilization	42.9%			ICU Level of Service			A					
Analysis Period (min)	15											

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	36	134	53	365	5	92	75	59
v/c Ratio	0.29	0.28	0.17	0.76	0.01	0.05	0.09	0.03
Control Delay	28.2	23.0	22.5	35.2	0.0	0.0	9.4	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	23.0	22.5	35.2	0.0	0.0	9.4	7.2
Queue Length 50th (m)	4.9	17.1	6.4	48.8	0.0	0.0	5.2	1.6
Queue Length 95th (m)	m8.7	m22.5	12.4	66.6	m0.0	0.0	16.4	5.3
Internal Link Dist (m)		209.4		348.3		536.6		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	212	804	525	789	820	1936	794	2106
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.17	0.10	0.46	0.01	0.05	0.09	0.03
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	114	9	49	222	114	5	16	69	69	42	12
Future Volume (vph)	33	114	9	49	222	114	5	16	69	69	42	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.95		1.00	0.88		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1780		1711	1709		1711	3003		1711	3308	
Flt Permitted	0.26	1.00		0.65	1.00		0.72	1.00		0.69	1.00	
Satd. Flow (perm)	471	1780		1167	1709		1290	3003		1250	3308	
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)	36	124	10	53	241	124	5	17	75	75	46	13
RTOR Reduction (vph)	0	4	0	0	27	0	0	27	0	0	5	0
Lane Group Flow (vph)	36	130	0	53	338	0	5	65	0	75	54	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.8	23.8		23.8	23.8		57.2	57.2		57.2	57.2	
Effective Green, g (s)	23.8	23.8		23.8	23.8		57.2	57.2		57.2	57.2	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.64	0.64		0.64	0.64	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	124	470		308	451		819	1908		794	2102	
v/s Ratio Prot		0.07			c0.20			0.02			0.02	
v/s Ratio Perm	0.08			0.05			0.00			c0.06		
v/c Ratio	0.29	0.28		0.17	0.75		0.01	0.03		0.09	0.03	
Uniform Delay, d1	26.4	26.3		25.5	30.4		6.0	6.1		6.4	6.1	
Progression Factor	0.94	0.93		0.93	0.92		0.00	0.00		1.09	1.06	
Incremental Delay, d2	1.2	0.3		0.3	6.7		0.0	0.0		0.2	0.0	
Delay (s)	26.0	24.7		24.0	34.8		0.0	0.0		7.2	6.5	
Level of Service	C	C		C	C		A	A		A	A	
Approach Delay (s)		25.0			33.4			0.0			6.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay	23.4			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.29											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			9.0					
Intersection Capacity Utilization	44.5%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	93	2	84	7	11	9	81	108	3	3	80	61	
Future Volume (Veh/h)	93	2	84	7	11	9	81	108	3	3	80	61	
Sign Control		Stop				Free					Free		
Grade		0%				0%					0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	101	2	91	8	12	10	88	117	3	3	87	66	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	436	422	120	512	454	118	153			120			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	436	422	120	512	454	118	153			120			
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	79	100	90	98	97	99	94			100			
cM capacity (veh/h)	489	490	931	404	470	933	1428			1468			
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	194	30	208	156									
Volume Left	101	8	88	3									
Volume Right	91	10	3	66									
cSH	630	535	1428	1468									
Volume to Capacity	0.31	0.06	0.06	0.00									
Queue Length 95th (m)	9.8	1.3	1.5	0.0									
Control Delay (s)	13.2	12.1	3.5	0.2									
Lane LOS	B	B	A	A									
Approach Delay (s)	13.2	12.1	3.5	0.2									
Approach LOS	B	B											
Intersection Summary													
Average Delay				6.3									
Intersection Capacity Utilization				45.5%		ICU Level of Service				A			
Analysis Period (min)				15									

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

					
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	78	571	612	42	66
v/c Ratio	0.27	0.37	0.40	0.05	0.09
Control Delay	18.8	17.2	17.4	3.5	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	17.2	17.4	3.5	1.6
Queue Length 50th (m)	8.1	32.7	35.2	1.3	0.1
Queue Length 95th (m)	18.2	44.9	48.0	2.7	0.0
Internal Link Dist (m)	202.4		385.6	536.6	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	287	1539	1534	769	725
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	0.37	0.40	0.05	0.09
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↱	↱		↰	↱
Traffic Volume (vph)	72	525	544	19	39	61
Future Volume (vph)	72	525	544	19	39	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3404		1711	1531
Flt Permitted	0.35	1.00	1.00		0.95	1.00
Satd. Flow (perm)	639	3421	3404		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	78	571	591	21	42	66
RTOR Reduction (vph)	0	0	3	0	0	36
Lane Group Flow (vph)	78	571	609	0	42	30
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	287	1539	1531		769	688
v/s Ratio Prot		0.17	c0.18		c0.02	
v/s Ratio Perm	0.12					0.02
v/c Ratio	0.27	0.37	0.40		0.05	0.04
Uniform Delay, d1	15.5	16.3	16.6		14.0	13.9
Progression Factor	1.00	1.00	1.00		0.24	0.34
Incremental Delay, d2	2.3	0.7	0.8		0.1	0.1
Delay (s)	17.8	17.0	17.4		3.5	4.8
Level of Service	B	B	B		A	A
Approach Delay (s)		17.1	17.4		4.3	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay		16.2		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.23				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		35.2%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↱	↱	
Traffic Volume (veh/h)	90	18	5	157	106	32
Future Volume (Veh/h)	90	18	5	157	106	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	20	5	171	115	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	228	75	150			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	228	75	150			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	98	100			
cM capacity (veh/h)	737	971	1429			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	118	62	114	77	73	
Volume Left	98	5	0	0	0	
Volume Right	20	0	0	0	35	
cSH	769	1429	1700	1700	1700	
Volume to Capacity	0.15	0.00	0.07	0.05	0.04	
Queue Length 95th (m)	4.1	0.1	0.0	0.0	0.0	
Control Delay (s)	10.5	0.6	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	10.5	0.2		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		2.9				
Intersection Capacity Utilization		20.7%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	98	49	18	216	5	147	32	49	9	69	54
Future Volume (Veh/h)	18	98	49	18	216	5	147	32	49	9	69	54
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	107	53	20	235	5	160	35	53	10	75	59
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)					233							
pX, platoon unblocked	0.92						0.92	0.92		0.92	0.92	0.92
vC, conflicting volume	240			160			548	454	134	522	478	238
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	132			160			466	364	134	438	390	129
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			57	93	94	98	85	93
cM capacity (veh/h)	1338			1419			375	505	916	425	488	848
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	180	260	248	144								
Volume Left	20	20	160	10								
Volume Right	53	5	53	59								
cSH	1338	1419	448	583								
Volume to Capacity	0.01	0.01	0.55	0.25								
Queue Length 95th (m)	0.3	0.3	24.7	7.2								
Control Delay (s)	1.0	0.7	22.6	13.2								
Lane LOS	A	A	C	B								
Approach Delay (s)	1.0	0.7	22.6	13.2								
Approach LOS			C	B								
Intersection Summary												
Average Delay	9.4											
Intersection Capacity Utilization	45.6%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
12: Highway 8 & Street C

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	54	538	572	34	58	141
Future Volume (Veh/h)	54	538	572	34	58	141
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	585	622	37	63	153
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		287	226			
pX, platoon unblocked	0.90				0.90	0.90
vC, conflicting volume	659				1051	330
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	403				838	37
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				76	83
cM capacity (veh/h)	1039				259	925
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	254	390	415	244	216	
Volume Left	59	0	0	0	63	
Volume Right	0	0	0	37	153	
cSH	1039	1700	1700	1700	529	
Volume to Capacity	0.06	0.23	0.24	0.14	0.41	
Queue Length 95th (m)	1.4	0.0	0.0	0.0	14.8	
Control Delay (s)	2.4	0.0	0.0	0.0	16.4	
Lane LOS	A				C	
Approach Delay (s)	1.0		0.0		16.4	
Approach LOS					C	
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization	55.2%			ICU Level of Service		B
Analysis Period (min)	15					

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	372	746	34	375	203	113	313	207	675
v/c Ratio	1.10	0.49	0.14	0.46	0.27	1.08	0.41	0.66	0.95
Control Delay	105.0	15.5	20.9	24.8	8.5	141.3	20.1	33.2	50.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.0	15.5	20.9	24.8	8.5	141.3	20.1	33.2	50.3
Queue Length 50th (m)	~72.5	36.8	4.7	57.1	4.6	~21.7	35.8	27.6	104.5
Queue Length 95th (m)	#124.1	52.0	12.2	79.5	25.1	#53.6	56.5	#56.3	#175.8
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0			35.0		50.0	
Base Capacity (vph)	339	1517	240	818	744	105	756	314	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.49	0.14	0.46	0.27	1.08	0.41	0.66	0.95

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	353	464	245	32	356	193	107	274	24	197	432	209
Future Volume (vph)	353	464	245	32	356	193	107	274	24	197	432	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	3241		1744	1842	1421	1742	1798		1428	1644	
Flt Permitted	0.44	1.00		0.30	1.00	1.00	0.14	1.00		0.50	1.00	
Satd. Flow (perm)	765	3241		542	1842	1421	251	1798		750	1644	
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)	372	488	258	34	375	203	113	288	25	207	455	220
RTOR Reduction (vph)	0	77	0	0	0	113	0	3	0	0	19	0
Lane Group Flow (vph)	372	669	0	34	375	90	113	310	0	207	656	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	40.0	40.0		40.0	40.0	40.0	37.7	37.7		37.7	37.7	
Effective Green, g (s)	40.0	40.0		40.0	40.0	40.0	37.7	37.7		37.7	37.7	
Actuated g/C Ratio	0.44	0.44		0.44	0.44	0.44	0.42	0.42		0.42	0.42	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	1440		240	818	631	105	753		314	688	
v/s Ratio Prot		0.21			0.20			0.17			0.40	
v/s Ratio Perm	c0.49			0.06		0.06	c0.45			0.28		
v/c Ratio	1.09	0.46		0.14	0.46	0.14	1.08	0.41		0.66	0.95	
Uniform Delay, d1	25.0	17.5		14.8	17.4	14.8	26.1	18.4		21.0	25.3	
Progression Factor	1.00	1.00		1.26	1.29	1.14	1.00	1.00		1.00	1.00	
Incremental Delay, d2	76.4	1.1		1.2	1.8	0.5	109.9	0.4		4.9	23.3	
Delay (s)	101.4	18.6		19.9	24.3	47.1	136.0	18.7		25.9	48.6	
Level of Service	F	B		B	C	D	F	B		C	D	
Approach Delay (s)	46.2				31.6			49.8			43.3	
Approach LOS	D				C			D			D	

Intersection Summary

HCM 2000 Control Delay	42.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	126.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	13	697	132	561	132	93	35
v/c Ratio	0.03	0.35	0.34	0.27	0.32	0.13	0.08
Control Delay	5.5	5.5	9.9	7.1	23.9	0.4	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	5.5	9.9	7.1	23.9	0.4	10.6
Queue Length 50th (m)	0.8	20.2	8.4	18.6	13.1	0.0	0.7
Queue Length 95th (m)	m1.1	16.7	13.5	19.3	25.7	0.0	6.2
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	384	1973	385	2060	413	736	442
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	0.03	0.35	0.34	0.27	0.32	0.13	0.08
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	11	406	166	108	460	0	108	0	76	5	0	24
Future Volume (vph)	11	406	166	108	460	0	108	0	76	5	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5		
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		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1462	3235		1750	3466		1750	1566			1415	
Flt Permitted	0.42	1.00		0.35	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	646	3235		648	3466		1353	1566			1382	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	495	202	132	561	0	132	0	93	6	0	29
RTOR Reduction (vph)	0	49	0	0	0	0	0	65	0	0	20	0
Lane Group Flow (vph)	13	648	0	132	561	0	132	28	0	0	15	0
Confl. Peds. (#/hr)	1					1						3
Heavy Vehicles (%)	22%	7%	2%	2%	3%	0%	2%	2%	2%	50%	2%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Effective Green, g (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.31	0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	384	1923		385	2060		413	478			422	
v/s Ratio Prot		0.20			0.16			0.02				
v/s Ratio Perm	0.02			c0.20			c0.10				0.01	
v/c Ratio	0.03	0.34		0.34	0.27		0.32	0.06			0.04	
Uniform Delay, d1	7.6	9.3		9.3	8.8		24.1	22.1			21.9	
Progression Factor	0.68	0.66		0.75	0.76		0.88	1.00			1.00	
Incremental Delay, d2	0.1	0.4		0.5	0.1		2.0	0.2			0.2	
Delay (s)	5.3	6.5		7.5	6.8		23.3	22.3			22.1	
Level of Service	A	A		A	A		C	C			C	
Approach Delay (s)	6.5			6.9			22.9				22.1	
Approach LOS	A			A			C				C	
Intersection Summary												
HCM 2000 Control Delay		9.2			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		48.8%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	40	624	110	552	216	248
v/c Ratio	0.10	0.35	0.34	0.30	0.38	0.43
Control Delay	15.1	15.7	15.5	11.8	16.2	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	15.7	15.5	11.8	16.2	21.5
Queue Length 50th (m)	3.7	30.1	10.0	25.3	17.5	27.1
Queue Length 95th (m)	8.4	36.7	19.3	31.5	31.0	42.1
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	407	1797	323	1838	566	583
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	0.35	0.34	0.30	0.38	0.43
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	33	439	79	91	439	19	51	52	76	32	104	70
Future Volume (vph)	33	439	79	91	439	19	51	52	76	32	104	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
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			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Flt	1.00	0.98		1.00	0.99			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1739	3307		1528	3405			1697			1669	
Flt Permitted	0.41	1.00		0.37	1.00			0.86			0.93	
Satd. Flow (perm)	757	3307		602	3405			1487			1560	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	40	529	95	110	529	23	61	63	92	39	125	84
RTOR Reduction (vph)	0	16	0	0	3	0	0	29	0	0	20	0
Lane Group Flow (vph)	40	608	0	110	549	0	0	187	0	0	228	0
Confl. Peds. (#/hr)	3		2	2		3	1		1	1		1
Heavy Vehicles (%)	0%	6%	0%	14%	4%	6%	0%	0%	0%	15%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.5	48.5		48.5	48.5			32.5			32.5	
Effective Green, g (s)	48.5	48.5		48.5	48.5			32.5			32.5	
Actuated g/C Ratio	0.54	0.54		0.54	0.54			0.36			0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	407	1782		324	1834			536			563	
v/s Ratio Prot		c0.18			0.16							
v/s Ratio Perm	0.05			0.18				0.13			c0.15	
v/c Ratio	0.10	0.34		0.34	0.30			0.35			0.40	
Uniform Delay, d1	10.1	11.7		11.7	11.4			21.0			21.5	
Progression Factor	1.39	1.36		1.00	1.00			0.84			1.00	
Incremental Delay, d2	0.5	0.5		2.8	0.4			1.8			2.2	
Delay (s)	14.5	16.5		14.5	11.8			19.5			23.7	
Level of Service	B	B		B	B			B			C	
Approach Delay (s)	16.3			12.3				19.5			23.7	
Approach LOS	B			B				B			C	
Intersection Summary												
HCM 2000 Control Delay		16.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.37										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		49.0%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
4: Fruitland Road & Sherwood Park Road/Collector B 2031 Total PM Peak Hour - Scenario 1

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	20	0	13	43	0	196	22	213	21	339	337	24	
Future Volume (Veh/h)	20	0	13	43	0	196	22	213	21	339	337	24	
Sign Control		Stop				Stop				Free			
Grade		0%				0%				0%			
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	
Hourly flow rate (vph)	22	0	14	46	0	211	24	229	23	365	362	26	
Pedestrians		4											
Lane Width (m)		3.3											
Walking Speed (m/s)		1.2											
Percent Blockage		0											
Right turn flare (veh)													
Median type		None						None					
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	1597	1409	379	1394	1410	240	392			252			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1597	1409	379	1394	1410	240	392			252			
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	50	100	98	49	100	74	98			72			
cM capacity (veh/h)	44	98	670	90	98	798	1174			1313			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	36	257	24	252	365	388							
Volume Left	22	46	24	0	365	0							
Volume Right	14	211	0	23	0	26							
cSH	70	331	1174	1700	1313	1700							
Volume to Capacity	0.52	0.78	0.02	0.15	0.28	0.23							
Queue Length 95th (m)	16.0	46.7	0.5	0.0	8.6	0.0							
Control Delay (s)	102.5	45.1	8.1	0.0	8.8	0.0							
Lane LOS	F	E	A		A								
Approach Delay (s)	102.5	45.1	0.7		4.3								
Approach LOS	F	E											
Intersection Summary													
Average Delay				14.1									
Intersection Capacity Utilization				55.7%	ICU Level of Service			B					
Analysis Period (min)				15									

Queues 210193 - Block 1 Servicing Strategy
5: Regalview Drive/Fruitland Road & Highway 8 2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Group Flow (vph)	150	653	50	886	27	100	90	329
v/c Ratio	0.33	0.27	0.11	0.45	0.36	0.34	0.52	0.70
Control Delay	5.9	5.3	11.0	11.9	46.0	18.8	44.7	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.9	5.3	11.0	11.9	46.0	18.8	44.7	15.8
Queue Length 50th (m)	5.4	16.2	3.3	37.8	4.3	6.6	14.5	8.2
Queue Length 95th (m)	14.3	31.2	11.0	68.6	11.4	18.2	26.5	31.2
Internal Link Dist (m)	245.7		263.5		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	478	2438	439	1988	163	579	378	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.27	0.11	0.45	0.17	0.17	0.24	0.47
Intersection Summary								

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	135	575	13	45	742	56	24	39	51	81	48	248
Future Volume (vph)	135	575	13	45	742	56	24	39	51	81	48	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	3410		1743	3347		1604	1625		1558	1539	
Flt Permitted	0.26	1.00		0.40	1.00		0.29	1.00		0.69	1.00	
Satd. Flow (perm)	461	3410		741	3347		489	1625		1136	1539	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	150	639	14	50	824	62	27	43	57	90	53	276
RTOR Reduction (vph)	0	1	0	0	4	0	0	48	0	0	234	0
Lane Group Flow (vph)	150	652	0	50	882	0	27	52	0	90	95	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	64.2	64.2		53.2	53.2		13.8	13.8		13.8	13.8	
Effective Green, g (s)	64.2	64.2		53.2	53.2		13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.71	0.71		0.59	0.59		0.15	0.15		0.15	0.15	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	435	2435		438	1980		75	249		174	236	
v/s Ratio Prot	c0.03	0.19			c0.26			0.03			0.06	
v/s Ratio Perm	0.22			0.07			0.06			c0.08		
v/c Ratio	0.34	0.27		0.11	0.45		0.36	0.21		0.52	0.40	
Uniform Delay, d1	4.8	4.5		8.0	10.2		34.1	33.3		35.0	34.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.3		0.5	0.7		2.9	0.4		2.6	1.1	
Delay (s)	5.3	4.8		8.6	10.9		37.0	33.7		37.6	35.5	
Level of Service	A	A		A	B		D	C		D	D	
Approach Delay (s)	4.9			10.8			34.4			35.9		
Approach LOS	A			B			C			D		
Intersection Summary												
HCM 2000 Control Delay		14.6								B		
HCM 2000 Volume to Capacity ratio		0.45										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		93.1%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	531	4	4	622	106	1	0	4	101	0	114
Future Volume (Veh/h)	64	531	4	4	622	106	1	0	4	101	0	114
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	71	590	4	4	691	118	1	0	4	112	0	127
Pedestrians						3						5
Lane Width (m)						3.3						4.0
Walking Speed (m/s)						1.2						1.2
Percent Blockage						0						0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	814			594			1214	1556	300	1207	1499	410
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	814			594			1214	1556	300	1207	1499	410
tC, single (s)	4.2			4.1			7.5	6.5	6.9	7.6	6.5	7.1
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	91			100			99	100	99	8	100	78
cM capacity (veh/h)	786			992			100	103	701	122	111	569
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	71	393	201	4	461	348	1	4	112	127		
Volume Left	71	0	0	4	0	0	1	0	112	0		
Volume Right	0	0	4	0	0	118	0	4	0	127		
cSH	786	1700	1700	992	1700	1700	100	701	122	569		
Volume to Capacity	0.09	0.23	0.12	0.00	0.27	0.20	0.01	0.01	0.92	0.22		
Queue Length 95th (m)	2.2	0.0	0.0	0.1	0.0	0.0	0.2	0.1	44.2	6.4		
Control Delay (s)	10.0	0.0	0.0	8.6	0.0	0.0	41.3	10.2	128.3	13.1		
Lane LOS	B			A			E	B	F	B		
Approach Delay (s)	1.1			0.0			16.4	67.1				
Approach LOS							C	F				
Intersection Summary												
Average Delay	9.8											
Intersection Capacity Utilization	46.5%			ICU Level of Service			A					
Analysis Period (min)	15											

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	179	57	211	12	95	95	89
v/c Ratio	0.31	0.59	0.39	0.67	0.01	0.04	0.10	0.04
Control Delay	35.1	38.0	40.8	41.4	0.0	0.0	6.8	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.1	38.0	40.8	41.4	0.0	0.0	6.8	3.8
Queue Length 50th (m)	5.9	28.4	8.6	29.4	0.0	0.0	3.5	0.0
Queue Length 95th (m)	m9.4	m36.4	18.4	46.4	m0.0	0.0	16.9	4.6
Internal Link Dist (m)		209.4		348.3		536.6		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	337	833	406	818	915	2269	910	2281
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.21	0.14	0.26	0.01	0.04	0.10	0.04
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	156	8	52	140	54	11	29	58	87	31	51
Future Volume (vph)	35	156	8	52	140	54	11	29	58	87	31	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.96		1.00	0.90		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1787		1711	1725		1711	3081		1711	3104	
Flt Permitted	0.40	1.00		0.48	1.00		0.70	1.00		0.69	1.00	
Satd. Flow (perm)	724	1787		873	1725		1254	3081		1247	3104	
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)	38	170	9	57	152	59	12	32	63	95	34	55
RTOR Reduction (vph)	0	3	0	0	24	0	0	17	0	0	15	0
Lane Group Flow (vph)	38	176	0	57	187	0	12	78	0	95	74	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	15.2		15.2	15.2		65.8	65.8		65.8	65.8	
Effective Green, g (s)	15.2	15.2		15.2	15.2		65.8	65.8		65.8	65.8	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.73	0.73		0.73	0.73	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	122	301		147	291		916	2252		911	2269	
v/s Ratio Prot		0.10			c0.11			0.03			0.02	
v/s Ratio Perm	0.05			0.07			0.01			c0.08		
v/c Ratio	0.31	0.58		0.39	0.64		0.01	0.03		0.10	0.03	
Uniform Delay, d1	32.8	34.5		33.3	34.9		3.3	3.3		3.5	3.3	
Progression Factor	0.95	0.95		1.06	1.06		0.00	0.00		1.45	1.72	
Incremental Delay, d2	1.3	2.5		1.7	4.7		0.0	0.0		0.2	0.0	
Delay (s)	32.4	35.2		36.8	41.6		0.0	0.0		5.3	5.8	
Level of Service	C	D		D	D		A	A		A	A	
Approach Delay (s)		34.7			40.6			0.0			5.5	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM 2000 Control Delay	25.0			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.21											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			9.0					
Intersection Capacity Utilization	37.6%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	75	8	74	6	6	4	79	99	8	12	152	96	
Future Volume (Veh/h)	75	8	74	6	6	4	79	99	8	12	152	96	
Sign Control		Stop				Stop				Free			
Grade		0%				0%				0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	82	9	80	7	7	4	86	108	9	13	165	104	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	535	532	217	612	580	112	269	117					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	535	532	217	612	580	112	269	117					
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1					
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					
p0 queue free %	81	98	90	98	98	100	93	99					
cM capacity (veh/h)	423	419	823	339	394	940	1295	1471					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	171	18	203	282									
Volume Left	82	7	86	13									
Volume Right	80	4	9	104									
cSH	547	422	1295	1471									
Volume to Capacity	0.31	0.04	0.07	0.01									
Queue Length 95th (m)	10.0	1.0	1.6	0.2									
Control Delay (s)	14.6	13.9	3.7	0.4									
Lane LOS	B	B	A	A									
Approach Delay (s)	14.6	13.9	3.7	0.4									
Approach LOS	B	B											
Intersection Summary													
Average Delay				5.4									
Intersection Capacity Utilization				47.7%			ICU Level of Service			A			
Analysis Period (min)				15									

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

					
Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	72	608	824	33	65
v/c Ratio	0.36	0.40	0.54	0.04	0.09
Control Delay	22.8	17.5	19.4	2.7	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.8	17.5	19.4	2.7	1.6
Queue Length 50th (m)	7.8	35.2	51.4	0.6	0.3
Queue Length 95th (m)	19.3	48.1	68.2	1.2	0.0
Internal Link Dist (m)	202.4		385.6	536.6	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	200	1539	1533	769	724
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.40	0.54	0.04	0.09
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↔	↔	↕
Traffic Volume (vph)	66	559	726	32	30	60
Future Volume (vph)	66	559	726	32	30	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3399		1711	1531
Flt Permitted	0.25	1.00	1.00		0.95	1.00
Satd. Flow (perm)	444	3421	3399		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	72	608	789	35	33	65
RTOR Reduction (vph)	0	0	3	0	0	36
Lane Group Flow (vph)	72	608	821	0	33	29
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	199	1539	1529		769	688
v/s Ratio Prot		0.18	c0.24		c0.02	
v/s Ratio Perm	0.16					0.02
v/c Ratio	0.36	0.40	0.54		0.04	0.04
Uniform Delay, d1	16.3	16.6	17.9		13.9	13.9
Progression Factor	1.00	1.00	1.00		0.19	0.34
Incremental Delay, d2	5.0	0.8	1.4		0.1	0.1
Delay (s)	21.3	17.3	19.3		2.7	4.8
Level of Service	C	B	B		A	A
Approach Delay (s)		17.7	19.3		4.1	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay		17.7		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.29				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		40.7%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Traffic Volume (veh/h)	77	15	11	107	153	121
Future Volume (Veh/h)	77	15	11	107	153	121
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	16	12	116	166	132
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	314	149	298			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	314	149	298			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	98	99			
cM capacity (veh/h)	648	871	1260			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	51	77	111	187	
Volume Left	84	12	0	0	0	
Volume Right	16	0	0	0	132	
cSH	676	1260	1700	1700	1700	
Volume to Capacity	0.15	0.01	0.05	0.07	0.11	
Queue Length 95th (m)	3.9	0.2	0.0	0.0	0.0	
Control Delay (s)	11.3	1.9	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.3	0.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		23.3%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	64	145	152	68	123	11	81	78	46	8	69	36
Future Volume (Veh/h)	64	145	152	68	123	11	81	78	46	8	69	36
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	158	165	74	134	12	88	85	50	9	75	39
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	146			323			745	674	240	761	751	140
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			323			726	654	240	742	732	106
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 %	95			94			63	75	94	96	75	96
cM capacity (veh/h)	1441			1237			237	337	798	225	304	925
Direction, Lane #												
Volume Total												
Volume Left												
Volume Right												
cSH												
Volume to Capacity												
Queue Length 95th (m)												
Control Delay (s)												
Lane LOS												
Approach Delay (s)												
Approach LOS												
Intersection Summary												
Average Delay												
Intersection Capacity Utilization												
Analysis Period (min)												

HCM Unsignalized Intersection Capacity Analysis 12: Highway 8 & Street C

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Volume (veh/h)	124	583	713	72	42	131
Future Volume (Veh/h)	124	583	713	72	42	131
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	135	634	775	78	46	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	853				1401	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	442				1049	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	86				71	84
cM capacity (veh/h)	935				161	910
Direction, Lane #						
Volume Total						
Volume Left						
Volume Right						
cSH						
Volume to Capacity						
Queue Length 95th (m)						
Control Delay (s)						
Lane LOS						
Approach Delay (s)						
Approach LOS						
Intersection Summary						
Average Delay						
Intersection Capacity Utilization						
Analysis Period (min)						

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	378	475	11	393	277	234	640	252	720
v/c Ratio	1.43	0.37	0.05	0.56	0.44	1.93	0.78	1.56	0.95
Control Delay	240.9	16.6	19.9	28.3	12.1	470.6	28.4	302.2	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	240.9	16.6	19.9	28.3	12.1	470.6	28.4	302.2	43.8
Queue Length 50th (m)	-88.1	24.0	1.3	60.3	13.2	-62.1	87.9	-61.2	102.4
Queue Length 95th (m)	#125.1	32.0	m4.0	78.7	24.9	#76.1	114.0	#94.9	#152.4
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0			35.0		50.0	
Base Capacity (vph)	264	1271	244	696	636	121	820	162	761
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.43	0.37	0.05	0.56	0.44	1.93	0.78	1.56	0.95

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Future Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frft	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1585	3060		1310	1740	1308	1691	1767		1545	1541	
Flt Permitted	0.40	1.00		0.44	1.00	1.00	0.15	1.00		0.22	1.00	
Satd. Flow (perm)	661	3060		612	1740	1308	264	1767		351	1541	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	378	339	136	11	393	277	234	617	23	252	328	392
RTOR Reduction (vph)	0	48	0	0	0	113	0	2	0	0	48	0
Lane Group Flow (vph)	378	427	0	11	393	164	234	638	0	252	672	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	13%	9%	10%	6%	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	36.0	36.0		36.0	36.0	36.0	41.7	41.7		41.7	41.7	
Effective Green, g (s)	36.0	36.0		36.0	36.0	36.0	41.7	41.7		41.7	41.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.46	0.46		0.46	0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	264	1224		244	696	523	122	818		162	713	
v/s Ratio Prot		0.14			0.23			0.36			0.44	
v/s Ratio Perm	c0.57			0.02		0.13	c0.89			0.72		
v/c Ratio	1.43	0.35		0.05	0.56	0.31	1.92	0.78		1.56	0.94	
Uniform Delay, d1	27.0	18.8		16.5	20.9	18.5	24.1	20.3		24.1	23.0	
Progression Factor	1.00	1.00		1.15	1.17	1.50	1.00	1.00		1.00	1.00	
Incremental Delay, d2	214.8	0.8		0.3	3.2	1.5	441.9	4.9		278.0	20.8	
Delay (s)	241.8	19.6		19.3	27.6	29.3	466.1	25.2		302.1	43.8	
Level of Service	F	B		B	C	C	F	C		F	D	
Approach Delay (s)	118.1				28.1			143.2			110.8	
Approach LOS	F				C			F			F	

Intersection Summary

HCM 2000 Control Delay	104.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	125.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	16	629	35	486	211	84	41
v/c Ratio	0.03	0.33	0.08	0.26	0.51	0.11	0.09
Control Delay	4.3	4.2	5.4	5.6	36.6	0.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	4.2	5.4	5.6	36.6	0.3	10.7
Queue Length 50th (m)	0.6	11.1	1.4	10.6	26.7	0.0	1.1
Queue Length 95th (m)	m1.0	m10.5	3.4	13.3	46.0	0.0	7.4
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	514	1909	420	1861	410	736	480
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	0.03	0.33	0.08	0.26	0.51	0.11	0.09
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰			↱	
Traffic Volume (vph)	14	422	113	30	404	9	179	0	71	8	0	27
Future Volume (vph)	14	422	113	30	404	9	179	0	71	8	0	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
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			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1783	3168		1750	3128		1750	1566			1553	
Flt Permitted	0.46	1.00		0.38	1.00		0.73	1.00			0.96	
Satd. Flow (perm)	866	3168		708	3128		1345	1566			1499	
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	496	133	35	475	11	211	0	84	9	0	32
RTOR Reduction (vph)	0	27	0	0	2	0	0	58	0	0	22	0
Lane Group Flow (vph)	16	602	0	35	484	0	211	26	0	0	19	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	11%	2%	2%	14%	0%	2%	2%	2%	0%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Effective Green, g (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.31	0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	514	1883		420	1859		410	478			458	
v/s Ratio Prot		c0.19			0.15			0.02				
v/s Ratio Perm	0.02			0.05			c0.16				0.01	
v/c Ratio	0.03	0.32		0.08	0.26		0.51	0.05			0.04	
Uniform Delay, d1	7.5	9.1		7.8	8.8		25.8	22.1			22.0	
Progression Factor	0.55	0.48		0.63	0.60		1.21	1.00			1.00	
Incremental Delay, d2	0.1	0.2		0.1	0.1		4.5	0.2			0.2	
Delay (s)	4.2	4.6		5.0	5.3		35.6	22.3			22.1	
Level of Service	A	A		A	A		D	C			C	
Approach Delay (s)	4.6						31.8				22.1	
Approach LOS	A				A		C				C	
Intersection Summary												
HCM 2000 Control Delay		10.6					HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		90.0					Sum of lost time (s)		9.0			
Intersection Capacity Utilization		47.3%					ICU Level of Service		A			
Analysis Period (min)		15										
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	57	473	53	437	313	136
v/c Ratio	0.22	0.37	0.17	0.35	0.39	0.22
Control Delay	21.9	20.4	19.7	19.6	11.9	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	20.4	19.7	19.6	11.9	11.2
Queue Length 50th (m)	6.5	27.7	5.8	26.2	22.6	9.9
Queue Length 95th (m)	13.3	34.6	12.1	33.1	32.2	17.4
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	265	1275	306	1252	800	630
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	0.17	0.35	0.39	0.22
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰↱		↰	↰↱	
Traffic Volume (vph)	46	348	35	43	327	27	65	116	73	21	64	25
Future Volume (vph)	46	348	35	43	327	27	65	116	73	21	64	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
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			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	0.99			0.96			0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1427	3213		1743	3158			1721			1325	
Flt Permitted	0.45	1.00		0.42	1.00			0.89			0.91	
Satd. Flow (perm)	675	3213		777	3158			1552			1223	
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	57	430	43	53	404	33	80	143	90	26	79	31
RTOR Reduction (vph)	0	8	0	0	7	0	0	16	0	0	12	0
Lane Group Flow (vph)	57	465	0	53	430	0	0	297	0	0	124	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	22%	8%	23%	0%	12%	6%	0%	2%	0%	0%	40%	43%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			45.5			45.5	
Effective Green, g (s)	35.5	35.5		35.5	35.5			45.5			45.5	
Actuated g/C Ratio	0.39	0.39		0.39	0.39			0.51			0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	266	1267		306	1245			784			618	
v/s Ratio Prot		c0.14			0.14							
v/s Ratio Perm	0.08			0.07				c0.19			0.10	
v/c Ratio	0.21	0.37		0.17	0.35			0.38			0.20	
Uniform Delay, d1	18.0	19.3		17.7	19.1			13.6			12.2	
Progression Factor	1.06	1.04		1.00	1.00			0.84			1.00	
Incremental Delay, d2	1.8	0.8		1.2	0.8			1.4			0.7	
Delay (s)	20.9	20.8		18.9	19.9			12.8			13.0	
Level of Service	C	C		B	B			B			B	
Approach Delay (s)		20.8			19.8			12.8			13.0	
Approach LOS		C			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			18.0							B		
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0							9.0		
Intersection Capacity Utilization			51.3%							A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	0	23	82	0	335	6	358	18	147	241	6
Future Volume (Veh/h)	21	0	23	82	0	335	6	358	18	147	241	6
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	22	0	24	85	0	349	6	373	19	153	251	6
Pedestrians	13											
Lane Width (m)	3.3											
Walking Speed (m/s)	1.2											
Percent Blockage	1											
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1307	977	267	976	970	382	270			392		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1307	977	267	976	970	382	270			392		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	59	100	97	57	100	48	100			87		
cM capacity (veh/h)	54	215	769	199	217	665	1292			1167		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	46	434	6	392	153	257						
Volume Left	22	85	6	0	153	0						
Volume Right	24	349	0	19	0	6						
cSH	105	456	1292	1700	1167	1700						
Volume to Capacity	0.44	0.95	0.00	0.23	0.13	0.15						
Queue Length 95th (m)	14.0	86.1	0.1	0.0	3.4	0.0						
Control Delay (s)	63.9	61.4	7.8	0.0	8.6	0.0						
Lane LOS	F	F	A		A							
Approach Delay (s)	63.9	61.4	0.1		3.2							
Approach LOS	F	F										
Intersection Summary												
Average Delay	24.0											
Intersection Capacity Utilization	64.5%			ICU Level of Service				C				
Analysis Period (min)	15											

Queues
5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	716	51	916	35	120	87	283
v/c Ratio	0.48	0.30	0.13	0.48	0.49	0.43	0.54	0.67
Control Delay	7.4	5.4	12.4	13.4	57.1	31.2	46.9	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	5.4	12.4	13.4	57.1	31.2	46.9	16.1
Queue Length 50th (m)	8.6	18.3	3.5	41.8	5.6	15.0	14.1	7.7
Queue Length 95th (m)	19.6	32.2	11.5	72.7	13.4	26.3	24.8	25.2
Internal Link Dist (m)	245.7		263.5		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	488	2394	400	1901	158	585	358	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.30	0.13	0.48	0.22	0.21	0.24	0.43
Intersection Summary								

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	195	599	16	44	719	69	30	73	30	75	43	200
Future Volume (vph)	195	599	16	44	719	69	30	73	30	75	43	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Flt	1.00	1.00		1.00	0.99		1.00	0.96		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3336		1744	3296		1529	1704		1502	1503	
Flt Permitted	0.25	1.00		0.38	1.00		0.30	1.00		0.68	1.00	
Satd. Flow (perm)	446	3336		696	3296		477	1704		1075	1503	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	227	697	19	51	836	80	35	85	35	87	50	233
RTOR Reduction (vph)	0	1	0	0	6	0	0	21	0	0	198	0
Lane Group Flow (vph)	227	715	0	51	910	0	35	99	0	87	85	0
Confl. Peds. (#/hr)	5		1	1		5	3		2	2		3
Heavy Vehicles (%)	2%	4%	9%	0%	3%	17%	10%	0%	9%	12%	0%	7%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	64.5	64.5		51.7	51.7		13.5	13.5		13.5	13.5	
Effective Green, g (s)	64.5	64.5		51.7	51.7		13.5	13.5		13.5	13.5	
Actuated g/C Ratio	0.72	0.72		0.58	0.58		0.15	0.15		0.15	0.15	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	457	2393		400	1895		71	255		161	225	
v/s Ratio Prot	c0.05	0.21			0.28			0.06			0.06	
v/s Ratio Perm	c0.30			0.07			0.07			c0.08		
v/c Ratio	0.50	0.30		0.13	0.48		0.49	0.39		0.54	0.38	
Uniform Delay, d1	5.3	4.6		8.8	11.2		35.1	34.5		35.3	34.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		0.7	0.9		5.3	1.0		3.7	1.1	
Delay (s)	6.2	4.9		9.4	12.1		40.4	35.4		39.0	35.5	
Level of Service	A	A		A	B		D	D		D	D	
Approach Delay (s)	5.2			11.9			36.6			36.3		
Approach LOS	A			B			D			D		
Intersection Summary												
HCM 2000 Control Delay		14.6										
HCM 2000 Volume to Capacity ratio		0.52										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		98.0%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	70	646	4	4	752	111	1	0	4	109	0	130	
Future Volume (Veh/h)	70	646	4	4	752	111	1	0	4	109	0	130	
Sign Control	Free			Free			Stop			Stop			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	78	718	4	4	836	123	1	0	4	121	0	144	
Pedestrians					3				5				
Lane Width (m)					3.3				4.0				
Walking Speed (m/s)					1.2				1.2				
Percent Blockage					0				0				
Right turn flare (veh)													
Median type	None			None									
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	964			722				1446	1848	364	1432	1788	484
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	964			722				1446	1848	364	1432	1788	484
tC, single (s)	4.2			4.1				7.5	6.5	6.9	7.6	6.5	7.1
tC, 2 stage (s)													
tF (s)	2.2			2.2				3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	89			100				98	100	99	0	100	72
cM capacity (veh/h)	689			889				61	66	637	81	72	508
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2			
Volume Total	78	479	243	4	557	402	1	4	121	144			
Volume Left	78	0	0	4	0	0	1	0	121	0			
Volume Right	0	0	4	0	0	123	0	4	0	144			
cSH	689	1700	1700	889	1700	1700	61	637	81	508			
Volume to Capacity	0.11	0.28	0.14	0.00	0.33	0.24	0.02	0.01	1.50	0.28			
Queue Length 95th (m)	2.9	0.0	0.0	0.1	0.0	0.0	0.4	0.1	72.7	8.7			
Control Delay (s)	10.9	0.0	0.0	9.1	0.0	0.0	64.8	10.7	367.3	14.9			
Lane LOS	B			A				F	B	F	B		
Approach Delay (s)	1.1			0.0				21.5	175.8				
Approach LOS									C	F			
Intersection Summary													
Average Delay	23.4												
Intersection Capacity Utilization	51.0%			ICU Level of Service			A						
Analysis Period (min)	15												

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	179	57	211	12	100	95	92
v/c Ratio	0.31	0.59	0.39	0.67	0.01	0.04	0.10	0.04
Control Delay	26.0	16.6	21.1	60.9	0.0	0.0	7.8	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	16.6	21.1	60.9	0.0	0.0	7.8	5.3
Queue Length 50th (m)	5.7	27.5	8.5	28.5	0.0	0.0	4.3	1.0
Queue Length 95th (m)	m8.4	m33.4	m17.8	47.0	m0.0	m0.0	15.3	5.0
Internal Link Dist (m)		209.4		348.3		536.6		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	337	833	406	818	913	2279	906	2289
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.21	0.14	0.26	0.01	0.04	0.10	0.04
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	↰
Traffic Volume (vph)	35	156	8	52	140	54	11	34	58	87	34	51
Future Volume (vph)	35	156	8	52	140	54	11	34	58	87	34	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.96		1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1787		1711	1725		1711	3098		1711	3114	
Flt Permitted	0.40	1.00		0.48	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	724	1787		873	1725		1250	3098		1241	3114	
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)	38	170	9	57	152	59	12	37	63	95	37	55
RTOR Reduction (vph)	0	3	0	0	24	0	0	17	0	0	15	0
Lane Group Flow (vph)	38	176	0	57	187	0	12	83	0	95	77	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	15.2		15.2	15.2		65.8	65.8		65.8	65.8	
Effective Green, g (s)	15.2	15.2		15.2	15.2		65.8	65.8		65.8	65.8	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.73	0.73		0.73	0.73	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	122	301		147	291		913	2264		907	2276	
v/s Ratio Prot		0.10			c0.11			0.03			0.02	
v/s Ratio Perm	0.05			0.07			0.01			c0.08		
v/c Ratio	0.31	0.58		0.39	0.64		0.01	0.04		0.10	0.03	
Uniform Delay, d1	32.8	34.5		33.3	34.9		3.3	3.3		3.5	3.3	
Progression Factor	0.93	0.92		1.00	1.00		0.00	0.00		1.45	1.78	
Incremental Delay, d2	1.1	2.3		1.7	4.7		0.0	0.0		0.2	0.0	
Delay (s)	31.7	34.0		35.0	39.5		0.0	0.0		5.3	6.0	
Level of Service	C	C		D	D		A	A		A	A	
Approach Delay (s)		33.6			38.5			0.0			5.6	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM 2000 Control Delay		23.8								C		
HCM 2000 Volume to Capacity ratio		0.21										
Actuated Cycle Length (s)		90.0								9.0		
Intersection Capacity Utilization		37.6%								A		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	8	74	6	6	4	79	109	8	12	173	96
Future Volume (Veh/h)	75	8	74	6	6	4	79	109	8	12	173	96
Sign Control		Stop				Stop					Free	
Grade		0%				0%					0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	9	80	7	7	4	86	118	9	13	188	104
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	568	565	240	645	612	122	292			127		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	568	565	240	645	612	122	292			127		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	98	90	98	98	100	93			99		
cM capacity (veh/h)	401	401	799	321	377	929	1270			1459		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	171	18	213	305								
Volume Left	82	7	86	13								
Volume Right	80	4	9	104								
cSH	523	403	1270	1459								
Volume to Capacity	0.33	0.04	0.07	0.01								
Queue Length 95th (m)	10.6	1.0	1.6	0.2								
Control Delay (s)	15.2	14.4	3.6	0.4								
Lane LOS	C	B	A	A								
Approach Delay (s)	15.2	14.4	3.6	0.4								
Approach LOS	C	B										
Intersection Summary												
Average Delay				5.3								
Intersection Capacity Utilization				49.3%	ICU Level of Service			A				
Analysis Period (min)				15								

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	74	735	987	35	67
v/c Ratio	0.51	0.48	0.64	0.05	0.09
Control Delay	22.5	17.2	13.9	4.3	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	17.2	13.9	4.3	1.5
Queue Length 50th (m)	8.7	44.6	65.9	1.0	0.3
Queue Length 95th (m)	#25.2	59.5	86.0	1.8	0.0
Internal Link Dist (m)	202.4		385.6	536.6	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	144	1539	1533	769	724
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	0.51	0.48	0.64	0.05	0.09
Intersection Summary					
# 95th percentile volume exceeds capacity, queue may be longer.					
Queue shown is maximum after two cycles.					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕		↕	↕
Traffic Volume (vph)	68	676	873	35	32	62
Future Volume (vph)	68	676	873	35	32	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3401		1711	1531
Flt Permitted	0.18	1.00	1.00		0.95	1.00
Satd. Flow (perm)	322	3421	3401		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	735	949	38	35	67
RTOR Reduction (vph)	0	0	3	0	0	36
Lane Group Flow (vph)	74	735	984	0	35	31
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	1539	1530		769	688
v/s Ratio Prot		0.21	c0.29		c0.02	
v/s Ratio Perm	0.23					0.02
v/c Ratio	0.51	0.48	0.64		0.05	0.05
Uniform Delay, d1	17.7	17.3	19.2		13.9	13.9
Progression Factor	1.00	1.00	1.00		0.31	0.31
Incremental Delay, d2	12.5	1.1	2.1		0.1	0.1
Delay (s)	30.2	18.4	21.2		4.4	4.4
Level of Service	C	B	C		A	A
Approach Delay (s)		19.5	21.2		4.4	
Approach LOS		B	C		A	
Intersection Summary						
HCM 2000 Control Delay		19.6		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.34				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		44.8%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↕		↕	↕	
Traffic Volume (veh/h)	77	15	11	111	157	121
Future Volume (Veh/h)	77	15	11	111	157	121
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	16	12	121	171	132
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	322	152	303			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	322	152	303			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	98	99			
cM capacity (veh/h)	641	868	1255			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	52	81	114	189	
Volume Left	84	12	0	0	0	
Volume Right	16	0	0	0	132	
cSH	669	1255	1700	1700	1700	
Volume to Capacity	0.15	0.01	0.05	0.07	0.11	
Queue Length 95th (m)	3.9	0.2	0.0	0.0	0.0	
Control Delay (s)	11.3	1.9	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.3	0.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		23.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	145	152	68	123	11	81	78	46	8	69	36
Future Volume (Veh/h)	64	145	152	68	123	11	81	78	46	8	69	36
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	158	165	74	134	12	88	85	50	9	75	39
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	233											
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	146			323			745	674	240	761	751	140
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			323			726	654	240	742	732	106
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 %	95			94			63	75	94	96	75	96
cM capacity (veh/h)	1441			1237			237	337	798	225	304	925
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	393	220	223	123								
Volume Left	70	74	88	9								
Volume Right	165	12	50	39								
cSH	1441	1237	325	374								
Volume to Capacity	0.05	0.06	0.69	0.33								
Queue Length 95th (m)	1.1	1.4	35.7	10.6								
Control Delay (s)	1.7	3.1	37.1	19.3								
Lane LOS	A	A	E	C								
Approach Delay (s)	1.7	3.1	37.1	19.3								
Approach LOS			E	C								
Intersection Summary												
Average Delay	12.5											
Intersection Capacity Utilization	47.7%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
12: Highway 8 & Street C

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	124	703	863	72	42	131
Future Volume (Veh/h)	124	703	863	72	42	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	135	764	938	78	46	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		287	226			
pX, platoon unblocked	0.78				0.81	0.78
vC, conflicting volume	1016				1629	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	470				1024	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				71	83
cM capacity (veh/h)	853				158	850
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	390	509	625	391	188	
Volume Left	135	0	0	0	46	
Volume Right	0	0	0	78	142	
cSH	853	1700	1700	1700	410	
Volume to Capacity	0.16	0.30	0.37	0.23	0.46	
Queue Length 95th (m)	4.2	0.0	0.0	0.0	17.6	
Control Delay (s)	4.7	0.0	0.0	0.0	21.0	
Lane LOS	A				C	
Approach Delay (s)	2.0		0.0		21.0	
Approach LOS					C	
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization	69.6%		ICU Level of Service		C	
Analysis Period (min)	15					

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	462	852	42	453	235	119	361	236	801
v/c Ratio	1.50	0.54	0.19	0.53	0.30	1.47	0.50	0.91	1.19
Control Delay	267.6	16.0	23.8	25.7	10.0	293.4	23.2	66.9	128.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	267.6	16.0	23.8	25.7	10.0	293.4	23.2	66.9	128.0
Queue Length 50th (m)	~110.6	44.7	5.0	56.0	6.8	~28.0	44.7	37.3	~163.9
Queue Length 95th (m)	#166.2	61.2	m12.3	82.2	23.1	#47.7	69.4	#81.3	#231.8
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0			35.0		50.0	
Base Capacity (vph)	307	1581	216	859	788	81	716	258	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.50	0.54	0.19	0.53	0.30	1.47	0.50	0.91	1.19

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Future Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	3254		1744	1842	1421	1745	1796		1428	1639	
Flt Permitted	0.38	1.00		0.25	1.00	1.00	0.11	1.00		0.43	1.00	
Satd. Flow (perm)	658	3254		465	1842	1421	206	1796		652	1639	
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)	462	578	274	42	453	235	119	329	32	236	526	275
RTOR Reduction (vph)	0	63	0	0	0	125	0	4	0	0	21	0
Lane Group Flow (vph)	462	789	0	42	453	110	119	357	0	236	780	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	42.0	42.0		42.0	42.0	42.0	35.7	35.7		35.7	35.7	
Effective Green, g (s)	42.0	42.0		42.0	42.0	42.0	35.7	35.7		35.7	35.7	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47	0.40	0.40		0.40	0.40	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1518		217	859	663	81	712		258	650	
v/s Ratio Prot		0.24			0.25			0.20			0.48	
v/s Ratio Perm	c0.70			0.09		0.08	c0.58			0.36		
v/c Ratio	1.50	0.52		0.19	0.53	0.17	1.47	0.50		0.91	1.20	
Uniform Delay, d1	24.0	16.9		14.1	17.0	13.9	27.1	20.5		25.7	27.1	
Progression Factor	1.00	1.00		1.45	1.35	4.37	1.00	1.00		1.00	1.00	
Incremental Delay, d2	243.5	1.3		1.9	2.2	0.5	266.3	0.6		34.0	104.3	
Delay (s)	267.5	18.2		22.3	25.1	61.1	293.4	21.0		59.7	131.4	
Level of Service	F	B		C	C	E	F	C		E	F	
Approach Delay (s)		105.8			36.5			88.5			115.1	
Approach LOS		F			D			F			F	

Intersection Summary

HCM 2000 Control Delay	92.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	133.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	17	808	132	689	138	93	44
v/c Ratio	0.04	0.32	0.28	0.26	0.62	0.17	0.20
Control Delay	1.8	2.1	10.0	7.6	44.2	0.7	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.8	2.1	10.0	7.6	44.2	0.7	16.6
Queue Length 50th (m)	0.4	10.2	10.0	26.8	16.7	0.0	1.1
Queue Length 95th (m)	m0.6	m9.6	20.3	35.8	30.5	0.0	8.7
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	449	2510	471	2638	223	555	221
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	0.04	0.32	0.28	0.26	0.62	0.17	0.20
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	14	493	170	108	565	0	113	0	76	6	0	30
Future Volume (vph)	14	493	170	108	565	0	113	0	76	6	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
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		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1462	3247		1750	3466		1750	1566			1420	
Flt Permitted	0.38	1.00		0.34	1.00		0.87	1.00			0.95	
Satd. Flow (perm)	591	3247		618	3466		1609	1566			1365	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	17	601	207	132	689	0	138	0	93	7	0	37
RTOR Reduction (vph)	0	38	0	0	0	0	0	80	0	0	32	0
Lane Group Flow (vph)	17	770	0	132	689	0	138	13	0	0	12	0
Confl. Peds. (#/hr)	1						1					3
Heavy Vehicles (%)	22%	7%	2%	2%	3%	0%	2%	2%	2%	50%	2%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	68.5	68.5		68.5	68.5		12.5	12.5			12.5	
Effective Green, g (s)	68.5	68.5		68.5	68.5		12.5	12.5			12.5	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.14	0.14			0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	449	2471		470	2638		223	217			189	
v/s Ratio Prot		c0.24			0.20			0.01				
v/s Ratio Perm	0.03			0.21			c0.09				0.01	
v/c Ratio	0.04	0.31		0.28	0.26		0.62	0.06			0.06	
Uniform Delay, d1	2.6	3.4		3.3	3.2		36.5	33.6			33.7	
Progression Factor	0.61	0.69		2.44	2.26		0.85	1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.3	0.1		12.2	0.5			0.7	
Delay (s)	1.7	2.6		8.3	7.3		43.2	34.2			34.3	
Level of Service	A	A		A	A		D	C			C	
Approach Delay (s)		2.5			7.5			39.6			34.3	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			9.8			HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			51.3%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	47	742	112	660	226	291
v/c Ratio	0.13	0.40	0.40	0.35	0.43	0.52
Control Delay	7.6	8.2	16.9	11.8	23.2	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	8.2	16.9	11.8	23.2	24.5
Queue Length 50th (m)	3.2	29.2	10.3	30.5	26.0	34.3
Queue Length 95th (m)	6.9	32.7	20.6	37.2	41.3	51.4
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	361	1835	283	1874	527	559
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	0.40	0.40	0.35	0.43	0.52
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	39	531	85	93	524	24	55	56	77	40	118	84
Future Volume (vph)	39	531	85	93	524	24	55	56	77	40	118	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
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			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1740	3313		1528	3403			1700			1664	
Flt Permitted	0.36	1.00		0.32	1.00			0.83			0.92	
Satd. Flow (perm)	657	3313		514	3403			1427			1538	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	47	640	102	112	631	29	66	67	93	48	142	101
RTOR Reduction (vph)	0	14	0	0	4	0	0	28	0	0	21	0
Lane Group Flow (vph)	47	728	0	112	656	0	0	198	0	0	270	0
Confl. Peds. (#/hr)	3		2	2		3	1		1	1		1
Heavy Vehicles (%)	0%	6%	0%	14%	4%	6%	0%	0%	0%	15%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	49.5	49.5		49.5	49.5			31.5			31.5	
Effective Green, g (s)	49.5	49.5		49.5	49.5			31.5			31.5	
Actuated g/C Ratio	0.55	0.55		0.55	0.55			0.35			0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	361	1822		282	1871			499			538	
v/s Ratio Prot		c0.22			0.19							
v/s Ratio Perm	0.07			0.22				0.14			c0.18	
v/c Ratio	0.13	0.40		0.40	0.35			0.40			0.50	
Uniform Delay, d1	9.8	11.7		11.7	11.3			22.1			23.1	
Progression Factor	0.66	0.66		1.00	1.00			1.13			1.00	
Incremental Delay, d2	0.7	0.6		4.1	0.5			2.4			3.3	
Delay (s)	7.2	8.4		15.8	11.8			27.2			26.4	
Level of Service	A	A		B	B			C			C	
Approach Delay (s)		8.3			12.4			27.2			26.4	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			14.4							B		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			90.0							9.0		
Intersection Capacity Utilization			52.1%							A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
4: Fruitland Road & Sherwood Park Road/Collector B 2036 Total PM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	0	17	43	0	196	27	265	21	339	420	30
Future Volume (Veh/h)	24	0	17	43	0	196	27	265	21	339	420	30
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	26	0	18	46	0	211	29	285	23	365	452	32
Pedestrians	4											
Lane Width (m)	3.3											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1756	1568	472	1554	1572	296	488	308				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1756	1568	472	1554	1572	296	488	308				
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	20	100	97	32	100	72	97	71				
cM capacity (veh/h)	33	76	594	68	76	743	1082	1253				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	44	257	29	308	365	484						
Volume Left	26	46	29	0	365	0						
Volume Right	18	211	0	23	0	32						
cSH	53	266	1082	1700	1253	1700						
Volume to Capacity	0.83	0.96	0.03	0.18	0.29	0.28						
Queue Length 95th (m)	26.5	69.3	0.6	0.0	9.2	0.0						
Control Delay (s)	197.9	87.5	8.4	0.0	9.1	0.0						
Lane LOS	F	F	A		A							
Approach Delay (s)	197.9	87.5	0.7		3.9							
Approach LOS	F	F										
Intersection Summary												
Average Delay				23.4								
Intersection Capacity Utilization				58.5%	ICU Level of Service				B			
Analysis Period (min)				15								

Queues 210193 - Block 1 Servicing Strategy
5: Regalview Drive/Fruitland Road & Highway 8 2036 Total PM Peak Hour - Scenario 1

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	187	765	54	1050	33	109	112	397
v/c Ratio	0.49	0.33	0.15	0.58	0.45	0.31	0.53	0.78
Control Delay	10.1	7.3	15.6	17.2	48.3	16.4	40.7	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	7.3	15.6	17.2	48.3	16.4	40.7	22.0
Queue Length 50th (m)	8.1	22.8	4.1	54.7	5.1	7.2	17.8	19.8
Queue Length 95th (m)	22.7	47.2	14.5	105.8	12.6	17.6	28.8	44.9
Internal Link Dist (m)	245.7		263.5		176.2		531.3	
Turn Bay Length (m)	80.0	50.0		30.0		50.0		
Base Capacity (vph)	398	2322	360	1817	134	583	376	693
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.33	0.15	0.58	0.25	0.19	0.30	0.57
Intersection Summary								

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	168	672	16	49	875	70	30	44	54	101	55	302
Future Volume (vph)	168	672	16	49	875	70	30	44	54	101	55	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.92		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	3409		1744	3342		1604	1629		1558	1537	
Flt Permitted	0.19	1.00		0.36	1.00		0.24	1.00		0.69	1.00	
Satd. Flow (perm)	334	3409		664	3342		402	1629		1127	1537	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	187	747	18	54	972	78	33	49	60	112	61	336
RTOR Reduction (vph)	0	1	0	0	5	0	0	49	0	0	220	0
Lane Group Flow (vph)	187	764	0	54	1045	0	33	60	0	112	177	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	61.2	61.2		48.7	48.7		16.8	16.8		16.8	16.8	
Effective Green, g (s)	61.2	61.2		48.7	48.7		16.8	16.8		16.8	16.8	
Actuated g/C Ratio	0.68	0.68		0.54	0.54		0.19	0.19		0.19	0.19	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	367	2320		359	1810		75	304		210	287	
v/s Ratio Prot	c0.05	0.22			c0.31			0.04			c0.11	
v/s Ratio Perm	0.29			0.08			0.08			0.10		
v/c Ratio	0.51	0.33		0.15	0.58		0.44	0.20		0.53	0.62	
Uniform Delay, d1	7.3	5.9		10.3	13.7		32.4	30.9		33.0	33.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.4		0.9	1.3		4.1	0.3		2.6	3.9	
Delay (s)	8.5	6.3		11.2	15.1		36.5	31.2		35.6	37.5	
Level of Service	A	A		B	B		D	C		D	D	
Approach Delay (s)	6.7			14.9			32.4			37.1		
Approach LOS	A			B			C			D		
Intersection Summary												
HCM 2000 Control Delay		17.1										
HCM 2000 Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		98.0%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	70	646	4	4	752	111	1	0	4	109	0	130		
Future Volume (Veh/h)	70	646	4	4	752	111	1	0	4	109	0	130		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	78	718	4	4	836	123	1	0	4	121	0	144		
Pedestrians						3						5		
Lane Width (m)						3.3						4.0		
Walking Speed (m/s)						1.2						1.2		
Percent Blockage						0						0		
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	964				722				1446	1848	364	1432	1788	484
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	964				722				1446	1848	364	1432	1788	484
tC, single (s)	4.2				4.1				7.5	6.5	6.9	7.6	6.5	7.1
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	89				100				98	100	99	0	100	72
cM capacity (veh/h)	689				889				61	66	637	81	72	508
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2				
Volume Total	78	479	243	4	557	402	1	4	121	144				
Volume Left	78	0	0	4	0	0	1	0	121	0				
Volume Right	0	0	4	0	0	123	0	4	0	144				
cSH	689	1700	1700	889	1700	1700	61	637	81	508				
Volume to Capacity	0.11	0.28	0.14	0.00	0.33	0.24	0.02	0.01	1.50	0.28				
Queue Length 95th (m)	2.9	0.0	0.0	0.1	0.0	0.0	0.4	0.1	72.7	8.7				
Control Delay (s)	10.9	0.0	0.0	9.1	0.0	0.0	64.8	10.7	367.3	14.9				
Lane LOS	B				A				F	B	F	B		
Approach Delay (s)	1.1				0.0				21.5	175.8				
Approach LOS							C			F				
Intersection Summary														
Average Delay				23.4										
Intersection Capacity Utilization				51.0%			ICU Level of Service			A				
Analysis Period (min)				15										

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	38	179	57	211	12	100	95	92
v/c Ratio	0.31	0.59	0.39	0.67	0.01	0.04	0.10	0.04
Control Delay	34.0	36.3	39.1	39.6	0.0	0.0	6.9	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.0	36.3	39.1	39.6	0.0	0.0	6.9	4.1
Queue Length 50th (m)	5.7	27.5	8.5	28.5	0.0	0.0	4.3	1.0
Queue Length 95th (m)	m8.4	m33.4	m17.8	47.0	m0.0	m0.0	15.3	5.0
Internal Link Dist (m)		209.4		348.3		536.6		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	337	833	406	818	913	2279	906	2289
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.21	0.14	0.26	0.01	0.04	0.10	0.04

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	35	156	8	52	140	54	11	34	58	87	34	51
Future Volume (vph)	35	156	8	52	140	54	11	34	58	87	34	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.96		1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1787		1711	1725		1711	3098		1711	3114	
Flt Permitted	0.40	1.00		0.48	1.00		0.69	1.00		0.69	1.00	
Satd. Flow (perm)	724	1787		873	1725		1250	3098		1241	3114	
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)	38	170	9	57	152	59	12	37	63	95	37	55
RTOR Reduction (vph)	0	3	0	0	24	0	0	17	0	0	15	0
Lane Group Flow (vph)	38	176	0	57	187	0	12	83	0	95	77	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	15.2		15.2	15.2		65.8	65.8		65.8	65.8	
Effective Green, g (s)	15.2	15.2		15.2	15.2		65.8	65.8		65.8	65.8	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.73	0.73		0.73	0.73	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	122	301		147	291		913	2264		907	2276	
v/s Ratio Prot		0.10			c0.11			0.03			0.02	
v/s Ratio Perm	0.05			0.07			0.01			c0.08		
v/c Ratio	0.31	0.58		0.39	0.64		0.01	0.04		0.10	0.03	
Uniform Delay, d1	32.8	34.5		33.3	34.9		3.3	3.3		3.5	3.3	
Progression Factor	0.93	0.92		1.00	1.00		0.00	0.00		1.45	1.78	
Incremental Delay, d2	1.1	2.3		1.7	4.7		0.0	0.0		0.2	0.0	
Delay (s)	31.7	34.0		35.0	39.5		0.0	0.0		5.3	6.0	
Level of Service	C	C		D	D		A	A		A	A	
Approach Delay (s)		33.6			38.5			0.0			5.6	
Approach LOS		C			D			A			A	

Intersection Summary

HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	75	8	74	6	6	4	79	109	8	12	173	96	
Future Volume (Veh/h)	75	8	74	6	6	4	79	109	8	12	173	96	
Sign Control		Stop				Stop				Free			
Grade		0%				0%				0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	82	9	80	7	7	4	86	118	9	13	188	104	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	568	565	240	645	612	122	292	127					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	568	565	240	645	612	122	292	127					
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1					
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					
p0 queue free %	80	98	90	98	98	100	93	99					
cM capacity (veh/h)	401	401	799	321	377	929	1270	1459					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	171	18	213	305									
Volume Left	82	7	86	13									
Volume Right	80	4	9	104									
cSH	523	403	1270	1459									
Volume to Capacity	0.33	0.04	0.07	0.01									
Queue Length 95th (m)	10.6	1.0	1.6	0.2									
Control Delay (s)	15.2	14.4	3.6	0.4									
Lane LOS	C	B	A	A									
Approach Delay (s)	15.2	14.4	3.6	0.4									
Approach LOS	C	B											
Intersection Summary													
Average Delay				5.3									
Intersection Capacity Utilization				49.3%		ICU Level of Service			A				
Analysis Period (min)				15									

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBT	SBL	SBR
Lane Group					
Lane Group Flow (vph)	74	735	987	35	67
v/c Ratio	0.51	0.48	0.64	0.05	0.09
Control Delay	33.2	18.6	21.5	4.4	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	18.6	21.5	4.4	1.5
Queue Length 50th (m)	8.7	44.6	65.9	1.0	0.3
Queue Length 95th (m)	#25.2	59.5	86.0	1.8	0.0
Internal Link Dist (m)	202.4		385.6	536.6	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	144	1539	1533	769	724
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	0.51	0.48	0.64	0.05	0.09
Intersection Summary					
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↗	↗		↖	↖
Traffic Volume (vph)	68	676	873	35	32	62
Future Volume (vph)	68	676	873	35	32	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3401		1711	1531
Flt Permitted	0.18	1.00	1.00		0.95	1.00
Satd. Flow (perm)	322	3421	3401		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	735	949	38	35	67
RTOR Reduction (vph)	0	0	3	0	0	36
Lane Group Flow (vph)	74	735	984	0	35	31
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	144	1539	1530		769	688
v/s Ratio Prot		0.21	c0.29		c0.02	
v/s Ratio Perm	0.23					0.02
v/c Ratio	0.51	0.48	0.64		0.05	0.05
Uniform Delay, d1	17.7	17.3	19.2		13.9	13.9
Progression Factor	1.00	1.00	1.00		0.31	0.31
Incremental Delay, d2	12.5	1.1	2.1		0.1	0.1
Delay (s)	30.2	18.4	21.2		4.4	4.4
Level of Service	C	B	C		A	A
Approach Delay (s)		19.5	21.2		4.4	
Approach LOS		B	C		A	
Intersection Summary						
HCM 2000 Control Delay		19.6		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.34				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		44.8%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↗		↖	↖	
Traffic Volume (veh/h)	77	15	11	111	157	121
Future Volume (Veh/h)	77	15	11	111	157	121
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	16	12	121	171	132
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	322	152	303			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	322	152	303			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	98	99			
cM capacity (veh/h)	641	868	1255			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	52	81	114	189	
Volume Left	84	12	0	0	0	
Volume Right	16	0	0	0	132	
cSH	669	1255	1700	1700	1700	
Volume to Capacity	0.15	0.01	0.05	0.07	0.11	
Queue Length 95th (m)	3.9	0.2	0.0	0.0	0.0	
Control Delay (s)	11.3	1.9	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.3	0.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		23.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	64	145	152	68	123	11	81	78	46	8	69	36
Future Volume (Veh/h)	64	145	152	68	123	11	81	78	46	8	69	36
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	158	165	74	134	12	88	85	50	9	75	39
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	233											
pX, platoon unblocked	0.98						0.98	0.98		0.98	0.98	0.98
vC, conflicting volume	146			323			745	674	240	761	751	140
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	112			323			726	654	240	742	732	106
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 %	95			94			63	75	94	96	75	96
cM capacity (veh/h)	1441			1237			237	337	798	225	304	925
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	393	220	223	123								
Volume Left	70	74	88	9								
Volume Right	165	12	50	39								
cSH	1441	1237	325	374								
Volume to Capacity	0.05	0.06	0.69	0.33								
Queue Length 95th (m)	1.1	1.4	35.7	10.6								
Control Delay (s)	1.7	3.1	37.1	19.3								
Lane LOS	A	A	E	C								
Approach Delay (s)	1.7	3.1	37.1	19.3								
Approach LOS			E	C								
Intersection Summary												
Average Delay	12.5											
Intersection Capacity Utilization	47.7%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
12: Highway 8 & Street C

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 1

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	124	703	863	72	42	131
Future Volume (Veh/h)	124	703	863	72	42	131
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	135	764	938	78	46	142
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)		287	226			
pX, platoon unblocked	0.78				0.81	0.78
vC, conflicting volume	1016				1629	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	470				1024	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	84				71	83
cM capacity (veh/h)	853				158	850
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	390	509	625	391	188	
Volume Left	135	0	0	0	46	
Volume Right	0	0	0	78	142	
cSH	853	1700	1700	1700	410	
Volume to Capacity	0.16	0.30	0.37	0.23	0.46	
Queue Length 95th (m)	4.2	0.0	0.0	0.0	17.6	
Control Delay (s)	4.7	0.0	0.0	0.0	21.0	
Lane LOS	A				C	
Approach Delay (s)	2.0		0.0		21.0	
Approach LOS					C	
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization	69.6%		ICU Level of Service		C	
Analysis Period (min)	15					

Appendix J

Future Total Traffic Operations Reports (Scenario 2)



Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	304	411	8	339	248	222	559	214	595
v/c Ratio	1.04	0.33	0.03	0.50	0.38	1.00	0.67	0.94	0.77
Control Delay	95.1	15.5	29.1	35.7	14.0	88.2	22.9	73.3	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.1	15.5	29.1	35.7	14.0	88.2	22.9	73.3	24.5
Queue Length 50th (m)	~56.8	19.1	0.9	47.1	16.0	36.2	70.0	33.2	69.7
Queue Length 95th (m)	#92.3	26.6	m2.9	65.2	24.3	#72.2	91.9	#68.2	96.3
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	291	1242	262	676	659	222	840	227	777
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.33	0.03	0.50	0.38	1.00	0.67	0.94	0.77

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	252	236	105	7	281	206	184	448	16	178	233	261
Future Volume (vph)	252	236	105	7	281	206	184	448	16	178	233	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1585	3048		1309	1740	1308	1690	1767		1545	1545	
Flt Permitted	0.45	1.00		0.49	1.00	1.00	0.26	1.00		0.29	1.00	
Satd. Flow (perm)	749	3048		674	1740	1308	470	1767		480	1545	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	304	284	127	8	339	248	222	540	19	214	281	314
RTOR Reduction (vph)	0	57	0	0	0	150	0	2	0	0	45	0
Lane Group Flow (vph)	304	354	0	8	339	98	222	557	0	214	550	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	13%	9%	10%	6%	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	35.0	35.0		35.0	35.0	35.0	42.7	42.7		42.7	42.7	
Effective Green, g (s)	35.0	35.0		35.0	35.0	35.0	42.7	42.7		42.7	42.7	
Actuated g/C Ratio	0.39	0.39		0.39	0.39	0.39	0.47	0.47		0.47	0.47	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	291	1185		262	676	508	222	838		227	733	
v/s Ratio Prot		0.12			0.19			0.32			0.36	
v/s Ratio Perm	c0.41			0.01		0.07	c0.47			0.45		
v/c Ratio	1.04	0.30		0.03	0.50	0.19	1.00	0.67		0.94	0.75	
Uniform Delay, d1	27.5	19.0		17.0	20.9	18.2	23.6	18.2		22.5	19.3	
Progression Factor	1.00	1.00		1.66	1.55	4.43	1.00	1.00		1.00	1.00	
Incremental Delay, d2	64.9	0.6		0.2	2.6	0.8	60.4	2.0		43.7	4.3	
Delay (s)	92.4	19.7		28.5	34.8	81.3	84.1	20.2		66.2	23.7	
Level of Service	F	B		C	C	F	F	C		E	C	
Approach Delay (s)	50.6				54.1			38.3			34.9	
Approach LOS	D				D			D			C	

Intersection Summary

HCM 2000 Control Delay	43.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	119.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	13	529	35	399	207	84	33
v/c Ratio	0.02	0.28	0.07	0.21	0.50	0.11	0.07
Control Delay	4.5	3.9	6.7	8.2	35.4	0.3	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	3.9	6.7	8.2	35.4	0.3	11.1
Queue Length 50th (m)	0.5	8.6	3.9	24.9	27.6	0.0	0.8
Queue Length 95th (m)	m1.0	m7.0	9.4	33.4	45.6	0.0	6.5
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	573	1913	478	1861	414	795	477
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	0.02	0.28	0.07	0.21	0.50	0.11	0.07
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	11	342	108	30	332	7	176	0	71	6	0	22
Future Volume (vph)	11	342	108	30	332	7	176	0	71	6	0	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5		
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		1.00		
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00		
Frt	1.00	0.96		1.00	1.00		1.00	0.85		0.89		
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.99		
Satd. Flow (prot)	1782	3162		1750	3128		1750	1566		1551		
Flt Permitted	0.51	1.00		0.44	1.00		0.74	1.00		0.96		
Satd. Flow (perm)	964	3162		805	3128		1355	1566		1505		
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)	13	402	127	35	391	8	207	0	84	7	0	26
RTOR Reduction (vph)	0	34	0	0	2	0	0	58	0	0	18	0
Lane Group Flow (vph)	13	495	0	35	397	0	207	26	0	0	15	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	11%	2%	2%	14%	0%	2%	2%	2%	0%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Effective Green, g (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.31	0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	573	1879		478	1859		414	478			459	
v/s Ratio Prot		c0.16			0.13			0.02				
v/s Ratio Perm	0.01			0.04			c0.15				0.01	
v/c Ratio	0.02	0.26		0.07	0.21		0.50	0.05			0.03	
Uniform Delay, d1	7.5	8.8		7.7	8.5		25.6	22.1			21.9	
Progression Factor	0.57	0.48		0.80	0.94		1.18	1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.1		4.2	0.2			0.1	
Delay (s)	4.4	4.5		6.3	8.0		34.4	22.3			22.1	
Level of Service	A	A		A	A		C	C			C	
Approach Delay (s)	4.5			7.9			30.9				22.1	
Approach LOS	A			A			C				C	
Intersection Summary												
HCM 2000 Control Delay		12.0			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.34										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		44.7%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	48	399	53	355	286	117
v/c Ratio	0.18	0.34	0.17	0.31	0.33	0.17
Control Delay	16.3	16.0	21.5	20.9	13.9	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	16.0	21.5	20.9	13.9	9.0
Queue Length 50th (m)	5.3	23.5	6.1	21.8	25.4	7.4
Queue Length 95th (m)	10.8	28.4	12.7	28.5	36.5	13.7
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	273	1166	309	1147	858	680
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	0.34	0.17	0.31	0.33	0.17
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰↱		↰	↰↱	
Traffic Volume (vph)	39	291	32	43	266	22	60	102	70	17	57	21
Future Volume (vph)	39	291	32	43	266	22	60	102	70	17	57	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5			4.5		4.5
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		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00		1.00
Frt	1.00	0.98		1.00	0.99		0.96			0.97		0.97
Flt Protected	0.95	1.00		0.95	1.00		0.99			0.99		0.99
Satd. Flow (prot)	1426	3204		1743	3158		1717			1323		1323
Flt Permitted	0.50	1.00		0.47	1.00		0.90			0.93		0.93
Satd. Flow (perm)	756	3204		858	3158		1562			1240		1240
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	48	359	40	53	328	27	74	126	86	21	70	26
RTOR Reduction (vph)	0	10	0	0	7	0	0	17	0	0	12	0
Lane Group Flow (vph)	48	389	0	53	348	0	0	269	0	0	105	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	22%	8%	23%	0%	12%	6%	0%	2%	0%	0%	40%	43%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	32.5	32.5		32.5	32.5			48.5			48.5	
Effective Green, g (s)	32.5	32.5		32.5	32.5			48.5			48.5	
Actuated g/C Ratio	0.36	0.36		0.36	0.36			0.54			0.54	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	273	1157		309	1140			841			668	
v/s Ratio Prot		c0.12			0.11							
v/s Ratio Perm	0.06			0.06			c0.17			0.09		
v/c Ratio	0.18	0.34		0.17	0.31		0.32			0.16		
Uniform Delay, d1	19.6	20.9		19.6	20.6		11.6			10.5		
Progression Factor	0.73	0.75		1.00	1.00		1.25			1.00		
Incremental Delay, d2	1.4	0.8		1.2	0.7		1.0			0.5		
Delay (s)	15.7	16.4		20.8	21.3		15.5			11.0		
Level of Service	B	B		C	C		B			B		
Approach Delay (s)	16.3			21.3			15.5			11.0		
Approach LOS	B			C			B			B		
Intersection Summary												
HCM 2000 Control Delay		17.2			HCM 2000 Level of Service		B					
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)		9.0					
Intersection Capacity Utilization		50.1%			ICU Level of Service		A					
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	0	18	182	0	335	5	288	47	147	193	5
Future Volume (Veh/h)	17	0	18	182	0	335	5	288	47	147	193	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	18	0	19	190	0	349	5	300	49	153	201	5
Pedestrians		13										
Lane Width (m)		3.3										
Walking Speed (m/s)		1.2										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1182	882	216	860	860	324	219			349		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1182	882	216	860	860	324	219			349		
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	75	100	98	21	100	51	100			87		
cM capacity (veh/h)	72	246	820	241	253	717	1349			1210		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	37	539	5	349	153	206						
Volume Left	18	190	5	0	153	0						
Volume Right	19	349	0	49	0	5						
cSH	135	423	1349	1700	1210	1700						
Volume to Capacity	0.27	1.28	0.00	0.21	0.13	0.12						
Queue Length 95th (m)	7.8	174.4	0.1	0.0	3.2	0.0						
Control Delay (s)	41.5	169.0	7.7	0.0	8.4	0.0						
Lane LOS	E	F	A		A							
Approach Delay (s)	41.5	169.0	0.1		3.6							
Approach LOS	E	F										
Intersection Summary												
Average Delay	72.9											
Intersection Capacity Utilization	71.2%			ICU Level of Service				C				
Analysis Period (min)	15											

Queues
5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	207	578	24	685	28	103	70	363
v/c Ratio	0.37	0.25	0.05	0.37	0.39	0.33	0.37	0.78
Control Delay	7.0	6.3	13.8	13.5	46.0	27.9	35.8	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	6.3	13.8	13.5	46.0	27.9	35.8	22.9
Queue Length 50th (m)	8.2	14.8	1.6	28.7	4.4	13.4	11.0	18.4
Queue Length 95th (m)	22.7	31.4	7.2	57.2	10.4	21.9	18.6	37.2
Internal Link Dist (m)	245.7		490.0		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	572	2313	442	1835	136	590	364	668
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.25	0.05	0.37	0.21	0.17	0.19	0.54
Intersection Summary								

HCM Signalized Intersection Capacity Analysis
5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	178	484	13	21	534	55	24	70	19	60	61	251
Future Volume (vph)	178	484	13	21	534	55	24	70	19	60	61	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1709	3336		1743	3289		1529	1739		1501	1510	
Flt Permitted	0.34	1.00		0.43	1.00		0.25	1.00		0.69	1.00	
Satd. Flow (perm)	608	3336		797	3289		410	1739		1091	1510	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	207	563	15	24	621	64	28	81	22	70	71	292
RTOR Reduction (vph)	0	1	0	0	6	0	0	13	0	0	204	0
Lane Group Flow (vph)	207	577	0	24	679	0	28	90	0	70	159	0
Confl. Peds. (#/hr)	5		1	1		5	3		2	2		3
Heavy Vehicles (%)	2%	4%	9%	0%	3%	17%	10%	0%	9%	12%	0%	7%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	62.3	62.3		50.0	50.0		15.7	15.7		15.7	15.7	
Effective Green, g (s)	62.3	62.3		50.0	50.0		15.7	15.7		15.7	15.7	
Actuated g/C Ratio	0.69	0.69		0.56	0.56		0.17	0.17		0.17	0.17	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	535	2311		443	1829		71	303		190	263	
v/s Ratio Prot	c0.04	0.17			0.21			0.05			c0.11	
v/s Ratio Perm	c0.23			0.03			0.07			0.06		
v/c Ratio	0.39	0.25		0.05	0.37		0.39	0.30		0.37	0.61	
Uniform Delay, d1	5.2	5.1		9.1	11.2		32.9	32.3		32.7	34.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.3		0.2	0.6		3.6	0.5		1.2	3.9	
Delay (s)	5.7	5.4		9.4	11.7		36.5	32.8		33.9	38.1	
Level of Service	A	A		A	B		D	C		C	D	
Approach Delay (s)	5.5			11.7			33.6			37.5		
Approach LOS	A			B			C			D		
Intersection Summary												
HCM 2000 Control Delay	16.1											
HCM 2000 Volume to Capacity ratio	0.45											
Actuated Cycle Length (s)	89.9											
Intersection Capacity Utilization	93.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (veh/h)	66	462	0	0	487	110	1	0	0	100	0	54
Future Volume (Veh/h)	66	462	0	0	487	110	1	0	0	100	0	54
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)	80	557	0	0	587	133	1	0	0	120	0	65
Pedestrians												4
Lane Width (m)												4.0
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	724			557			1076	1441	278	1096	1374	364
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	724			557			1076	1441	278	1096	1374	364
tC, single (s)	4.3			4.1			7.5	6.5	6.9	8.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	90			100			99	100	100	0	100	89
cM capacity (veh/h)	820			1024			145	120	725	108	132	595
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	80	371	186	0	391	329	1	0	120	65		
Volume Left	80	0	0	0	0	0	1	0	120	0		
Volume Right	0	0	0	0	0	133	0	0	0	65		
cSH	820	1700	1700	1700	1700	1700	145	1700	108	595		
Volume to Capacity	0.10	0.22	0.11	0.00	0.23	0.19	0.01	0.00	1.12	0.11		
Queue Length 95th (m)	2.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	56.5	2.7		
Control Delay (s)	9.9	0.0	0.0	0.0	0.0	0.0	30.0	0.0	196.6	11.8		
Lane LOS	A						D	A	F	B		
Approach Delay (s)	1.2			0.0			30.0		131.7			
Approach LOS							D		F			
Intersection Summary												
Average Delay		16.3										
Intersection Capacity Utilization		42.9%					ICU Level of Service		A			
Analysis Period (min)		15										

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	17	135	57	362	15	130	75	59
v/c Ratio	0.14	0.29	0.19	0.76	0.02	0.07	0.10	0.03
Control Delay	23.3	21.7	22.8	35.4	1.6	0.1	8.9	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	21.7	22.8	35.4	1.6	0.1	8.9	7.4
Queue Length 50th (m)	2.3	16.3	7.3	51.1	0.2	0.0	4.3	1.5
Queue Length 95th (m)	m4.8	m22.4	14.2	69.8	m0.6	0.0	14.4	4.8
Internal Link Dist (m)		209.4		348.3		200.5		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	213	799	523	789	823	1998	768	2144
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.17	0.11	0.46	0.02	0.07	0.10	0.03
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	16	106	18	52	219	114	14	41	78	69	48	6
Future Volume (vph)	16	106	18	52	219	114	14	41	78	69	48	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.95		1.00	0.90		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1761		1711	1708		1711	3086		1711	3360	
Flt Permitted	0.26	1.00		0.65	1.00		0.72	1.00		0.67	1.00	
Satd. Flow (perm)	474	1761		1162	1708		1290	3086		1206	3360	
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)	17	115	20	57	238	124	15	45	85	75	52	7
RTOR Reduction (vph)	0	10	0	0	28	0	0	31	0	0	3	0
Lane Group Flow (vph)	17	125	0	57	334	0	15	99	0	75	56	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.6	23.6		23.6	23.6		57.4	57.4		57.4	57.4	
Effective Green, g (s)	23.6	23.6		23.6	23.6		57.4	57.4		57.4	57.4	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.64	0.64		0.64	0.64	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	124	461		304	447		822	1968		769	2142	
v/s Ratio Prot		0.07			c0.20			0.03			0.02	
v/s Ratio Perm	0.04			0.05			0.01			c0.06		
v/c Ratio	0.14	0.27		0.19	0.75		0.02	0.05		0.10	0.03	
Uniform Delay, d1	25.4	26.4		25.8	30.5		6.0	6.1		6.3	6.0	
Progression Factor	0.95	0.92		0.93	0.93		0.19	0.00		1.04	1.03	
Incremental Delay, d2	0.5	0.3		0.3	6.7		0.0	0.0		0.3	0.0	
Delay (s)	24.5	24.6		24.3	35.2		1.2	0.0		6.8	6.2	
Level of Service	C	C		C	D		A	A		A	A	
Approach Delay (s)		24.6			33.7			0.2			6.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		22.1								C		
HCM 2000 Volume to Capacity ratio		0.29										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		44.4%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	93	2	84	7	11	9	81	108	3	3	80	61	
Future Volume (Veh/h)	93	2	84	7	11	9	81	108	3	3	80	61	
Sign Control		Stop				Stop				Free			
Grade		0%				0%				0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	101	2	91	8	12	10	88	117	3	3	87	66	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	436	422	120	512	454	118	153	120					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	436	422	120	512	454	118	153	120					
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1					
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					
p0 queue free %	79	100	90	98	97	99	94	100					
cM capacity (veh/h)	489	490	931	404	470	933	1428	1468					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	194	30	208	156									
Volume Left	101	8	88	3									
Volume Right	91	10	3	66									
cSH	630	535	1428	1468									
Volume to Capacity	0.31	0.06	0.06	0.00									
Queue Length 95th (m)	9.8	1.3	1.5	0.0									
Control Delay (s)	13.2	12.1	3.5	0.2									
Lane LOS	B	B	A	A									
Approach Delay (s)	13.2	12.1	3.5	0.2									
Approach LOS	B	B											
Intersection Summary													
Average Delay				6.3									
Intersection Capacity Utilization				45.5%			ICU Level of Service			A			
Analysis Period (min)				15									

Queues
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBT	SBL	SBR
Lane Group					
Lane Group Flow (vph)	104	508	611	104	110
v/c Ratio	0.36	0.33	0.40	0.14	0.15
Control Delay	20.9	16.7	17.1	10.0	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	16.7	17.1	10.0	1.3
Queue Length 50th (m)	11.3	28.4	34.5	6.5	0.0
Queue Length 95th (m)	24.3	39.6	47.3	12.3	0.0
Internal Link Dist (m)	490.0		385.6	312.1	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	287	1539	1526	769	749
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.33	0.40	0.14	0.15
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↰↱	↰↱		↰	↰↱
Traffic Volume (vph)	96	467	510	52	96	101
Future Volume (vph)	96	467	510	52	96	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3373		1711	1531
Flt Permitted	0.36	1.00	1.00		0.95	1.00
Satd. Flow (perm)	640	3421	3373		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	508	554	57	104	110
RTOR Reduction (vph)	0	0	9	0	0	61
Lane Group Flow (vph)	104	508	602	0	104	50
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	288	1539	1517		769	688
v/s Ratio Prot		0.15	c0.18		c0.06	
v/s Ratio Perm	0.16					0.03
v/c Ratio	0.36	0.33	0.40		0.14	0.07
Uniform Delay, d1	16.3	16.0	16.6		14.5	14.1
Progression Factor	1.00	1.00	1.00		0.65	0.28
Incremental Delay, d2	3.5	0.6	0.8		0.4	0.2
Delay (s)	19.7	16.6	17.4		9.8	4.2
Level of Service	B	B	B		A	A
Approach Delay (s)		17.1	17.4		6.9	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay		15.7		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.27				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		37.6%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C (North Leg)

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↰	↰	↰↱	↰↱	↰
Traffic Volume (veh/h)	90	18	14	157	106	32
Future Volume (Veh/h)	90	18	14	157	106	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	20	15	171	115	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	248	75	150			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	248	75	150			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	98	99			
cM capacity (veh/h)	711	971	1429			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	118	72	114	77	73	
Volume Left	98	15	0	0	0	
Volume Right	20	0	0	0	35	
cSH	745	1429	1700	1700	1700	
Volume to Capacity	0.16	0.01	0.07	0.05	0.04	
Queue Length 95th (m)	4.2	0.2	0.0	0.0	0.0	
Control Delay (s)	10.7	1.6	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	10.7	0.6		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		3.1				
Intersection Capacity Utilization		24.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	98	64	9	216	14	187	0	24	18	0	114
Future Volume (Veh/h)	32	98	64	9	216	14	187	0	24	18	0	114
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	107	70	10	235	15	203	0	26	20	0	124
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	233											
pX, platoon unblocked	0.93							0.93	0.93		0.93	0.93
vC, conflicting volume	250				177				598	482	142	500
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	149				177				525	400	142	420
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	97				99				43	100	97	96
cM capacity (veh/h)	1325				1399				356	482	906	476
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	212	260	229	144								
Volume Left	35	10	203	20								
Volume Right	70	15	26	124								
cSH	1325	1399	382	759								
Volume to Capacity	0.03	0.01	0.60	0.19								
Queue Length 95th (m)	0.6	0.2	28.2	5.2								
Control Delay (s)	1.5	0.4	27.6	10.9								
Lane LOS	A	A	D	B								
Approach Delay (s)	1.5	0.4	27.6	10.9								
Approach LOS	D			B								
Intersection Summary												
Average Delay	9.8											
Intersection Capacity Utilization	48.8%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
12: Gordon Dean Avenue & Street C (South Leg)

210193 - Block 1 Servicing Strategy
2031 Total AM Peak Hour - Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	90	40	108	109	9
Future Volume (Veh/h)	24	90	40	108	109	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	98	43	117	118	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				336	225	
pX, platoon unblocked						
vC, conflicting volume	268	64	128			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	268	64	128			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	90	97			
cM capacity (veh/h)	679	987	1456			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	124	82	78	79	49	
Volume Left	26	43	0	0	0	
Volume Right	98	0	0	0	10	
cSH	901	1456	1700	1700	1700	
Volume to Capacity	0.14	0.03	0.05	0.05	0.03	
Queue Length 95th (m)	3.6	0.7	0.0	0.0	0.0	
Control Delay (s)	9.6	4.1	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	9.6	2.1		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay	3.7					
Intersection Capacity Utilization	22.4%			ICU Level of Service		A
Analysis Period (min)	15					

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	372	746	34	375	203	113	313	207	675
v/c Ratio	1.10	0.49	0.14	0.46	0.27	1.08	0.41	0.66	0.95
Control Delay	105.0	15.5	24.2	26.0	10.6	141.3	20.1	33.2	50.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.0	15.5	24.2	26.0	10.6	141.3	20.1	33.2	50.3
Queue Length 50th (m)	~72.5	36.8	4.0	46.3	3.0	~21.7	35.8	27.6	104.5
Queue Length 95th (m)	#124.1	52.0	m10.7	72.2	m21.0	#53.6	56.5	#56.3	#175.8
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	339	1517	240	818	744	105	756	314	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.49	0.14	0.46	0.27	1.08	0.41	0.66	0.95

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	353	464	245	32	356	193	107	274	24	197	432	209
Future Volume (vph)	353	464	245	32	356	193	107	274	24	197	432	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1643	3241		1744	1842	1421	1742	1798		1428	1644	
Flt Permitted	0.44	1.00		0.30	1.00	1.00	0.14	1.00		0.50	1.00	
Satd. Flow (perm)	765	3241		542	1842	1421	251	1798		750	1644	
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)	372	488	258	34	375	203	113	288	25	207	455	220
RTOR Reduction (vph)	0	77	0	0	0	113	0	3	0	0	19	0
Lane Group Flow (vph)	372	669	0	34	375	90	113	310	0	207	656	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	40.0	40.0		40.0	40.0	40.0	37.7	37.7		37.7	37.7	
Effective Green, g (s)	40.0	40.0		40.0	40.0	40.0	37.7	37.7		37.7	37.7	
Actuated g/C Ratio	0.44	0.44		0.44	0.44	0.44	0.42	0.42		0.42	0.42	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	340	1440		240	818	631	105	753		314	688	
v/s Ratio Prot		0.21			0.20			0.17			0.40	
v/s Ratio Perm	c0.49			0.06		0.06	c0.45			0.28		
v/c Ratio	1.09	0.46		0.14	0.46	0.14	1.08	0.41		0.66	0.95	
Uniform Delay, d1	25.0	17.5		14.8	17.4	14.8	26.1	18.4		21.0	25.3	
Progression Factor	1.00	1.00		1.48	1.35	4.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	76.4	1.1		1.2	1.8	0.5	109.9	0.4		4.9	23.3	
Delay (s)	101.4	18.6		23.1	25.4	59.8	136.0	18.7		25.9	48.6	
Level of Service	F	B		C	C	E	F	B		C	D	
Approach Delay (s)	46.2				36.7			49.8			43.3	
Approach LOS	D				D			D			D	

Intersection Summary

HCM 2000 Control Delay	43.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	126.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	13	697	132	561	132	93	35
v/c Ratio	0.03	0.28	0.25	0.21	0.71	0.15	0.16
Control Delay	2.3	2.6	9.8	7.6	51.3	0.5	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.3	2.6	9.8	7.6	51.3	0.5	17.4
Queue Length 50th (m)	0.5	12.6	10.1	22.0	20.2	0.0	0.9
Queue Length 95th (m)	m0.6	8.7	20.2	29.9	#39.8	0.0	7.9
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	517	2511	534	2638	187	623	213
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	0.03	0.28	0.25	0.21	0.71	0.15	0.16
Intersection Summary							
#	95th percentile volume exceeds capacity, queue may be longer.						
	Queue shown is maximum after two cycles.						
m	Volume for 95th percentile queue is metered by upstream signal.						

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	11	406	166	108	460	0	108	0	76	5	0	24
Future Volume (vph)	11	406	166	108	460	0	108	0	76	5	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
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		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1461	3235		1750	3466		1750	1566			1415	
Flt Permitted	0.44	1.00		0.38	1.00		0.73	1.00			0.95	
Satd. Flow (perm)	679	3235		702	3466		1353	1566			1359	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	13	495	202	132	561	0	132	0	93	6	0	29
RTOR Reduction (vph)	0	48	0	0	0	0	0	80	0	0	25	0
Lane Group Flow (vph)	13	649	0	132	561	0	132	13	0	0	10	0
Confl. Peds. (#/hr)	1						1					3
Heavy Vehicles (%)	22%	7%	2%	2%	3%	0%	2%	2%	2%	50%	2%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	68.5	68.5		68.5	68.5		12.5	12.5			12.5	
Effective Green, g (s)	68.5	68.5		68.5	68.5		12.5	12.5			12.5	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.14	0.14			0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	516	2462		534	2638		187	217			188	
v/s Ratio Prot		c0.20			0.16			0.01				
v/s Ratio Perm	0.02			0.19			c0.10				0.01	
v/c Ratio	0.03	0.26		0.25	0.21		0.71	0.06			0.05	
Uniform Delay, d1	2.6	3.2		3.2	3.1		37.0	33.6			33.6	
Progression Factor	0.83	1.06		2.58	2.40		0.79	1.00			1.00	
Incremental Delay, d2	0.1	0.2		0.2	0.0		20.1	0.5			0.5	
Delay (s)	2.2	3.6		8.4	7.4		49.1	34.2			34.2	
Level of Service	A	A		A	A		D	C			C	
Approach Delay (s)		3.6			7.6			42.9			34.2	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM 2000 Control Delay		11.2			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.33										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		48.8%			ICU Level of Service			A				
Analysis Period (min)		15										
c	Critical Lane Group											

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	40	624	110	552	216	248
v/c Ratio	0.10	0.35	0.34	0.30	0.38	0.43
Control Delay	7.8	8.3	15.5	11.8	20.7	21.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	8.3	15.5	11.8	20.7	21.5
Queue Length 50th (m)	2.9	23.7	10.0	25.3	22.6	27.1
Queue Length 95th (m)	6.0	27.0	19.3	31.5	37.3	42.1
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	407	1797	323	1838	566	583
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	0.35	0.34	0.30	0.38	0.43
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰↱		↰	↰↱	
Traffic Volume (vph)	33	439	79	91	439	19	51	52	76	32	104	70
Future Volume (vph)	33	439	79	91	439	19	51	52	76	32	104	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
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			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1739	3307		1528	3405			1697			1669	
Flt Permitted	0.41	1.00		0.37	1.00			0.86			0.93	
Satd. Flow (perm)	757	3307		602	3405			1487			1560	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	40	529	95	110	529	23	61	63	92	39	125	84
RTOR Reduction (vph)	0	16	0	0	3	0	0	29	0	0	20	0
Lane Group Flow (vph)	40	608	0	110	549	0	0	187	0	0	228	0
Confl. Peds. (#/hr)	3		2	2		3	1		1	1		1
Heavy Vehicles (%)	0%	6%	0%	14%	4%	6%	0%	0%	0%	15%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	48.5	48.5		48.5	48.5			32.5			32.5	
Effective Green, g (s)	48.5	48.5		48.5	48.5			32.5			32.5	
Actuated g/C Ratio	0.54	0.54		0.54	0.54			0.36			0.36	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	407	1782		324	1834			536			563	
v/s Ratio Prot		c0.18			0.16							
v/s Ratio Perm	0.05			0.18				0.13			c0.15	
v/c Ratio	0.10	0.34		0.34	0.30			0.35			0.40	
Uniform Delay, d1	10.1	11.7		11.7	11.4			21.0			21.5	
Progression Factor	0.70	0.69		1.00	1.00			1.11			1.00	
Incremental Delay, d2	0.5	0.5		2.8	0.4			1.8			2.2	
Delay (s)	7.6	8.6		14.5	11.8			25.1			23.7	
Level of Service	A	A		B	B			C			C	
Approach Delay (s)		8.6			12.3			25.1			23.7	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			14.0							B		
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0							9.0		
Intersection Capacity Utilization			49.0%							A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	13	139	0	196	22	213	91	339	337	24
Future Volume (Veh/h)	20	0	13	139	0	196	22	213	91	339	337	24
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	22	0	14	149	0	211	24	229	98	365	362	26
Pedestrians	4											
Lane Width (m)	3.3											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1597	1484	379	1432	1448	278	392	327				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1597	1484	379	1432	1448	278	392	327				
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	49	100	98	0	100	72	98	70				
cM capacity (veh/h)	43	86	670	83	90	761	1174	1233				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	36	360	24	327	365	388						
Volume Left	22	149	24	0	365	0						
Volume Right	14	211	0	98	0	26						
cSH	67	174	1174	1700	1233	1700						
Volume to Capacity	0.54	2.07	0.02	0.19	0.30	0.23						
Queue Length 95th (m)	16.6	210.6	0.5	0.0	9.4	0.0						
Control Delay (s)	108.4	544.9	8.1	0.0	9.1	0.0						
Lane LOS	F	F	A		A							
Approach Delay (s)	108.4	544.9	0.6		4.4							
Approach LOS	F	F										
Intersection Summary												
Average Delay				135.7								
Intersection Capacity Utilization				66.9%			ICU Level of Service			C		
Analysis Period (min)				15								

Queues
5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	202	602	32	798	27	101	90	435
v/c Ratio	0.43	0.26	0.08	0.44	0.36	0.30	0.42	0.81
Control Delay	8.5	6.9	14.5	14.9	42.1	23.0	36.0	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	6.9	14.5	14.9	42.1	23.0	36.0	22.1
Queue Length 50th (m)	8.9	17.0	2.3	37.7	4.1	10.9	13.9	19.9
Queue Length 95th (m)	25.2	37.0	9.3	73.7	10.4	20.2	23.3	46.3
Internal Link Dist (m)	245.7		490.0		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	490	2322	424	1827	134	576	378	718
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.26	0.08	0.44	0.20	0.18	0.24	0.61
Intersection Summary								

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	182	529	13	29	662	56	24	62	29	81	64	328
Future Volume (vph)	182	529	13	29	662	56	24	62	29	81	64	328
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.95		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	3409		1743	3338		1604	1674		1558	1540	
Flt Permitted	0.29	1.00		0.42	1.00		0.24	1.00		0.69	1.00	
Satd. Flow (perm)	499	3409		779	3338		402	1674		1135	1540	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	202	588	14	32	736	62	27	69	32	90	71	364
RTOR Reduction (vph)	0	1	0	0	5	0	0	23	0	0	250	0
Lane Group Flow (vph)	202	601	0	32	793	0	27	78	0	90	185	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	61.2	61.2		49.1	49.1		16.8	16.8		16.8	16.8	
Effective Green, g (s)	61.2	61.2		49.1	49.1		16.8	16.8		16.8	16.8	
Actuated g/C Ratio	0.68	0.68		0.55	0.55		0.19	0.19		0.19	0.19	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	457	2320		425	1823		75	312		212	287	
v/s Ratio Prot	c0.04	0.18			0.24			0.05			c0.12	
v/s Ratio Perm	c0.26			0.04			0.07			0.08		
v/c Ratio	0.44	0.26		0.08	0.44		0.36	0.25		0.42	0.64	
Uniform Delay, d1	6.0	5.6		9.7	12.1		31.9	31.2		32.3	33.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.3		0.3	0.8		2.9	0.4		1.4	4.9	
Delay (s)	6.7	5.8		10.0	12.9		34.8	31.6		33.7	38.6	
Level of Service	A	A		A	B		C	C		C	D	
Approach Delay (s)	6.0			12.8			32.3			37.8		
Approach LOS	A			B			C			D		
Intersection Summary												
HCM 2000 Control Delay		17.2										
HCM 2000 Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		89.9										
Intersection Capacity Utilization		96.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Traffic Volume (veh/h)	64	531	4	4	622	106	1	0	4	101	0	114		
Future Volume (Veh/h)	64	531	4	4	622	106	1	0	4	101	0	114		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	71	590	4	4	691	118	1	0	4	112	0	127		
Pedestrians						3						5		
Lane Width (m)						3.3						4.0		
Walking Speed (m/s)						1.2						1.2		
Percent Blockage						0						0		
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	814				594				1214	1556	300	1207	1499	410
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	814				594				1214	1556	300	1207	1499	410
tC, single (s)	4.2				4.1				7.5	6.5	6.9	7.6	6.5	7.1
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	91				100				99	100	99	8	100	78
cM capacity (veh/h)	786				992				100	103	701	122	111	569
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2				
Volume Total	71	393	201	4	461	348	1	4	112	127				
Volume Left	71	0	0	4	0	0	1	0	112	0				
Volume Right	0	0	4	0	0	118	0	4	0	127				
cSH	786	1700	1700	992	1700	1700	100	701	122	569				
Volume to Capacity	0.09	0.23	0.12	0.00	0.27	0.20	0.01	0.01	0.92	0.22				
Queue Length 95th (m)	2.2	0.0	0.0	0.1	0.0	0.0	0.2	0.1	44.2	6.4				
Control Delay (s)	10.0	0.0	0.0	8.6	0.0	0.0	41.3	10.2	128.3	13.1				
Lane LOS	B				A				E	B	F	B		
Approach Delay (s)	1.1				0.0				16.4	67.1				
Approach LOS							C			F				
Intersection Summary														
Average Delay				9.8										
Intersection Capacity Utilization				46.5%			ICU Level of Service			A				
Analysis Period (min)				15										

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	18	179	65	201	35	144	95	88
v/c Ratio	0.15	0.61	0.47	0.65	0.04	0.06	0.11	0.04
Control Delay	29.9	37.1	42.9	37.0	1.7	0.3	8.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	37.1	42.9	37.0	1.7	0.3	8.2	6.2
Queue Length 50th (m)	2.4	25.4	10.1	25.9	0.4	0.2	7.0	2.7
Queue Length 95th (m)	m5.0	m34.9	20.4	42.3	m1.1	m0.0	15.6	6.6
Internal Link Dist (m)		209.4		348.3		200.5		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	411	981	471	963	926	2359	878	2416
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.18	0.14	0.21	0.04	0.06	0.11	0.04
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↰	↱		↰	↱		↰	↱		↰	↱	
Lane Configurations	↰	↱		↰	↱		↰	↱		↰	↱	
Traffic Volume (vph)	17	150	15	60	131	54	32	68	64	87	56	25
Future Volume (vph)	17	150	15	60	131	54	32	68	64	87	56	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.96		1.00	0.93		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1777		1711	1721		1711	3172		1711	3264	
Flt Permitted	0.42	1.00		0.48	1.00		0.70	1.00		0.66	1.00	
Satd. Flow (perm)	750	1777		856	1721		1255	3172		1190	3264	
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)	18	163	16	65	142	59	35	74	70	95	61	27
RTOR Reduction (vph)	0	8	0	0	31	0	0	18	0	0	7	0
Lane Group Flow (vph)	18	171	0	65	170	0	35	126	0	95	81	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		66.4	66.4		66.4	66.4	
Effective Green, g (s)	14.6	14.6		14.6	14.6		66.4	66.4		66.4	66.4	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.74	0.74		0.74	0.74	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	121	288		138	279		925	2340		877	2408	
v/s Ratio Prot		0.10			c0.10			0.04			0.02	
v/s Ratio Perm	0.02			0.08			0.03			c0.08		
v/c Ratio	0.15	0.60		0.47	0.61		0.04	0.05		0.11	0.03	
Uniform Delay, d1	32.4	35.0		34.2	35.0		3.2	3.2		3.4	3.2	
Progression Factor	0.92	0.90		0.97	0.97		0.38	0.12		1.83	2.05	
Incremental Delay, d2	0.5	3.0		2.5	3.7		0.1	0.0		0.2	0.0	
Delay (s)	30.2	34.3		35.7	37.6		1.3	0.4		6.4	6.5	
Level of Service	C	C		D	D		A	A		A	A	
Approach Delay (s)		33.9			37.2			0.6			6.5	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM 2000 Control Delay	21.6			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.20											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			9.0					
Intersection Capacity Utilization	38.3%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	75	8	74	6	6	4	79	99	8	12	152	96	
Future Volume (Veh/h)	75	8	74	6	6	4	79	99	8	12	152	96	
Sign Control		Stop				Stop				Free			
Grade		0%				0%				0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	82	9	80	7	7	4	86	108	9	13	165	104	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	535	532	217	612	580	112	269	117					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	535	532	217	612	580	112	269	117					
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1					
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					
p0 queue free %	81	98	90	98	98	100	93	99					
cM capacity (veh/h)	423	419	823	339	394	940	1295	1471					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	171	18	203	282									
Volume Left	82	7	86	13									
Volume Right	80	4	9	104									
cSH	547	422	1295	1471									
Volume to Capacity	0.31	0.04	0.07	0.01									
Queue Length 95th (m)	10.0	1.0	1.6	0.2									
Control Delay (s)	14.6	13.9	3.7	0.4									
Lane LOS	B	B	A	A									
Approach Delay (s)	14.6	13.9	3.7	0.4									
Approach LOS	B	B											
Intersection Summary													
Average Delay				5.4									
Intersection Capacity Utilization				47.7%		ICU Level of Service			A				
Analysis Period (min)				15									

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBT	SBL	SBR
Lane Group					
Lane Group Flow (vph)	133	562	824	78	102
v/c Ratio	0.67	0.37	0.54	0.10	0.14
Control Delay	38.9	17.2	19.0	11.1	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	17.2	19.0	11.1	2.7
Queue Length 50th (m)	17.2	32.1	50.3	8.5	1.9
Queue Length 95th (m)	#45.8	44.1	67.0	15.0	6.8
Internal Link Dist (m)	490.0		385.6	312.1	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	200	1539	1521	769	745
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	0.67	0.37	0.54	0.10	0.14
Intersection Summary					
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↰↰	↰↰		↰	↰
Traffic Volume (vph)	122	517	654	104	72	94
Future Volume (vph)	122	517	654	104	72	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3351		1711	1531
Flt Permitted	0.25	1.00	1.00		0.95	1.00
Satd. Flow (perm)	444	3421	3351		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	133	562	711	113	78	102
RTOR Reduction (vph)	0	0	14	0	0	56
Lane Group Flow (vph)	133	562	810	0	78	46
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	199	1539	1507		769	688
v/s Ratio Prot		0.16	0.24		c0.05	
v/s Ratio Perm	c0.30					0.03
v/c Ratio	0.67	0.37	0.54		0.10	0.07
Uniform Delay, d1	19.5	16.3	18.0		14.3	14.0
Progression Factor	1.00	1.00	1.00		0.75	0.71
Incremental Delay, d2	16.4	0.7	1.4		0.3	0.2
Delay (s)	35.9	17.0	19.3		10.9	10.2
Level of Service	D	B	B		B	B
Approach Delay (s)		20.6	19.3		10.5	
Approach LOS		C	B		B	
Intersection Summary						
HCM 2000 Control Delay		18.9		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.38				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		43.6%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C (North Leg)

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↰	↰	↰↰	↰↰	↰
Traffic Volume (veh/h)	77	15	32	107	153	121
Future Volume (Veh/h)	77	15	32	107	153	121
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	16	35	116	166	132
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	360	149	298			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	360	149	298			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	98	97			
cM capacity (veh/h)	595	871	1260			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	74	77	111	187	
Volume Left	84	35	0	0	0	
Volume Right	16	0	0	0	132	
cSH	627	1260	1700	1700	1700	
Volume to Capacity	0.16	0.03	0.05	0.07	0.11	
Queue Length 95th (m)	4.2	0.6	0.0	0.0	0.0	
Control Delay (s)	11.8	3.9	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.8	1.9		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		2.7				
Intersection Capacity Utilization		27.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	145	186	34	123	32	115	0	23	15	0	97
Future Volume (Veh/h)	99	145	186	34	123	32	115	0	23	15	0	97
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	158	202	37	134	35	125	0	25	16	0	105
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	233											
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	169			360			806	718	259	726	802	152
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	154			360			797	709	259	717	793	136
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 %	92			97			49	100	97	95	100	88
cM capacity (veh/h)	1411			1199			244	318	780	304	284	902
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	468	206	150	121								
Volume Left	108	37	125	16								
Volume Right	202	35	25	105								
cSH	1411	1199	276	716								
Volume to Capacity	0.08	0.03	0.54	0.17								
Queue Length 95th (m)	1.9	0.7	22.5	4.5								
Control Delay (s)	2.4	1.7	32.5	11.1								
Lane LOS	A	A	D	B								
Approach Delay (s)	2.4	1.7	32.5	11.1								
Approach LOS			D	B								
Intersection Summary												
Average Delay	8.1											
Intersection Capacity Utilization	57.0%			ICU Level of Service			B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
12: Gordon Dean Avenue & Street C (South Leg)

210193 - Block 1 Servicing Strategy
2031 Total PM Peak Hour - Scenario 2

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 	 	
Traffic Volume (veh/h)	23	69	85	141	97	34
Future Volume (Veh/h)	23	69	85	141	97	34
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	75	92	153	105	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				336	225	
pX, platoon unblocked						
vC, conflicting volume	384	71	142			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	384	71	142			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	92	94			
cM capacity (veh/h)	554	977	1438			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	143	102	70	72	
Volume Left	25	92	0	0	0	
Volume Right	75	0	0	0	37	
cSH	820	1438	1700	1700	1700	
Volume to Capacity	0.12	0.06	0.06	0.04	0.04	
Queue Length 95th (m)	3.1	1.5	0.0	0.0	0.0	
Control Delay (s)	10.0	5.1	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	10.0	3.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			25.7%	ICU Level of Service		A
Analysis Period (min)			15			

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	378	475	11	393	277	234	640	252	720
v/c Ratio	1.43	0.37	0.05	0.56	0.44	1.93	0.78	1.56	0.95
Control Delay	240.9	16.6	28.2	37.1	19.7	470.6	28.4	302.2	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	240.9	16.6	28.2	37.1	19.7	470.6	28.4	302.2	43.8
Queue Length 50th (m)	-88.1	24.0	1.3	60.3	19.9	-62.1	87.9	-61.2	102.4
Queue Length 95th (m)	#125.1	32.0	m4.1	78.8	28.8	#76.1	114.0	#94.9	#152.4
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	264	1271	244	696	636	121	820	162	761
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.43	0.37	0.05	0.56	0.44	1.93	0.78	1.56	0.95

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Future Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frft	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1585	3060		1310	1740	1308	1691	1767		1545	1541	
Flt Permitted	0.40	1.00		0.44	1.00	1.00	0.15	1.00		0.22	1.00	
Satd. Flow (perm)	661	3060		612	1740	1308	264	1767		351	1541	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	378	339	136	11	393	277	234	617	23	252	328	392
RTOR Reduction (vph)	0	48	0	0	0	113	0	2	0	0	48	0
Lane Group Flow (vph)	378	427	0	11	393	164	234	638	0	252	672	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	13%	9%	10%	6%	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	36.0	36.0		36.0	36.0	36.0	41.7	41.7		41.7	41.7	
Effective Green, g (s)	36.0	36.0		36.0	36.0	36.0	41.7	41.7		41.7	41.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.46	0.46		0.46	0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	264	1224		244	696	523	122	818		162	713	
v/s Ratio Prot		0.14			0.23			0.36			0.44	
v/s Ratio Perm	c0.57			0.02		0.13	c0.89			0.72		
v/c Ratio	1.43	0.35		0.05	0.56	0.31	1.92	0.78		1.56	0.94	
Uniform Delay, d1	27.0	18.8		16.5	20.9	18.5	24.1	20.3		24.1	23.0	
Progression Factor	1.00	1.00		1.64	1.58	2.63	1.00	1.00		1.00	1.00	
Incremental Delay, d2	214.8	0.8		0.3	3.2	1.5	441.9	4.9		278.0	20.8	
Delay (s)	241.8	19.6		27.4	36.2	50.3	466.1	25.2		302.1	43.8	
Level of Service	F	B		C	D	D	F	C		F	D	
Approach Delay (s)	118.1				41.8			143.2			110.8	
Approach LOS	F				D			F			F	

Intersection Summary

HCM 2000 Control Delay	107.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	125.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	16	629	35	486	211	84	41
v/c Ratio	0.03	0.33	0.08	0.26	0.51	0.11	0.09
Control Delay	4.3	4.2	7.0	8.8	35.7	0.3	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	4.2	7.0	8.8	35.7	0.3	10.7
Queue Length 50th (m)	0.6	11.1	3.9	30.7	28.6	0.0	1.1
Queue Length 95th (m)	m1.0	m10.5	9.5	39.9	46.5	0.0	7.4
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	514	1909	420	1861	410	736	480
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	0.03	0.33	0.08	0.26	0.51	0.11	0.09
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰			↱	
Traffic Volume (vph)	14	422	113	30	404	9	179	0	71	8	0	27
Future Volume (vph)	14	422	113	30	404	9	179	0	71	8	0	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
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			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1783	3168		1750	3128		1750	1566			1553	
Flt Permitted	0.46	1.00		0.38	1.00		0.73	1.00			0.96	
Satd. Flow (perm)	866	3168		708	3128		1345	1566			1499	
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	496	133	35	475	11	211	0	84	9	0	32
RTOR Reduction (vph)	0	27	0	0	2	0	0	58	0	0	22	0
Lane Group Flow (vph)	16	602	0	35	484	0	211	26	0	0	19	0
Confl. Peds. (#/hr)	1						1					
Heavy Vehicles (%)	0%	11%	2%	2%	14%	0%	2%	2%	2%	0%	2%	6%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Effective Green, g (s)	53.5	53.5		53.5	53.5		27.5	27.5			27.5	
Actuated g/C Ratio	0.59	0.59		0.59	0.59		0.31	0.31			0.31	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	514	1883		420	1859		410	478			458	
v/s Ratio Prot		c0.19			0.15			0.02				
v/s Ratio Perm	0.02			0.05			c0.16				0.01	
v/c Ratio	0.03	0.32		0.08	0.26		0.51	0.05			0.04	
Uniform Delay, d1	7.5	9.1		7.8	8.8		25.8	22.1			22.0	
Progression Factor	0.55	0.48		0.81	0.96		1.17	1.00			1.00	
Incremental Delay, d2	0.1	0.2		0.1	0.1		4.5	0.2			0.2	
Delay (s)	4.2	4.6		6.4	8.5		34.7	22.3			22.1	
Level of Service	A	A		A	A		C	C			C	
Approach Delay (s)	4.6			8.4			31.2				22.1	
Approach LOS	A			A			C				C	
Intersection Summary												
HCM 2000 Control Delay		11.6			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		47.3%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	57	473	53	437	313	136
v/c Ratio	0.22	0.37	0.17	0.35	0.39	0.22
Control Delay	15.2	14.4	19.7	19.6	17.1	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	14.4	19.7	19.6	17.1	11.2
Queue Length 50th (m)	5.9	26.4	5.8	26.2	31.9	9.9
Queue Length 95th (m)	12.2	32.2	12.1	33.1	45.6	17.4
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	265	1275	306	1252	800	630
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	0.17	0.35	0.39	0.22
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰↱		↰	↰↱	
Traffic Volume (vph)	46	348	35	43	327	27	65	116	73	21	64	25
Future Volume (vph)	46	348	35	43	327	27	65	116	73	21	64	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5			4.5		4.5
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		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00		1.00
Frt	1.00	0.99		1.00	0.99		0.96			0.96		0.97
Flt Protected	0.95	1.00		0.95	1.00		0.99			0.99		0.99
Satd. Flow (prot)	1427	3213		1743	3158		1721			1325		1325
Flt Permitted	0.45	1.00		0.42	1.00		0.89			0.91		0.91
Satd. Flow (perm)	675	3213		777	3158		1552			1223		1223
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	57	430	43	53	404	33	80	143	90	26	79	31
RTOR Reduction (vph)	0	8	0	0	7	0	0	16	0	0	12	0
Lane Group Flow (vph)	57	465	0	53	430	0	0	297	0	0	124	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	22%	8%	23%	0%	12%	6%	0%	2%	0%	0%	40%	43%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.5	35.5		35.5	35.5			45.5			45.5	
Effective Green, g (s)	35.5	35.5		35.5	35.5			45.5			45.5	
Actuated g/C Ratio	0.39	0.39		0.39	0.39			0.51			0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	266	1267		306	1245			784			618	
v/s Ratio Prot		c0.14			0.14							
v/s Ratio Perm	0.08			0.07			c0.19			0.10		
v/c Ratio	0.21	0.37		0.17	0.35		0.38			0.20		
Uniform Delay, d1	18.0	19.3		17.7	19.1		13.6			12.2		
Progression Factor	0.70	0.72		1.00	1.00		1.26			1.00		
Incremental Delay, d2	1.8	0.8		1.2	0.8		1.4			0.7		
Delay (s)	14.5	14.7		18.9	19.9		18.5			13.0		
Level of Service	B	B		B	B		B			B		
Approach Delay (s)		14.7			19.8			18.5			13.0	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.0			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			51.3%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
4: Fruitland Road & Sherwood Park Road/Collector B 2036 Total AM Peak Hour - Scenario 2

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	21	0	23	182	0	335	6	358	47	147	241	6	
Future Volume (Veh/h)	21	0	23	182	0	335	6	358	47	147	241	6	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
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	
Hourly flow rate (vph)	22	0	24	190	0	349	6	373	49	153	251	6	
Pedestrians		13											
Lane Width (m)		3.3											
Walking Speed (m/s)		1.2											
Percent Blockage		1											
Right turn flare (veh)													
Median type		None								None			
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	1307	1007	267	990	986	398	270			422			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1307	1007	267	990	986	398	270			422			
tC, single (s)	7.2	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.6	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	58	100	97	2	100	46	100			87			
cM capacity (veh/h)	53	205	769	194	211	652	1292			1137			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	46	539	6	422	153	257							
Volume Left	22	190	6	0	153	0							
Volume Right	24	349	0	49	0	6							
cSH	102	355	1292	1700	1137	1700							
Volume to Capacity	0.45	1.52	0.00	0.25	0.13	0.15							
Queue Length 95th (m)	14.4	223.1	0.1	0.0	3.5	0.0							
Control Delay (s)	66.1	274.4	7.8	0.0	8.7	0.0							
Lane LOS	F	F	A		A								
Approach Delay (s)	66.1	274.4	0.1		3.2								
Approach LOS	F	F											
Intersection Summary													
Average Delay	107.0												
Intersection Capacity Utilization	75.1%			ICU Level of Service				D					
Analysis Period (min)	15												

Queues 210193 - Block 1 Servicing Strategy
5: Regalview Drive/Fruitland Road & Highway 8 2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Group Flow (vph)	251	690	28	822	35	120	87	399
v/c Ratio	0.52	0.30	0.07	0.46	0.49	0.36	0.43	0.80
Control Delay	9.7	7.2	15.0	15.6	52.7	27.9	36.7	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	7.2	15.0	15.6	52.7	27.9	36.7	23.4
Queue Length 50th (m)	11.6	20.5	2.1	40.8	5.5	15.6	13.4	20.8
Queue Length 95th (m)	29.1	40.5	8.0	71.8	12.4	24.1	21.7	40.3
Internal Link Dist (m)	245.7		490.0		176.2		531.3	
Turn Bay Length (m)	80.0		50.0		30.0		50.0	
Base Capacity (vph)	496	2271	383	1769	127	590	358	680
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.30	0.07	0.46	0.28	0.20	0.24	0.59
Intersection Summary								

HCM Signalized Intersection Capacity Analysis 5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	577	16	24	638	69	30	81	22	75	63	280
Future Volume (vph)	216	577	16	24	638	69	30	81	22	75	63	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1710	3335		1743	3285		1530	1738		1502	1506	
Flt Permitted	0.27	1.00		0.39	1.00		0.24	1.00		0.68	1.00	
Satd. Flow (perm)	491	3335		714	3285		383	1738		1075	1506	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	251	671	19	28	742	80	35	94	26	87	73	326
RTOR Reduction (vph)	0	2	0	0	7	0	0	14	0	0	218	0
Lane Group Flow (vph)	251	688	0	28	815	0	35	106	0	87	181	0
Confl. Peds. (#/hr)	5		1	1		5	3		2	2		3
Heavy Vehicles (%)	2%	4%	9%	0%	3%	17%	10%	0%	9%	12%	0%	7%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	61.2	61.2		48.3	48.3		16.8	16.8		16.8	16.8	
Effective Green, g (s)	61.2	61.2		48.3	48.3		16.8	16.8		16.8	16.8	
Actuated g/C Ratio	0.68	0.68		0.54	0.54		0.19	0.19		0.19	0.19	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	468	2270		383	1764		71	324		200	281	
v/s Ratio Prot	c0.06	0.21			0.25			0.06			c0.12	
v/s Ratio Perm	c0.31			0.04			0.09			0.08		
v/c Ratio	0.54	0.30		0.07	0.46		0.49	0.33		0.43	0.64	
Uniform Delay, d1	6.4	5.8		10.0	12.8		32.7	31.7		32.3	33.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.3		0.4	0.9		5.3	0.6		1.5	5.0	
Delay (s)	7.6	6.1		10.4	13.7		38.0	32.3		33.9	38.8	
Level of Service	A	A		B	B		D	C		C	D	
Approach Delay (s)		6.5			13.6			33.6			37.9	
Approach LOS		A			B			C			D	
Intersection Summary												
HCM 2000 Control Delay	17.0			HCM 2000 Level of Service			B					
HCM 2000 Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	89.9			Sum of lost time (s)			14.9					
Intersection Capacity Utilization	98.0%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	555	0	0	597	118	1	0	0	103	0	60
Future Volume (Veh/h)	79	555	0	0	597	118	1	0	0	103	0	60
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)	95	669	0	0	719	142	1	0	0	124	0	72
Pedestrians												4
Lane Width (m)												4.0
Walking Speed (m/s)												1.2
Percent Blockage												0
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	865			669			1290	1724	334	1318	1653	434
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	865			669			1290	1724	334	1318	1653	434
tC, single (s)	4.3			4.1			7.5	6.5	6.9	8.5	6.5	7.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	4.0	4.0	3.4
p0 queue free %	87			100			99	100	100	0	100	86
cM capacity (veh/h)	722			931			95	78	667	68	86	533
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2		
Volume Total	95	446	223	0	479	382	1	0	124	72		
Volume Left	95	0	0	0	0	0	1	0	124	0		
Volume Right	0	0	0	0	0	142	0	0	0	72		
cSH	722	1700	1700	1700	1700	1700	95	1700	68	533		
Volume to Capacity	0.13	0.26	0.13	0.00	0.28	0.22	0.01	0.01	1.82	0.14		
Queue Length 95th (m)	3.4	0.0	0.0	0.0	0.0	0.0	0.2	0.0	83.7	3.5		
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0	43.2	0.0	520.8	12.8		
Lane LOS	B							E	A	F	B	
Approach Delay (s)	1.3			0.0				43.2	334.2			
Approach LOS							E		F			
Intersection Summary												
Average Delay	36.5											
Intersection Capacity Utilization	47.1%			ICU Level of Service			A					
Analysis Period (min)	15											

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	17	135	57	362	15	133	75	65
v/c Ratio	0.14	0.29	0.19	0.76	0.02	0.07	0.10	0.03
Control Delay	22.4	21.2	22.8	35.4	1.5	0.1	9.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	21.2	22.8	35.4	1.5	0.1	9.7	8.2
Queue Length 50th (m)	1.9	15.2	7.1	50.7	0.2	0.0	4.4	1.7
Queue Length 95th (m)	m4.5	m20.8	13.9	69.2	m0.5	0.0	15.4	5.6
Internal Link Dist (m)		209.4		348.3		200.5		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	213	799	523	789	817	2002	766	2148
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.17	0.11	0.46	0.02	0.07	0.10	0.03
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	106	18	52	219	114	14	44	78	69	53	6
Future Volume (vph)	16	106	18	52	219	114	14	44	78	69	53	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Flt	1.00	0.98		1.00	0.95		1.00	0.90		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1761		1711	1708		1711	3093		1711	3366	
Flt Permitted	0.26	1.00		0.65	1.00		0.71	1.00		0.67	1.00	
Satd. Flow (perm)	474	1761		1162	1708		1283	3093		1202	3366	
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)	17	115	20	57	238	124	15	48	85	75	58	7
RTOR Reduction (vph)	0	10	0	0	28	0	0	31	0	0	3	0
Lane Group Flow (vph)	17	125	0	57	334	0	15	102	0	75	62	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.6	23.6		23.6	23.6		57.4	57.4		57.4	57.4	
Effective Green, g (s)	23.6	23.6		23.6	23.6		57.4	57.4		57.4	57.4	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.64	0.64		0.64	0.64	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	124	461		304	447		818	1972		766	2146	
v/s Ratio Prot		0.07			c0.20			0.03			0.02	
v/s Ratio Perm	0.04			0.05			0.01			c0.06		
v/c Ratio	0.14	0.27		0.19	0.75		0.02	0.05		0.10	0.03	
Uniform Delay, d1	25.4	26.4		25.8	30.5		6.0	6.1		6.3	6.0	
Progression Factor	0.91	0.90		0.93	0.93		0.18	0.00		1.13	1.12	
Incremental Delay, d2	0.5	0.3		0.3	6.7		0.0	0.0		0.3	0.0	
Delay (s)	23.5	24.0		24.2	35.2		1.1	0.0		7.4	6.8	
Level of Service	C	C		C	D		A	A		A	A	
Approach Delay (s)		24.0			33.7			0.2			7.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay	21.8			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.29											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			9.0					
Intersection Capacity Utilization	46.0%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	93	2	84	7	11	9	81	128	3	3	91	61
Future Volume (Veh/h)	93	2	84	7	11	9	81	128	3	3	91	61
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	101	2	91	8	12	10	88	139	3	3	99	66
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	470	456	132	546	488	140	165	142				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	470	456	132	546	488	140	165	142				
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	78	100	90	98	97	99	94	100				
cM capacity (veh/h)	464	468	917	383	450	907	1413	1441				
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	194	30	230	168								
Volume Left	101	8	88	3								
Volume Right	91	10	3	66								
cSH	604	512	1413	1441								
Volume to Capacity	0.32	0.06	0.06	0.00								
Queue Length 95th (m)	10.4	1.4	1.5	0.0								
Control Delay (s)	13.8	12.5	3.3	0.2								
Lane LOS	B	B	A	A								
Approach Delay (s)	13.8	12.5	3.3	0.2								
Approach LOS	B	B										
Intersection Summary												
Average Delay				6.1								
Intersection Capacity Utilization				47.1%	ICU Level of Service			A				
Analysis Period (min)				15								

Queues

9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	105	628	741	108	113
v/c Ratio	0.45	0.41	0.48	0.14	0.15
Control Delay	25.1	17.7	18.4	9.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.1	17.7	18.4	9.6	1.3
Queue Length 50th (m)	12.0	36.7	44.3	6.7	0.0
Queue Length 95th (m)	27.5	49.8	59.5	12.5	0.0
Internal Link Dist (m)	490.0		385.6	312.1	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	231	1539	1528	769	751
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	0.45	0.41	0.48	0.14	0.15
Intersection Summary					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↰↱	↰↱		↰	↰↱
Traffic Volume (vph)	97	578	627	54	99	104
Future Volume (vph)	97	578	627	54	99	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3380		1711	1531
Flt Permitted	0.29	1.00	1.00		0.95	1.00
Satd. Flow (perm)	515	3421	3380		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	628	682	59	108	113
RTOR Reduction (vph)	0	0	7	0	0	62
Lane Group Flow (vph)	105	628	734	0	108	51
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	40.5	40.5	40.5		40.5	40.5
Effective Green, g (s)	40.5	40.5	40.5		40.5	40.5
Actuated g/C Ratio	0.45	0.45	0.45		0.45	0.45
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	231	1539	1521		769	688
v/s Ratio Prot		0.18	c0.22		c0.06	
v/s Ratio Perm	0.20					0.03
v/c Ratio	0.45	0.41	0.48		0.14	0.07
Uniform Delay, d1	17.1	16.7	17.4		14.5	14.1
Progression Factor	1.00	1.00	1.00		0.62	0.28
Incremental Delay, d2	6.3	0.8	1.1		0.4	0.2
Delay (s)	23.4	17.5	18.5		9.4	4.2
Level of Service	C	B	B		A	A
Approach Delay (s)		18.3	18.5		6.7	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay		16.9		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.31				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		41.2%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C (North Leg)

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↰	↰	↰↱	↰↱	↰
Traffic Volume (veh/h)	90	18	14	160	111	32
Future Volume (Veh/h)	90	18	14	160	111	32
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	98	20	15	174	121	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	256	78	156			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	256	78	156			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	98	99			
cM capacity (veh/h)	704	967	1422			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	118	73	116	81	75	
Volume Left	98	15	0	0	0	
Volume Right	20	0	0	0	35	
cSH	738	1422	1700	1700	1700	
Volume to Capacity	0.16	0.01	0.07	0.05	0.04	
Queue Length 95th (m)	4.3	0.2	0.0	0.0	0.0	
Control Delay (s)	10.8	1.6	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	10.8	0.6		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		25.0%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	98	64	9	216	14	187	0	24	18	0	114
Future Volume (Veh/h)	32	98	64	9	216	14	187	0	24	18	0	114
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	107	70	10	235	15	203	0	26	20	0	124
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	233											
pX, platoon unblocked	0.93							0.93	0.93		0.93	0.93
vC, conflicting volume	250				177				598	482	142	500
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	149				177				525	400	142	420
tC, single (s)	4.1				4.1				7.1	6.5	6.2	7.1
tC, 2 stage (s)												
tF (s)	2.2				2.2				3.5	4.0	3.3	3.5
p0 queue free %	97				99				43	100	97	96
cM capacity (veh/h)	1325				1399				356	482	906	476
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	212	260	229	144								
Volume Left	35	10	203	20								
Volume Right	70	15	26	124								
cSH	1325	1399	382	759								
Volume to Capacity	0.03	0.01	0.60	0.19								
Queue Length 95th (m)	0.6	0.2	28.2	5.2								
Control Delay (s)	1.5	0.4	27.6	10.9								
Lane LOS	A	A	D	B								
Approach Delay (s)	1.5	0.4	27.6	10.9								
Approach LOS	D			B								
Intersection Summary												
Average Delay	9.8											
Intersection Capacity Utilization	48.8%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
12: Gordon Dean Avenue & Street C (South Leg)

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		 
Traffic Volume (veh/h)	24	90	40	111	114	9
Future Volume (Veh/h)	24	90	40	111	114	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	98	43	121	124	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				336	225	
pX, platoon unblocked						
vC, conflicting volume	276	67	134			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	276	67	134			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	90	97			
cM capacity (veh/h)	671	983	1448			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	124	83	81	83	51	
Volume Left	26	43	0	0	0	
Volume Right	98	0	0	0	10	
cSH	895	1448	1700	1700	1700	
Volume to Capacity	0.14	0.03	0.05	0.05	0.03	
Queue Length 95th (m)	3.6	0.7	0.0	0.0	0.0	
Control Delay (s)	9.7	4.0	0.0	0.0	0.0	
Lane LOS	A	A				
Approach Delay (s)	9.7	2.0		0.0		
Approach LOS	A					
Intersection Summary						
Average Delay	3.6					
Intersection Capacity Utilization	24.5%			ICU Level of Service		A
Analysis Period (min)	15					

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	462	852	42	453	235	119	361	236	801
v/c Ratio	1.50	0.54	0.19	0.53	0.30	1.47	0.50	0.91	1.19
Control Delay	267.6	16.0	23.4	25.3	10.0	293.4	23.2	66.9	128.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	267.6	16.0	23.4	25.3	10.0	293.4	23.2	66.9	128.0
Queue Length 50th (m)	~110.6	44.7	4.9	55.0	6.8	~28.0	44.7	37.3	~163.9
Queue Length 95th (m)	#166.2	61.2	m12.3	82.2	23.1	#47.7	69.4	#81.3	#231.8
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0		26.0	35.0		50.0	
Base Capacity (vph)	307	1581	216	859	788	81	716	258	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.50	0.54	0.19	0.53	0.30	1.47	0.50	0.91	1.19

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Future Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frft	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1644	3254		1744	1842	1421	1745	1796		1428	1639	
Flt Permitted	0.38	1.00		0.25	1.00	1.00	0.11	1.00		0.43	1.00	
Satd. Flow (perm)	658	3254		465	1842	1421	206	1796		652	1639	
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)	462	578	274	42	453	235	119	329	32	236	526	275
RTOR Reduction (vph)	0	63	0	0	0	125	0	4	0	0	21	0
Lane Group Flow (vph)	462	789	0	42	453	110	119	357	0	236	780	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			8			4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	42.0	42.0		42.0	42.0	42.0	35.7	35.7		35.7	35.7	
Effective Green, g (s)	42.0	42.0		42.0	42.0	42.0	35.7	35.7		35.7	35.7	
Actuated g/C Ratio	0.47	0.47		0.47	0.47	0.47	0.40	0.40		0.40	0.40	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.3	6.3		6.3	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1518		217	859	663	81	712		258	650	
v/s Ratio Prot		0.24			0.25			0.20			0.48	
v/s Ratio Perm	c0.70			0.09		0.08	c0.58			0.36		
v/c Ratio	1.50	0.52		0.19	0.53	0.17	1.47	0.50		0.91	1.20	
Uniform Delay, d1	24.0	16.9		14.1	17.0	13.9	27.1	20.5		25.7	27.1	
Progression Factor	1.00	1.00		1.42	1.32	4.37	1.00	1.00		1.00	1.00	
Incremental Delay, d2	243.5	1.3		1.9	2.2	0.5	266.3	0.6		34.0	104.3	
Delay (s)	267.5	18.2		21.9	24.6	61.1	293.4	21.0		59.7	131.4	
Level of Service	F	B		C	C	E	F	C		E	F	
Approach Delay (s)		105.8			36.2			88.5			115.1	
Approach LOS		F			D			F			F	

Intersection Summary

HCM 2000 Control Delay	91.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.3
Intersection Capacity Utilization	133.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group Flow (vph)	17	808	132	689	138	93	44
v/c Ratio	0.04	0.32	0.28	0.26	0.62	0.17	0.20
Control Delay	1.8	2.1	10.0	7.6	42.3	0.7	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	1.8	2.1	10.0	7.6	42.3	0.7	16.6
Queue Length 50th (m)	0.4	10.2	10.0	26.8	20.1	0.2	1.1
Queue Length 95th (m)	m0.6	m9.6	20.3	35.8	33.9	0.0	8.7
Internal Link Dist (m)		497.4		340.1		143.9	346.5
Turn Bay Length (m)	20.0		20.0				
Base Capacity (vph)	449	2510	471	2638	223	555	221
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	0.04	0.32	0.28	0.26	0.62	0.17	0.20
Intersection Summary							
m Volume for 95th percentile queue is metered by upstream signal.							

HCM Signalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
2: Gordon Dean Avenue/Sunnyhurst Avenue & Barton Street 2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰			↱	
Traffic Volume (vph)	14	493	170	108	565	0	113	0	76	6	0	30
Future Volume (vph)	14	493	170	108	565	0	113	0	76	6	0	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
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		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1462	3247		1750	3466		1750	1566			1420	
Flt Permitted	0.38	1.00		0.34	1.00		0.87	1.00			0.95	
Satd. Flow (perm)	591	3247		618	3466		1609	1566			1365	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	17	601	207	132	689	0	138	0	93	7	0	37
RTOR Reduction (vph)	0	38	0	0	0	0	0	80	0	0	32	0
Lane Group Flow (vph)	17	770	0	132	689	0	138	13	0	0	12	0
Confl. Peds. (#/hr)	1						1					3
Heavy Vehicles (%)	22%	7%	2%	2%	3%	0%	2%	2%	2%	50%	2%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	68.5	68.5		68.5	68.5		12.5	12.5			12.5	
Effective Green, g (s)	68.5	68.5		68.5	68.5		12.5	12.5			12.5	
Actuated g/C Ratio	0.76	0.76		0.76	0.76		0.14	0.14			0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	449	2471		470	2638		223	217			189	
v/s Ratio Prot		c0.24			0.20			0.01				
v/s Ratio Perm	0.03			0.21			c0.09				0.01	
v/c Ratio	0.04	0.31		0.28	0.26		0.62	0.06			0.06	
Uniform Delay, d1	2.6	3.4		3.3	3.2		36.5	33.6			33.7	
Progression Factor	0.61	0.69		2.44	2.26		0.80	1.00			1.00	
Incremental Delay, d2	0.1	0.3		0.3	0.1		12.2	0.5			0.7	
Delay (s)	1.7	2.6		8.3	7.3		41.3	34.2			34.3	
Level of Service	A	A		A	A		D	C			C	
Approach Delay (s)		2.5			7.5			38.4			34.3	
Approach LOS		A			A			D			C	
Intersection Summary												
HCM 2000 Control Delay			9.7			HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			51.3%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	47	742	112	660	226	291
v/c Ratio	0.13	0.40	0.40	0.35	0.43	0.52
Control Delay	7.6	8.1	16.9	11.8	22.1	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	8.1	16.9	11.8	22.1	24.5
Queue Length 50th (m)	3.1	28.4	10.3	30.5	24.6	34.3
Queue Length 95th (m)	6.7	31.7	20.6	37.2	40.1	51.4
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	361	1835	283	1874	527	559
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	0.40	0.40	0.35	0.43	0.52
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	39	531	85	93	524	24	55	56	77	40	118	84
Future Volume (vph)	39	531	85	93	524	24	55	56	77	40	118	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
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			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1740	3313		1528	3403			1700			1664	
Flt Permitted	0.36	1.00		0.32	1.00			0.83			0.92	
Satd. Flow (perm)	657	3313		514	3403			1427			1538	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	47	640	102	112	631	29	66	67	93	48	142	101
RTOR Reduction (vph)	0	14	0	0	4	0	0	28	0	0	21	0
Lane Group Flow (vph)	47	728	0	112	656	0	0	198	0	0	270	0
Confl. Peds. (#/hr)	3		2	2		3	1		1	1		1
Heavy Vehicles (%)	0%	6%	0%	14%	4%	6%	0%	0%	0%	15%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	49.5	49.5		49.5	49.5			31.5			31.5	
Effective Green, g (s)	49.5	49.5		49.5	49.5			31.5			31.5	
Actuated g/C Ratio	0.55	0.55		0.55	0.55			0.35			0.35	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	361	1822		282	1871			499			538	
v/s Ratio Prot		c0.22			0.19							
v/s Ratio Perm	0.07			0.22				0.14			c0.18	
v/c Ratio	0.13	0.40		0.40	0.35			0.40			0.50	
Uniform Delay, d1	9.8	11.7		11.7	11.3			22.1			23.1	
Progression Factor	0.67	0.66		1.00	1.00			1.07			1.00	
Incremental Delay, d2	0.7	0.6		4.1	0.5			2.4			3.3	
Delay (s)	7.3	8.3		15.8	11.8			25.9			26.4	
Level of Service	A	A		B	B			C			C	
Approach Delay (s)		8.3			12.4			25.9			26.4	
Approach LOS		A			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			14.3							B		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			90.0							9.0		
Intersection Capacity Utilization			52.1%							A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 210193 - Block 1 Servicing Strategy
4: Fruitland Road & Sherwood Park Road/Collector B 2036 Total PM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	0	17	139	0	196	27	265	91	339	420	30
Future Volume (Veh/h)	24	0	17	139	0	196	27	265	91	339	420	30
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	26	0	18	149	0	211	29	285	98	365	452	32
Pedestrians	4											
Lane Width (m)	3.3											
Walking Speed (m/s)	1.2											
Percent Blockage	0											
Right turn flare (veh)												
Median type	None								None			
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1756	1643	472	1592	1610	334	488	383				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1756	1643	472	1592	1610	334	488	383				
tC, single (s)	7.3	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.7	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	17	100	97	0	100	70	97	69				
cM capacity (veh/h)	31	67	594	62	70	708	1082	1175				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	44	360	29	383	365	484						
Volume Left	26	149	29	0	365	0						
Volume Right	18	211	0	98	0	32						
cSH	51	134	1082	1700	1175	1700						
Volume to Capacity	0.86	2.69	0.03	0.23	0.31	0.28						
Queue Length 95th (m)	27.3	243.1	0.6	0.0	10.0	0.0						
Control Delay (s)	212.3	831.0	8.4	0.0	9.4	0.0						
Lane LOS	F	F	A		A							
Approach Delay (s)	212.3	831.0	0.6	4.1								
Approach LOS	F	F										
Intersection Summary												
Average Delay	187.5											
Intersection Capacity Utilization	69.9%			ICU Level of Service					C			
Analysis Period (min)	15											

Queues 210193 - Block 1 Servicing Strategy
5: Regalview Drive/Fruitland Road & Highway 8 2036 Total PM Peak Hour - Scenario 2

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	239	714	37	961	33	109	112	503
v/c Ratio	0.60	0.34	0.12	0.63	0.44	0.25	0.41	0.84
Control Delay	16.4	10.2	20.7	23.9	43.5	17.8	30.3	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	10.2	20.7	23.9	43.5	17.8	30.3	24.8
Queue Length 50th (m)	14.2	26.7	3.6	64.1	4.8	10.4	16.2	34.2
Queue Length 95th (m)	#46.8	53.8	11.8	#114.6	11.8	18.4	24.8	58.8
Internal Link Dist (m)	245.7		490.0		176.2		531.3	
Turn Bay Length (m)	80.0	50.0		30.0		50.0		
Base Capacity (vph)	399	2129	315	1517	123	684	448	792
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.34	0.12	0.63	0.27	0.16	0.25	0.64
Intersection Summary								
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.								

HCM Signalized Intersection Capacity Analysis
5: Regalview Drive/Fruitland Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	215	626	16	33	795	70	30	66	32	101	71	382
Future Volume (vph)	215	626	16	33	795	70	30	66	32	101	71	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.3	3.0	3.3	3.3	3.0	3.0	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.95		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1661	3408		1744	3335		1604	1671		1558	1538	
Flt Permitted	0.19	1.00		0.38	1.00		0.18	1.00		0.69	1.00	
Satd. Flow (perm)	325	3408		698	3335		308	1671		1127	1538	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	239	696	18	37	883	78	33	73	36	112	79	424
RTOR Reduction (vph)	0	2	0	0	6	0	0	25	0	0	225	0
Lane Group Flow (vph)	239	712	0	37	955	0	33	84	0	112	278	0
Confl. Peds. (#/hr)	4		1	1		4	1		1	1		1
Heavy Vehicles (%)	5%	2%	0%	0%	2%	16%	5%	6%	0%	8%	4%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	56.1	56.1		40.7	40.7		21.9	21.9		21.9	21.9	
Effective Green, g (s)	56.1	56.1		40.7	40.7		21.9	21.9		21.9	21.9	
Actuated g/C Ratio	0.62	0.62		0.45	0.45		0.24	0.24		0.24	0.24	
Clearance Time (s)	3.0	5.8		5.8	5.8		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	387	2126		316	1509		75	407		274	374	
v/s Ratio Prot	c0.09	0.21			0.29			0.05			c0.18	
v/s Ratio Perm	c0.30			0.05			0.11			0.10		
v/c Ratio	0.62	0.34		0.12	0.63		0.44	0.21		0.41	0.74	
Uniform Delay, d1	10.2	8.0		14.2	18.9		28.8	27.1		28.6	31.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.9	0.4		0.8	2.0		4.1	0.3		1.0	7.7	
Delay (s)	13.1	8.5		15.0	20.9		32.9	27.3		29.6	39.1	
Level of Service	B	A		B	C		C	C		C	D	
Approach Delay (s)		9.6			20.7			28.6			37.4	
Approach LOS		A			C			C			D	
Intersection Summary												
HCM 2000 Control Delay		21.0			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.67										
Actuated Cycle Length (s)		89.9			Sum of lost time (s)			14.9				
Intersection Capacity Utilization		100.5%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		 			 						 			
Traffic Volume (veh/h)	70	646	4	4	752	111	1	0	4	109	0	130		
Future Volume (Veh/h)	70	646	4	4	752	111	1	0	4	109	0	130		
Sign Control	Free			Free			Stop			Stop				
Grade	0%			0%			0%			0%				
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	78	718	4	4	836	123	1	0	4	121	0	144		
Pedestrians						3						5		
Lane Width (m)						3.3						4.0		
Walking Speed (m/s)						1.2						1.2		
Percent Blockage						0						0		
Right turn flare (veh)														
Median type	None			None										
Median storage (veh)														
Upstream signal (m)														
pX, platoon unblocked														
vC, conflicting volume	964				722				1446	1848	364	1432	1788	484
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	964				722				1446	1848	364	1432	1788	484
tC, single (s)	4.2				4.1				7.5	6.5	6.9	7.6	6.5	7.1
tC, 2 stage (s)														
tF (s)	2.2				2.2				3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	89				100				98	100	99	0	100	72
cM capacity (veh/h)	689				889				61	66	637	81	72	508
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	NB 2	SB 1	SB 2				
Volume Total	78	479	243	4	557	402	1	4	121	144				
Volume Left	78	0	0	4	0	0	1	0	121	0				
Volume Right	0	0	4	0	0	123	0	4	0	144				
cSH	689	1700	1700	889	1700	1700	61	637	81	508				
Volume to Capacity	0.11	0.28	0.14	0.00	0.33	0.24	0.02	0.01	1.50	0.28				
Queue Length 95th (m)	2.9	0.0	0.0	0.1	0.0	0.0	0.4	0.1	72.7	8.7				
Control Delay (s)	10.9	0.0	0.0	9.1	0.0	0.0	64.8	10.7	367.3	14.9				
Lane LOS	B				A				F	B	F	B		
Approach Delay (s)	1.1				0.0				21.5	175.8				
Approach LOS								C	F					
Intersection Summary														
Average Delay				23.4										
Intersection Capacity Utilization				51.0%		ICU Level of Service				A				
Analysis Period (min)				15										

Queues

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	18	179	65	201	35	149	95	92
v/c Ratio	0.15	0.61	0.47	0.65	0.04	0.06	0.11	0.04
Control Delay	29.5	36.3	43.4	37.4	3.9	1.9	7.8	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	36.3	43.4	37.4	3.9	1.9	7.8	5.9
Queue Length 50th (m)	2.4	25.5	10.1	26.3	1.0	0.6	6.9	2.8
Queue Length 95th (m)	m4.7	m31.7	m20.3	42.5	m2.7	2.2	15.3	6.4
Internal Link Dist (m)		209.4		348.3		200.5		295.7
Turn Bay Length (m)	20.0		20.0		20.0		20.0	
Base Capacity (vph)	411	981	471	963	922	2367	874	2421
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.18	0.14	0.21	0.04	0.06	0.11	0.04
Intersection Summary								
m Volume for 95th percentile queue is metered by upstream signal.								

HCM Signalized Intersection Capacity Analysis

7: Gordon Dean Avenue & Collector B

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	↰	↱		↰	↱		↰	↱↰		↰	↱↰	
Lane Configurations	↰	↱		↰	↱		↰	↱↰		↰	↱↰	
Traffic Volume (vph)	17	150	15	60	131	54	32	73	64	87	60	25
Future Volume (vph)	17	150	15	60	131	54	32	73	64	87	60	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.96		1.00	0.93		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1711	1777		1711	1721		1711	3180		1711	3271	
Flt Permitted	0.42	1.00		0.48	1.00		0.69	1.00		0.66	1.00	
Satd. Flow (perm)	750	1777		856	1721		1250	3180		1184	3271	
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)	18	163	16	65	142	59	35	79	70	95	65	27
RTOR Reduction (vph)	0	8	0	0	31	0	0	18	0	0	7	0
Lane Group Flow (vph)	18	171	0	65	170	0	35	131	0	95	85	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		66.4	66.4		66.4	66.4	
Effective Green, g (s)	14.6	14.6		14.6	14.6		66.4	66.4		66.4	66.4	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.74	0.74		0.74	0.74	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	121	288		138	279		922	2346		873	2413	
v/s Ratio Prot		0.10			c0.10			0.04			0.03	
v/s Ratio Perm	0.02			0.08			0.03			c0.08		
v/c Ratio	0.15	0.60		0.47	0.61		0.04	0.06		0.11	0.04	
Uniform Delay, d1	32.4	35.0		34.2	35.0		3.2	3.2		3.4	3.2	
Progression Factor	0.91	0.89		0.99	0.99		0.89	0.80		1.75	1.94	
Incremental Delay, d2	0.5	2.7		2.5	3.7		0.1	0.0		0.2	0.0	
Delay (s)	29.9	33.9		36.2	38.2		2.9	2.6		6.1	6.2	
Level of Service	C	C		D	D		A	A		A	A	
Approach Delay (s)		33.5			37.7			2.7			6.2	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM 2000 Control Delay	21.9			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.20											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)			9.0					
Intersection Capacity Utilization	38.3%			ICU Level of Service			A					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
8: Jones Road & Collector B

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	75	8	74	6	6	4	79	109	8	12	173	96	
Future Volume (Veh/h)	75	8	74	6	6	4	79	109	8	12	173	96	
Sign Control		Stop				Stop				Free			
Grade		0%				0%				0%			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	82	9	80	7	7	4	86	118	9	13	188	104	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None								None				
Median storage (veh)													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	568	565	240	645	612	122	292	127					
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	568	565	240	645	612	122	292	127					
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1	4.1					
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2	2.2					
p0 queue free %	80	98	90	98	98	100	93	99					
cM capacity (veh/h)	401	401	799	321	377	929	1270	1459					
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total	171	18	213	305									
Volume Left	82	7	86	13									
Volume Right	80	4	9	104									
cSH	523	403	1270	1459									
Volume to Capacity	0.33	0.04	0.07	0.01									
Queue Length 95th (m)	10.6	1.0	1.6	0.2									
Control Delay (s)	15.2	14.4	3.6	0.4									
Lane LOS	C	B	A	A									
Approach Delay (s)	15.2	14.4	3.6	0.4									
Approach LOS	C	B											
Intersection Summary													
Average Delay				5.3									
Intersection Capacity Utilization				49.3%		ICU Level of Service			A				
Analysis Period (min)				15									

Queues
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBT	SBL	SBR
Lane Group					
Lane Group Flow (vph)	135	689	987	80	104
v/c Ratio	0.60	0.36	0.52	0.14	0.18
Control Delay	26.7	11.5	13.1	18.3	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	11.5	13.1	18.3	5.6
Queue Length 50th (m)	14.2	31.6	49.7	10.1	1.9
Queue Length 95th (m)	#39.0	42.5	65.3	19.0	10.6
Internal Link Dist (m)	490.0		385.6	312.1	
Turn Bay Length (m)	50.0				
Base Capacity (vph)	226	1919	1896	579	587
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.36	0.52	0.14	0.18
Intersection Summary					
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.					

HCM Signalized Intersection Capacity Analysis
9: Highway 8 & Gordon Dean Avenue

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↔	↕
Traffic Volume (vph)	124	634	801	107	74	96
Future Volume (vph)	124	634	801	107	74	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5	4.5
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1711	3421	3361		1711	1531
Flt Permitted	0.22	1.00	1.00		0.95	1.00
Satd. Flow (perm)	403	3421	3361		1711	1531
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	135	689	871	116	80	104
RTOR Reduction (vph)	0	0	11	0	0	69
Lane Group Flow (vph)	135	689	976	0	80	35
Turn Type	Perm	NA	NA		Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2					4
Actuated Green, G (s)	50.5	50.5	50.5		30.5	30.5
Effective Green, g (s)	50.5	50.5	50.5		30.5	30.5
Actuated g/C Ratio	0.56	0.56	0.56		0.34	0.34
Clearance Time (s)	4.5	4.5	4.5		4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	226	1919	1885		579	518
v/s Ratio Prot		0.20	0.29		0.05	
v/s Ratio Perm	0.33					0.02
v/c Ratio	0.60	0.36	0.52		0.14	0.07
Uniform Delay, d1	13.0	10.9	12.2		20.6	20.1
Progression Factor	1.00	1.00	1.00		0.85	1.06
Incremental Delay, d2	11.1	0.5	1.0		0.5	0.3
Delay (s)	24.2	11.4	13.2		18.0	21.5
Level of Service	C	B	B		B	C
Approach Delay (s)		13.5	13.2		20.0	
Approach LOS		B	B		B	
Intersection Summary						
HCM 2000 Control Delay		14.0		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.42				
Actuated Cycle Length (s)		90.0		Sum of lost time (s)		9.0
Intersection Capacity Utilization		47.8%		ICU Level of Service		A
Analysis Period (min)		15				

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
10: Gordon Dean Avenue & Street C (North Leg)

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Traffic Volume (veh/h)	77	15	32	111	157	121
Future Volume (Veh/h)	77	15	32	111	157	121
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	84	16	35	121	171	132
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				320	168	
pX, platoon unblocked						
vC, conflicting volume	368	152	303			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	368	152	303			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	98	97			
cM capacity (veh/h)	589	868	1255			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	75	81	114	189	
Volume Left	84	35	0	0	0	
Volume Right	16	0	0	0	132	
cSH	621	1255	1700	1700	1700	
Volume to Capacity	0.16	0.03	0.05	0.07	0.11	
Queue Length 95th (m)	4.3	0.6	0.0	0.0	0.0	
Control Delay (s)	11.9	3.8	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	11.9	1.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay		2.6				
Intersection Capacity Utilization		27.4%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
11: Street C & Collector B

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	99	145	186	34	123	32	115	0	23	15	0	97
Future Volume (Veh/h)	99	145	186	34	123	32	115	0	23	15	0	97
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	158	202	37	134	35	125	0	25	16	0	105
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)	233											
pX, platoon unblocked	0.99						0.99	0.99		0.99	0.99	0.99
vC, conflicting volume	169			360			806	718	259	726	802	152
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	154			360			797	709	259	717	793	136
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 %	92			97			49	100	97	95	100	88
cM capacity (veh/h)	1411			1199			244	318	780	304	284	902
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	468	206	150	121								
Volume Left	108	37	125	16								
Volume Right	202	35	25	105								
cSH	1411	1199	276	716								
Volume to Capacity	0.08	0.03	0.54	0.17								
Queue Length 95th (m)	1.9	0.7	22.5	4.5								
Control Delay (s)	2.4	1.7	32.5	11.1								
Lane LOS	A	A	D	B								
Approach Delay (s)	2.4	1.7	32.5	11.1								
Approach LOS			D	B								
Intersection Summary												
Average Delay	8.1											
Intersection Capacity Utilization	57.0%			ICU Level of Service			B					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
12: Gordon Dean Avenue & Street C (South Leg)

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	69	85	145	101	34
Future Volume (Veh/h)	23	69	85	145	101	34
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	75	92	158	110	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)			336		225	
pX, platoon unblocked						
vC, conflicting volume	392	74	147			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	392	74	147			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	92	94			
cM capacity (veh/h)	547	973	1432			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	100	145	105	73	74	
Volume Left	25	92	0	0	0	
Volume Right	75	0	0	0	37	
cSH	815	1432	1700	1700	1700	
Volume to Capacity	0.12	0.06	0.06	0.04	0.04	
Queue Length 95th (m)	3.1	1.5	0.0	0.0	0.0	
Control Delay (s)	10.0	5.1	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	10.0	2.9		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			25.9%	ICU Level of Service		A
Analysis Period (min)			15			

Appendix K

Signal Warrants



Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2031 Background
Region/City/Township: City of Hamilton

Major Street: Fruitland Road
Minor Street: Sherwood Park Road/Collector B

North/South?: Y

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Fruitland Road						Sherwood Park Road/Collector B						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	5	288	0	2	193	5	17	0	18	2	0	9	
PM Peak Hour	22	213	0	8	337	24	20	0	13	1	0	5	
verage Hourly Volum	7	125	0	3	133	7	9	0	8	1	0	4	0

Warrant	AHV
1A - All	296
1B - Minor	21
2A - Major	274
2B - Cross	10

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	
% Fulfilled						32.8%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	
% Fulfilled						12.5%

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	
% Fulfilled						30.5%

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	
% Fulfilled						13.3%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2036 Background
Region/City/Township: City of Hamilton

Major Street: Fruitland Road
Minor Street: Sherwood Park Road/Collector B

North/South?: Y

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Fruitland Road						Sherwood Park Road/Collector B						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	6	358	0	2	241	6	21	0	23	2	0	9	
PM Peak Hour	27	265	0	8	420	30	24	0	17	1	0	5	
Average Hourly Volume	8	156	0	3	165	9	11	0	10	1	0	4	0

Warrant	AHV
1A - All	366
1B - Minor	26
2A - Major	341
2B - Cross	12

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	366
% Fulfilled						40.7%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	26
% Fulfilled						15.0%

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	341
% Fulfilled						37.9%

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	12
% Fulfilled						16.0%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2031 Total - Scenario 1
Region/City/Township: City of Hamilton

Major Street: Fruitland Road
Minor Street: Sherwood Park Road/Collector B

North/South?: Y

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Fruitland Road						Sherwood Park Road/Collector B						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	5	288	18	147	193	5	17	0	18	82	0	335	
PM Peak Hour	22	213	21	339	337	24	20	0	13	43	0	196	
Average Hourly Volume	7	125	10	122	133	7	9	0	8	31	0	133	0

Warrant	AHV
1A - All	584
1B - Minor	181
2A - Major	403
2B - Cross	41

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	584
% Fulfilled						64.9%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	181
% Fulfilled						106.5%

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	403
% Fulfilled						44.8%

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	41
% Fulfilled						54.0%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2036 Total - Scenario 1
Region/City/Township: City of Hamilton

Major Street: Fruitland Road
Minor Street: Sherwood Park Road/Collector B

North/South?: Y

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Fruitland Road						Sherwood Park Road/Collector B						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	6	358	18	147	241	6	21	0	23	82	0	335	
PM Peak Hour	27	265	21	339	420	30	24	0	17	43	0	196	
Average Hourly Volume	8	156	10	122	165	9	11	0	10	31	0	133	0

Warrant	AHV
1A - All	655
1B - Minor	185
2A - Major	470
2B - Cross	43

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	655
% Fulfilled						72.8%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	185
% Fulfilled						109.0%

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	470
% Fulfilled						52.2%

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	43
% Fulfilled						56.7%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2031 Total - Scenario 2
Region/City/Township: City of Hamilton

Major Street: Fruitland Road
Minor Street: Sherwood Park Road/Collector B

North/South?: Y

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Fruitland Road						Sherwood Park Road/Collector B						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	5	288	47	147	193	5	17	0	18	182	0	335	
PM Peak Hour	22	213	91	339	337	24	20	0	13	139	0	196	
Average Hourly Volume	7	125	35	122	133	7	9	0	8	80	0	133	0

Warrant	AHV
1A - All	658
1B - Minor	230
2A - Major	428
2B - Cross	90

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	658
% Fulfilled						73.1%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	230
% Fulfilled						135.3%

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	428
% Fulfilled						47.5%

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	90
% Fulfilled						119.3%

Signal Justification Calculation for Forecast Volumes
(OTM Book 12 - Justification 7)



Horizon Year: 2036 Total - Scenario 2
Region/City/Township: City of Hamilton

Major Street: Fruitland Road North/South?: Y
Minor Street: Sherwood Park Road/Collector B

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						
	Fruitland Road						Sherwood Park Road/Collector B						
	Northbound			Southbound			Eastbound			Westbound			Peds Crossing
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	6	358	47	147	241	6	21	0	23	182	0	335	
PM Peak Hour	27	265	91	339	420	30	24	0	17	139	0	196	
Average Hourly Volume	8	156	35	122	165	9	11	0	10	80	0	133	0

Warrant	AHV
1A - All	729
1B - Minor	234
2A - Major	494
2B - Cross	92

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	
% Fulfilled						80.9%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	
% Fulfilled						137.8%

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	
% Fulfilled						54.9%

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	
% Fulfilled						122.0%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2031 Background
Region/City/Township: City of Hamilton

Major Street: Highway 8
Minor Street: Jones Road

North/South?: N

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Highway 8						Jones Road						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	53	378	0	0	445	30	1	0	0	10	0	31	
PM Peak Hour	33	466	4	4	528	23	1	0	4	32	0	71	
Average Hourly Volume	22	211	1	1	243	13	1	0	1	11	0	26	0

Warrant	AHV
1A - All	529
1B - Minor	38
2A - Major	491
2B - Cross	11

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	
% Fulfilled						58.7%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	
% Fulfilled						22.1%

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	
% Fulfilled						54.6%

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	
% Fulfilled						14.7%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2036 Background
Region/City/Township: City of Hamilton

Major Street: Highway 8
Minor Street: Jones Road

North/South?: N

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Highway 8						Jones Road						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	66	471	0	0	554	37	1	0	0	12	0	37	
PM Peak Hour	39	581	4	4	658	28	1	0	4	40	0	86	
Average Hourly Volume	26	263	1	1	303	16	1	0	1	13	0	31	0

Warrant	AHV
1A - All	656
1B - Minor	45
2A - Major	611
2B - Cross	14

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	656
% Fulfilled						72.9%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	45
% Fulfilled						26.6%

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						67.8%

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	14
% Fulfilled						18.0%

Signal Justification Calculation for Forecast Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2031 Total
Region/City/Township: City of Hamilton

Major Street: Highway 8
Minor Street: Jones Road

North/South?: N

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Highway 8						Jones Road						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	66	462	0	0	487	110	1	0	0	100	0	54	
PM Peak Hour	64	531	4	4	622	106	1	0	4	101	0	114	
Average Hourly Volume	33	248	1	1	277	54	1	0	1	50	0	42	0

Warrant	AHV
1A - All	708
1B - Minor	94
2A - Major	614
2B - Cross	51

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	708
% Fulfilled						78.6%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	94
% Fulfilled						55.1%

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	614
% Fulfilled						68.2%

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	51
% Fulfilled						67.7%

Signal Justification Calculation for Forecast Volumes
(OTM Book 12 - Justification 7)



Horizon Year: 2036 Total
Region/City/Township: City of Hamilton

Major Street: Highway 8
Minor Street: Jones Road

North/South?: N

Number of Approach Lanes: 2 or more
Tee Intersection?: N
Flow Conditions: Restricted

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	No	Justification for existing intersections with forecast traffic

PM Forecast Only? N

Time Period	Major Street						Minor Street						Peds Crossing
	Highway 8						Jones Road						
	Eastbound			Westbound			Northbound			Southbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	79	555	0	0	597	118	1	0	0	103	0	60	
PM Peak Hour	70	646	4	4	752	111	1	0	4	109	0	130	
Average Hourly Volume	37	300	1	1	337	57	1	0	1	53	0	48	0

Warrant	AHV
1A - All	836
1B - Minor	102
2A - Major	734
2B - Cross	54

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	
% Fulfilled						92.9%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
					X	
	Minor Street Approaches	120	170	120	170	
% Fulfilled						60.0%

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	
% Fulfilled						81.6%

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	
% Fulfilled						71.3%

Appendix L

Future Total Traffic Operations Reports (With Remedial Measures)



Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	378	475	11	393	277	234	640	252	720
v/c Ratio	1.41	0.39	0.05	0.85	0.51	1.11	1.04	1.16	1.21
Control Delay	230.8	24.7	21.4	59.7	8.2	125.9	85.9	141.5	141.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	230.8	24.7	21.4	59.7	8.2	125.9	85.9	141.5	141.8
Queue Length 50th (m)	~93.1	35.1	1.5	86.8	1.4	~47.0	~160.6	~55.2	~196.3
Queue Length 95th (m)	#132.9	49.9	4.6	#117.5	15.5	#83.9	#199.9	#92.6	#234.6
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0			85.0		50.0	
Base Capacity (vph)	268	1232	239	464	545	210	615	217	595
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.39	0.05	0.85	0.51	1.11	1.04	1.16	1.21

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Future Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1589	3059		1310	1740	1306	1694	1767		1546	1539	
Flt Permitted	0.19	1.00		0.48	1.00	1.00	0.10	1.00		0.09	1.00	
Satd. Flow (perm)	326	3059		662	1740	1306	171	1767		149	1539	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	378	339	136	11	393	277	234	617	23	252	328	392
RTOR Reduction (vph)	0	34	0	0	0	197	0	1	0	0	36	0
Lane Group Flow (vph)	378	441	0	11	393	80	234	639	0	252	684	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	3%	13%	9%	10%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	49.0	43.5		33.0	32.0	32.0	52.2	41.7		56.2	43.7	
Effective Green, g (s)	49.0	43.5		33.0	32.0	32.0	52.2	41.7		56.2	43.7	
Actuated g/C Ratio	0.41	0.36		0.28	0.27	0.27	0.44	0.35		0.47	0.36	
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	264	1108		187	464	348	207	614		215	560	
v/s Ratio Prot	c0.15	0.14		0.00	0.23		0.10	0.36		c0.12	c0.44	
v/s Ratio Perm	c0.43			0.02		0.06	0.39			0.43		
v/c Ratio	1.43	0.40		0.06	0.85	0.23	1.13	1.04		1.17	1.22	
Uniform Delay, d1	30.7	28.5		31.8	41.7	34.4	33.2	39.1		35.5	38.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	214.8	1.1		0.1	17.2	1.5	102.0	47.2		115.6	115.3	
Delay (s)	245.5	29.6		31.9	58.9	35.9	135.2	86.3		151.1	153.4	
Level of Service	F	C		C	E	D	F	F		F	F	
Approach Delay (s)		125.2			49.1			99.4			152.8	
Approach LOS		F			D			F			F	

Intersection Summary

HCM 2000 Control Delay	111.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	→	←	↖	↑	↗	↓
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	434	6	392	153	257
v/c Ratio	0.21	0.90	0.01	0.33	0.24	0.22
Control Delay	18.1	50.4	5.8	7.2	7.5	6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.1	50.4	5.8	7.2	7.5	6.4
Queue Length 50th (m)	3.0	40.4	0.3	25.1	9.3	15.0
Queue Length 95th (m)	11.2	#77.6	1.6	42.6	19.5	26.9
Internal Link Dist (m)	160.9	260.2		531.3		466.4
Turn Bay Length (m)			20.0		20.0	
Base Capacity (vph)	270	549	718	1193	626	1181
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	0.17	0.79	0.01	0.33	0.24	0.22

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 1

	↖	→	↗	↖	←	↗	↖	↑	↗	↖	↓	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↖	↗	↖	↖	↗	↖
Traffic Volume (vph)	21	0	23	82	0	335	6	358	18	147	241	6
Future Volume (vph)	21	0	23	82	0	335	6	358	18	147	241	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.8	3.3	3.3	3.3	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5			4.5			4.5			4.5		4.5
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			0.98			1.00		1.00
Frt	0.93			0.89			1.00			0.99		1.00
Flt Protected	0.98			0.99			0.95			1.00		0.95
Satd. Flow (prot)	1563			1590			1646			1723		1711
Flt Permitted	0.60			0.92			0.60			1.00		0.50
Satd. Flow (perm)	967			1478			1038			1723		905
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)	22	0	24	85	0	349	6	373	19	153	251	6
RTOR Reduction (vph)	0	19	0	0	176	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	27	0	0	258	0	6	390	0	153	256	0
Confl. Peds. (#/hr)							13					13
Heavy Vehicles (%)	14%	2%	0%	2%	2%	2%	0%	6%	2%	2%	6%	50%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.8			18.8		62.2	62.2		62.2	62.2	
Effective Green, g (s)		18.8			18.8		62.2	62.2		62.2	62.2	
Actuated g/C Ratio		0.21			0.21		0.69	0.69		0.69	0.69	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		201			308		717	1190		625	1180	
v/s Ratio Prot								c0.23			0.15	
v/s Ratio Perm		0.03			c0.17		0.01			0.17		
v/c Ratio		0.13			0.84		0.01	0.33		0.24	0.22	
Uniform Delay, d1		29.0			34.1		4.3	5.6		5.2	5.1	
Progression Factor		1.00			1.79		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.3			17.6		0.0	0.7		0.9	0.4	
Delay (s)		29.3			78.6		4.3	6.3		6.1	5.5	
Level of Service		C			E		A	A		A	A	
Approach Delay (s)		29.3			78.6			6.3			5.7	
Approach LOS		C			E			A			A	

Intersection Summary

HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	WBT	NBL	SBL	SBT
Lane Group	EBL	EBT	WBT	NBL	SBL	SBT
Lane Group Flow (vph)	95	669	861	1	124	72
v/c Ratio	0.27	0.28	0.36	0.00	0.70	0.15
Control Delay	9.7	5.3	6.2	24.0	52.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	5.3	6.2	24.0	52.6	1.0
Queue Length 50th (m)	0.4	1.4	24.3	0.2	18.8	0.0
Queue Length 95th (m)	22.3	59.2	40.8	1.1	27.7	0.0
Internal Link Dist (m)	385.6	416.7			419.0	
Turn Bay Length (m)	30.0			30.0	40.0	
Base Capacity (vph)	348	2381	2382	427	303	660
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	0.27	0.28	0.36	0.00	0.41	0.11
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰		↰	↰		↰	↰	
Traffic Volume (vph)	79	555	0	0	597	118	1	0	0	103	0	60
Future Volume (vph)	79	555	0	0	597	118	1	0	0	103	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.3	3.0	3.5	3.3	3.3	3.5	3.3	3.3	4.8	3.3
Total Lost time (s)	4.5	4.5			4.5		4.5			4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00			1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00			1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00			1.00		1.00
Frt	1.00	1.00			0.98		1.00			1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95			0.95		1.00
Satd. Flow (prot)	1527	3368			3352		1745			1163		1592
Flt Permitted	0.31	1.00			1.00		0.71			0.76		1.00
Satd. Flow (perm)	492	3368			3352		1304			927		1592
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	95	669	0	0	719	142	1	0	0	124	0	72
RTOR Reduction (vph)	0	0	0	0	13	0	0	0	0	0	58	0
Lane Group Flow (vph)	95	669	0	0	848	0	1	0	0	124	14	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	10%	6%	0%	0%	4%	0%	0%	0%	0%	50%	0%	15%
Turn Type	Perm	NA		Perm	NA		Perm			Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	63.6	63.6			63.6		17.4			17.4		17.4
Effective Green, g (s)	63.6	63.6			63.6		17.4			17.4		17.4
Actuated g/C Ratio	0.71	0.71			0.71		0.19			0.19		0.19
Clearance Time (s)	4.5	4.5			4.5		4.5			4.5		4.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0			3.0		3.0
Lane Grp Cap (vph)	347	2380			2368		252			179		307
v/s Ratio Prot		0.20			c0.25							0.01
v/s Ratio Perm	0.19						0.00			c0.13		
v/c Ratio	0.27	0.28			0.36		0.00			0.69		0.05
Uniform Delay, d1	4.8	4.8			5.2		29.3			33.8		29.5
Progression Factor	1.11	0.88			1.00		1.00			1.01		1.00
Incremental Delay, d2	1.8	0.3			0.4		0.0			11.0		0.1
Delay (s)	7.1	4.5			5.6		29.3			45.0		29.6
Level of Service	A	A			A		C			D		C
Approach Delay (s)	4.9				5.6		29.3					39.3
Approach LOS	A				A		C					D
Intersection Summary												
HCM 2000 Control Delay		8.9			HCM 2000 Level of Service		A					
HCM 2000 Volume to Capacity ratio		0.43										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)		9.0					
Intersection Capacity Utilization		48.3%			ICU Level of Service		A					
Analysis Period (min)		15										
c Critical Lane Group												

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	462	852	42	453	235	119	361	236	801
v/c Ratio	1.78	0.71	0.22	0.94	0.43	0.88	0.63	0.69	1.20
Control Delay	392.3	34.5	23.6	72.0	7.4	73.6	40.3	30.3	136.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	392.3	34.5	23.6	72.0	7.4	73.6	40.3	30.3	136.9
Queue Length 50th (m)	~147.1	84.0	5.6	103.2	0.5	14.6	71.0	32.4	~223.2
Queue Length 95th (m)	#210.1	107.4	12.3	#164.1	19.7	#46.4	103.1	50.6	#296.5
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0			85.0		50.0	
Base Capacity (vph)	259	1207	191	483	542	136	576	349	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.78	0.71	0.22	0.94	0.43	0.88	0.63	0.68	1.20

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Future Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3253		1745	1842	1416	1745	1796		1428	1638	
Flt Permitted	0.11	1.00		0.23	1.00	1.00	0.10	1.00		0.31	1.00	
Satd. Flow (perm)	193	3253		425	1842	1416	191	1796		463	1638	
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)	462	578	274	42	453	235	119	329	32	236	526	275
RTOR Reduction (vph)	0	47	0	0	0	171	0	3	0	0	16	0
Lane Group Flow (vph)	462	805	0	42	453	64	119	358	0	236	785	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	50.5	41.9		35.6	31.5	31.5	43.4	38.4		57.2	47.7	
Effective Green, g (s)	50.5	41.9		35.6	31.5	31.5	43.4	38.4		57.2	47.7	
Actuated g/C Ratio	0.42	0.35		0.30	0.26	0.26	0.36	0.32		0.48	0.40	
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	1135		171	483	371	133	574		335	651	
v/s Ratio Prot	c0.22	0.25		0.01	0.25		0.04	0.20		c0.08	c0.48	
v/s Ratio Perm	c0.54			0.06		0.05	0.28			0.25		
v/c Ratio	1.80	0.71		0.25	0.94	0.17	0.89	0.62		0.70	1.21	
Uniform Delay, d1	34.6	33.8		30.8	43.3	34.2	34.0	34.7		21.7	36.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	374.1	3.8		0.8	28.1	1.0	47.4	2.1		6.6	106.9	
Delay (s)	408.7	37.5		31.6	71.4	35.2	81.4	36.8		28.3	143.0	
Level of Service	F	D		C	E	D	F	D		C	F	
Approach Delay (s)		168.0			57.4			47.9			116.9	
Approach LOS		F			E			D			F	

Intersection Summary

HCM 2000 Control Delay	114.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	115.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues

4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	→	←	↖	↗	↘	↙
Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	44	257	29	308	365	484
v/c Ratio	0.60	0.88	0.04	0.21	0.43	0.32
Control Delay	62.1	45.5	1.5	1.9	3.8	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.1	45.5	1.5	1.9	3.8	2.4
Queue Length 50th (m)	4.4	5.7	0.6	6.9	11.2	12.5
Queue Length 95th (m)	#20.4	#46.6	1.7	11.1	19.9	19.0
Internal Link Dist (m)	160.9	260.2		531.3		466.4
Turn Bay Length (m)			20.0		20.0	
Base Capacity (vph)	73	292	699	1451	854	1491
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	0.60	0.88	0.04	0.21	0.43	0.32

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	↖	→	↗	↖	←	↗	↖	↗	↘	↙	↘	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔		↔	↔	↔
Traffic Volume (vph)	24	0	17	43	0	196	27	265	21	339	420	30
Future Volume (vph)	24	0	17	43	0	196	27	265	21	339	420	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.8	3.3	3.3	3.3	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5			4.5			4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00			1.00			1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00			1.00			1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00			1.00			1.00	1.00		1.00	1.00	
Frt	0.94			0.89			1.00	0.99		1.00	0.99	
Flt Protected	0.97			0.99			0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1515			1587			1676	1749		1711	1798	
Flt Permitted	0.51			0.94			0.48	1.00		0.57	1.00	
Satd. Flow (perm)	791			1506			846	1749		1031	1798	
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)	26	0	18	46	0	211	29	285	23	365	452	32
RTOR Reduction (vph)	0	17	0	0	184	0	0	3	0	0	3	0
Lane Group Flow (vph)	0	27	0	0	73	0	29	305	0	365	481	0
Confl. Peds. (#/hr)							4					4
Heavy Vehicles (%)	19%	2%	0%	2%	2%	2%	0%	4%	2%	2%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.5			6.5		74.5	74.5		74.5	74.5	
Effective Green, g (s)		6.5			6.5		74.5	74.5		74.5	74.5	
Actuated g/C Ratio		0.07			0.07		0.83	0.83		0.83	0.83	
Clearance Time (s)		4.5			4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		57			108		700	1447		853	1488	
v/s Ratio Prot								0.17			0.27	
v/s Ratio Perm		0.03			c0.05		0.03			c0.35		
v/c Ratio		0.48			0.68		0.04	0.21		0.43	0.32	
Uniform Delay, d1		40.1			40.7		1.4	1.6		2.1	1.8	
Progression Factor		1.00			1.35		1.00	1.00		1.00	1.00	
Incremental Delay, d2		6.2			15.6		0.1	0.3		1.6	0.6	
Delay (s)		46.3			70.5		1.5	1.9		3.6	2.4	
Level of Service		D			E		A	A		A	A	
Approach Delay (s)		46.3			70.5			1.9			2.9	
Approach LOS		D			E			A			A	

Intersection Summary

HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Queues

6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	78	722	4	959	1	4	121	144
v/c Ratio	0.22	0.28	0.01	0.38	0.01	0.01	0.62	0.35
Control Delay	7.1	4.5	4.2	4.8	29.0	0.0	44.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	4.5	4.2	4.8	29.0	0.0	44.8	4.9
Queue Length 50th (m)	0.1	0.6	0.1	23.4	0.2	0.0	20.0	1.3
Queue Length 95th (m)	16.3	67.6	1.1	42.3	1.4	0.0	31.3	6.6
Internal Link Dist (m)		385.6		416.7		249.4		419.0
Turn Bay Length (m)	30.0		30.0		30.0		40.0	
Base Capacity (vph)	351	2588	488	2512	292	616	365	604
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.28	0.01	0.38	0.00	0.01	0.33	0.24
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 1

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	70	646	4	4	752	111	1	0	4	109	0	130
Future Volume (vph)	70	646	4	4	752	111	1	0	4	109	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.3	3.0	3.5	3.3	3.3	3.5	3.3	3.3	4.8	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	3464		1685	3348		1745	1571		1623	1679	
Flt Permitted	0.28	1.00		0.37	1.00		0.56	1.00		0.76	1.00	
Satd. Flow (perm)	470	3464		653	3348		1031	1571		1290	1679	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	718	4	4	836	123	1	0	4	121	0	144
RTOR Reduction (vph)	0	0	0	0	9	0	0	3	0	0	122	0
Lane Group Flow (vph)	78	722	0	4	950	0	1	1	0	121	22	0
Confl. Peds. (#/hr)	5						5			3		
Heavy Vehicles (%)	5%	3%	0%	0%	4%	5%	0%	0%	0%	7%	0%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	67.3	67.3		67.3	67.3		13.7	13.7		13.7	13.7	
Effective Green, g (s)	67.3	67.3		67.3	67.3		13.7	13.7		13.7	13.7	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.15	0.15		0.15	0.15	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	351	2590		488	2503		156	239		196	255	
v/s Ratio Prot		0.21			0.28			0.00			0.01	
v/s Ratio Perm	0.17			0.01			0.00			0.09		
v/c Ratio	0.22	0.28		0.01	0.38		0.01	0.00		0.62	0.09	
Uniform Delay, d1	3.4	3.6		2.9	4.0		32.4	32.4		35.7	32.8	
Progression Factor	1.18	1.03		1.00	1.00		1.00	1.00		0.91	0.98	
Incremental Delay, d2	1.3	0.2		0.0	0.4		0.0	0.0		5.5	0.1	
Delay (s)	5.4	4.0		2.9	4.4		32.4	32.4		37.9	32.2	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s)	4.1			4.4			32.4			34.8		
Approach LOS	A			A			C			C		
Intersection Summary												
HCM 2000 Control Delay		8.3			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		52.5%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	378	475	11	393	277	234	640	252	720
v/c Ratio	1.41	0.39	0.05	0.85	0.51	1.11	1.04	1.16	1.21
Control Delay	230.8	24.7	21.4	59.7	8.2	125.9	85.9	141.5	141.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	230.8	24.7	21.4	59.7	8.2	125.9	85.9	141.5	141.8
Queue Length 50th (m)	~93.1	35.1	1.5	86.8	1.4	~47.0	~160.6	~55.2	~196.3
Queue Length 95th (m)	#132.9	49.9	4.6	#117.5	15.5	#83.9	#199.9	#92.6	#234.6
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0			85.0		50.0	
Base Capacity (vph)	268	1232	239	464	545	210	615	217	595
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.39	0.05	0.85	0.51	1.11	1.04	1.16	1.21

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Future Volume (vph)	314	281	113	9	326	230	194	512	19	209	272	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1589	3059		1310	1740	1306	1694	1767		1546	1539	
Flt Permitted	0.19	1.00		0.48	1.00	1.00	0.10	1.00		0.09	1.00	
Satd. Flow (perm)	326	3059		662	1740	1306	171	1767		149	1539	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	378	339	136	11	393	277	234	617	23	252	328	392
RTOR Reduction (vph)	0	34	0	0	0	197	0	1	0	0	36	0
Lane Group Flow (vph)	378	441	0	11	393	80	234	639	0	252	684	0
Confl. Peds. (#/hr)	3		2	2		3	5		1	1		5
Heavy Vehicles (%)	6%	9%	7%	33%	8%	19%	3%	3%	13%	9%	10%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	49.0	43.5		33.0	32.0	32.0	52.2	41.7		56.2	43.7	
Effective Green, g (s)	49.0	43.5		33.0	32.0	32.0	52.2	41.7		56.2	43.7	
Actuated g/C Ratio	0.41	0.36		0.28	0.27	0.27	0.44	0.35		0.47	0.36	
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	264	1108		187	464	348	207	614		215	560	
v/s Ratio Prot	c0.15	0.14		0.00	0.23		0.10	0.36		c0.12	c0.44	
v/s Ratio Perm	c0.43			0.02		0.06	0.39			0.43		
v/c Ratio	1.43	0.40		0.06	0.85	0.23	1.13	1.04		1.17	1.22	
Uniform Delay, d1	30.7	28.5		31.8	41.7	34.4	33.2	39.1		35.5	38.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	214.8	1.1		0.1	17.2	1.5	102.0	47.2		115.6	115.3	
Delay (s)	245.5	29.6		31.9	58.9	35.9	135.2	86.3		151.1	153.4	
Level of Service	F	C		C	E	D	F	F		F	F	
Approach Delay (s)		125.2			49.1			99.4			152.8	
Approach LOS		F			D			F			F	

Intersection Summary

HCM 2000 Control Delay	111.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	57	473	53	437	313	136
v/c Ratio	0.12	0.23	0.09	0.21	0.76	0.43
Control Delay	10.1	8.3	8.6	7.7	36.5	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.1	8.3	8.6	7.7	36.5	25.3
Queue Length 50th (m)	3.2	14.3	3.0	13.8	39.4	15.8
Queue Length 95th (m)	10.9	29.3	8.6	23.8	54.5	23.8
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	482	2083	564	2048	791	614
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	0.23	0.09	0.21	0.40	0.22
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱		↰	↰↱		↰	↰↱	
Traffic Volume (vph)	46	348	35	43	327	27	65	116	73	21	64	25
Future Volume (vph)	46	348	35	43	327	27	65	116	73	21	64	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5			4.5		4.5
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		1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00			1.00		1.00
Frt	1.00	0.99		1.00	0.99		0.96			0.96		0.97
Flt Protected	0.95	1.00		0.95	1.00		0.99			0.99		0.99
Satd. Flow (prot)	1426	3213		1743	3158		1721			1325		1325
Flt Permitted	0.50	1.00		0.48	1.00		0.88			0.89		0.89
Satd. Flow (perm)	746	3213		873	3158		1534			1192		1192
Peak-hour factor, PHF	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Adj. Flow (vph)	57	430	43	53	404	33	80	143	90	26	79	31
RTOR Reduction (vph)	0	5	0	0	4	0	0	25	0	0	18	0
Lane Group Flow (vph)	57	468	0	53	433	0	0	288	0	0	118	0
Confl. Peds. (#/hr)	2		1	1		2			1	1		
Heavy Vehicles (%)	22%	8%	23%	0%	12%	6%	0%	2%	0%	0%	40%	43%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	58.2	58.2		58.2	58.2			22.8			22.8	
Effective Green, g (s)	58.2	58.2		58.2	58.2			22.8			22.8	
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.25			0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	482	2077		564	2042			388			301	
v/s Ratio Prot		c0.15			0.14							
v/s Ratio Perm	0.08			0.06			c0.19			0.10		
v/c Ratio	0.12	0.23		0.09	0.21		0.74			0.39		
Uniform Delay, d1	6.1	6.6		6.0	6.5		30.9			27.9		
Progression Factor	1.14	1.09		1.00	1.00		0.91			1.00		
Incremental Delay, d2	0.5	0.2		0.3	0.2		7.5			0.8		
Delay (s)	7.4	7.4		6.3	6.7		35.6			28.7		
Level of Service	A	A		A	A		D			C		
Approach Delay (s)	7.4			6.7			35.6			28.7		
Approach LOS	A			A			D			C		
Intersection Summary												
HCM 2000 Control Delay		15.1			HCM 2000 Level of Service		B					
HCM 2000 Volume to Capacity ratio		0.37										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)		9.0					
Intersection Capacity Utilization		51.3%			ICU Level of Service		A					
Analysis Period (min)		15										
c Critical Lane Group												

Queues

4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

	→	↖	←	↗	↑	↘	↓
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	190	349	6	422	153	257
v/c Ratio	0.26	0.74	0.49	0.01	0.35	0.25	0.21
Control Delay	20.5	60.1	6.6	5.5	6.8	7.1	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	60.1	6.6	5.5	6.8	7.1	5.9
Queue Length 50th (m)	3.1	32.5	8.9	0.3	23.6	8.2	13.2
Queue Length 95th (m)	11.5	49.4	16.3	1.6	45.9	19.8	26.9
Internal Link Dist (m)	160.9		260.2		531.3		466.4
Turn Bay Length (m)		50.0		20.0		35.0	
Base Capacity (vph)	222	341	780	730	1206	614	1200
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	0.21	0.56	0.45	0.01	0.35	0.25	0.21
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy

2036 Total AM Peak Hour - Scenario 2

	↖	→	↗	↖	←	↗	↖	↑	↗	↘	↓	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↖		↖	↖		↖	↖	
Traffic Volume (vph)	21	0	23	182	0	335	6	358	47	147	241	6
Future Volume (vph)	21	0	23	182	0	335	6	358	47	147	241	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.8	3.3	3.3	3.3	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5			4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00		0.98	1.00		1.00	1.00	
Frt	0.93			1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected	0.98			0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1563			1711	1531		1646	1710		1711	1708	
Flt Permitted	0.49			0.73	1.00		0.60	1.00		0.49	1.00	
Satd. Flow (perm)	784			1309	1531		1040	1710		875	1708	
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)	22	0	24	190	0	349	6	373	49	153	251	6
RTOR Reduction (vph)	0	19	0	0	280	0	0	4	0	0	1	0
Lane Group Flow (vph)	0	27	0	190	69	0	6	418	0	153	256	0
Confl. Peds. (#/hr)							13					13
Heavy Vehicles (%)	14%	2%	0%	2%	2%	2%	0%	6%	2%	2%	6%	50%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.8		17.8	17.8		63.2	63.2		63.2	63.2	
Effective Green, g (s)		17.8		17.8	17.8		63.2	63.2		63.2	63.2	
Actuated g/C Ratio		0.20		0.20	0.20		0.70	0.70		0.70	0.70	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		155		258	302		730	1200		614	1199	
v/s Ratio Prot					0.05			c0.24			0.15	
v/s Ratio Perm		0.03		c0.15			0.01			0.17		
v/c Ratio		0.17		0.74	0.23		0.01	0.35		0.25	0.21	
Uniform Delay, d1		30.0		33.9	30.3		4.0	5.3		4.8	4.7	
Progression Factor		1.00		1.30	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5		10.4	0.4		0.0	0.8		1.0	0.4	
Delay (s)		30.5		54.5	30.7		4.0	6.1		5.8	5.1	
Level of Service		C		D	C		A	A		A	A	
Approach Delay (s)		30.5			39.1			6.0			5.4	
Approach LOS		C			D			A			A	
Intersection Summary												
HCM 2000 Control Delay				19.2			HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio				0.43								
Actuated Cycle Length (s)				90.0			Sum of lost time (s)			9.0		
Intersection Capacity Utilization				62.7%			ICU Level of Service			B		
Analysis Period (min)				15								
c Critical Lane Group												

Queues
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	WBT	NBL	SBL	SBT
Lane Group	EBL	EBT	WBT	NBL	SBL	SBT
Lane Group Flow (vph)	95	669	861	1	124	72
v/c Ratio	0.27	0.28	0.36	0.00	0.69	0.16
Control Delay	11.2	6.1	6.2	24.0	54.0	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	6.1	6.2	24.0	54.0	1.1
Queue Length 50th (m)	4.1	15.5	24.3	0.2	19.8	0.0
Queue Length 95th (m)	15.9	34.8	41.2	1.1	28.4	0.2
Internal Link Dist (m)		385.6	416.7			419.0
Turn Bay Length (m)	30.0			30.0	40.0	
Base Capacity (vph)	347	2380	2380	456	324	682
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	0.27	0.28	0.36	0.00	0.38	0.11
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy
2036 Total AM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	79	555	0	0	597	118	1	0	0	103	0	60
Future Volume (vph)	79	555	0	0	597	118	1	0	0	103	0	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.3	3.0	3.5	3.3	3.3	3.5	3.3	3.3	4.8	3.3
Total Lost time (s)	4.5	4.5			4.5		4.5			4.5		4.5
Lane Util. Factor	1.00	0.95			0.95		1.00			1.00		1.00
Frpb, ped/bikes	1.00	1.00			1.00		1.00			1.00		1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00			1.00		1.00
Frt	1.00	1.00			0.98		1.00			1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95			0.95		1.00
Satd. Flow (prot)	1527	3368			3352		1745			1163		1592
Flt Permitted	0.31	1.00			1.00		0.71			0.76		1.00
Satd. Flow (perm)	492	3368			3352		1304			927		1592
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	95	669	0	0	719	142	1	0	0	124	0	72
RTOR Reduction (vph)	0	0	0	0	12	0	0	0	0	0	58	0
Lane Group Flow (vph)	95	669	0	0	849	0	1	0	0	124	14	0
Confl. Peds. (#/hr)	4					4						
Heavy Vehicles (%)	10%	6%	0%	0%	4%	0%	0%	0%	0%	50%	0%	15%
Turn Type	Perm	NA		Perm	NA		Perm			Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	63.6	63.6			63.6		17.4			17.4	17.4	
Effective Green, g (s)	63.6	63.6			63.6		17.4			17.4	17.4	
Actuated g/C Ratio	0.71	0.71			0.71		0.19			0.19	0.19	
Clearance Time (s)	4.5	4.5			4.5		4.5			4.5	4.5	
Vehicle Extension (s)	3.0	3.0			3.0		3.0			3.0	3.0	
Lane Grp Cap (vph)	347	2380			2368		252			179	307	
v/s Ratio Prot		0.20			c0.25						0.01	
v/s Ratio Perm	0.19						0.00			c0.13		
v/c Ratio	0.27	0.28			0.36		0.00			0.69	0.05	
Uniform Delay, d1	4.8	4.8			5.2		29.3			33.8	29.5	
Progression Factor	1.31	1.02			1.00		1.00			1.06	1.00	
Incremental Delay, d2	1.9	0.3			0.4		0.0			11.0	0.1	
Delay (s)	8.1	5.2			5.6		29.3			46.7	29.6	
Level of Service	A	A			A		C			D	C	
Approach Delay (s)		5.6			5.6			29.3			40.4	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			9.3							A		
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			90.0							9.0		
Intersection Capacity Utilization			48.3%							A		
Analysis Period (min)			15									
c Critical Lane Group												

Queues

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	462	852	42	453	235	119	361	236	801
v/c Ratio	1.78	0.71	0.22	0.94	0.43	0.88	0.63	0.69	1.20
Control Delay	392.3	34.5	23.6	72.0	7.4	73.6	40.3	30.3	136.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	392.3	34.5	23.6	72.0	7.4	73.6	40.3	30.3	136.9
Queue Length 50th (m)	~147.1	84.0	5.6	103.2	0.5	14.6	71.0	32.4	~223.2
Queue Length 95th (m)	#210.1	107.4	12.3	#164.1	19.7	#46.4	103.1	50.6	#296.5
Internal Link Dist (m)		518.7		497.4			466.4		267.6
Turn Bay Length (m)	80.0		30.0			85.0		50.0	
Base Capacity (vph)	259	1207	191	483	542	136	576	349	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.78	0.71	0.22	0.94	0.43	0.88	0.63	0.68	1.20

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Fruitland Road & Barton Street

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Future Volume (vph)	439	549	260	40	430	223	113	313	30	224	500	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.3	3.3	3.3	3.5	3.5	3.3	3.3	3.3	3.0	3.3	3.3
Total Lost time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3253		1745	1842	1416	1745	1796		1428	1638	
Flt Permitted	0.11	1.00		0.23	1.00	1.00	0.10	1.00		0.31	1.00	
Satd. Flow (perm)	193	3253		425	1842	1416	191	1796		463	1638	
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)	462	578	274	42	453	235	119	329	32	236	526	275
RTOR Reduction (vph)	0	47	0	0	0	171	0	3	0	0	16	0
Lane Group Flow (vph)	462	805	0	42	453	64	119	358	0	236	785	0
Confl. Peds. (#/hr)	6		1	1		6	4					4
Heavy Vehicles (%)	2%	2%	0%	0%	2%	9%	0%	1%	0%	18%	5%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases	6			2		2	8			4		
Actuated Green, G (s)	50.5	41.9		35.6	31.5	31.5	43.4	38.4		57.2	47.7	
Effective Green, g (s)	50.5	41.9		35.6	31.5	31.5	43.4	38.4		57.2	47.7	
Actuated g/C Ratio	0.42	0.35		0.30	0.26	0.26	0.36	0.32		0.48	0.40	
Clearance Time (s)	4.5	6.0		4.5	6.0	6.0	4.5	6.3		4.5	6.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	1135		171	483	371	133	574		335	651	
v/s Ratio Prot	c0.22	0.25		0.01	0.25		0.04	0.20		c0.08	c0.48	
v/s Ratio Perm	c0.54			0.06		0.05	0.28			0.25		
v/c Ratio	1.80	0.71		0.25	0.94	0.17	0.89	0.62		0.70	1.21	
Uniform Delay, d1	34.6	33.8		30.8	43.3	34.2	34.0	34.7		21.7	36.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	374.1	3.8		0.8	28.1	1.0	47.4	2.1		6.6	106.9	
Delay (s)	408.7	37.5		31.6	71.4	35.2	81.4	36.8		28.3	143.0	
Level of Service	F	D		C	E	D	F	D		C	F	
Approach Delay (s)		168.0			57.4			47.9			116.9	
Approach LOS		F			E			D			F	

Intersection Summary

HCM 2000 Control Delay	114.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.3
Intersection Capacity Utilization	115.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Queues
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	47	742	112	660	226	291
v/c Ratio	0.10	0.33	0.30	0.29	0.73	0.79
Control Delay	7.4	6.7	10.5	7.2	35.5	43.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.4	6.7	10.5	7.2	35.5	43.4
Queue Length 50th (m)	2.6	23.7	6.9	21.0	23.4	41.7
Queue Length 95th (m)	6.6	29.3	18.2	34.2	28.1	54.6
Internal Link Dist (m)		340.1		349.9	461.6	231.1
Turn Bay Length (m)	30.0		30.0			
Base Capacity (vph)	470	2227	373	2280	445	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	0.10	0.33	0.30	0.29	0.51	0.53
Intersection Summary						

HCM Signalized Intersection Capacity Analysis
3: Jones Road & Barton Street

210193 - Block 1 Servicing Strategy
2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱		↰	↰↱			↱		↰	↰↱	
Traffic Volume (vph)	39	531	85	93	524	24	55	56	77	40	118	84
Future Volume (vph)	39	531	85	93	524	24	55	56	77	40	118	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.3	3.5	3.3	3.3	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
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			0.99			1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.94			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1740	3313		1528	3403			1700			1664	
Flt Permitted	0.38	1.00		0.35	1.00			0.69			0.89	
Satd. Flow (perm)	703	3313		558	3403			1194			1494	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	47	640	102	112	631	29	66	67	93	48	142	101
RTOR Reduction (vph)	0	10	0	0	3	0	0	33	0	0	25	0
Lane Group Flow (vph)	47	732	0	112	657	0	0	193	0	0	266	0
Confl. Peds. (#/hr)	3		2	2		3	1		1	1		1
Heavy Vehicles (%)	0%	6%	0%	14%	4%	6%	0%	0%	0%	15%	0%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	60.3	60.3		60.3	60.3			20.7			20.7	
Effective Green, g (s)	60.3	60.3		60.3	60.3			20.7			20.7	
Actuated g/C Ratio	0.67	0.67		0.67	0.67			0.23			0.23	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	471	2219		373	2280			274			343	
v/s Ratio Prot		c0.22			0.19							
v/s Ratio Perm	0.07			0.20				0.16			c0.18	
v/c Ratio	0.10	0.33		0.30	0.29			0.70			0.77	
Uniform Delay, d1	5.3	6.3		6.1	6.1			31.8			32.5	
Progression Factor	0.96	0.92		1.00	1.00			0.85			1.00	
Incremental Delay, d2	0.4	0.4		2.1	0.3			7.9			10.4	
Delay (s)	5.5	6.2		8.2	6.4			35.0			42.9	
Level of Service	A	A		A	A			D			D	
Approach Delay (s)	6.1			6.7				35.0			42.9	
Approach LOS	A			A				D			D	
Intersection Summary												
HCM 2000 Control Delay			14.6			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			52.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Queues

4: Fruitland Road & Sherwood Park Road/Collector

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

							
Lane Group	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	44	149	211	29	383	365	484
v/c Ratio	0.38	0.76	0.27	0.05	0.29	0.50	0.35
Control Delay	34.3	63.8	0.8	2.9	3.3	6.9	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.3	63.8	0.8	2.9	3.3	6.9	4.1
Queue Length 50th (m)	4.0	22.4	0.1	1.0	13.0	19.2	20.7
Queue Length 95th (m)	14.2	#49.8	0.2	2.8	20.9	35.4	31.5
Internal Link Dist (m)	160.9		260.2		531.3		466.4
Turn Bay Length (m)		50.0		20.0		35.0	
Base Capacity (vph)	121	209	794	631	1326	728	1386
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	0.36	0.71	0.27	0.05	0.29	0.50	0.35

Intersection Summary

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

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

4: Fruitland Road & Sherwood Park Road/Collector B

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	0	17	139	0	196	27	265	91	339	420	30
Future Volume (vph)	24	0	17	139	0	196	27	265	91	339	420	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.8	3.3	3.3	3.3	3.3	3.3	3.0	3.3	3.3	3.3	3.3	3.3
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.94		1.00	0.85		1.00	0.96		1.00	0.99	
Flt Protected		0.97		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1515		1711	1531		1677	1707		1711	1798	
Flt Permitted		0.49		0.84	1.00		0.47	1.00		0.53	1.00	
Satd. Flow (perm)		764		1508	1531		821	1707		947	1798	
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)	26	0	18	149	0	211	29	285	98	365	452	32
RTOR Reduction (vph)	0	16	0	0	183	0	0	13	0	0	3	0
Lane Group Flow (vph)	0	28	0	149	28	0	29	370	0	365	481	0
Confl. Peds. (#/hr)							4					4
Heavy Vehicles (%)	19%	2%	0%	2%	2%	2%	0%	4%	2%	2%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		11.8		11.8	11.8		69.2	69.2		69.2	69.2	
Effective Green, g (s)		11.8		11.8	11.8		69.2	69.2		69.2	69.2	
Actuated g/C Ratio		0.13		0.13	0.13		0.77	0.77		0.77	0.77	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		100		197	200		631	1312		728	1382	
v/s Ratio Prot					0.02			0.22			0.27	
v/s Ratio Perm		0.04		c0.10			0.04			c0.39		
v/c Ratio		0.28		0.76	0.14		0.05	0.28		0.50	0.35	
Uniform Delay, d1		35.3		37.7	34.6		2.5	3.1		3.9	3.3	
Progression Factor		1.00		1.04	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.6		15.2	0.3		0.1	0.5		2.5	0.7	
Delay (s)		36.8		54.4	34.9		2.6	3.6		6.4	4.0	
Level of Service		D		D	C		A	A		A	A	
Approach Delay (s)		36.8			43.0			3.5			5.0	
Approach LOS		D			D			A			A	

Intersection Summary

HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues

6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	78	722	4	959	1	4	121	144
v/c Ratio	0.22	0.28	0.01	0.38	0.01	0.01	0.62	0.35
Control Delay	6.1	3.8	4.2	4.8	29.0	0.0	44.7	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.1	3.8	4.2	4.8	29.0	0.0	44.7	4.8
Queue Length 50th (m)	0.3	1.2	0.1	23.4	0.2	0.0	19.9	1.3
Queue Length 95th (m)	15.3	52.0	1.1	42.3	1.4	0.0	31.3	6.6
Internal Link Dist (m)		385.6		416.7		249.4		419.0
Turn Bay Length (m)	30.0		30.0		30.0		40.0	
Base Capacity (vph)	351	2588	488	2512	292	616	365	604
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.28	0.01	0.38	0.00	0.01	0.33	0.24
Intersection Summary								

HCM Signalized Intersection Capacity Analysis

6: Jones Road & Highway 8

210193 - Block 1 Servicing Strategy

2036 Total PM Peak Hour - Scenario 2

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	70	646	4	4	752	111	1	0	4	109	0	130
Future Volume (vph)	70	646	4	4	752	111	1	0	4	109	0	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.5	3.3	3.0	3.5	3.3	3.3	3.5	3.3	3.3	4.8	3.3
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	3464		1685	3348		1745	1571		1623	1679	
Flt Permitted	0.28	1.00		0.37	1.00		0.56	1.00		0.76	1.00	
Satd. Flow (perm)	470	3464		653	3348		1031	1571		1290	1679	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	718	4	4	836	123	1	0	4	121	0	144
RTOR Reduction (vph)	0	0	0	0	9	0	0	3	0	0	122	0
Lane Group Flow (vph)	78	722	0	4	950	0	1	1	0	121	22	0
Confl. Peds. (#/hr)	5						5			3		
Heavy Vehicles (%)	5%	3%	0%	0%	4%	5%	0%	0%	0%	7%	0%	9%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	67.3	67.3		67.3	67.3		13.7	13.7		13.7	13.7	
Effective Green, g (s)	67.3	67.3		67.3	67.3		13.7	13.7		13.7	13.7	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.15	0.15		0.15	0.15	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	351	2590		488	2503		156	239		196	255	
v/s Ratio Prot		0.21			0.28			0.00			0.01	
v/s Ratio Perm	0.17			0.01			0.00			0.09		
v/c Ratio	0.22	0.28		0.01	0.38		0.01	0.00		0.62	0.09	
Uniform Delay, d1	3.4	3.6		2.9	4.0		32.4	32.4		35.7	32.8	
Progression Factor	0.95	0.85		1.00	1.00		1.00	1.00		0.90	0.97	
Incremental Delay, d2	1.4	0.3		0.0	0.4		0.0	0.0		5.5	0.1	
Delay (s)	4.7	3.3		2.9	4.4		32.4	32.4		37.8	31.8	
Level of Service	A	A		A	A		C	C		D	C	
Approach Delay (s)	3.5			4.4			32.4			34.6		
Approach LOS	A			A			C			C		
Intersection Summary												
HCM 2000 Control Delay		8.0			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)			9.0				
Intersection Capacity Utilization		52.5%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												



A. J. Clarke and Associates Ltd.

SURVEYORS • PLANNERS • ENGINEERS

City of Hamilton – City Hall
71 Main Street West, 6th Floor
Hamilton ON L8P 4Y5

June 13, 2025

Sent via email

Attn: Margaret Fazi, E.P., RPP, MCIP
Senior Project Manager – Infrastructure Planning
Planning and Economic Development
City of Hamilton

Re: **Active Transportation Circulation Plan Memo (File:)**
Fruitland-Winona Lands, City of Hamilton

Margaret,

On behalf of our clients, this memo has been prepared to provide a general overview of the proposed active transportation network for the Fruitland-Winona Lands and how it addresses applicable Official Plan and Secondary Plan policy. The subject lands have been designated “Neighbourhoods” under the Urban Hamilton Official Plan Schedule E-1. Chapter C Section 4.3 of the UHOP outlines active transportation policies that directly relate to the proposed development. The applicable Official Plan policies are as follows:

- Pol. 4.3.1. *The City shall require, provide, and maintain infrastructure that maximizes safe and convenient passage for pedestrians and cyclists along streets.*
- Pol. 4.3.2. *The City shall accommodate commuter cycling needs on the road network and major recreational pathways to the greatest extent possible in accordance with the City's Cycling Master Plan and Trails Master Plan.*
- Pol. 4.3.3. *The City shall build and maintain the active transportation network which recognizes the importance of the sidewalk and cycling network while achieving a high standard of connectivity. Active Transportation shall be prioritized and accommodated in complete streets design and operation through: (OPA 167)*
 - a) *continuous improvement and expansion of the existing network of pedestrian and bicycle infrastructure, including multi-use paths, bike lanes, other emerging design trends as appropriate; (OPA 167)*
 - b) *establishment of pedestrian-oriented design guidelines in secondary plans and undeveloped areas that promote active transportation; and,*
 - c) *provision of traffic calming and management measures, where appropriate. (OPA 167)*

The Fruitland-Winona Secondary Plan further contains policies directly related to Active Transportation Networks. The following policies are applicable to the proposed development:

- Pol. 7.4.13.1. *Active transportation, including walkability shall be promoted in the design of the Fruitland-Winona Secondary Plan area through the provision of transit facilities, transportation demand management, pedestrian facilities, and connections between all major destinations such as schools, parks, and commercial areas.*
- Pol. 7.4.13.2. *In accordance with Policies of Section 7.4.10.16 of this Plan, the Barton Street Pedestrian Promenade, as shown on Map B.7.4-2 – Fruitland-Winona Secondary Plan –*



Transportation Classification Plan shall be located within the right-of-way on the south side of Barton Street, from Fruitland Road to Fifty Road. The Promenade shall include a four metre wide multi-use trail for use by pedestrians, cyclists, and users of other non-motorized forms of transportation, in accordance with Policy C.4.3 of Volume 1.

- Pol. 7.4.13.3. *The lands designated General Open Space on Map B.7.4-1 Fruitland-Winona Secondary Plan – Land Use Plan, connecting Jones Road to Collector Road “C”, shall be dedicated to the City for a multi-purpose trail in accordance with Policy 7.4.7.4 (a), (i) and (ii) of this Plan. The multi-purpose trail shall serve as an important connection within the Plan area, promoting active transportation and connections to the Community Node (Area Specific Policy Area C).*

The proposed active transportation network as depicted in Schedule ‘A’ showcases a robust network of multi-use pathways, rapid transit, bike lanes and pedestrian connections that support the policies outlined in the UHOP and Fruitland-Winona Secondary Plan. The proposed network provides a series of both north-south and east-west connections, aiming for seamless and safe travel. The intention behind the active transportation network is to offer residents a range of travel options and modes to major destinations and adjacent lands.

Pedestrian/Cycling Connections

Several pedestrian/cycling connections are proposed, envisioned in multiple forms from simple trails to designated multi-use pathways, supporting greater access to recreational opportunities and transit options. The intention is to provide more direct access to major destinations within, and to the periphery of, Block 1, limiting pedestrian reliance on roadways as shown in Figure 1.

Rapid Transit Route

A Rapid Transit Route is proposed to intersect the Subject Lands along Gordon Dean Avenue. Pedestrian/cycling connections on either side of the transit route will provide greater permeability into Block 1 while being located within 400 metres (walking distance) of all major destinations.

Planned Bike Lane

A protected bike lane is proposed along future Street “B”, implementing greater protection between cyclists and motor vehicles. The bike lane will extend between Fruitland Road and Jones Road with the possibility of being further continued eastward. The bike lane’s intersection at Gordon Dean Avenue and the channel block will enhance north-south connections.

Public-Private Pedestrian Connections

A series of public-private pedestrian connections have been identified on the Plan that showcase the permeability of the residential blocks and how pedestrian circulation occurs between private blocks and public rights-of-way. These connections aim to reduce barriers on resident movement within their respective blocks and reliance on more indirect public ROW's.

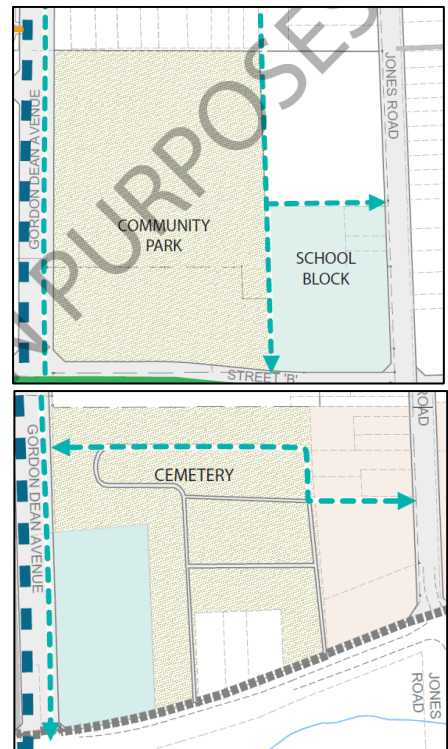


Figure 1: Proposed Pedestrian/Cycling Connections

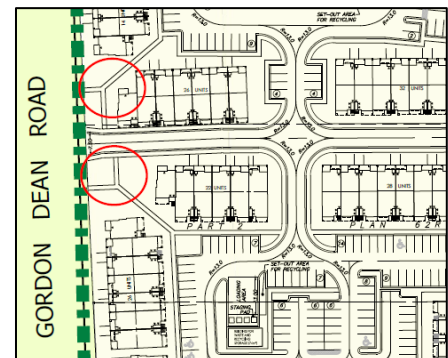


Figure 2: Conceptual Public-Private Pedestrian Connections



Barton Street Pedestrian Promenade

The Barton Street Pedestrian Promenade is a four-metre-wide trail planned to extend from Fruitland Road to Fifty Road on the south side of Barton Street. This promenade has been fully integrated into the proposed Active Transportation Circulation plan, connected to major destinations via the proposed pedestrian/cycling pathways and rapid transit network.

The proposed Active Transportation Circulation Plan meets the intent of both the Urban Hamilton Official Plan and the Fruitland-Winona Secondary Plan by providing an array of travel options with sufficient protection from vehicular movement. The combination of bike lanes and multi-use pathways implements a robust cycling network with a high level of connectivity. These pathways are designed to connect with major destinations, in this instance the community park, neighbourhood park, school block, rapid transit facilities and the Barton Street Promenade. The Barton Street Promenade has been placed on the south side of Barton Street at a width of four (4) metres, connecting to many of the proposed north-south pathways as shown in Figure 3. Lastly, it should be noted that all public streets located within Block 1 will feature sidewalks on either side as per the City's Complete Streets Guidelines.

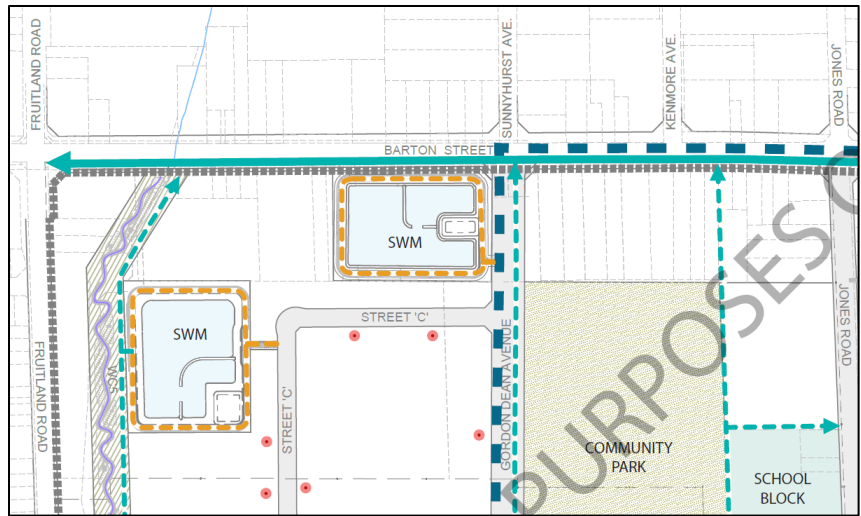


Figure 3: Pedestrian/Cycling Connections to the Barton Street Promenade

I trust this is satisfactory for your purposes and thank you for your co-operation in this matter. Should you have any questions or require additional information, please do not hesitate to contact our office.



SCHEDULE A

LEGEND

- LIMIT OF PROPERTY
- SWM POND
- LOCAL COMMERCIAL
- GREENSPACE
- INSTITUTIONAL
- UTILITY
- RESIDENTIAL
- OPEN SPACE
- RIGHT-OF-WAY TO MEET COMPLETE STREETS DESIGN GUIDELINES
- CONCEPTUAL PED/CYCLING CONNECTION LOCATION TO BE REFINED AT APPLICATION STAGE
- BARTON STREET PROMENADE
- PLANNED BIKE LANE
- FUTURE RAPID TRANSIT
- POND ACCESS / INFORMAL TRAIL
- PUBLIC-PRIVATE PED. CONNECTION
- TRAFFIC CALMING FEATURE

NOTE: ALL TRANSPORTATION ROUTES SHOWN ARE CONCEPTUAL AND WILL FURTHER BE REFINED DURING THE DRAFT PLAN OF SUBDIVISION STAGE.

FRUITLAND WINONA BLOCK 1

ACTIVE TRANSPORTATION CIRCULATION PLAN

PROJECT No.	DATE	SCALE	DWG No.
	MAY 2025	1:5000	

400m (5 min walk)