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Extendicare LTC Development

TRAFFIC IMPACT STUDY

Extendicare Canada Inc.

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Issue	Date	Description
1	November 12, 2020	Final Report
2	March 26, 2021	Revisions to address City comments

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1 Introduction

Tatham Engineering Limited was retained by Extendicare Canada Inc. to address the traffic impacts associated with the proposed long-term care facility to be located on Nottingham Ave, within the City of Greater Sudbury. The location of the site is illustrated in Figure 1.

The purpose of this study is to address the requirements of the City with respect to the potential transportation impacts of the proposed development on the local road network. In particular, the following will be discussed:

- the operations of the road system through the study area prior to the proposed development;
- an estimation of the growth in the traffic volumes not otherwise attributed to the development (i.e. from overall growth in the area and/or other developments);
- an estimation of the number of new trips the proposed development is likely to generate;
- the operations of the study area road system upon completion of the development; and
- the resulting impacts and need for mitigating measures (if required) to ensure acceptable overall road operations.

Chapter 2 of this report addresses the existing conditions, detailing the road system and corresponding traffic operations. Chapter 3 addresses future conditions, prior to the completion of the proposed development, and the expected growth in the traffic levels and the resulting operating conditions. Chapters 4 and 5 address the proposed development, the ensuing vehicle trips that it will generate, and the associated impacts on the road system. Lastly, Chapter 6 summarizes the report and the key findings.

2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

The road network to be addressed by this study consists of Bancroft Drive, Nottingham Avenue, Hazelton Drive, Levesque Street, Kingsway and the following intersections;

- Nottingham Avenue/Hazelton Drive with Bancroft Drive;
- Levesque Street with Bancroft Drive; and
- Levesque Street with Kingsway.

Aerial mapping and photographs of the road system are provided in Figure 2.

2.1.1 Road Network

A brief description of the road network is provided in Table 1. The functional classification for each road is based on "Schedule 6 – Transportation Network" of the *City of Greater Sudbury Official Plan*[1].

Table 1: Road Network

ROAD	CLASSIFICATION	CROSS SECTION	SPEED (KM/H)	CAPACITY[1] (VPHPL)	DIRECTION
Bancroft Drive	Secondary Arterial	2-lane	60	750	E-W
Nottingham Ave	Local Road	2-lane	50	400	N-S
Hazelton Drive	Local Road	2-lane	50	400	N-S
Levesque Street	Collector	2-lane	50	600	N-S
Kingsway	Primary Arterial	4-lane	80	900	E-W

[1] capacity is denoted as vehicles per hour per lane

[1] *The City of Greater Sudbury Official Plan.* Planning Services Division, Growth & Development Department, City of Greater Sudbury. June 2006 (updated July 2019)

2.1.2 Key Intersections

Bancroft Drive & Nottingham Avenue/Hazelton Drive

The intersection of Bancroft Drive with Nottingham Avenue is an unsignalized 4-leg intersection. The east, west, north (Hazelton Drive) and south (Nottingham Drive) approaches each consist of a shared left/through/right turn lane. The intersection is 2-way stop controlled in the north and south directions.

Bancroft Drive & Levesque Street

The intersection of Bancroft Drive with Levesque Street is an unsignalized 3-leg intersection with stop control on the minor approach (Levesque Street). The east, west and north approaches each consist of a shared left/through/right turn lane.

Kingsway & Levesque Street

The intersection of Kingsway with Levesque Street is a signalized 4-leg intersection (albeit the north leg is only a stub for a future road). The west approach consists of an exclusive left turn lane, two through lanes and a separate right turn lane. The east approach has an exclusive left turn lane, two through lanes and a 30 metre right turn taper. The south approach provides an exclusive left turn lane and a through/right turn lane. While constructed as a 4-leg intersection, it operates as a 3-leg intersection as the north approach is only partially constructed and does not currently serve any development, nor is it included in the existing signal control - although signal poles are in place for future signalization.

2.2 EXISTING TRAFFIC VOLUMES

To determine existing traffic volumes, traffic counts were obtained from the City for the intersections of Bancroft Drive with Levesque Street (conducted on March 31, 2017) and Kingsway with Levesque Street (conducted on March 24, 2017). Traffic count details are provided in Appendix A.

To reflect 2020 conditions, the 2017 volumes were adjusted by an annual growth rate of 1.5%. Additional discussion with respect to growth rates is provided in Section 3.2.1.

Traffic volumes on Nottingham Avenue have been established based on traffic counts conducted on Wednesday September 19, 2012 at the intersection of Nottingham Avenue with Bancroft Drive, as provided in the *Scenic View Subdivision Development Traffic Impact Study*[2]. While the traffic counts are dated, it is noted that the development level served by Nottingham Avenue in

[2] *Scenic View Subdivision Development Traffic Impact Study.* Tranplan Associates. October 2012.

2012 is consistent with the current level of development (42 detached homes along Dorsett Drive, 2 detached homes on Nottingham Avenue and a church on the southeast corner of Nottingham Avenue and Bancroft Drive). It is noted that Dorsett Drive also connects to Birmingham Drive to the west. Given that most traffic is distributed to/from the west on Bancroft Drive (i.e. toward the downtown area of Sudbury), the volumes on Nottingham Avenue are minimal.

With respect to volumes on Hazelton Drive, such have been estimated based on the existing (2020) level of development served by the road. Hazelton Drive is currently a cul-de-sac which provides access to 27 detached homes within the Lionsgate development. It is noted that these units were not constructed at the time of the 2017 traffic counts. To establish the traffic volumes on Hazelton Drive, ITE trip generation rates for the *single family detached* land use (ITE code 210) were applied to the existing 27 homes served by the road. The trips were distributed to the road network based on the trip distribution and assignment assumptions discussed in Section 4.6.2. The trip generation rates and resulting trip estimates are provided in Table 2 whereas the associated 2020 traffic volumes are illustrated in Figure 3.

Table 2: Trip Generation - Lionsgate Subdivision (Hazelton Drive)

LAND USE	RATE/ ESTIMATE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
single family detached (ITE 210)	rate	units	0.19	0.56	0.74	0.62	0.37	0.99
	estimate	27 units	5	15	20	17	10	27

2.3 EXISTING TRAFFIC OPERATIONS

The assessment of existing conditions provides the baseline from which the future traffic volumes and operations (both with and without the subject development) can be assessed. The capacity, and hence operations, of a road system is effectively dictated by its intersections. As such, the analysis focused on the operations of the key intersections. The analysis is based on the 2020 traffic volumes, the existing intersection configuration and control and procedures outlined in the *2000 Highway Capacity Manual*[3] (using Synchro v.10 software). For signalized intersections, the analysis considers the average delay (measured in seconds), level of service (LOS) and volume to capacity (v/c) each approach and the overall intersection. For unsignalized intersections, the analysis considers the same metrics but only for the stop-controlled movement. A summary of the analyses is provided in Table 3. Level of service A corresponds to the best

[3] *Highway Capacity Manual.* Transportation Research Board, Washington DC, 2000.

operating condition with minimal delays whereas level of service F corresponds to poor operations resulting from high intersection delays. A v/c ratio of less than 1.0 indicates the intersection movement/approach is operating at less than capacity while a v/c ratio of 1.0 indicates capacity has been reached. It is noted that the signal timings at the intersection of Kingsway and Levesque Street reflect the signal timing plans provided by the City (operating as a 3-leg intersection). Detailed operations worksheets for the existing traffic conditions are included in Appendix B.

Table 3: Intersection Operations – 2020 Conditions

INTERSECTION AND MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Bancroft Drive & Nottingham Ave	NB	stop	11	B	0.00	11	B	0.00
	SB	stop	9	A	0.02	9	A	0.01
Bancroft Drive & Levesque Street	SB	stop	9	A	0.15	10	B	0.15
Kingsway & Levesque Street	EB	signal	16	B	0.46	18	B	0.77
	WB	signal	11	B	0.53	9	A	0.40
	NB	signal	12	B	0.32	13	B	0.15
	overall	signal	12	B	0.57	15	B	0.54

Based on the existing volumes, the subject intersections provide excellent overall levels of service (LOS B or better) with average delays during both peak hours. All of the intersections are operating well below capacity. As such, no improvements are required to support the existing conditions.

3 Future Background Conditions

This chapter will describe the road network and background traffic volumes expected for the years 2025 and 2030. The 2025 horizon year has been adopted to reflect build-out of the subject development, whereas the 2030 horizon (5 years beyond build-out) will address future impacts (as requested by the City).

3.1 ROAD NETWORK

It is noted that there are no improvements currently being considered by the City for the study area road network. As such, the road network as described in Section 2.1 has been maintained.

3.2 FUTURE BACKGROUND TRAFFIC VOLUMES

Future background traffic volumes expected for the 2025 and 2030 horizon years for the study area have been determined based on the existing traffic volumes, historical and projected growth, and additional increases in volumes due to other development within the immediate area (apart from the subject development).

3.2.1 Background Growth

Through discussions with City staff, a 1.5% background growth rate has been applied to the road network through to the 2030 horizon year to account for general overall growth in background traffic volumes.

3.2.2 Development Growth

Several developments were identified by the City for inclusion in the development of the future traffic projections, as detailed below (additional details, including a location map and excerpts from their respective traffic impact studies (if available) are provided in Appendix C).

Lionsgate Subdivision

The Lionsgate Subdivision development, located on Hazelton Drive to the north of Bancroft Drive, will consist of 255 residential units built over 13 phases. At the time of the *Scenic View Subdivision TIS* (2012), approximately 70 units were constructed (Phases 1 to 3). The *Scenic View Subdivision TIS* assumed that an additional 119 units (Phases 4 to 8) would be completed between 2012 and 2022 - translating to approximately 12 units per year. As of 2020, only Phases 4 and 5 (a total of 51 units, or 6.4 units per year) have been constructed. In considering the build rate of Phases 4 and 5, build out of Phases 6 through 8 (68 units) is anticipated by 2030, with the remaining phases (Phases 9 to 13) being completed beyond 2030.

For the purpose of this study, the trip distribution and assignment for the Lionsgate Subdivision (Phases 4 to 8), as provided in the *Scenic View Subdivision TIS,* has been applied to the background volumes. While build-out is not anticipated until 2030 (as per the observed build rate), build-out by 2025 has been assumed to ensure a conservative approach. It is noted that Phases 1 to 4 are currently accessed via Shelbourne Street at Bancroft Drive to the west of the study area, whereas Phase 5 is accessed via Hazelton Drive at Bancroft Drive. Upon completion of Phase 6, the internal road network will be connected, with access to Phases 1 to 8 provided via both Shelbourne Street and Hazelton Drive. The distribution and assignment, as illustrated in Figure 4, reflect this internal road connection.

Scenic View Development

The Scenic View residential development is located south of Dorsett Drive and will consist of 154 residential units upon full build-out. Access will be provided via connections to Dorsett Drive, with access to the wider network provided via the intersections of Bancroft Drive with Birmingham Drive and Nottingham Avenue. It is noted that 45 single family units were already constructed at the time of the 2012 *Scenic View Subdivision TIS* (and thus also considered in the 2017 traffic counts). The *Scenic View Subdivision TIS* considered the impacts related to the remaining 109 units to be constructed. For the purpose of this study, it has been assumed that these units have yet to be constructed (although it is understood that a portion of the semi-detached units on Birmingham Drive have been built). Full build-out of the remaining units in the Scenic View Subdivision has been assumed by 2025. The distribution and assignment of trips to the road network, as illustrated in Figure 5, reflect the distribution/assignment provided in the *Scenic View Subdivision TIS*.

3.2.3 Background Traffic Volumes

The resulting 2025 and 2030 background traffic volumes are illustrated in Figure 6 and Figure 7 respectively. The background volumes reflect the 2020 volumes, the noted annual background growth rate and the additional traffic volumes associated with the Lionsgate and Scenic View background developments.

3.3 FUTURE BACKGROUND TRAFFIC OPERATIONS

The key intersections were again analyzed for each horizon year given the projected background volumes. The results are summarized in Table 4 and Table 5 (detailed worksheets are provided in Appendix D), assuming the existing intersection configurations and timings are maintained.

Table 4: Intersection Operations – 2025 Background Conditions

INTERSECTION AND MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Bancroft Drive & Nottingham Ave	NB	stop	12	B	0.03	14	B	0.03
	SB	stop	10	B	0.06	10	B	0.04
Bancroft Drive & Levesque Street	SB	stop	10	B	0.17	10	B	0.18
Kingsway & Levesque Street	EB	signal	16	B	0.48	20	C	0.83
	WB	signal	11	B	0.57	9	A	0.43
	NB	signal	12	B	0.35	14	B	0.16
	overall	signal	13	B	0.61	16	B	0.58

Table 5: Intersection Operations – 2030 Background Conditions

INTERSECTION AND MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Bancroft Drive & Nottingham Ave	NB	stop	13	B	0.04	15	B	0.03
	SB	stop	10	B	0.07	10	B	0.05
Bancroft Drive & Levesque Street	SB	stop	10	B	0.19	10	B	0.19
Kingsway & Levesque Street	EB	signal	16	B	0.50	16	B	0.72
	WB	signal	12	B	0.60	9	A	0.41
	NB	signal	12	B	0.38	17	B	0.19
	overall	signal	13	B	0.66	14	B	0.57

As indicated, the key intersections are expected to continue to provide excellent overall operating conditions (LOS B or better) with minor delays through the considered horizon periods given the assumed background traffic volumes.

In consideration of the noted intersection operations, no improvements are required to address the future background conditions.

4 Proposed Development

This chapter will provide additional details with respect to the proposed development, including its location, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

4.1 SITE LOCATION

The subject site is located on Nottingham Avenue, south of Dorsett Drive, within the City of Greater Sudbury (as per Figure 1). The property is bounded by parkland to the north, Nottingham Avenue to the west and undeveloped land to the south and east.

4.2 PROPOSED LAND-USE

The proposed development will consist of a 320-bed long-term care facility. For the purpose of this report, full build-out has been assumed by 2025.

A site plan is provided in Figure 8.

4.3 SITE ACCESS & ON-SITE CIRCULATION

As per the site plan, the development will be served by one access point located on Nottingham Avenue. The access will accommodate two-way operations with one lane of travel per direction. As per the *City of Greater Sudbury Zoning By-law 2010-100Z*, the minimum width of an access ramp or driveway accessing a parking area or parking lot shall be 6.0 metres. Similarly, the by-law states that a minimum parking aisle width of 6.0 metres is required where perpendicular parking is provided. As per the site plan, an aisle width of 6.0 metres will be maintained throughout the site.

With respect to emergency vehicle operations, a fire route with a 6.0 metre clear width and a 12.0 metre centre turn radius is required to accommodate the manoeuvering requirements of a typical fire truck. As per the site plan, the internal aisle has a clear width of 6.0 metres (as previously noted) and maintains a centre turn radius of 12.0 metres throughout.

As per the above, the access configuration and internal aisle layout as proposed is considered sufficient with respect to the circulation of site generated traffic and the manoeuvering requirements of typical design vehicles (i.e. passenger vehicles, fire truck, etc.).

4.4 PARKING

The parking requirements for the City of Greater Sudbury, as published in the *City of Greater Sudbury Zoning By-law 2010-100Z*, states that a long-term care facility must provide 0.5 spaces

per bed. In considering the City's parking standards, the proposed development requires a total of 160 parking spaces. (320 beds x 0.5 = 120).

As per the site plan, the development provides 160 parking spaces, thus satisfying the City's requirements.

4.5 PEDESTRIAN TRAFFIC

The site will provide pedestrian connections to the existing external pedestrian facilities serving the adjacent neighbourhood (i.e. sidewalks on Nottingham Avenue). While the site is expected to generate some pedestrian traffic, it is not expected to be such that would require any improvements to the existing pedestrian network. External pedestrian trips generated by the site will be limited to employee trips and perhaps some visitor trips. Given the nature of a long-term care facility, residents are not expected to be active or independent in their activities to the extent that external pedestrian trips would be generated (pedestrian activities related to residents is likely to remain on the grounds of the facility).

With respect to external pedestrian trips associated with employees or visitors, the site is well served by the existing pedestrian facilities. There are sidewalks on the west side of Nottingham Avenue that connect to Bancroft Drive. Bancroft Drive has pedestrian facilities on both sides of the road by way of an asphalt boulevard/sidewalk on the south side of the road and a concrete sidewalk on the north side of the road. There are curb drops and tactile plates on the northwest and southwest corners of the Bancroft Drive and Nottingham Avenue intersection, providing an unmarked pedestrian crossing for pedestrians seeking to cross Bancroft Drive. In this respect, the pedestrian connections are considered adequate.

To establish whether a signed pedestrian crossover or treatment is required, a pedestrian crossing review would be required to establish both vehicle and pedestrian volumes in the area. Regardless, the anticipated pedestrian volumes to be generated by the subject development are not such that would trigger or require a pedestrian crossing to support the development.

4.6 SITE TRAFFIC

4.6.1 Trip Generation

The number of vehicle trips to be generated by the proposed development has been determined based on type of use, development size, and ITE trip generation rates (as per the *ITE Trip Generation Manual, 10th Edition*). Based on the proposed development, trip rates for the *assisted living* (ITE code 254) land use have been applied.

The associated trip rates and trip estimates are provided in Table 6

Table 6: Trip Estimates – Extendicare LTC Development

LAND USE	RATE/ ESTIMATE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
assisted living (ITE 254)	rate	beds	0.12	0.07	0.19	0.10	0.16	0.26
	estimate	320 units	39	22	61	32	52	84

As indicated, the proposed development is expected to generate 61 trips during the weekday AM peak hour and 84 trips during the weekday PM peak hour (total of inbound and outbound trips).

4.6.2 Trip Distribution & Assignment

The distribution of the new trips to be generated by the site to the area road system was based on observed traffic patterns through the study area (as determined from the traffic counts) and the proximity of the site to surrounding development - specifically the downtown area of Sudbury to the west. Based on the above, the following distribution was assumed:

- to/from the west – 85%; and
- to/from the east – 15%.

The assignment of the trips generated by the development to the area road network is based on the trip distribution noted above with consideration given to the expected travel routes. In this respect, it has been assumed that approximately 50% of the trips distributed to/from the east will continue on Bancroft Drive, east of Levesque Street; whereas the remaining 50% will utilize Levesque Street to access Kingsway.

The resulting site generated traffic volumes assigned to the study area road network are illustrated in Figure 9.

5 Future Total Conditions

This chapter will address the resulting impacts of the proposed development on the adjacent road system. The following areas are to be addressed:

- operations at the key intersections;
- available sight lines at the proposed site access; and
- improvements to the study area road network, if necessary.

5.1 FUTURE TRAFFIC VOLUMES

To assess the impacts of the increased traffic volumes resulting from the proposed development, the site generated traffic was combined with the 2025 and 2030 background traffic volumes. The resulting future total traffic volumes are presented in Figure 10 and Figure 11.

5.2 FUTURE TRAFFIC OPERATIONS

The operations of the key intersections were again investigated considering the total traffic volumes for each horizon year. The existing intersection configurations and control have been maintained in the analysis. The signal timings have been optimized where appropriate to ensure efficient operations. The results of the operational review are provided in Table 7 and Table 8 for the key intersections (detailed worksheets are provided in Appendix E).

Table 7: Intersection Operations – 2025 Total Conditions

INTERSECTION AND MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Bancroft Drive & Nottingham Ave	NB	stop	13	B	0.09	16	C	0.17
	SB	stop	10	B	0.06	10	B	0.04
Bancroft Drive & Levesque Street	SB	stop	10	B	0.18	10	B	0.19
Kingsway & Levesque Street	EB	signal	16	B	0.48	20	C	0.83
	WB	signal	11	B	0.57	9	A	0.43
	NB	signal	12	B	0.35	14	B	0.16
	overall	signal	13	B	0.61	16	B	0.58

Table 8: Intersection Operations – 2030 Total Conditions

INTERSECTION AND MOVEMENT		CONTROL	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Bancroft Drive & Nottingham Ave	NB	stop	13	B	0.09	17	C	0.19
	SB	stop	10	B	0.07	11	B	0.05
Bancroft Drive & Levesque Street	SB	stop	10	B	0.20	11	B	0.20
Kingsway & Levesque Street	EB	signal	16	B	0.50	16	B	0.72
	WB	signal	12	B	0.60	9	A	0.53
	NB	signal	12	B	0.38	17	B	0.19
	overall	signal	13	B	0.66	14	B	0.57

As indicated, the key subject intersections will continue to provide good overall operations (LOS C or better) with minor delays through the 2030 horizon given the projected total volumes. No intersection improvements or access improvements are required to address the operations under future total conditions.

While the site access operations were not explicitly assessed, the access is anticipated to provide excellent operations given the low volumes on the local road network (i.e. Nottingham Drive) and the relatively low volumes to be generated by the site. Furthermore, as the higher volume intersections of Bancroft Drive with Nottingham Avenue and Levesque Street will provide excellent operations through 2030, it can be inferred that the site access will experience the same given that it will be a low volume intersection.

5.3 TURN LANE REQUIREMENTS

Notwithstanding the otherwise good operations provided at the study area intersections, the need for exclusive turn lanes on Bancroft Drive at Nottingham Avenue has been reviewed, considering the following:

- MTO warrants/guidelines for auxiliary turn lanes at unsignalized intersections;
- design speed of 70 km/h (reflective of the 60km/h posted speed limit + 10 km/h); and
- the 2030 background traffic volumes (critical horizon).

Right Turn Lane

MTO guidelines suggest that an exclusive right turn lane be considered where right turn volumes exceed 60 vehicles per hour and impede the operations of through traffic. Based on the projected volume of eastbound right turning traffic on Bancroft Drive at Nottingham Avenue (in the order of 38 to 43 vehicles per hour), an exclusive right turn lane is not warranted.

Left Turn Lane

For two-lane undivided highways, MTO warrants for left turn lanes at unsignalized intersections are based on design speed, advancing volume, opposing volume and the percentage of left turns in the approaching volume. Based on the MTO warrant criteria using 5% left turns in the advancing volume and a design speed of 70 km/h, a westbound left turn lane on Bancroft Drive at Nottingham Avenue is not warranted. MTO warrant nomographs are provided in Appendix F. Such is expected as the volume of left turns is relatively minor – less than 10 vehicles per hour.

5.4 SIGHT LINE ANALYSIS

The available sight lines at the proposed site access have been reviewed in consideration of the Transportation Association of Canada (TAC) minimum stopping sight distance requirements for a design speed of 60 km/h reflective of the 50 km/h speed limit. The minimum stopping sight distance provides sufficient distance for an approaching motorist to observe a stationary hazard in the road and bring their vehicle to a complete stop prior to the hazard.

The minimum stopping sight distance requirement for a design speed of 60 km/h is 85 metres. The sight lines to/from the north are 100 metres - thus satisfying the minimum requirements. With respect to the sight lines to/from the south, it is noted that Nottingham Avenue terminates as a dead end, thus the sight lines to/from the south have not been considered. Should Nottingham Avenue be extended to the south as part of future development, it is expected that appropriate design requirements will be considered, and the road designed to ensure adequate sight distances.

6 Summary

Proposed Development

This study has addressed the transportation impacts associated with the proposed long-term care development located at Nottingham Avenue within the City of Greater Sudbury. The proposed development will consist of a 320-bed assisted living facility. Upon build-out, the development is expected to generate 61 new trips during the AM peak hour and 84 new trips during the PM peak hour.

Traffic Operations

In addressing the study area traffic operations, key intersections were analysed under existing conditions (2020) and future (2025 and 2030) horizon periods. The results of the operational analyses indicate that the subject intersections will provide good (LOS C or better) overall conditions through the 2030 horizon under the future total conditions. As such, no intersection improvements are required to support the proposed development.

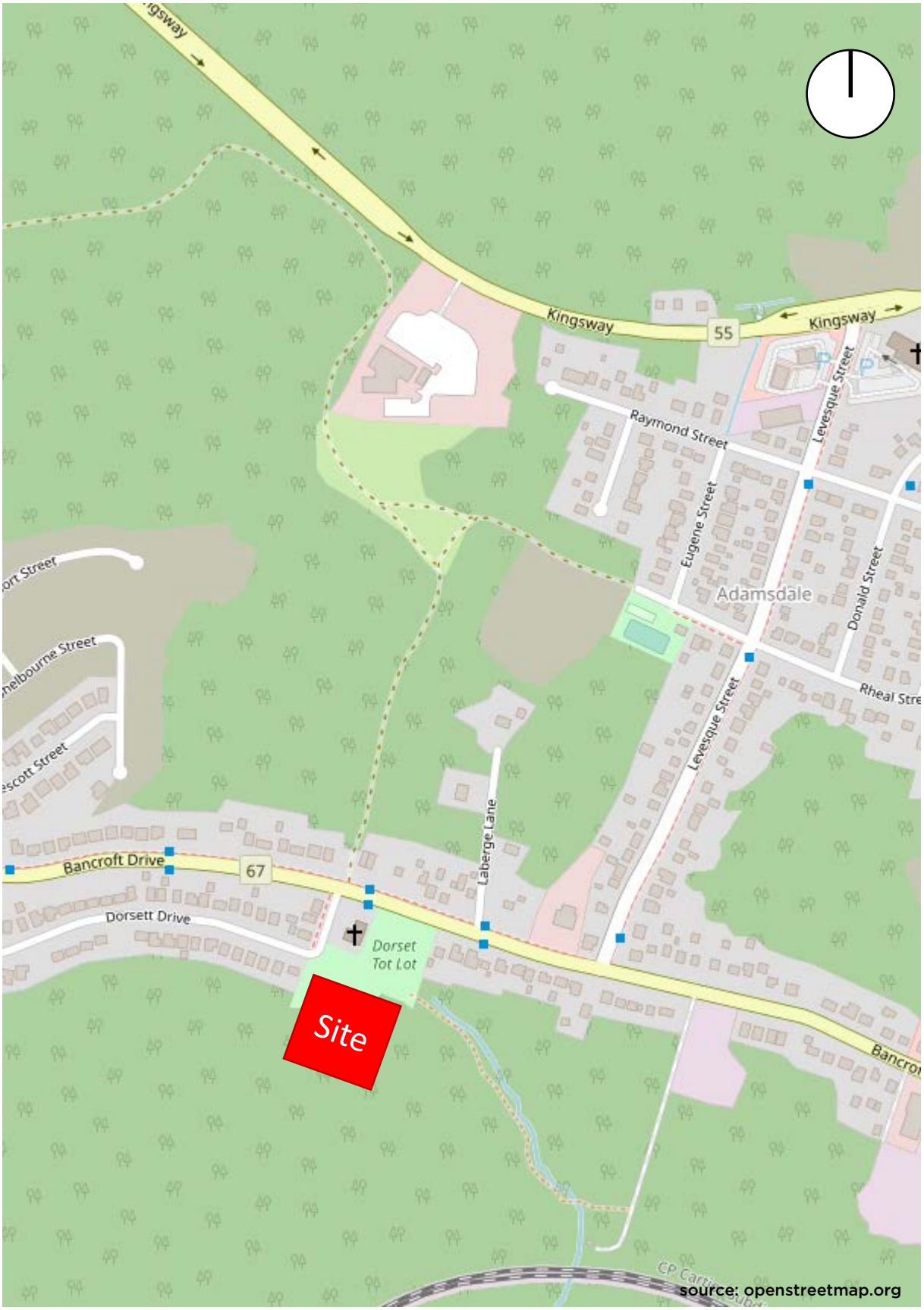
Given the minimal volumes on Nottingham Avenue at the proposed site, and the limited volumes that the site will generate, excellent traffic operations will be provided at the site access.

Turn Lane Requirements

The need for exclusive right and left turn lanes on Bancroft Drive at Nottingham Avenue was reviewed in consideration of MTO guidelines for auxiliary turn lanes at unsignalized intersections. Based on the projected volume of right and left turning vehicles, exclusive turn lanes are not warranted.

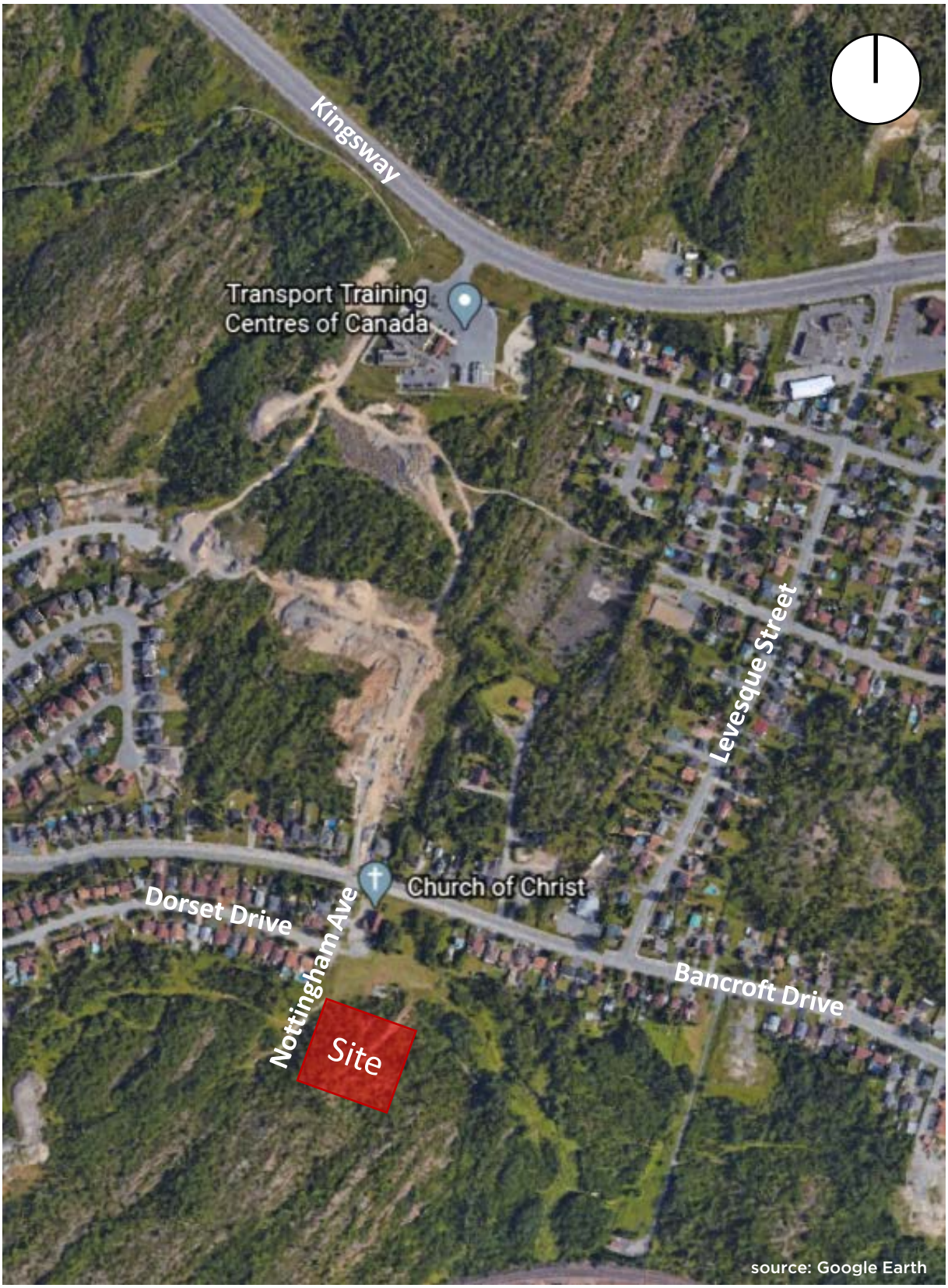
Sight Lines

The available sight lines along Nottingham Avenue at the proposed site access were reviewed and are considered appropriate in consideration of TAC design guidelines for minimum stopping sight distance.



Extendicare LTC Development

Figure 1: Site Location



Extendicare LTC Development

Figure 2A: Area Road Network

Looking north along Hazelton Drive from Bancroft Drive

Looking south along Nottingham Avenue from Bancroft Drive

Extendicare LTC Development

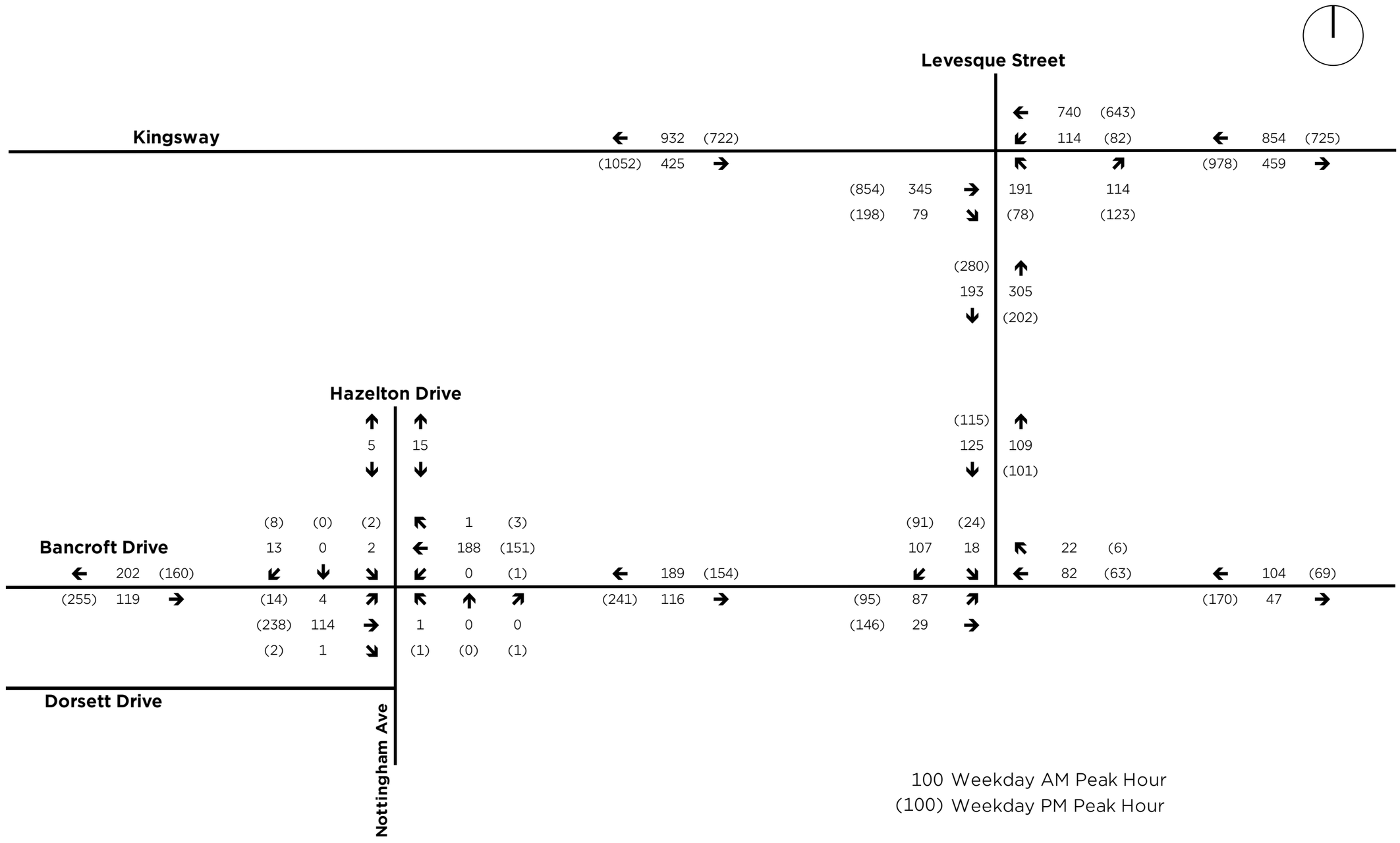
Figure 2B: Area Road Network

Looking east along Bancroft Drive from Hazelton Drive/Nottingham Avenue

Looking west along Bancroft Drive from Hazelton Drive/Nottingham Avenue

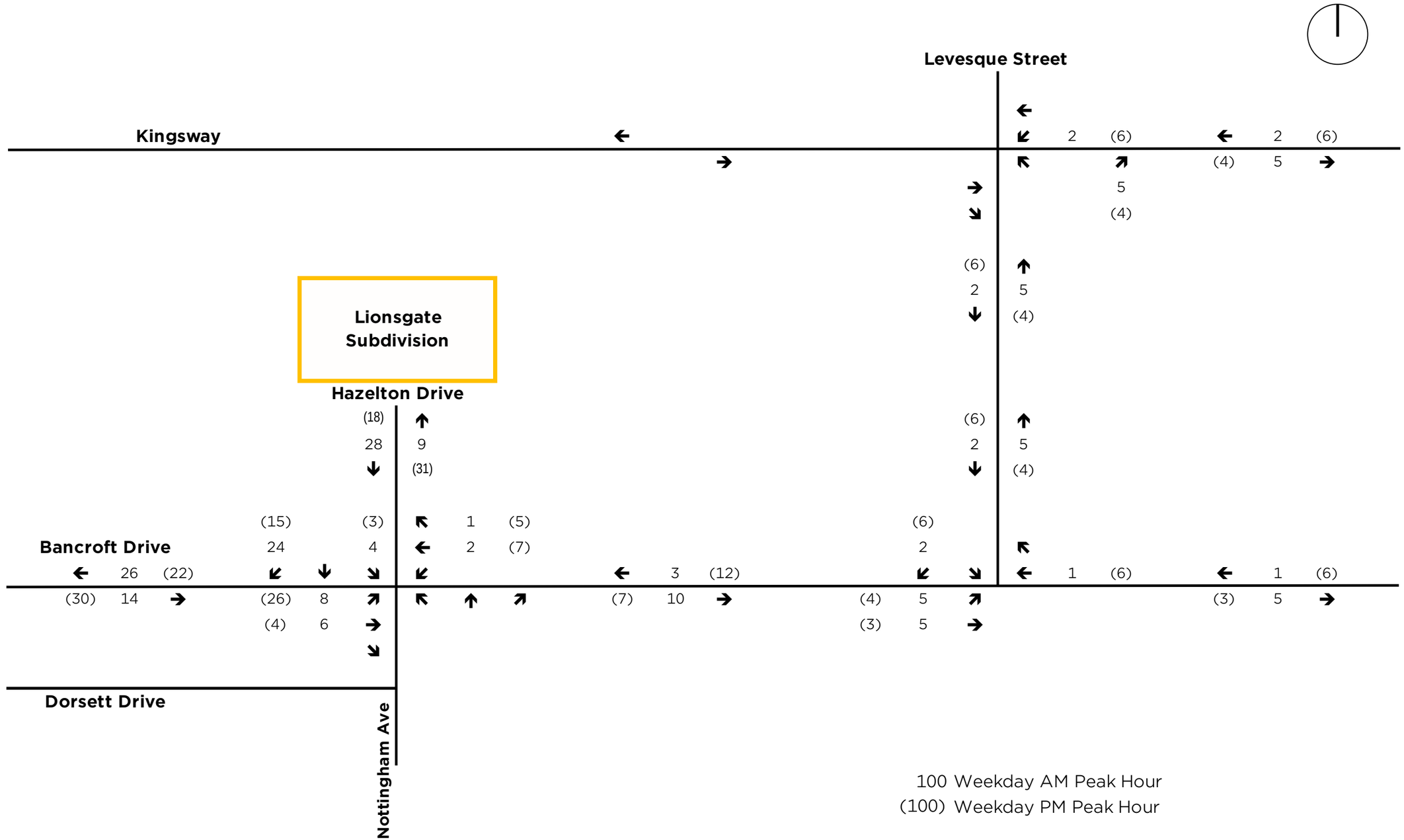
Extendicare LTC Development

Figure 2C: Area Road Network



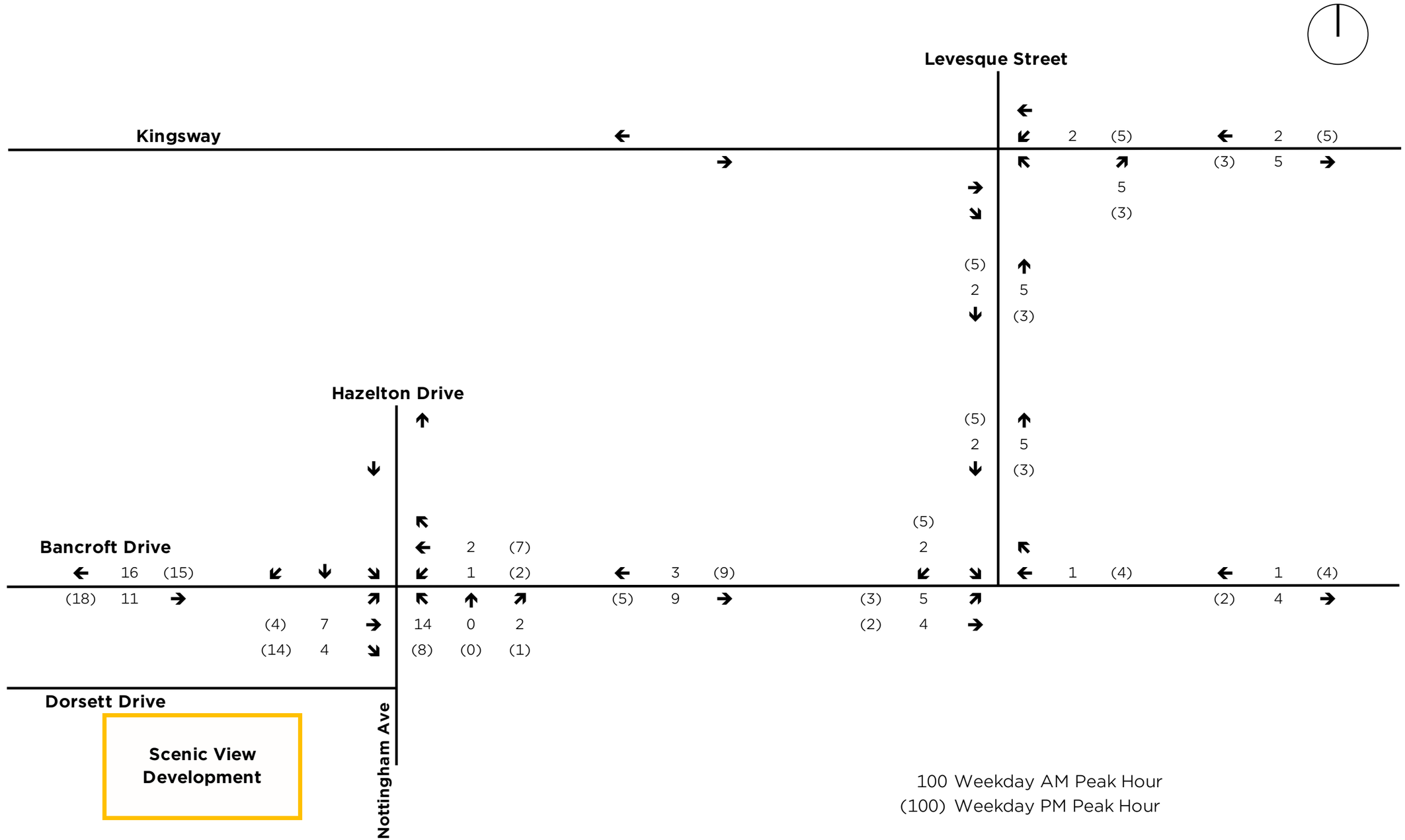
Extendicare LTC Development

Figure 3: 2020 Existing Traffic Volumes



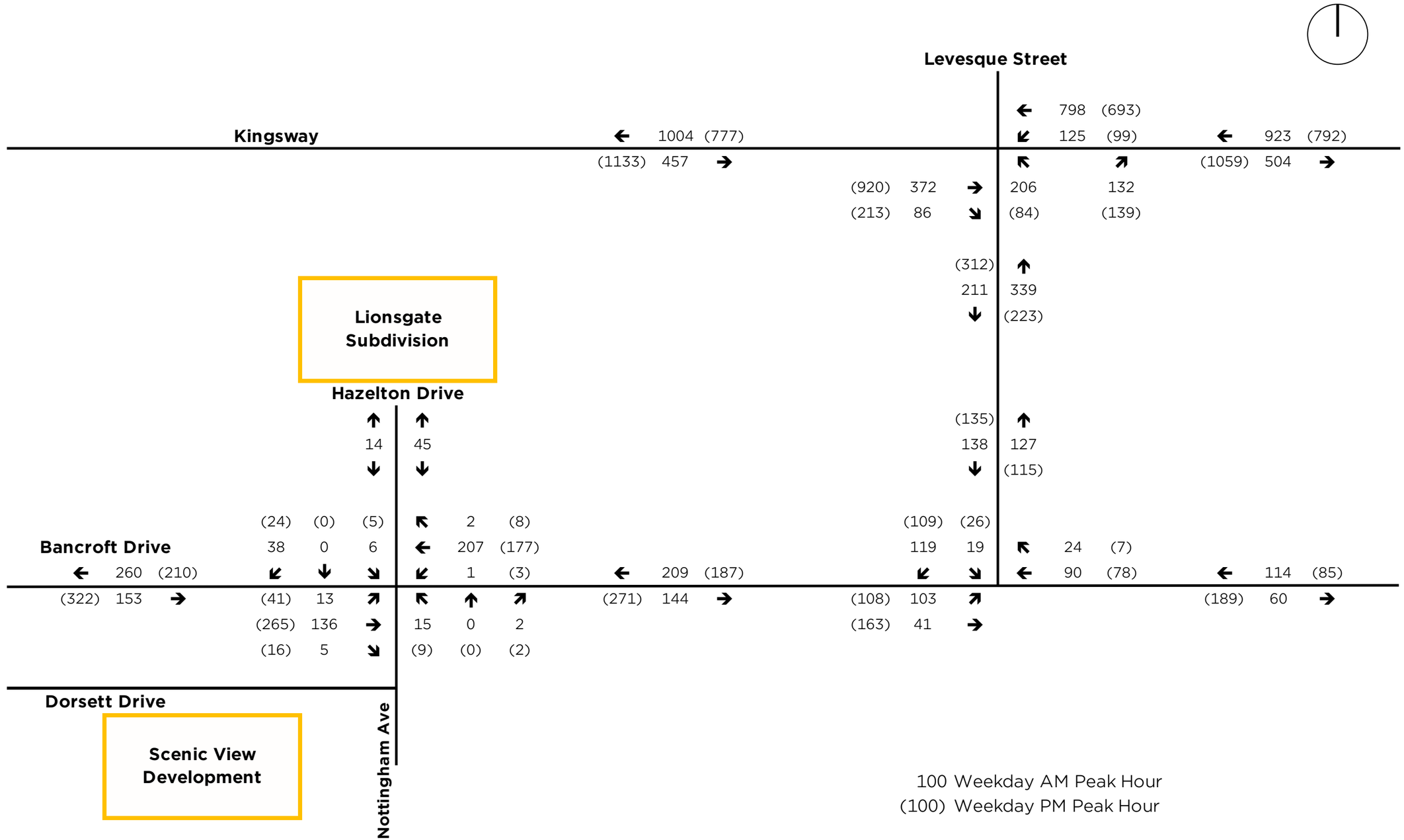
Extendicare LTC Development

Figure 4: Background Development Traffic – Lionsgate Subdivision



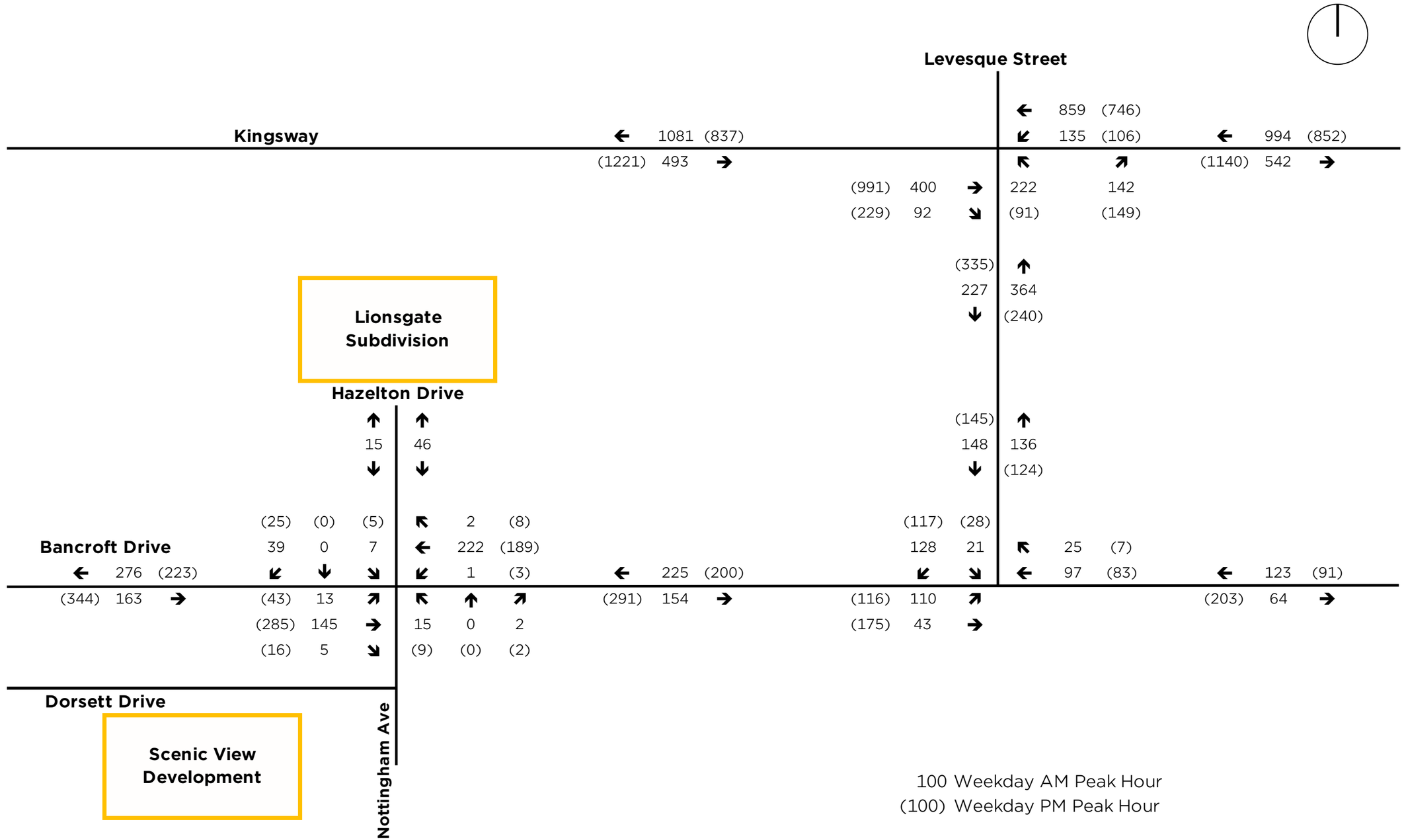
Extendicare LTC Development

Figure 5: Background Development Volumes – Scenic View Subdivision



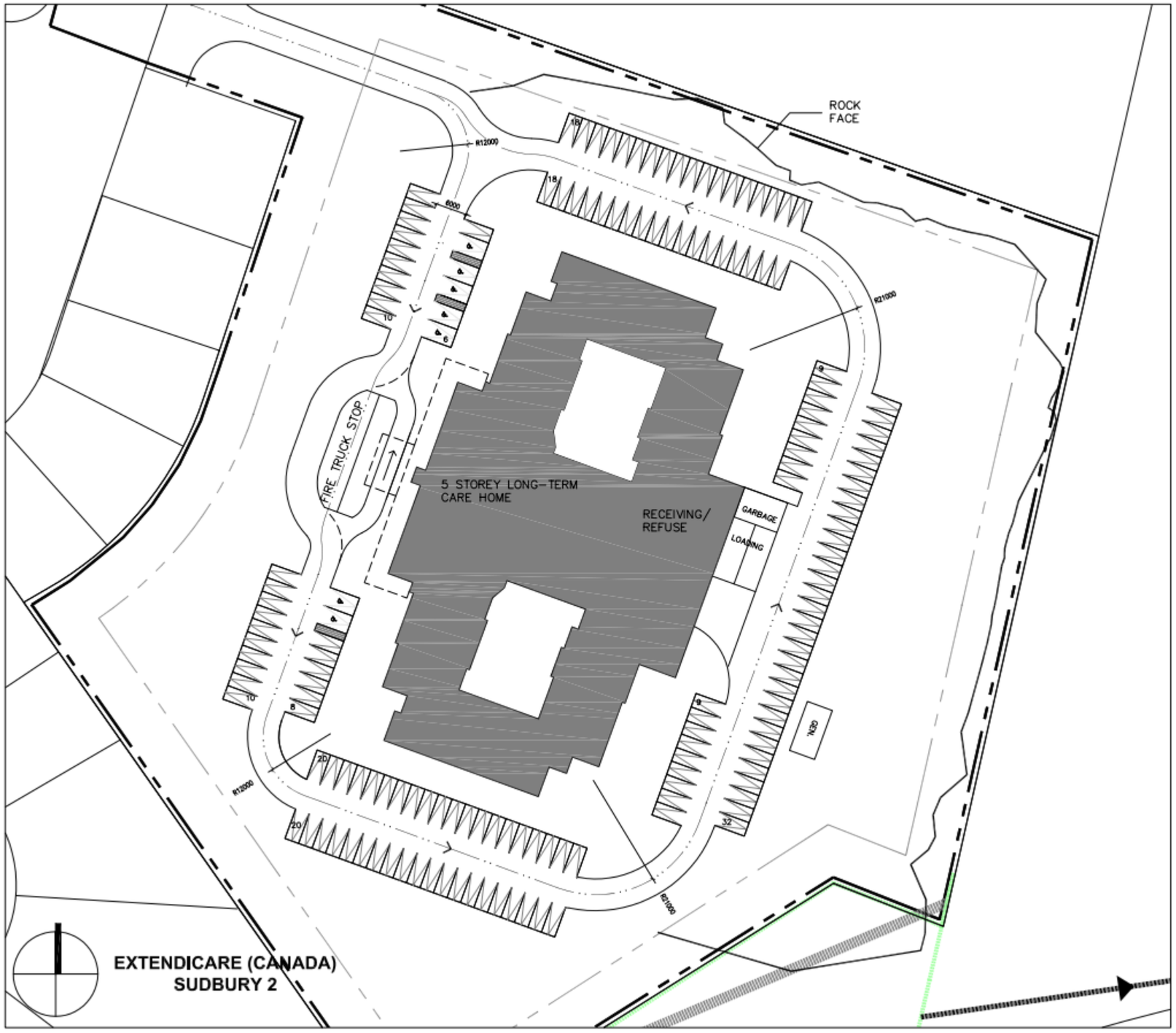
Extendicare LTC Development

Figure 6: 2025 Background Traffic Volumes



Extendicare LTC Development

Figure 7: 2030 Background Traffic Volumes

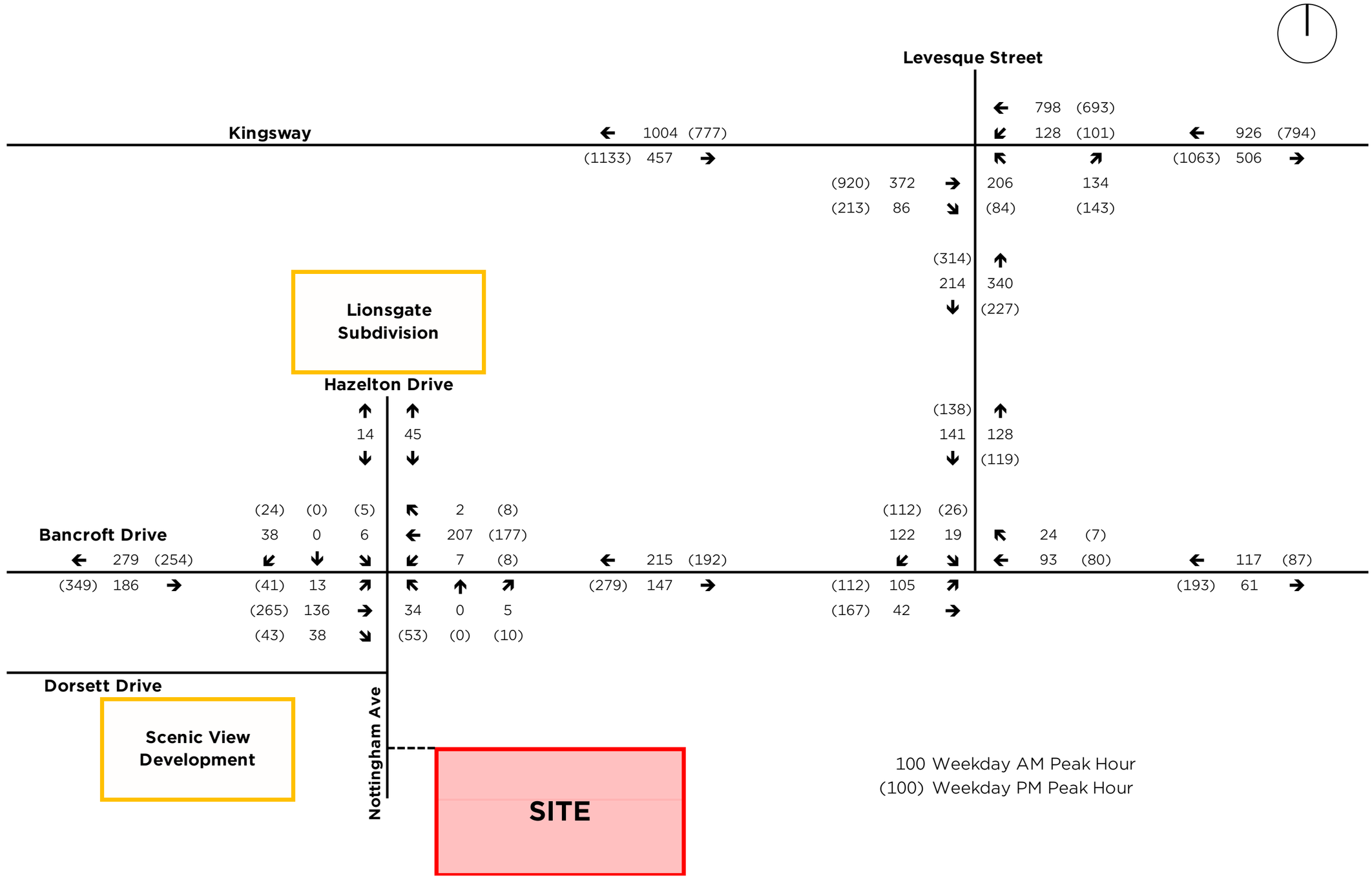


Extendicare LTC Development

Figure 8: Site Plan

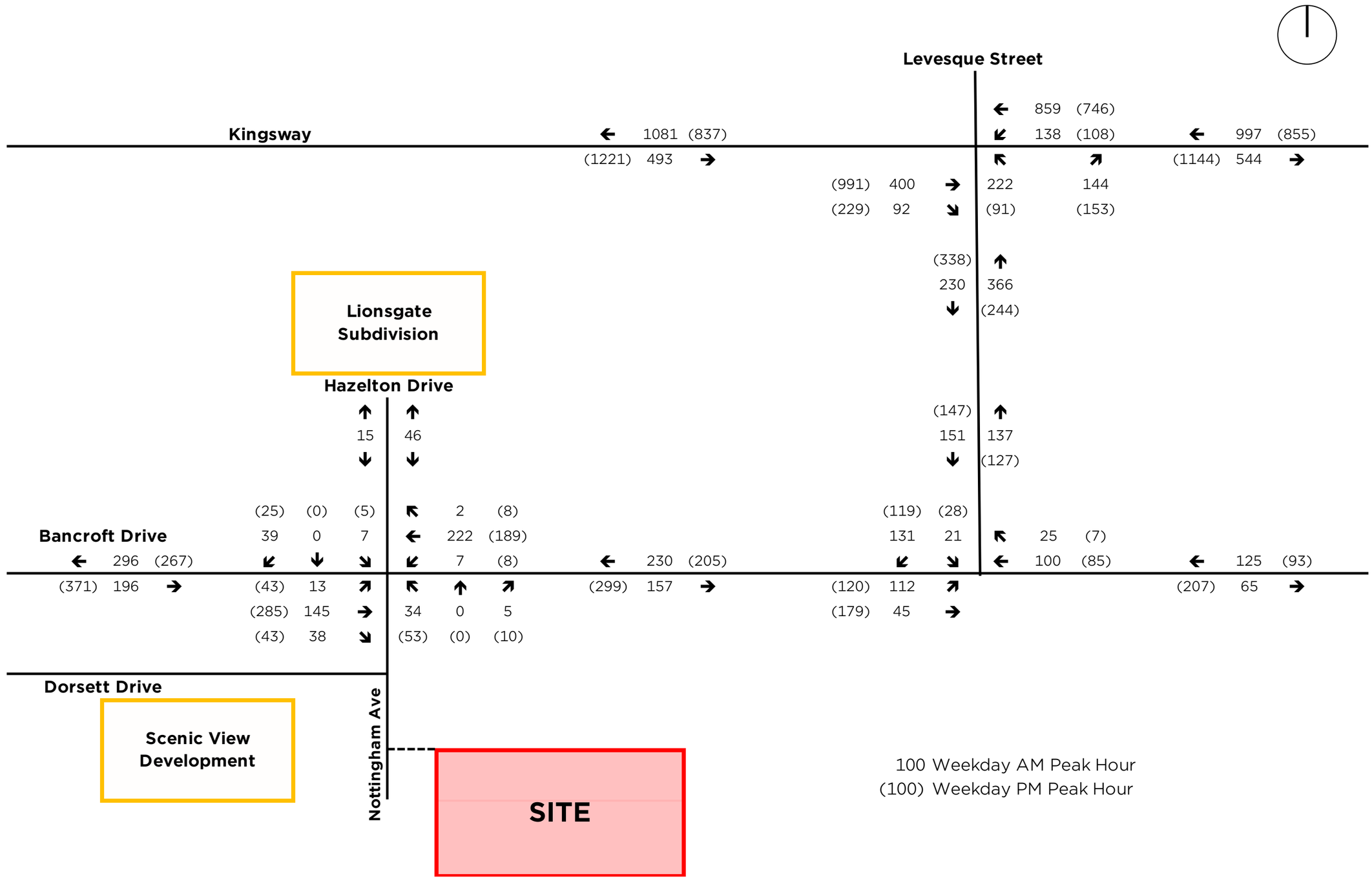
Extendicare LTC Development

Figure 9: Site Traffic



Extendicare LTC Development

Figure 10: 2025 Total Traffic Volumes



Extendicare LTC Development

Figure 11: 2030 Total Traffic Volumes

Appendix A: Traffic Counts

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017

Turning Movement Data

Start Time	Levesque Southbound				Bancroft Westbound				Bancroft Eastbound				
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
6:00 AM	8	0	0	8	1	2	0	3	1	10	0	11	22
6:15 AM	5	0	0	5	2	5	0	7	2	5	0	7	19
6:30 AM	13	2	0	15	5	17	0	22	3	11	0	14	51
6:45 AM	18	5	0	23	9	11	0	20	8	15	0	23	66
Hourly Total	44	7	0	51	17	35	0	52	14	41	0	55	158
7:00 AM	24	2	0	26	6	19	0	25	6	18	0	24	75
7:15 AM	19	1	4	20	2	25	0	27	9	24	0	33	80
7:30 AM	26	3	0	29	6	21	0	27	7	28	0	35	91
7:45 AM	25	7	1	32	6	12	0	18	9	21	0	30	80
Hourly Total	94	13	5	107	20	77	0	97	31	91	0	122	326
8:00 AM	22	3	0	25	6	22	0	28	7	12	0	19	72
8:15 AM	29	4	0	33	3	23	0	26	4	21	0	25	84
8:30 AM	18	5	0	23	4	20	0	24	7	23	0	30	77
8:45 AM	25	8	0	33	1	17	0	18	8	23	0	31	82
Hourly Total	94	20	0	114	14	82	0	96	26	79	0	105	315
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	10	4	0	14	3	8	0	11	13	14	0	27	52
11:15 AM	17	2	0	19	5	13	0	18	17	16	0	33	70
11:30 AM	13	3	0	16	3	11	0	14	9	17	0	26	56
11:45 AM	16	2	0	18	4	12	1	16	13	15	1	28	62
Hourly Total	56	11	0	67	15	44	1	59	52	62	1	114	240
12:00 PM	18	2	0	20	0	6	0	6	10	15	0	25	51
12:15 PM	15	3	0	18	2	10	0	12	7	14	1	21	51
12:30 PM	16	2	0	18	2	12	0	14	10	18	0	28	60
12:45 PM	20	6	0	26	5	11	0	16	16	16	0	32	74
Hourly Total	69	13	0	82	9	39	0	48	43	63	1	106	236
Grand Total	357	64	5	421	75	277	1	352	166	336	2	502	1275
Approach %	84.8	15.2	-	-	21.3	78.7	-	-	33.1	66.9	-	-	-
Total %	28.0	5.0	-	33.0	5.9	21.7	-	27.6	13.0	26.4	-	39.4	-
Lights	342	62	-	404	71	264	-	335	161	320	-	481	1220
% Lights	95.8	96.9	-	96.0	94.7	95.3	-	95.2	97.0	95.2	-	95.8	95.7
Mediums	15	1	-	16	4	13	-	17	5	16	-	21	54
% Mediums	4.2	1.6	-	3.8	5.3	4.7	-	4.8	3.0	4.8	-	4.2	4.2
Articulated Trucks	0	1	-	1	0	0	-	0	0	0	-	0	1
% Articulated Trucks	0.0	1.6	-	0.2	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Road	0	0	-	0	0	0	-	0	0	0	-	0	0
% 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	-	-	-	0.0	-	-
Pedestrians	-	-	5	-	-	-	1	-	-	-	2	-	-
% Pedestrians	-	-	100.0	-	-	-	100.0	-	-	-	100.0	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017

Levesque [N]		
Out	In	Total
391	404	795
20	16	36
0	1	1
0	0	0
0	0	0
411	**421**	**832**

342	62	0
15	1	0
0	1	0
0	0	0
0	0	5
357	**64**	**5**
R	L	P

Bancroft [W]			
	Out	In	Total
	606	481	1087
	28	21	49
	0	0	0
	0	0	0
	0	0	0
	634	**502**	**1136**

0	161	320
0	5	16
0	0	0
0	0	0
2	0	0
2	**166**	**336**
P	T	L

03/31/2017 6:00 AM
Ending At
03/31/2017 1:00 PM

Lights
Mediums
Articulated Trucks
Bicycles on Road
Other

P	T	R
1	**277**	**75**
1	0	0
0	0	0
0	0	0
0	13	4
0	264	71

582	**352**	**230**
0	0	0
0	0	0
1	0	1
23	17	6
558	335	223
Total	In	Out

Bancroft [E]

0	0	0
0	0	0
0	0	0
0	0	0
0	0	0
0	**0**	**0**
Out	In	Total

Fake Approach [S]

Turning Movement Data Plot

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

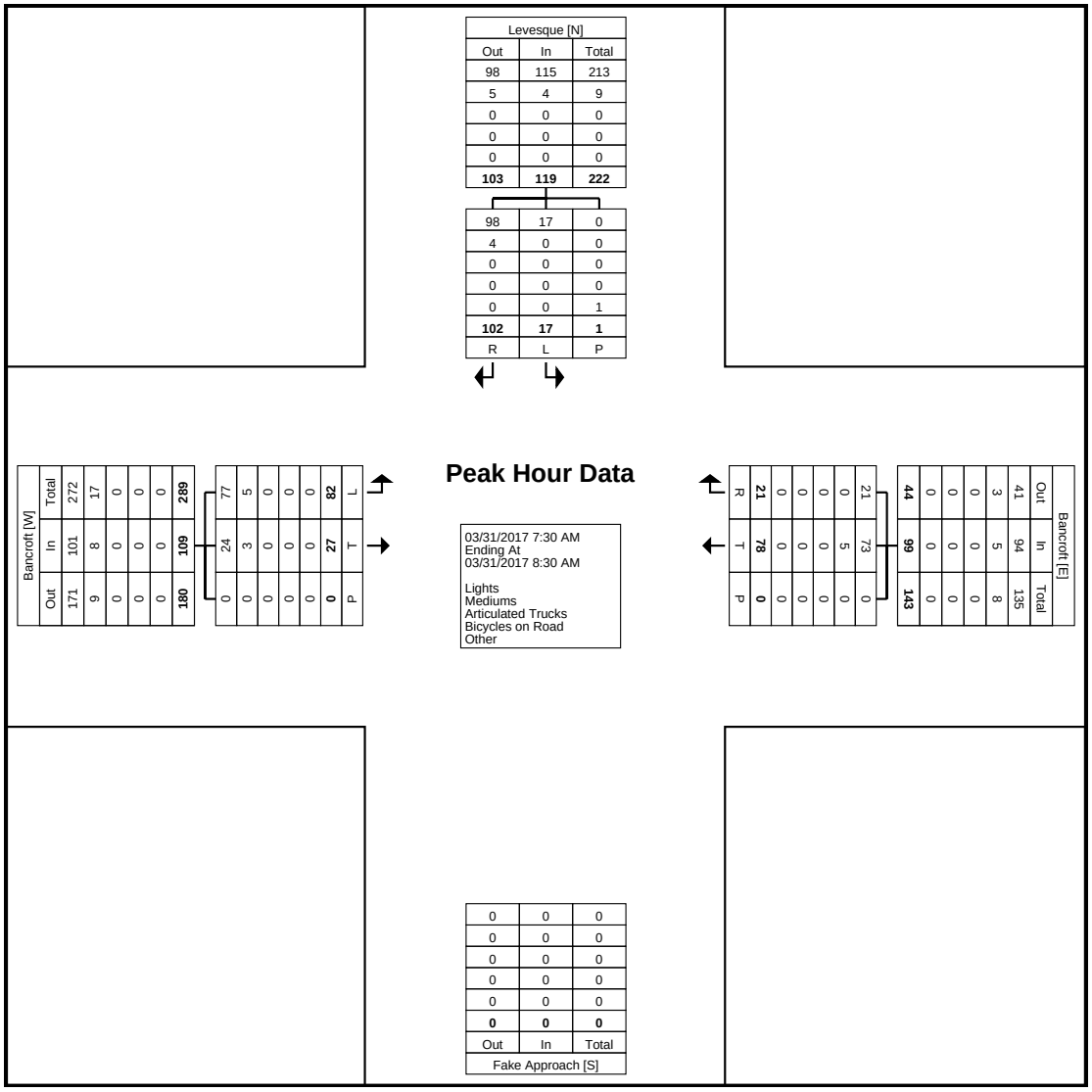
Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Levesque Southbound				Bancroft Westbound				Bancroft Eastbound				
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
7:30 AM	26	3	0	29	6	21	0	27	7	28	0	35	91
7:45 AM	25	7	1	32	6	12	0	18	9	21	0	30	80
8:00 AM	22	3	0	25	6	22	0	28	7	12	0	19	72
8:15 AM	29	4	0	33	3	23	0	26	4	21	0	25	84
Total	102	17	1	119	21	78	0	99	27	82	0	109	327
Approach %	85.7	14.3	-	-	21.2	78.8	-	-	24.8	75.2	-	-	-
Total %	31.2	5.2	-	36.4	6.4	23.9	-	30.3	8.3	25.1	-	33.3	-
PHF	0.879	0.607	-	0.902	0.875	0.848	-	0.884	0.750	0.732	-	0.779	0.898
Lights	98	17	-	115	21	73	-	94	24	77	-	101	310
% Lights	96.1	100.0	-	96.6	100.0	93.6	-	94.9	88.9	93.9	-	92.7	94.8
Mediums	4	0	-	4	0	5	-	5	3	5	-	8	17
% Mediums	3.9	0.0	-	3.4	0.0	6.4	-	5.1	11.1	6.1	-	7.3	5.2
Articulated Trucks	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
% 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	-	-	1	-	-	-	0	-	-	-	0	-	-
% Pedestrians	-	-	100.0	-	-	-	-	-	-	-	-	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017



Turning Movement Peak Hour Data Plot (7:30 AM)

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

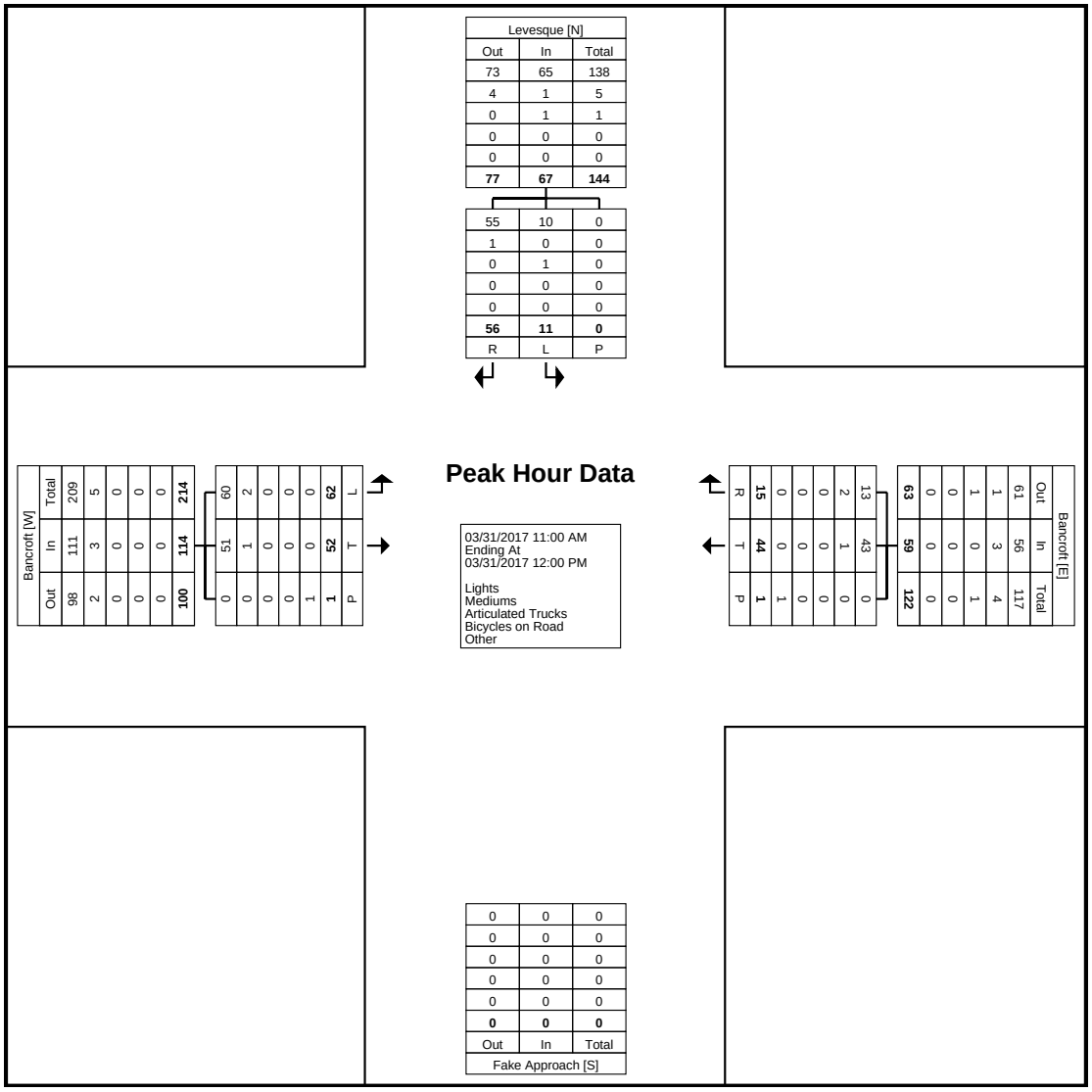
Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Levesque Southbound				Bancroft Westbound				Bancroft Eastbound				
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	10	4	0	14	3	8	0	11	13	14	0	27	52
11:15 AM	17	2	0	19	5	13	0	18	17	16	0	33	70
11:30 AM	13	3	0	16	3	11	0	14	9	17	0	26	56
11:45 AM	16	2	0	18	4	12	1	16	13	15	1	28	62
Total	56	11	0	67	15	44	1	59	52	62	1	114	240
Approach %	83.6	16.4	-	-	25.4	74.6	-	-	45.6	54.4	-	-	-
Total %	23.3	4.6	-	27.9	6.3	18.3	-	24.6	21.7	25.8	-	47.5	-
PHF	0.824	0.688	-	0.882	0.750	0.846	-	0.819	0.765	0.912	-	0.864	0.857
Lights	55	10	-	65	13	43	-	56	51	60	-	111	232
% Lights	98.2	90.9	-	97.0	86.7	97.7	-	94.9	98.1	96.8	-	97.4	96.7
Mediums	1	0	-	1	2	1	-	3	1	2	-	3	7
% Mediums	1.8	0.0	-	1.5	13.3	2.3	-	5.1	1.9	3.2	-	2.6	2.9
Articulated Trucks	0	1	-	1	0	0	-	0	0	0	-	0	1
% Articulated Trucks	0.0	9.1	-	1.5	0.0	0.0	-	0.0	0.0	0.0	-	0.0	0.4
Bicycles on Road	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	-	-	0	-	-	-	1	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	100.0	-	-	-	100.0	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017



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

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

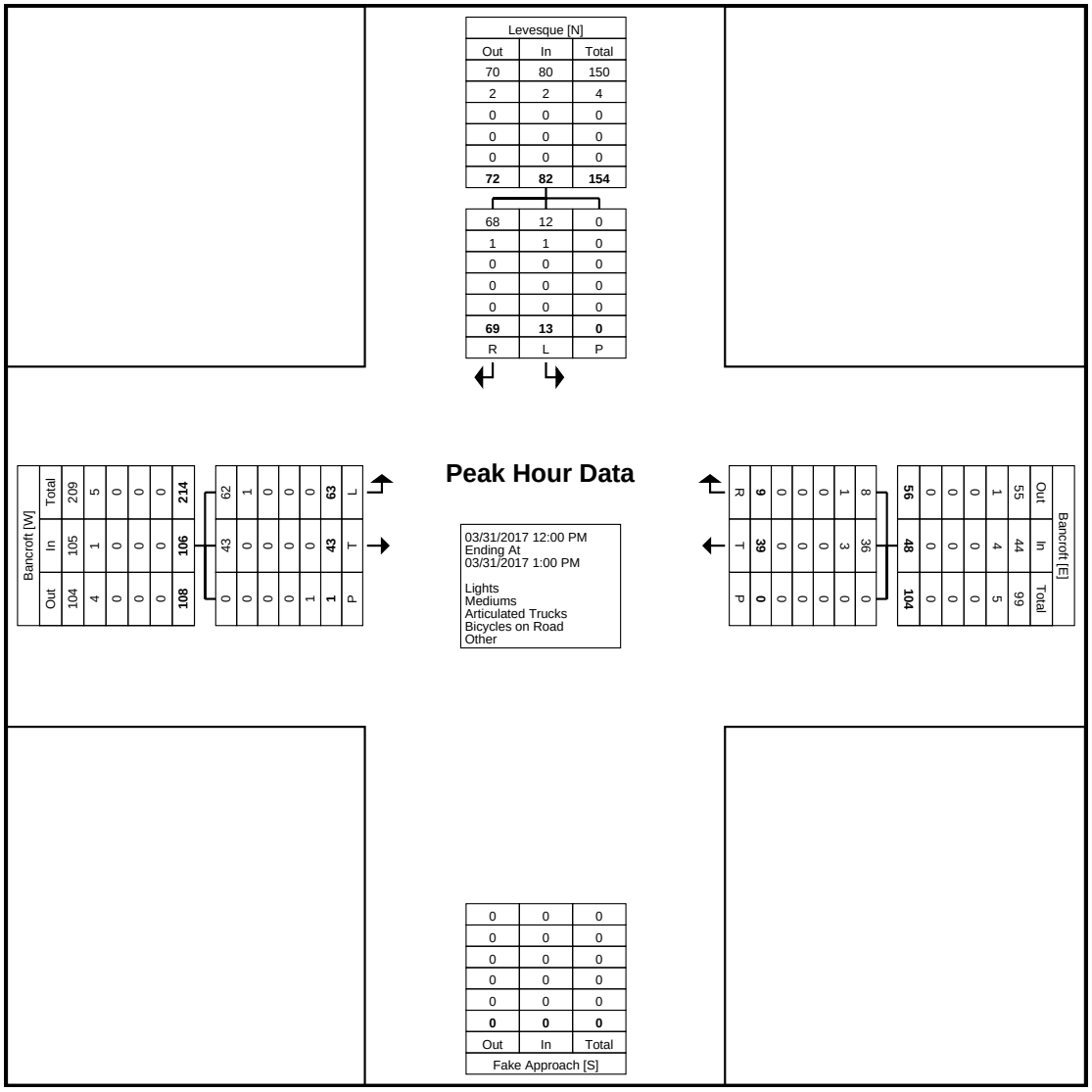
Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Levesque Southbound				Bancroft Westbound				Bancroft Eastbound				
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
12:00 PM	18	2	0	20	0	6	0	6	10	15	0	25	51
12:15 PM	15	3	0	18	2	10	0	12	7	14	1	21	51
12:30 PM	16	2	0	18	2	12	0	14	10	18	0	28	60
12:45 PM	20	6	0	26	5	11	0	16	16	16	0	32	74
Total	69	13	0	82	9	39	0	48	43	63	1	106	236
Approach %	84.1	15.9	-	-	18.8	81.3	-	-	40.6	59.4	-	-	-
Total %	29.2	5.5	-	34.7	3.8	16.5	-	20.3	18.2	26.7	-	44.9	-
PHF	0.863	0.542	-	0.788	0.450	0.813	-	0.750	0.672	0.875	-	0.828	0.797
Lights	68	12	-	80	8	36	-	44	43	62	-	105	229
% Lights	98.6	92.3	-	97.6	88.9	92.3	-	91.7	100.0	98.4	-	99.1	97.0
Mediums	1	1	-	2	1	3	-	4	0	1	-	1	7
% Mediums	1.4	7.7	-	2.4	11.1	7.7	-	8.3	0.0	1.6	-	0.9	3.0
Articulated Trucks	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
% 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	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft @ Levesque
Site Code: 00855103
Start Date: 03/31/2017



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

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

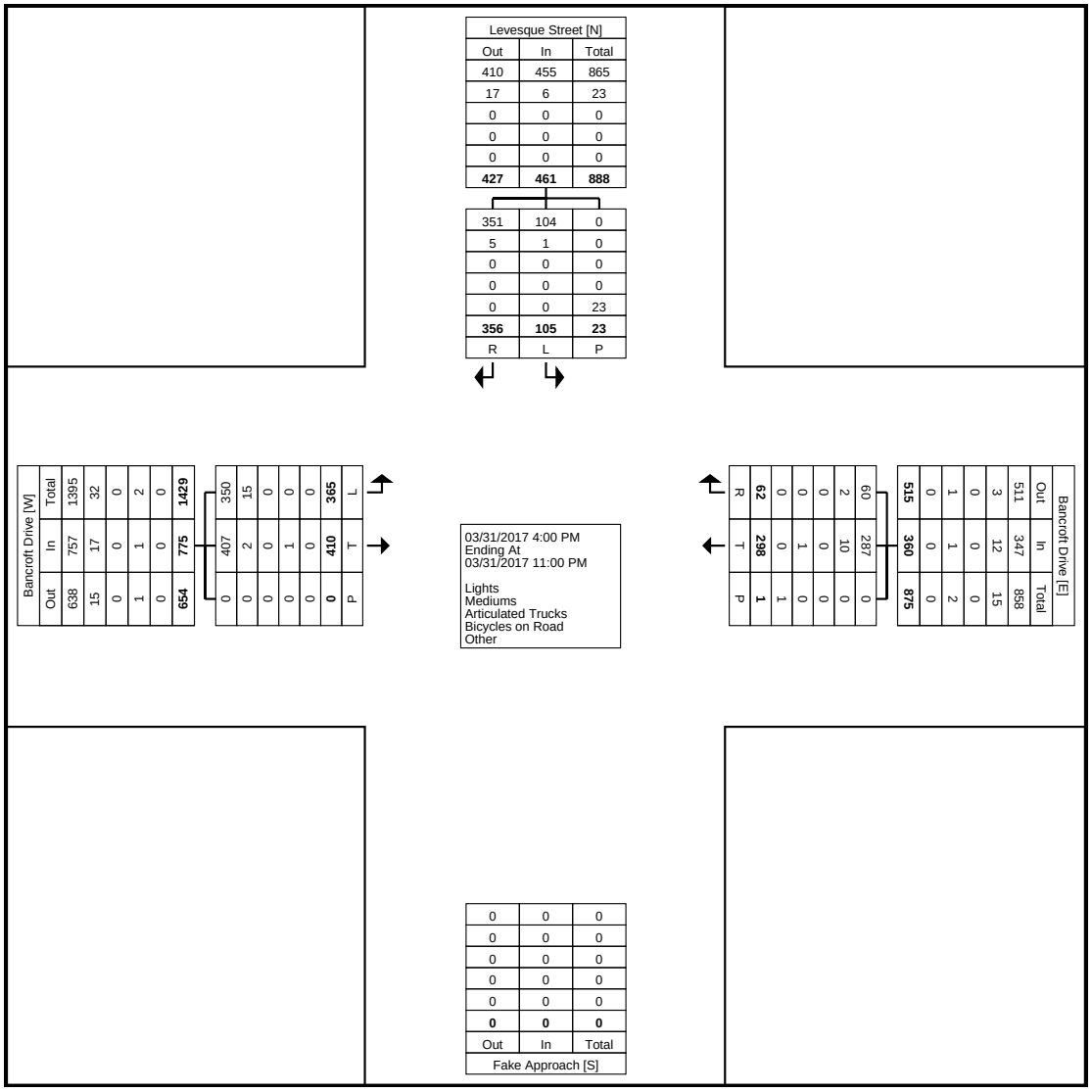
Count Name: Bancroft Drive @ Levesque Street
Site Code: 00855103
Start Date: 03/31/2017

Turning Movement Data

Start Time	Levesque Street Southbound				Bancroft Drive Westbound				Bancroft Drive Eastbound				
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
4:00 PM	19	2	0	21	5	23	0	28	30	23	0	53	102
4:15 PM	19	6	0	25	4	10	0	14	29	24	0	53	92
4:30 PM	15	3	0	18	1	13	0	14	30	18	0	48	80
4:45 PM	28	7	2	35	3	14	0	17	36	25	0	61	113
Hourly Total	81	18	2	99	13	60	0	73	125	90	0	215	387
5:00 PM	22	6	0	28	1	15	1	16	27	18	0	45	89
5:15 PM	21	7	1	28	1	17	0	18	46	29	0	75	121
5:30 PM	18	3	0	21	3	12	0	15	20	16	0	36	72
5:45 PM	11	2	1	13	2	14	0	16	15	15	0	30	59
Hourly Total	72	18	2	90	7	58	1	65	108	78	0	186	341
6:00 PM	16	3	0	19	1	21	0	22	15	23	0	38	79
6:15 PM	17	5	0	22	4	8	0	12	12	12	0	24	58
6:30 PM	20	5	0	25	5	17	0	22	18	17	0	35	82
6:45 PM	10	3	3	13	2	12	0	14	14	13	0	27	54
Hourly Total	63	16	3	79	12	58	0	70	59	65	0	124	273
7:00 PM	15	9	5	24	4	8	0	12	13	14	0	27	63
7:15 PM	9	5	1	14	5	5	0	10	9	11	0	20	44
7:30 PM	6	4	0	10	1	11	0	12	15	17	0	32	54
7:45 PM	14	1	0	15	2	16	0	18	6	6	0	12	45
Hourly Total	44	19	6	63	12	40	0	52	43	48	0	91	206
8:00 PM	9	4	1	13	2	9	0	11	10	10	0	20	44
8:15 PM	8	4	0	12	3	7	0	10	6	8	0	14	36
8:30 PM	10	7	4	17	1	9	0	10	11	7	0	18	45
8:45 PM	10	2	0	12	2	10	0	12	11	14	0	25	49
Hourly Total	37	17	5	54	8	35	0	43	38	39	0	77	174
9:00 PM	12	3	5	15	3	11	0	14	8	4	0	12	41
9:15 PM	8	3	0	11	1	4	0	5	4	8	0	12	28
9:30 PM	10	2	0	12	1	8	0	9	3	8	0	11	32
9:45 PM	4	4	0	8	1	3	0	4	2	5	0	7	19
Hourly Total	34	12	5	46	6	26	0	32	17	25	0	42	120
10:00 PM	9	0	0	9	1	5	0	6	7	2	0	9	24
10:15 PM	0	2	0	2	1	4	0	5	6	6	0	12	19
10:30 PM	8	2	0	10	1	6	0	7	3	4	0	7	24
10:45 PM	8	1	0	9	1	6	0	7	4	8	0	12	28
Hourly Total	25	5	0	30	4	21	0	25	20	20	0	40	95
Grand Total	356	105	23	461	62	298	1	360	410	365	0	775	1596
Approach %	77.2	22.8	-	-	17.2	82.8	-	-	52.9	47.1	-	-	-
Total %	22.3	6.6	-	28.9	3.9	18.7	-	22.6	25.7	22.9	-	48.6	-
Lights	351	104	-	455	60	287	-	347	407	350	-	757	1559
% Lights	98.6	99.0	-	98.7	96.8	96.3	-	96.4	99.3	95.9	-	97.7	97.7
Mediums	5	1	-	6	2	10	-	12	2	15	-	17	35
% Mediums	1.4	1.0	-	1.3	3.2	3.4	-	3.3	0.5	4.1	-	2.2	2.2
Articulated Trucks	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	1	-	1	1	0	-	1	2
% Bicycles on Road	0.0	0.0	-	0.0	0.0	0.3	-	0.3	0.2	0.0	-	0.1	0.1
Bicycles on Crosswalk	-	-	4	-	-	-	0	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	17.4	-	-	-	0.0	-	-	-	-	-	-
Pedestrians	-	-	19	-	-	-	1	-	-	-	0	-	-
% Pedestrians	-	-	82.6	-	-	-	100.0	-	-	-	-	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft Drive @ Levesque Street
Site Code: 00855103
Start Date: 03/31/2017



Turning Movement Data Plot

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft Drive @ Levesque Street
Site Code: 00855103
Start Date: 03/31/2017

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Levesque Street Southbound				Bancroft Drive Westbound				Bancroft Drive Eastbound				
	Right	Left	Peds	App. Total	Right	Thru	Peds	App. Total	Thru	Left	Peds	App. Total	Int. Total
4:30 PM	15	3	0	18	1	13	0	14	30	18	0	48	80
4:45 PM	28	7	2	35	3	14	0	17	36	25	0	61	113
5:00 PM	22	6	0	28	1	15	1	16	27	18	0	45	89
5:15 PM	21	7	1	28	1	17	0	18	46	29	0	75	121
Total	86	23	3	109	6	59	1	65	139	90	0	229	403
Approach %	78.9	21.1	-	-	9.2	90.8	-	-	60.7	39.3	-	-	-
Total %	21.3	5.7	-	27.0	1.5	14.6	-	16.1	34.5	22.3	-	56.8	-
PHF	0.768	0.821	-	0.779	0.500	0.868	-	0.903	0.755	0.776	-	0.763	0.833
Lights	86	23	-	109	6	57	-	63	138	87	-	225	397
% Lights	100.0	100.0	-	100.0	100.0	96.6	-	96.9	99.3	96.7	-	98.3	98.5
Mediums	0	0	-	0	0	2	-	2	1	3	-	4	6
% Mediums	0.0	0.0	-	0.0	0.0	3.4	-	3.1	0.7	3.3	-	1.7	1.5
Articulated Trucks	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
% 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	-	-	3	-	-	-	1	-	-	-	0	-	-
% Pedestrians	-	-	100.0	-	-	-	100.0	-	-	-	-	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
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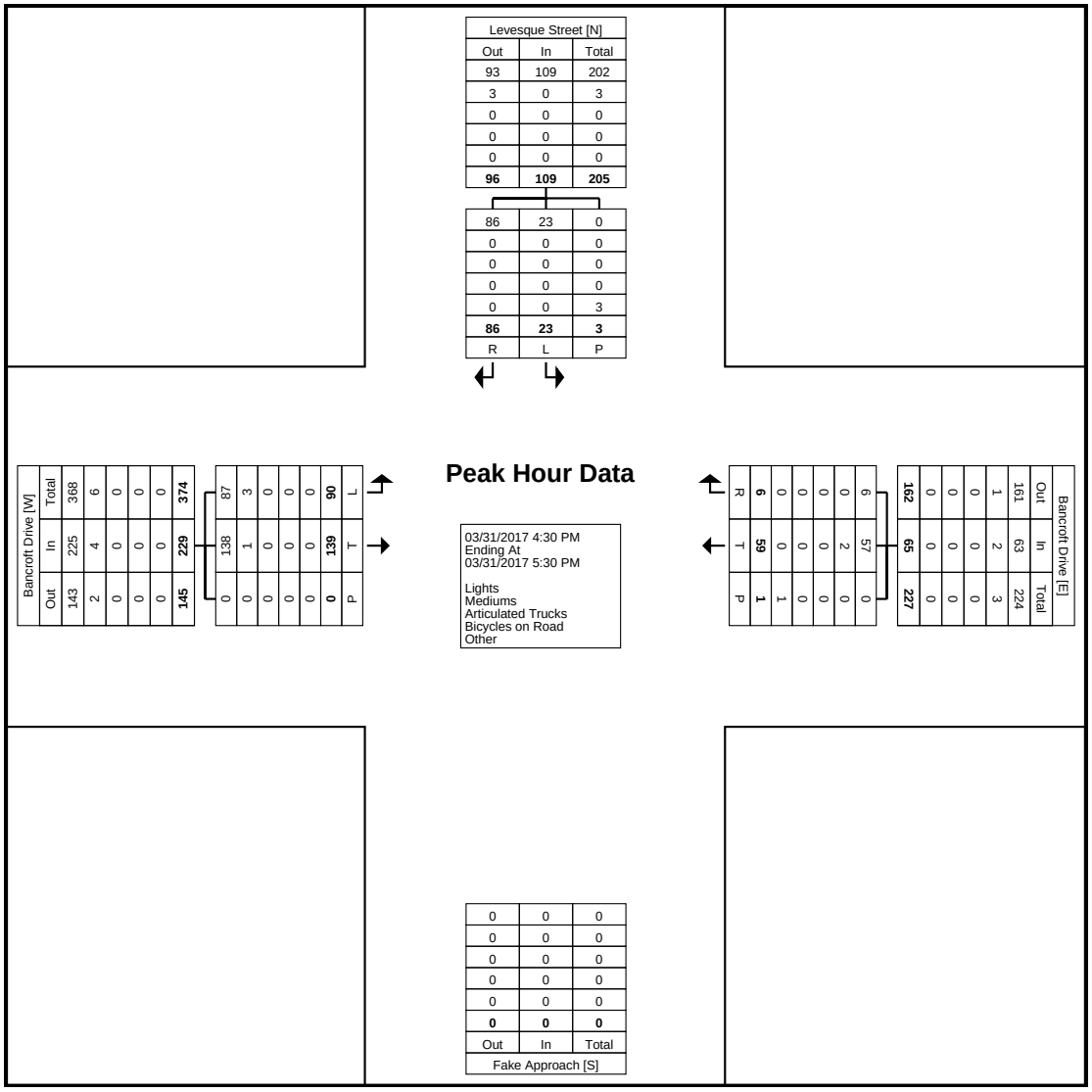
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Bancroft Drive @ Levesque Street
Site Code: 00855103
Start Date: 03/31/2017



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

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017

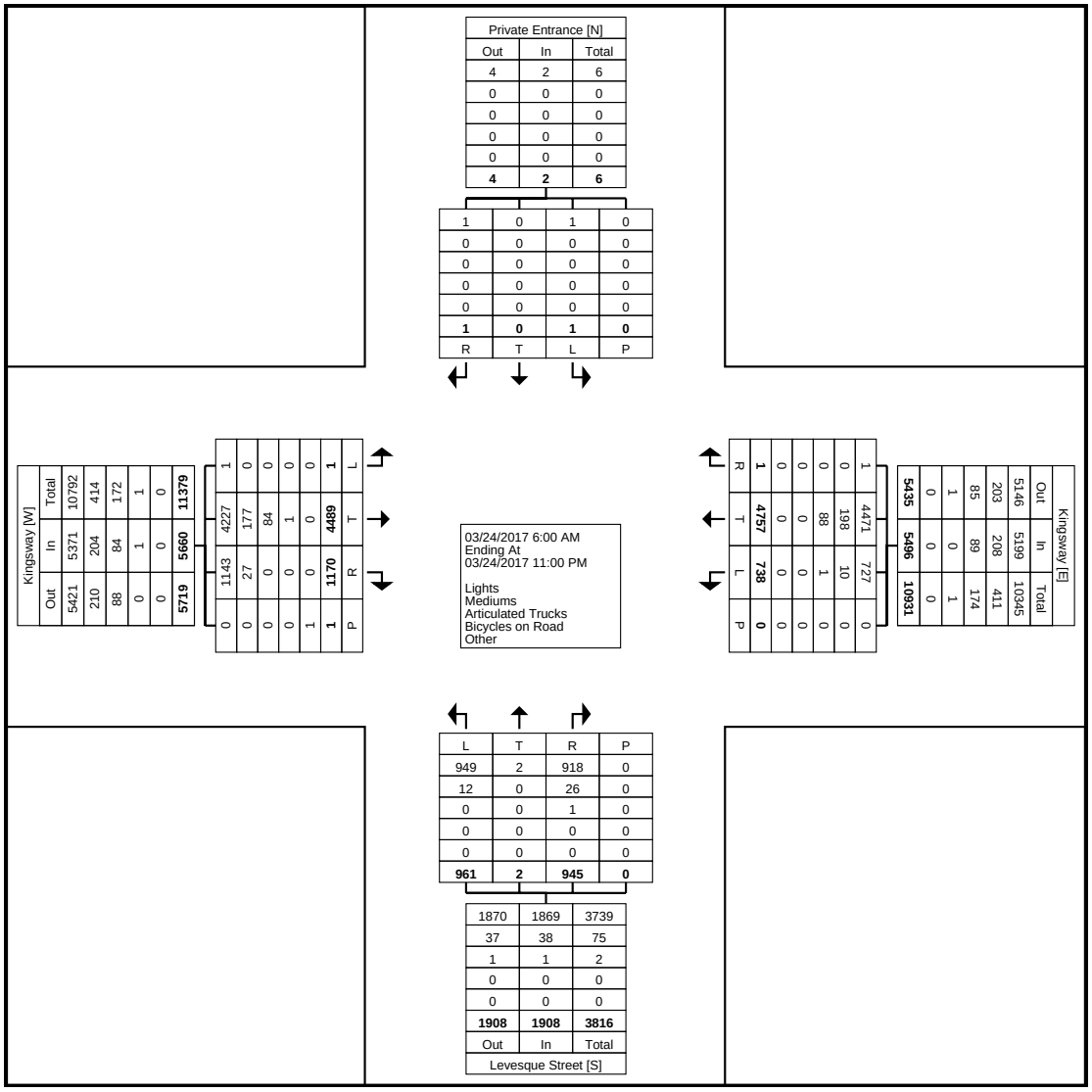
Turning Movement Data

Start Time	Private Entrance Southbound					Kingsway Westbound					Levesque Street Northbound					Kingsway Eastbound					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
6:00 AM	0	0	0	0	0	0	33	15	0	48	10	0	12	0	22	9	20	0	0	29	99
6:15 AM	0	0	0	0	0	0	41	19	0	60	10	0	20	0	30	11	27	0	0	38	128
6:30 AM	0	0	0	0	0	0	98	27	0	125	20	0	29	0	49	13	38	0	0	51	225
6:45 AM	0	0	0	0	0	0	130	28	0	158	24	0	34	0	58	12	42	0	0	54	270
Hourly Total	0	0	0	0	0	0	302	89	0	391	64	0	95	0	159	45	127	0	0	172	722
7:00 AM	0	0	0	0	0	0	75	24	0	99	27	0	22	0	49	11	55	0	0	66	214
7:15 AM	0	0	0	0	0	0	121	32	0	153	25	0	30	0	55	10	69	0	0	79	287
7:30 AM	0	0	0	0	0	0	183	33	0	216	29	0	53	0	82	17	86	0	0	103	401
7:45 AM	0	0	0	0	0	0	199	31	0	230	32	0	42	0	74	20	94	0	0	114	418
Hourly Total	0	0	0	0	0	0	578	120	0	698	113	0	147	0	260	58	304	0	0	362	1320
8:00 AM	0	0	0	0	0	0	192	30	0	222	16	0	40	0	56	21	78	0	0	99	377
8:15 AM	0	0	0	0	0	0	134	14	0	148	31	0	48	0	79	18	72	0	0	90	317
8:30 AM	0	0	0	0	0	0	144	28	0	172	22	2	31	0	55	18	83	0	0	101	328
8:45 AM	0	0	0	0	0	0	140	33	0	173	30	0	39	0	69	26	83	0	0	109	351
Hourly Total	0	0	0	0	0	0	610	105	0	715	99	2	158	0	259	83	316	0	0	399	1373
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	0	0	0	0	0	107	19	0	126	23	0	17	0	40	30	98	0	0	128	294
11:15 AM	0	0	0	0	0	0	114	18	0	132	21	0	18	0	39	30	105	0	1	135	306
11:30 AM	0	0	0	0	0	0	109	17	0	126	38	0	29	0	67	30	113	0	0	143	336
11:45 AM	0	0	1	0	1	0	141	6	0	147	30	0	21	0	51	40	105	0	0	145	344
Hourly Total	0	0	1	0	1	0	471	60	0	531	112	0	85	0	197	130	421	0	1	551	1280
12:00 PM	0	0	0	0	0	0	138	21	0	159	25	0	20	0	45	38	112	0	0	150	354
12:15 PM	0	0	0	0	0	0	129	21	0	150	17	0	25	0	42	24	119	0	0	143	335
12:30 PM	0	0	0	0	0	0	126	19	0	145	25	0	20	0	45	32	105	0	0	137	327
12:45 PM	0	0	0	0	0	0	112	22	0	134	23	0	25	0	48	28	117	0	0	145	327
Hourly Total	0	0	0	0	0	0	505	83	0	588	90	0	90	0	180	122	453	0	0	575	1343
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4:00 PM	0	0	0	0	0	0	150	21	0	171	30	0	19	0	49	40	179	0	0	219	439
4:15 PM	0	0	0	0	0	0	146	17	0	163	25	0	16	0	41	34	188	0	0	222	426
4:30 PM	0	0	0	0	0	0	138	22	0	160	29	0	20	0	49	38	199	0	0	237	446
4:45 PM	0	0	0	0	0	0	177	18	0	195	27	0	17	0	44	47	215	1	0	263	502
Hourly Total	0	0	0	0	0	0	611	78	0	689	111	0	72	0	183	159	781	1	0	941	1813
5:00 PM	0	0	0	0	0	0	151	19	0	170	28	0	19	0	47	44	216	0	0	260	477
5:15 PM	1	0	0	0	1	1	149	18	0	168	33	0	19	0	52	60	187	0	0	247	468
5:30 PM	0	0	0	0	0	0	163	15	0	178	34	0	16	0	50	37	159	0	0	196	424
5:45 PM	0	0	0	0	0	0	113	13	0	126	22	0	17	0	39	33	133	0	0	166	331
Hourly Total	1	0	0	0	1	1	576	65	0	642	117	0	71	0	188	174	695	0	0	869	1700
6:00 PM	0	0	0	0	0	0	95	13	0	108	21	0	22	0	43	18	110	0	0	128	279
6:15 PM	0	0	0	0	0	0	96	14	0	110	17	0	20	0	37	24	122	0	0	146	293
6:30 PM	0	0	0	0	0	0	95	19	0	114	20	0	18	0	38	24	125	0	0	149	301
6:45 PM	0	0	0	0	0	0	87	5	0	92	14	0	16	0	30	29	74	0	0	103	225
Hourly Total	0	0	0	0	0	0	373	51	0	424	72	0	76	0	148	95	431	0	0	526	1098
7:00 PM	0	0	0	0	0	0	78	10	0	88	13	0	16	0	29	31	104	0	0	135	252
7:15 PM	0	0	0	0	0	0	75	12	0	87	13	0	17	0	30	19	63	0	0	82	199
7:30 PM	0	0	0	0	0	0	82	9	0	91	11	0	11	0	22	20	77	0	0	97	210
7:45 PM	0	0	0	0	0	0	55	6	0	61	20	0	14	0	34	27	70	0	0	97	192
Hourly Total	0	0	0	0	0	0	290	37	0	327	57	0	58	0	115	97	314	0	0	411	853
8:00 PM	0	0	0	0	0	0	43	5	0	48	15	0	19	0	34	27	81	0	0	108	190
8:15 PM	0	0	0	0	0	0	43	5	0	48	17	0	12	0	29	18	67	0	0	85	162
8:30 PM	0	0	0	0	0	0	52	3	0	55	7	0	8	0	15	21	78	0	0	99	169
8:45 PM	0	0	0	0	0	0	53	4	0	57	13	0	12	0	25	25	60	0	0	85	167
Hourly Total	0	0	0	0	0	0	191	17	0	208	52	0	51	0	103	91	286	0	0	377	688
9:00 PM	0	0	0	0	0	0	46	5	0	51	12	0	6	0	18	22	57	0	0	79	148
9:15 PM	0	0	0	0	0	0	37	3	0	40	10	0	14	0	24	12	67	0	0	79	143
9:30 PM	0	0	0	0	0	0	30	3	0	33	5	0	7	0	12	14	43	0	0	57	102
9:45 PM	0	0	0	0	0	0	31	5	0	36	9	0	6	0	15	15	52	0	0	67	118
Hourly Total	0	0	0	0	0	0	144	16	0	160	36	0	33	0	69	63	219	0	0	282	511
10:00 PM	0	0	0	0	0	0	37	6	0	43	6	0	6	0	12	21	40	0	0	61	116
10:15 PM	0	0	0	0	0	0	26	4	0	30	5	0	12	0	17	11	38	0	0	49	96
10:30 PM	0	0	0	0	0	0	30	4	0	34	7	0	3	0	10	13	31	0	0	44	88

10:45 PM	0	0	0	0	0	0	13	3	0	16	4	0	4	0	8	8	33	0	0	41	65
Hourly Total	0	0	0	0	0	0	106	17	0	123	22	0	25	0	47	53	142	0	0	195	365
Grand Total	1	0	1	0	2	1	4757	738	0	5496	945	2	961	0	1908	1170	4489	1	1	5660	13066
Approach %	50.0	0.0	50.0	-	-	0.0	86.6	13.4	-	-	49.5	0.1	50.4	-	-	20.7	79.3	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	0.0	36.4	5.6	-	42.1	7.2	0.0	7.4	-	14.6	9.0	34.4	0.0	-	43.3	-
Lights	1	0	1	-	2	1	4471	727	-	5199	918	2	949	-	1869	1143	4227	1	-	5371	12441
% Lights	100.0	-	100.0	-	100.0	100.0	94.0	98.5	-	94.6	97.1	100.0	98.8	-	98.0	97.7	94.2	100.0	-	94.9	95.2
Mediums	0	0	0	-	0	0	198	10	-	208	26	0	12	-	38	27	177	0	-	204	450
% Mediums	0.0	-	0.0	-	0.0	0.0	4.2	1.4	-	3.8	2.8	0.0	1.2	-	2.0	2.3	3.9	0.0	-	3.6	3.4
Articulated Trucks	0	0	0	-	0	0	88	1	-	89	1	0	0	-	1	0	84	0	-	84	174
% Articulated Trucks	0.0	-	0.0	-	0.0	0.0	1.8	0.1	-	1.6	0.1	0.0	0.0	-	0.1	0.0	1.9	0.0	-	1.5	1.3
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0	1	0	-	1	1
% Bicycles on Road	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017



Turning Movement Data Plot

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

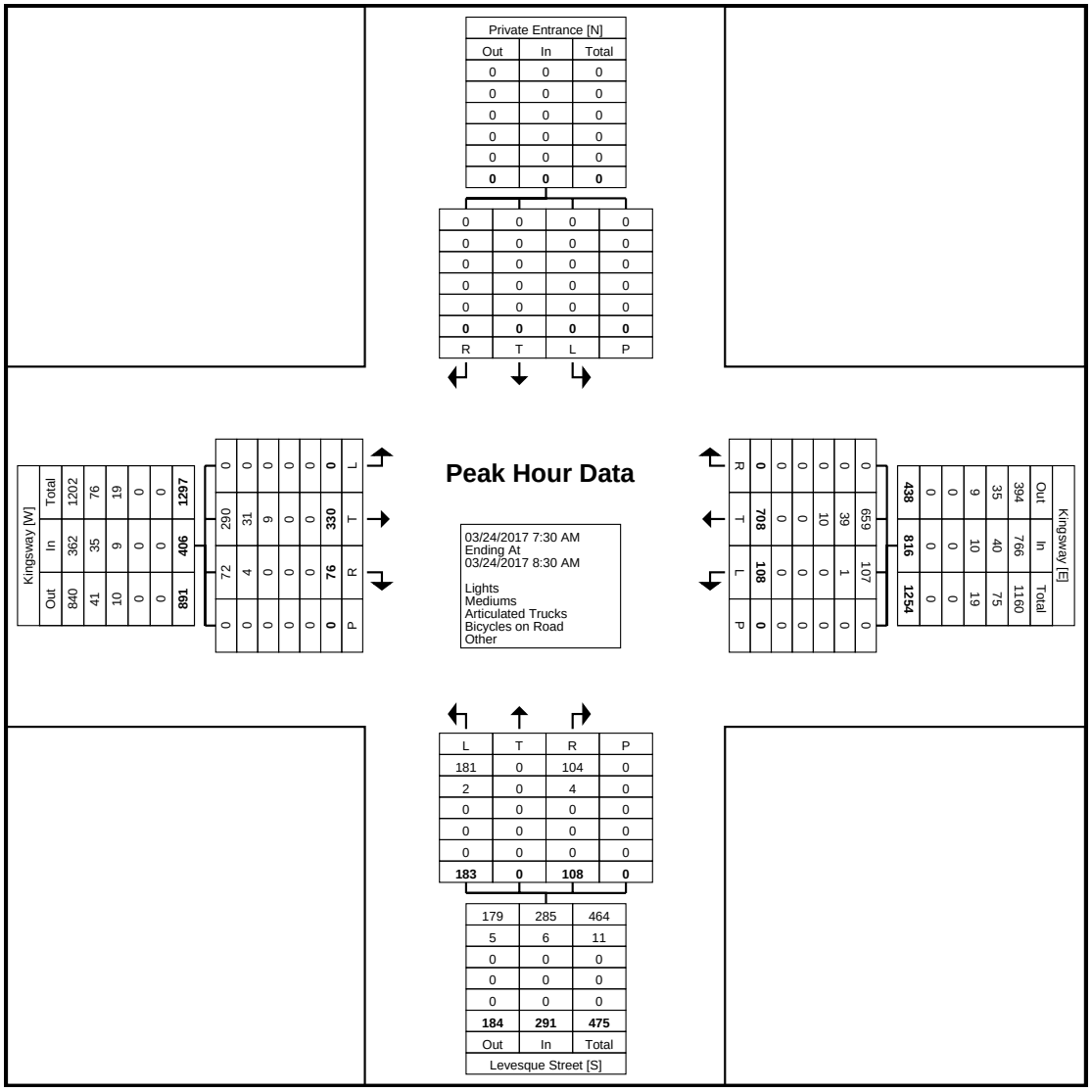
Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Private Entrance Southbound					Kingsway Westbound					Levesque Street Northbound					Kingsway Eastbound					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
7:30 AM	0	0	0	0	0	0	183	33	0	216	29	0	53	0	82	17	86	0	0	103	401
7:45 AM	0	0	0	0	0	0	199	31	0	230	32	0	42	0	74	20	94	0	0	114	418
8:00 AM	0	0	0	0	0	0	192	30	0	222	16	0	40	0	56	21	78	0	0	99	377
8:15 AM	0	0	0	0	0	0	134	14	0	148	31	0	48	0	79	18	72	0	0	90	317
Total	0	0	0	0	0	0	708	108	0	816	108	0	183	0	291	76	330	0	0	406	1513
Approach %	0.0	0.0	0.0	-	-	0.0	86.8	13.2	-	-	37.1	0.0	62.9	-	-	18.7	81.3	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	0.0	46.8	7.1	-	53.9	7.1	0.0	12.1	-	19.2	5.0	21.8	0.0	-	26.8	-
PHF	0.000	0.000	0.000	-	0.000	0.000	0.889	0.818	-	0.887	0.844	0.000	0.863	-	0.887	0.905	0.878	0.000	-	0.890	0.905
Lights	0	0	0	-	0	0	659	107	-	766	104	0	181	-	285	72	290	0	-	362	1413
% Lights	-	-	-	-	-	-	93.1	99.1	-	93.9	96.3	-	98.9	-	97.9	94.7	87.9	-	-	89.2	93.4
Mediums	0	0	0	-	0	0	39	1	-	40	4	0	2	-	6	4	31	0	-	35	81
% Mediums	-	-	-	-	-	-	5.5	0.9	-	4.9	3.7	-	1.1	-	2.1	5.3	9.4	-	-	8.6	5.4
Articulated Trucks	0	0	0	-	0	0	10	0	-	10	0	0	0	-	0	0	9	0	-	9	19
% Articulated Trucks	-	-	-	-	-	-	1.4	0.0	-	1.2	0.0	-	0.0	-	0.0	0.0	2.7	-	-	2.2	1.3
Bicycles on Road	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	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017



Turning Movement Peak Hour Data Plot (7:30 AM)

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

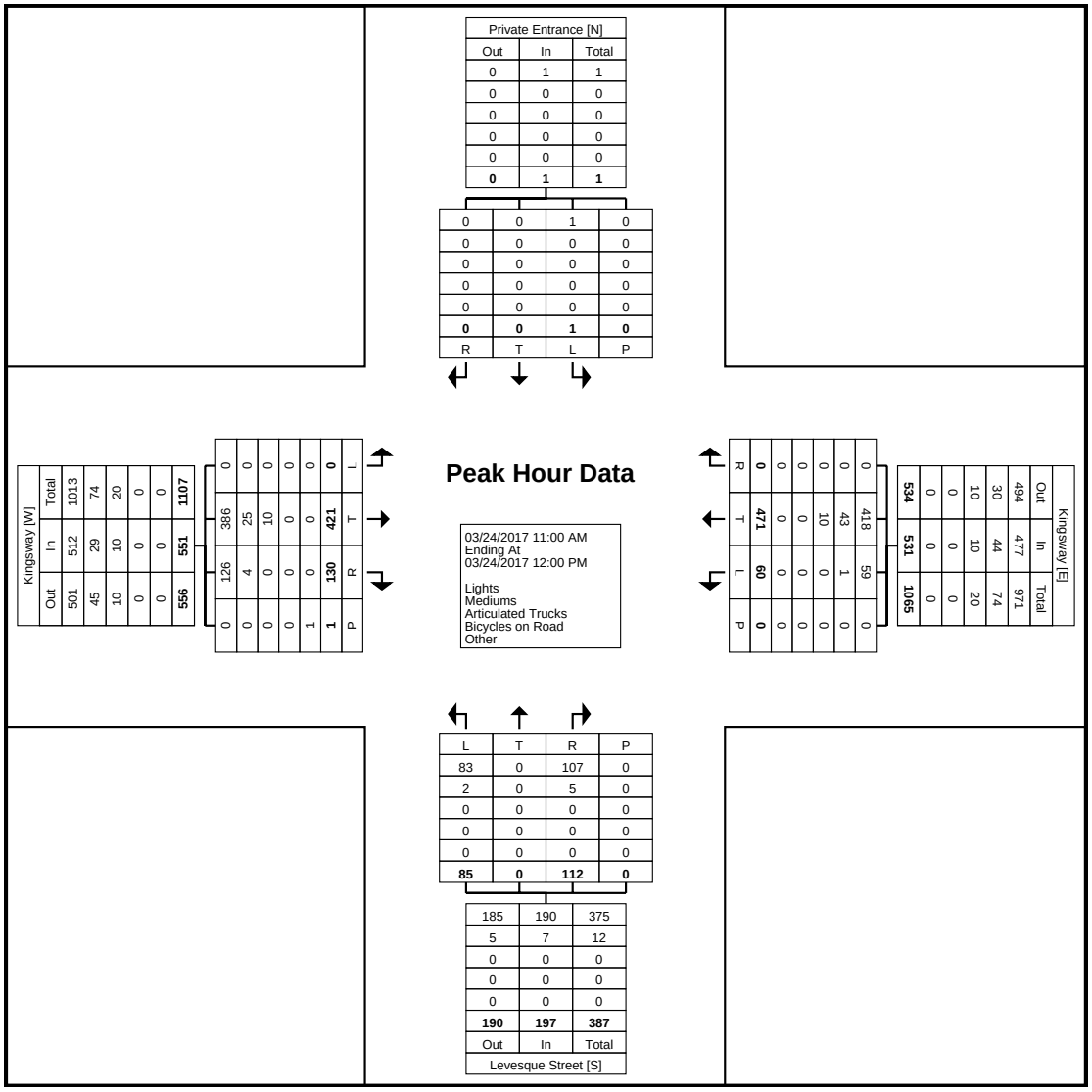
Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017

Turning Movement Peak Hour Data (11:00 AM)

Start Time	Private Entrance Southbound					Kingsway Westbound					Levesque Street Northbound					Kingsway Eastbound					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
11:00 AM	0	0	0	0	0	0	107	19	0	126	23	0	17	0	40	30	98	0	0	128	294
11:15 AM	0	0	0	0	0	0	114	18	0	132	21	0	18	0	39	30	105	0	1	135	306
11:30 AM	0	0	0	0	0	0	109	17	0	126	38	0	29	0	67	30	113	0	0	143	336
11:45 AM	0	0	1	0	1	0	141	6	0	147	30	0	21	0	51	40	105	0	0	145	344
Total	0	0	1	0	1	0	471	60	0	531	112	0	85	0	197	130	421	0	1	551	1280
Approach %	0.0	0.0	100.0	-	-	0.0	88.7	11.3	-	-	56.9	0.0	43.1	-	-	23.6	76.4	0.0	-	-	-
Total %	0.0	0.0	0.1	-	0.1	0.0	36.8	4.7	-	41.5	8.8	0.0	6.6	-	15.4	10.2	32.9	0.0	-	43.0	-
PHF	0.000	0.000	0.250	-	0.250	0.000	0.835	0.789	-	0.903	0.737	0.000	0.733	-	0.735	0.813	0.931	0.000	-	0.950	0.930
Lights	0	0	1	-	1	0	418	59	-	477	107	0	83	-	190	126	386	0	-	512	1180
% Lights	-	-	100.0	-	100.0	-	88.7	98.3	-	89.8	95.5	-	97.6	-	96.4	96.9	91.7	-	-	92.9	92.2
Mediums	0	0	0	-	0	0	43	1	-	44	5	0	2	-	7	4	25	0	-	29	80
% Mediums	-	-	0.0	-	0.0	-	9.1	1.7	-	8.3	4.5	-	2.4	-	3.6	3.1	5.9	-	-	5.3	6.3
Articulated Trucks	0	0	0	-	0	0	10	0	-	10	0	0	0	-	0	0	10	0	-	10	20
% Articulated Trucks	-	-	0.0	-	0.0	-	2.1	0.0	-	1.9	0.0	-	0.0	-	0.0	0.0	2.4	-	-	1.8	1.6
Bicycles on Road	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	-	0.0	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017



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

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

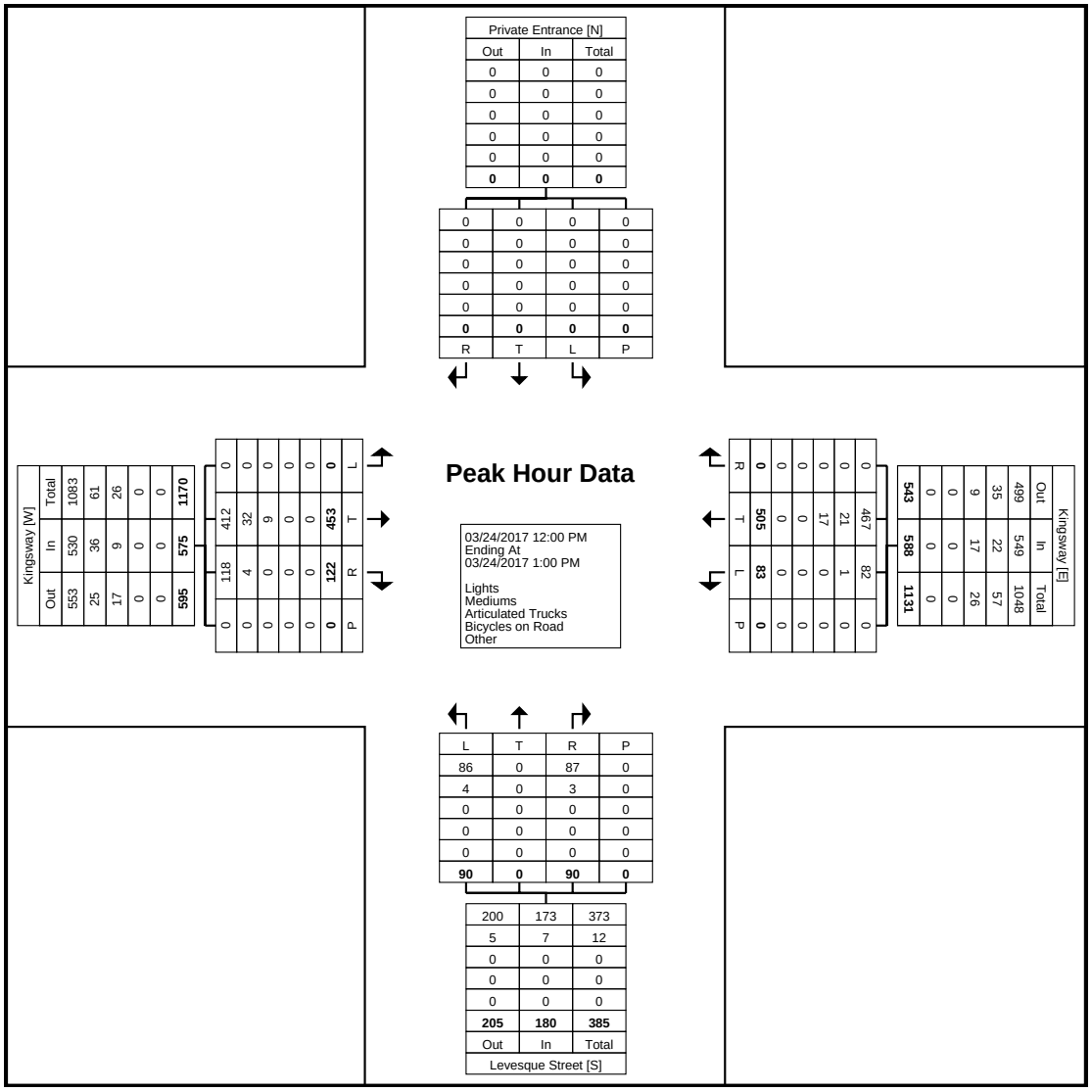
Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Private Entrance Southbound					Kingsway Westbound					Levesque Street Northbound					Kingsway Eastbound					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
12:00 PM	0	0	0	0	0	0	138	21	0	159	25	0	20	0	45	38	112	0	0	150	354
12:15 PM	0	0	0	0	0	0	129	21	0	150	17	0	25	0	42	24	119	0	0	143	335
12:30 PM	0	0	0	0	0	0	126	19	0	145	25	0	20	0	45	32	105	0	0	137	327
12:45 PM	0	0	0	0	0	0	112	22	0	134	23	0	25	0	48	28	117	0	0	145	327
Total	0	0	0	0	0	0	505	83	0	588	90	0	90	0	180	122	453	0	0	575	1343
Approach %	0.0	0.0	0.0	-	-	0.0	85.9	14.1	-	-	50.0	0.0	50.0	-	-	21.2	78.8	0.0	-	-	-
Total %	0.0	0.0	0.0	-	0.0	0.0	37.6	6.2	-	43.8	6.7	0.0	6.7	-	13.4	9.1	33.7	0.0	-	42.8	-
PHF	0.000	0.000	0.000	-	0.000	0.000	0.915	0.943	-	0.925	0.900	0.000	0.900	-	0.938	0.803	0.952	0.000	-	0.958	0.948
Lights	0	0	0	-	0	0	467	82	-	549	87	0	86	-	173	118	412	0	-	530	1252
% Lights	-	-	-	-	-	-	92.5	98.8	-	93.4	96.7	-	95.6	-	96.1	96.7	90.9	-	-	92.2	93.2
Mediums	0	0	0	-	0	0	21	1	-	22	3	0	4	-	7	4	32	0	-	36	65
% Mediums	-	-	-	-	-	-	4.2	1.2	-	3.7	3.3	-	4.4	-	3.9	3.3	7.1	-	-	6.3	4.8
Articulated Trucks	0	0	0	-	0	0	17	0	-	17	0	0	0	-	0	0	9	0	-	9	26
% Articulated Trucks	-	-	-	-	-	-	3.4	0.0	-	2.9	0.0	-	0.0	-	0.0	0.0	2.0	-	-	1.6	1.9
Bicycles on Road	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	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017



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

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Private Entrance Southbound					Kingsway Westbound					Levesque Street Northbound					Kingsway Eastbound					
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
4:30 PM	0	0	0	0	0	0	138	22	0	160	29	0	20	0	49	38	199	0	0	237	446
4:45 PM	0	0	0	0	0	0	177	18	0	195	27	0	17	0	44	47	215	1	0	263	502
5:00 PM	0	0	0	0	0	0	151	19	0	170	28	0	19	0	47	44	216	0	0	260	477
5:15 PM	1	0	0	0	1	1	149	18	0	168	33	0	19	0	52	60	187	0	0	247	468
Total	1	0	0	0	1	1	615	77	0	693	117	0	75	0	192	189	817	1	0	1007	1893
Approach %	100.0	0.0	0.0	-	-	0.1	88.7	11.1	-	-	60.9	0.0	39.1	-	-	18.8	81.1	0.1	-	-	-
Total %	0.1	0.0	0.0	-	0.1	0.1	32.5	4.1	-	36.6	6.2	0.0	4.0	-	10.1	10.0	43.2	0.1	-	53.2	-
PHF	0.250	0.000	0.000	-	0.250	0.250	0.869	0.875	-	0.888	0.886	0.000	0.938	-	0.923	0.788	0.946	0.250	-	0.957	0.943
Lights	1	0	0	-	1	1	587	74	-	662	114	0	75	-	189	186	800	1	-	987	1839
% Lights	100.0	-	-	-	100.0	100.0	95.4	96.1	-	95.5	97.4	-	100.0	-	98.4	98.4	97.9	100.0	-	98.0	97.1
Mediums	0	0	0	-	0	0	20	2	-	22	2	0	0	-	2	3	11	0	-	14	38
% Mediums	0.0	-	-	-	0.0	0.0	3.3	2.6	-	3.2	1.7	-	0.0	-	1.0	1.6	1.3	0.0	-	1.4	2.0
Articulated Trucks	0	0	0	-	0	0	8	1	-	9	1	0	0	-	1	0	6	0	-	6	16
% Articulated Trucks	0.0	-	-	-	0.0	0.0	1.3	1.3	-	1.3	0.9	-	0.0	-	0.5	0.0	0.7	0.0	-	0.6	0.8
Bicycles on Road	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	0.0	-	0.0	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Traffic and Transportation Engineering Services
1800 Frobisher Street
PO Box 5000, STN A
Sudbury, Ontario, Canada P3A 5P3
705-674-4455

Count Name: Kingsway @ Levesque
Site Code: 00577103
Start Date: 03/24/2017

Private Entrance [N]		
Out	In	Total
2	1	3
0	0	0
0	0	0
0	0	0
0	0	0
2	**1**	**3**

1	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	**0**	**0**	**0**
R	T	L	P

Kingsway [W]			
	Out	In	Total
	663	987	1650
	20	14	34
	8	6	14
	0	0	0
	0	0	0
	691	**1007**	**1698**

0	186	800	1
0	3	11	0
0	0	0	0
0	0	0	0
0	0	0	0
0	**189**	**817**	**1**
P	R	T	L

Peak Hour Data

03/24/2017 4:30 PM
Ending At
03/24/2017 5:30 PM

Lights
Mediums
Articulated Trucks
Bicycles on Road
Other

R	T	L	P
1	615	77	0
0	0	0	0
0	0	0	0
0	8	1	0
0	20	2	0
1	587	74	0

Kingsway [E]		
Out	In	Total
914	662	1576
13	22	35
7	9	16
0	0	0
0	0	0
934	**693**	**1627**

L	T	R	P
75	0	114	0
0	0	2	0
0	0	1	0
0	0	0	0
0	0	0	0
75	**0**	**117**	**0**

260	189	449
5	2	7
1	1	2
0	0	0
0	0	0
266	**192**	**458**
Out	In	Total
Levesque Street [S]		

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

Appendix B:
Existing Operations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	114	1	0	188	1	1	0	0	2	0	13
Future Volume (Veh/h)	4	114	1	0	188	1	1	0	0	2	0	13
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)	4	124	1	0	204	1	1	0	0	2	0	14
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	205			125			351	338	124	337	338	204
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	205			125			351	338	124	337	338	204
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	100	100	98
cM capacity (veh/h)	1366			1462			592	582	926	615	582	836

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	129	205	1	16
Volume Left	4	0	1	2
Volume Right	1	1	0	14
cSH	1366	1462	592	800
Volume to Capacity	0.00	0.00	0.00	0.02
Queue Length 95th (m)	0.1	0.0	0.0	0.5
Control Delay (s)	0.3	0.0	11.1	9.6
Lane LOS	A		B	A
Approach Delay (s)	0.3	0.0	11.1	9.6
Approach LOS			B	A

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	87	29	82	22	18	107
Future Volume (Veh/h)	87	29	82	22	18	107
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)	95	32	89	24	20	116
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	113				323	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	113				323	101
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				97	88
cM capacity (veh/h)	1476				628	954

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	127	113	136
Volume Left	95	0	20
Volume Right	0	24	116
cSH	1476	1700	886
Volume to Capacity	0.06	0.07	0.15
Queue Length 95th (m)	1.6	0.0	4.3
Control Delay (s)	5.8	0.0	9.8
Lane LOS	A		A
Approach Delay (s)	5.8	0.0	9.8
Approach LOS			A

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	27.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	345	79	114	740	0	191	0	114	0	0	0
Future Volume (vph)	0	345	79	114	740	0	191	0	114	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.38	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	707	3539			1770	1583			
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	375	86	124	804	0	208	0	124	0	0	0
RTOR Reduction (vph)	0	0	66	0	0	0	0	0	78	0	0	0
Lane Group Flow (vph)	0	375	20	124	804	0	0	208	46	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		11.4	11.4	20.9	20.9			18.2	18.2			
Effective Green, g (s)		11.4	11.4	20.9	20.9			18.2	18.2			
Actuated g/C Ratio		0.23	0.23	0.43	0.43			0.37	0.37			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		821	367	409	1506			656	586			
v/s Ratio Prot		0.11		0.03	c0.23			c0.12				
v/s Ratio Perm			0.01	0.10					0.03			
v/c Ratio		0.46	0.05	0.30	0.53			0.32	0.08			
Uniform Delay, d1		16.2	14.7	8.9	10.5			11.0	10.0			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		0.4	0.1	0.4	0.4			1.3	0.3			
Delay (s)		16.6	14.7	9.4	10.8			12.3	10.3			
Level of Service		B	B	A	B			B	B			
Approach Delay (s)		16.2			10.6			11.5			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	238	2	1	151	3	1	0	1	2	0	8
Future Volume (Veh/h)	14	238	2	1	151	3	1	0	1	2	0	8
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)	15	259	2	1	164	3	1	0	1	2	0	9
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	167			261			466	459	260	458	458	166
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	167			261			466	459	260	458	458	166
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	100	100	99
cM capacity (veh/h)	1411			1303			497	493	779	508	493	879

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	276	168	2	11
Volume Left	15	1	1	2
Volume Right	2	3	1	9
cSH	1411	1303	607	776
Volume to Capacity	0.01	0.00	0.00	0.01
Queue Length 95th (m)	0.3	0.0	0.1	0.3
Control Delay (s)	0.5	0.1	11.0	9.7
Lane LOS	A	A	B	A
Approach Delay (s)	0.5	0.1	11.0	9.7
Approach LOS			B	A

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	32.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	95	146	63	6	24	91
Future Volume (Veh/h)	95	146	63	6	24	91
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)	103	159	68	7	26	99
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	75				436	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	75				436	72
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				95	90
cM capacity (veh/h)	1524				538	991

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	262	75	125
Volume Left	103	0	26
Volume Right	0	7	99
cSH	1524	1700	843
Volume to Capacity	0.07	0.04	0.15
Queue Length 95th (m)	1.7	0.0	4.2
Control Delay (s)	3.3	0.0	10.0
Lane LOS	A		B
Approach Delay (s)	3.3	0.0	10.0
Approach LOS			B

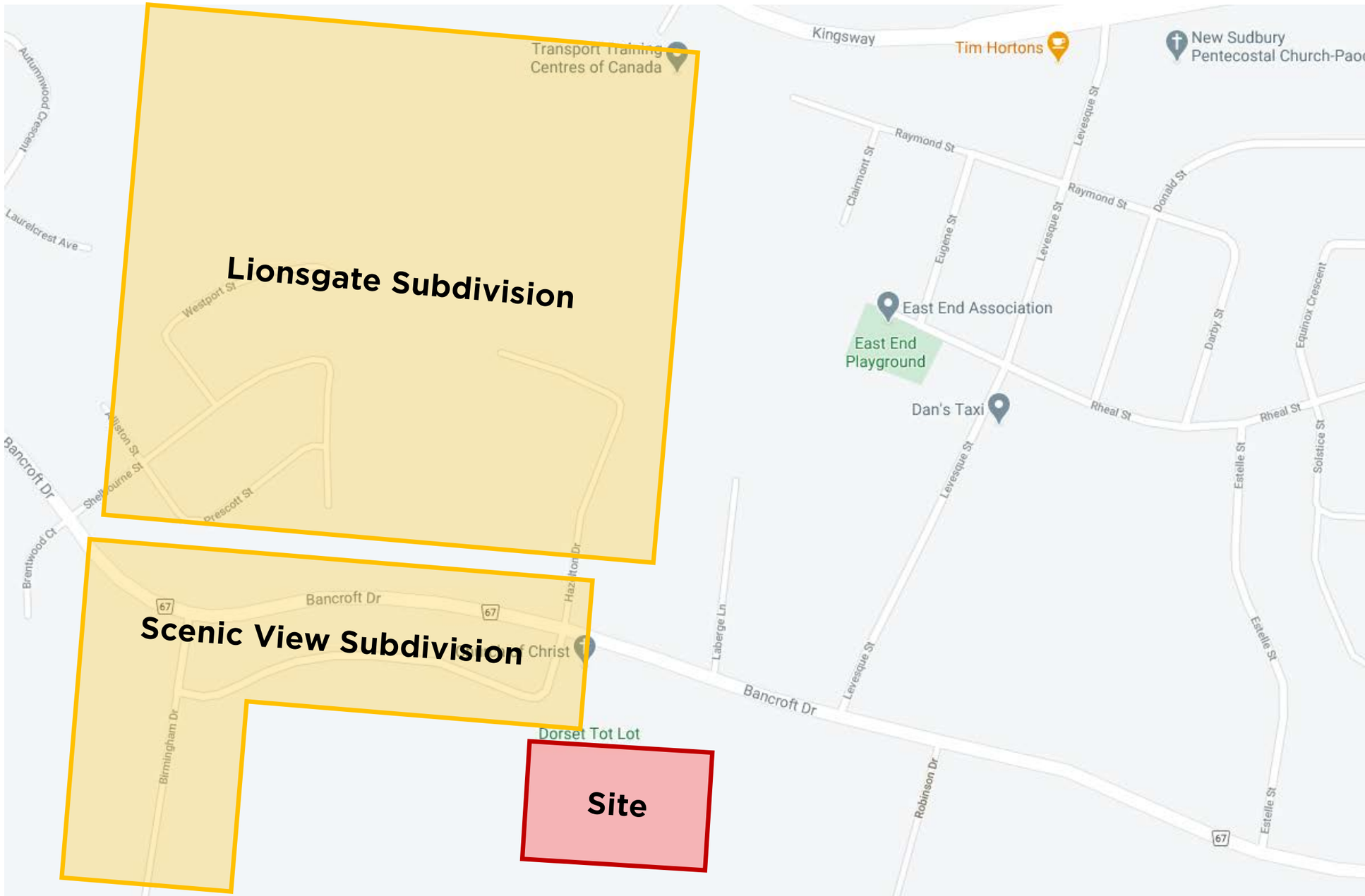
Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	854	198	82	643	0	78	0	123	0	0	0
Future Volume (vph)	0	854	198	82	643	0	78	0	123	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.17	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	316	3539			1770	1583			
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	928	215	89	699	0	85	0	134	0	0	0
RTOR Reduction (vph)	0	0	142	0	0	0	0	0	90	0	0	0
Lane Group Flow (vph)	0	928	73	89	699	0	0	85	44	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		19.1	19.1	27.5	27.5			18.6	18.6			
Effective Green, g (s)		19.1	19.1	27.5	27.5			18.6	18.6			
Actuated g/C Ratio		0.34	0.34	0.49	0.49			0.33	0.33			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		1204	538	255	1734			586	524			
v/s Ratio Prot		c0.26		0.02	c0.20			c0.05				
v/s Ratio Perm			0.05	0.15					0.03			
v/c Ratio		0.77	0.14	0.35	0.40			0.15	0.08			
Uniform Delay, d1		16.5	12.8	9.5	9.1			13.2	12.9			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		3.1	0.1	0.8	0.2			0.5	0.3			
Delay (s)		19.7	12.9	10.3	9.2			13.7	13.2			
Level of Service		B	B	B	A			B	B			
Approach Delay (s)		18.4			9.4			13.4			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

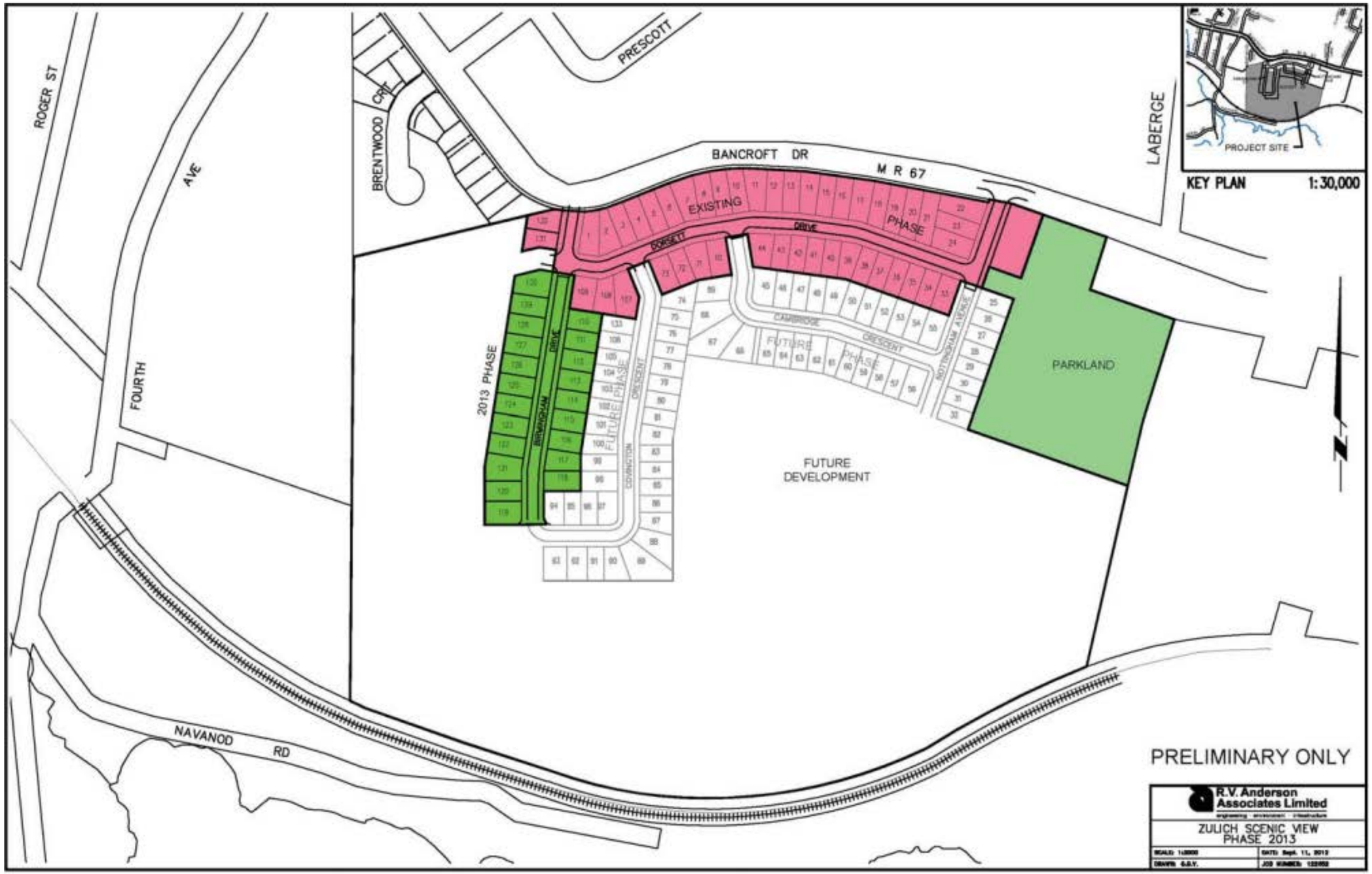
c Critical Lane Group

Appendix C:
Background Development



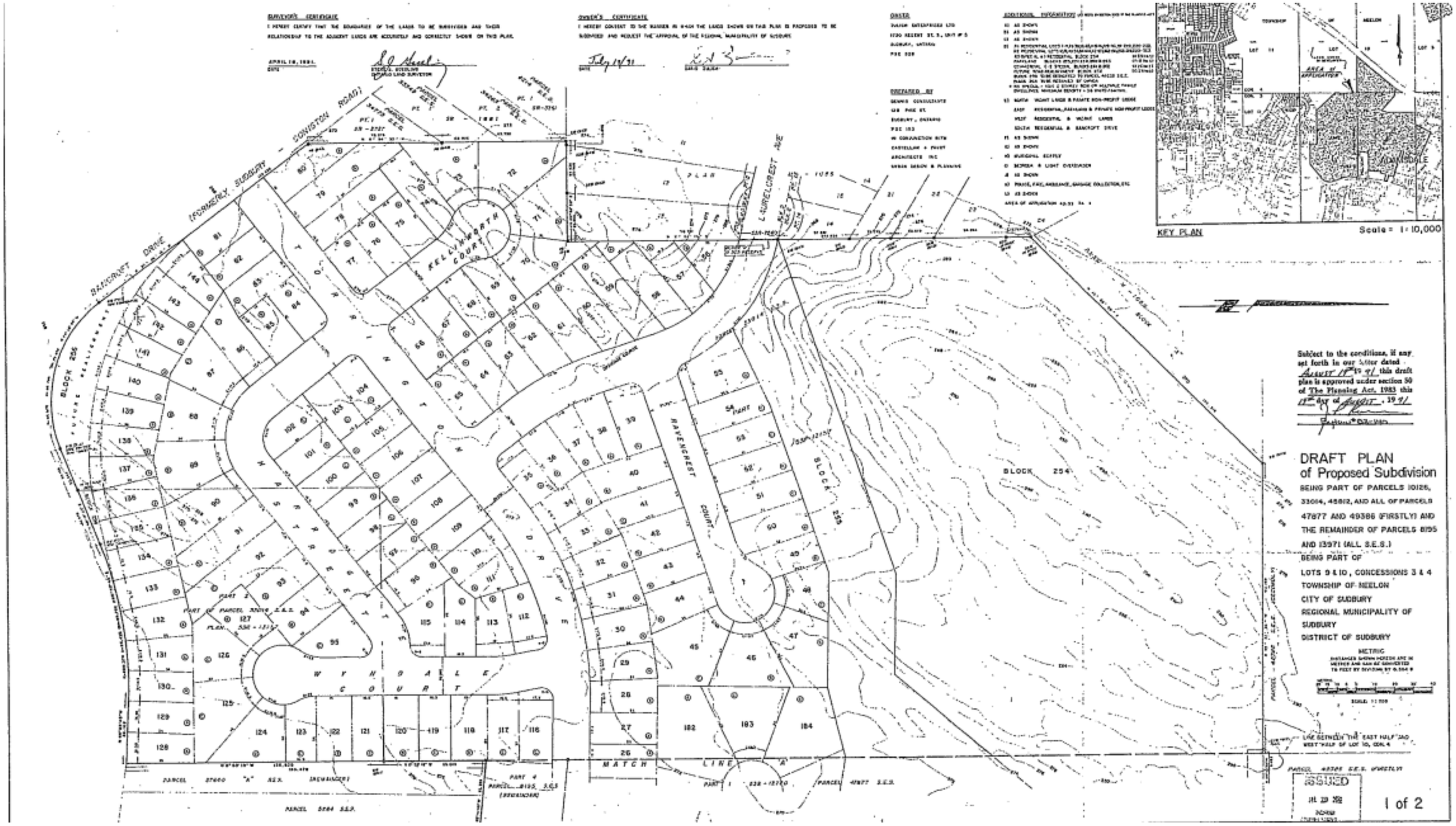
Extendicare LTC Development

Appendix C: Development Map



Extendicare LTC Development

Appendix C: Scenic View Subdivision Site Plan

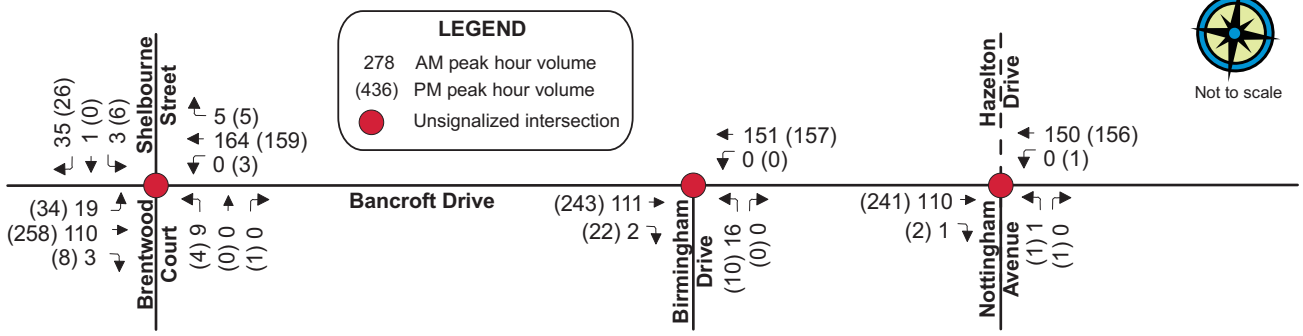


Extendicare LTC Development

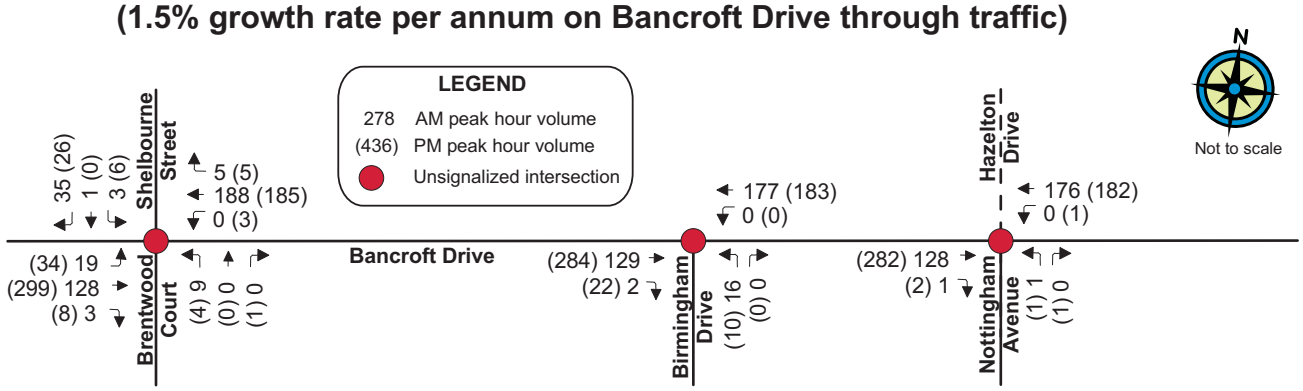
Appendix C: Lionsgate Subdivision Site Plan

EXHIBIT 2.2: BACKGROUND TRAFFIC VOLUMES

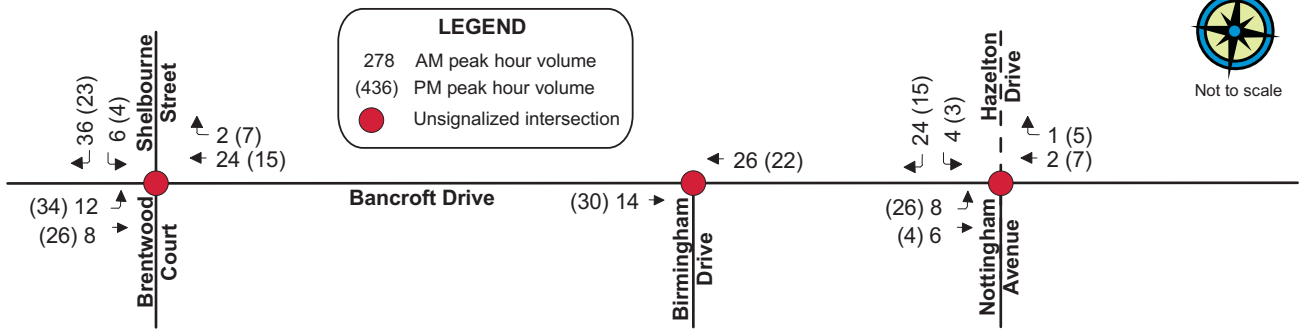
a) Existing Traffic Volumes



b) 2022 Background Growth
(1.5% growth rate per annum on Bancroft Drive through traffic)



c) 2022 Background Growth (Hazelton Development)



d) 2022 Total Background Traffic Volumes

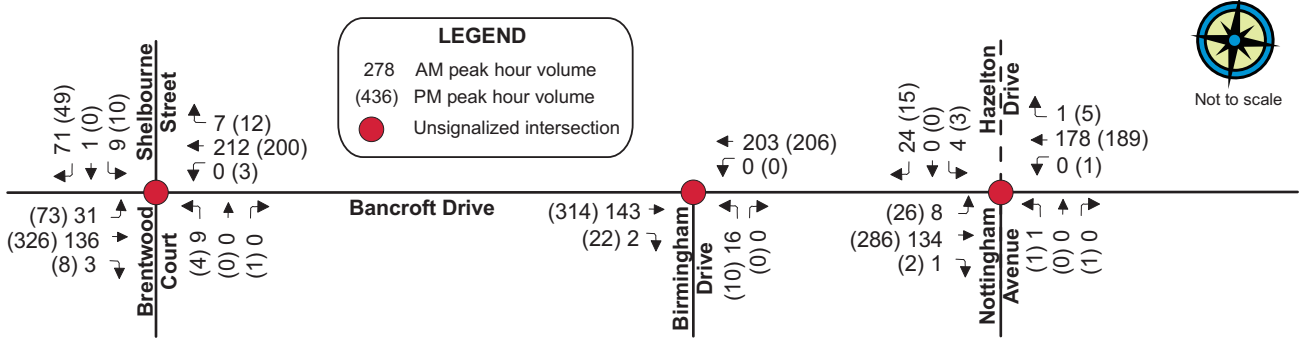
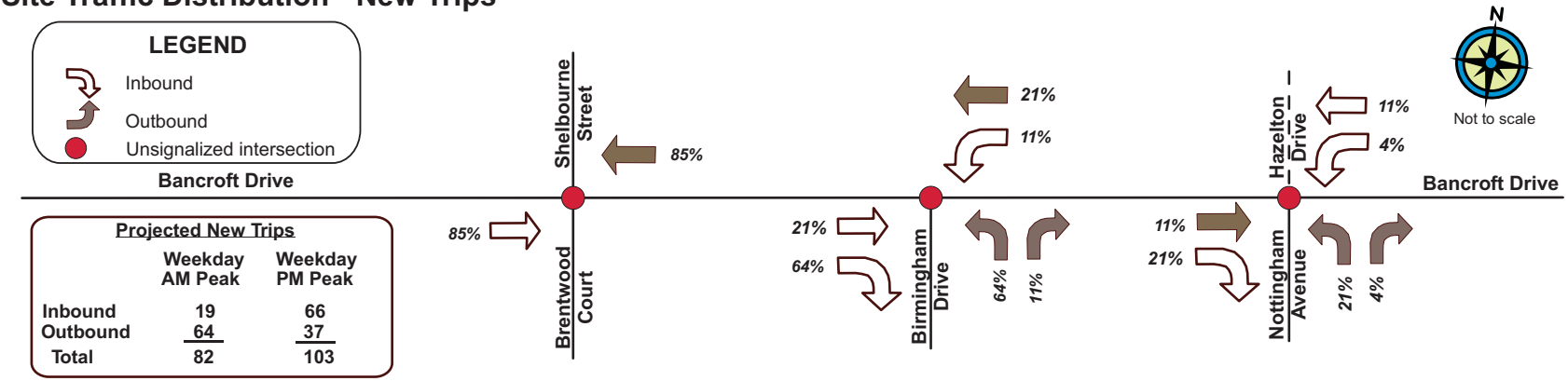


EXHIBIT 3.1: SITE TRAFFIC

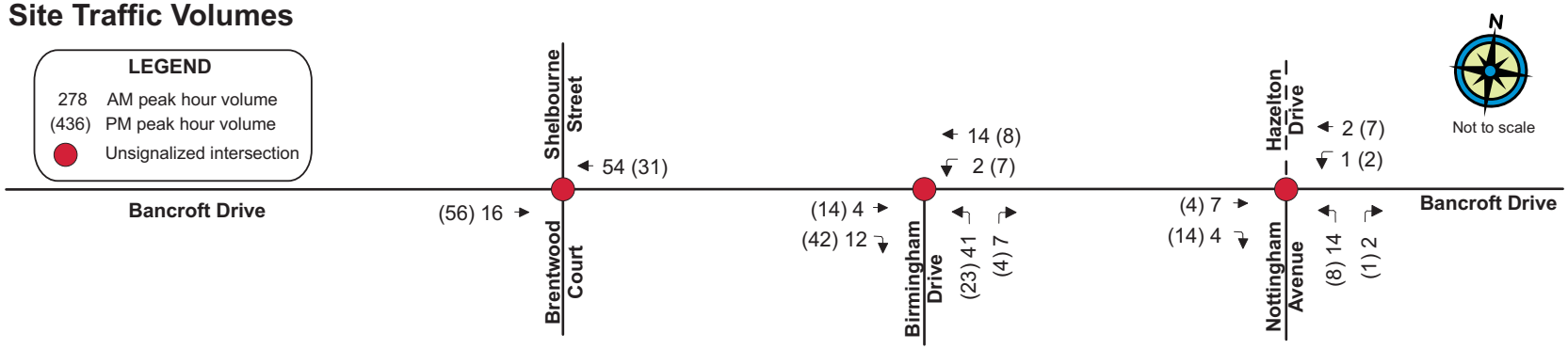
a) Site Traffic Distribution - New Trips



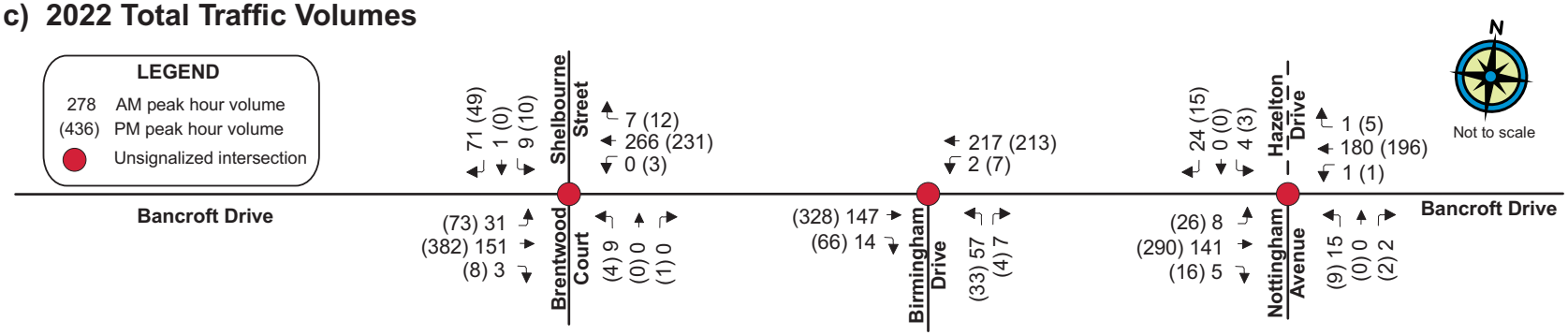
Projected New Trips

	Weekday AM Peak	Weekday PM Peak
Inbound	19	66
Outbound	64	37
Total	82	103

b) Site Traffic Volumes



c) 2022 Total Traffic Volumes



Appendix D:
Future Background Operations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	136	5	1	207	2	15	0	2	6	0	38
Future Volume (Veh/h)	13	136	5	1	207	2	15	0	2	6	0	38
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)	14	148	5	1	225	2	16	0	2	7	0	41
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	227			153			448	408	150	408	409	226
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	227			153			448	408	150	408	409	226
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	100	99	100	95
cM capacity (veh/h)	1341			1428			491	527	896	547	526	813

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	167	228	18	48
Volume Left	14	1	16	7
Volume Right	5	2	2	41
cSH	1341	1428	517	760
Volume to Capacity	0.01	0.00	0.03	0.06
Queue Length 95th (m)	0.3	0.0	0.9	1.6
Control Delay (s)	0.7	0.0	12.2	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.7	0.0	12.2	10.1
Approach LOS			B	B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	103	41	90	24	19	119
Future Volume (Veh/h)	103	41	90	24	19	119
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)	112	45	98	26	21	129
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	124				380	111
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	124				380	111
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				96	86
cM capacity (veh/h)	1463				574	942

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	157	124	150
Volume Left	112	0	21
Volume Right	0	26	129
cSH	1463	1700	865
Volume to Capacity	0.08	0.07	0.17
Queue Length 95th (m)	2.0	0.0	5.0
Control Delay (s)	5.6	0.0	10.0
Lane LOS	A		B
Approach Delay (s)	5.6	0.0	10.0
Approach LOS			B

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	372	86	125	798	0	206	0	132	0	0	0
Future Volume (vph)	0	372	86	125	798	0	206	0	132	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.37	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	692	3539			1770	1583			
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	404	93	136	867	0	224	0	143	0	0	0
RTOR Reduction (vph)	0	0	71	0	0	0	0	0	91	0	0	0
Lane Group Flow (vph)	0	404	22	136	867	0	0	224	52	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		11.9	11.9	21.4	21.4			18.2	18.2			
Effective Green, g (s)		11.9	11.9	21.4	21.4			18.2	18.2			
Actuated g/C Ratio		0.24	0.24	0.43	0.43			0.37	0.37			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		849	379	407	1526			649	580			
v/s Ratio Prot		0.11		0.03	c0.24			c0.13				
v/s Ratio Perm			0.01	0.11					0.03			
v/c Ratio		0.48	0.06	0.33	0.57			0.35	0.09			
Uniform Delay, d1		16.2	14.5	8.9	10.6			11.4	10.3			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		0.4	0.1	0.5	0.5			1.5	0.3			
Delay (s)		16.6	14.6	9.4	11.1			12.8	10.6			
Level of Service		B	B	A	B			B	B			
Approach Delay (s)		16.2			10.9			12.0			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	19.5
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	265	16	3	177	8	9	0	2	5	0	24
Future Volume (Veh/h)	41	265	16	3	177	8	9	0	2	5	0	24
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)	45	288	17	3	192	9	10	0	2	5	0	26
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	201			305			615	594	296	591	598	196
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	201			305			615	594	296	591	598	196
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			97	100	100	99	100	97
cM capacity (veh/h)	1371			1256			381	404	743	406	401	845

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	350	204	12	31
Volume Left	45	3	10	5
Volume Right	17	9	2	26
cSH	1371	1256	414	719
Volume to Capacity	0.03	0.00	0.03	0.04
Queue Length 95th (m)	0.8	0.1	0.7	1.1
Control Delay (s)	1.3	0.1	14.0	10.2
Lane LOS	A	A	B	B
Approach Delay (s)	1.3	0.1	14.0	10.2
Approach LOS			B	B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	108	163	78	7	26	109
Future Volume (Veh/h)	108	163	78	7	26	109
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)	117	177	85	8	28	118
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	93				500	89
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	93				500	89
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				94	88
cM capacity (veh/h)	1501				489	969

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	294	93	146
Volume Left	117	0	28
Volume Right	0	8	118
cSH	1501	1700	816
Volume to Capacity	0.08	0.05	0.18
Queue Length 95th (m)	2.0	0.0	5.2
Control Delay (s)	3.4	0.0	10.4
Lane LOS	A		B
Approach Delay (s)	3.4	0.0	10.4
Approach LOS			B

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	920	213	99	693	0	84	0	139	0	0	0
Future Volume (vph)	1	920	213	99	693	0	84	0	139	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00	1.00			
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)	1770	3539	1583	1770	3539			1770	1583			
Flt Permitted	0.37	1.00	1.00	0.17	1.00			0.95	1.00			
Satd. Flow (perm)	682	3539	1583	316	3539			1770	1583			
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)	1	1000	232	108	753	0	91	0	151	0	0	0
RTOR Reduction (vph)	0	0	153	0	0	0	0	0	101	0	0	0
Lane Group Flow (vph)	1	1000	79	108	753	0	0	91	50	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)	19.1	19.1	19.1	27.5	27.5			18.6	18.6			
Effective Green, g (s)	19.1	19.1	19.1	27.5	27.5			18.6	18.6			
Actuated g/C Ratio	0.34	0.34	0.34	0.49	0.49			0.33	0.33			
Clearance Time (s)	5.0	5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)	232	1204	538	255	1734			586	524			
v/s Ratio Prot		c0.28		0.03	c0.21			c0.05				
v/s Ratio Perm	0.00		0.05	0.18					0.03			
v/c Ratio	0.00	0.83	0.15	0.42	0.43			0.16	0.10			
Uniform Delay, d1	12.2	17.0	12.8	10.0	9.3			13.2	12.9			
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2	0.0	5.0	0.1	1.1	0.2			0.6	0.4			
Delay (s)	12.2	22.0	13.0	11.1	9.4			13.8	13.3			
Level of Service	B	C	B	B	A			B	B			
Approach Delay (s)		20.3			9.6			13.5			0.0	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	145	5	1	222	2	15	0	2	7	0	39
Future Volume (Veh/h)	13	145	5	1	222	2	15	0	2	7	0	39
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)	14	158	5	1	241	2	16	0	2	8	0	42
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	243			163			474	434	160	434	435	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243			163			474	434	160	434	435	242
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			97	100	100	98	100	95
cM capacity (veh/h)	1323			1416			470	510	885	526	509	797

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	177	244	18	50
Volume Left	14	1	16	8
Volume Right	5	2	2	42
cSH	1323	1416	496	736
Volume to Capacity	0.01	0.00	0.04	0.07
Queue Length 95th (m)	0.3	0.0	0.9	1.7
Control Delay (s)	0.7	0.0	12.5	10.2
Lane LOS	A	A	B	B
Approach Delay (s)	0.7	0.0	12.5	10.2
Approach LOS			B	B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	28.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	110	43	97	25	21	128
Future Volume (Veh/h)	110	43	97	25	21	128
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)	120	47	105	27	23	139
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	132				406	118
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	132				406	118
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				96	85
cM capacity (veh/h)	1453				552	933

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	167	132	162
Volume Left	120	0	23
Volume Right	0	27	139
cSH	1453	1700	850
Volume to Capacity	0.08	0.08	0.19
Queue Length 95th (m)	2.2	0.0	5.6
Control Delay (s)	5.7	0.0	10.2
Lane LOS	A		B
Approach Delay (s)	5.7	0.0	10.2
Approach LOS			B

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	400	92	135	859	0	222	0	142	0	0	0
Future Volume (vph)	0	400	92	135	859	0	222	0	142	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.35	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	655	3539			1770	1583			
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	435	100	147	934	0	241	0	154	0	0	0
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	98	0	0	0
Lane Group Flow (vph)	0	435	25	147	934	0	0	241	56	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		12.4	12.4	21.9	21.9			18.2	18.2			
Effective Green, g (s)		12.4	12.4	21.9	21.9			18.2	18.2			
Actuated g/C Ratio		0.25	0.25	0.44	0.44			0.36	0.36			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		875	391	397	1546			642	575			
v/s Ratio Prot		0.12		0.04	c0.26			c0.14				
v/s Ratio Perm			0.02	0.12					0.04			
v/c Ratio		0.50	0.06	0.37	0.60			0.38	0.10			
Uniform Delay, d1		16.2	14.4	9.0	10.8			11.8	10.5			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		0.4	0.1	0.6	0.7			1.7	0.3			
Delay (s)		16.6	14.5	9.5	11.5			13.4	10.9			
Level of Service		B	B	A	B			B	B			
Approach Delay (s)		16.2			11.2			12.4			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	285	16	3	189	8	9	0	2	5	0	25
Future Volume (Veh/h)	43	285	16	3	189	8	9	0	2	5	0	25
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)	47	310	17	3	205	9	10	0	2	5	0	27
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	214			327			655	632	318	630	636	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			327			655	632	318	630	636	210
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			97	100	100	99	100	97
cM capacity (veh/h)	1356			1233			357	383	722	382	381	831

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	374	217	12	32
Volume Left	47	3	10	5
Volume Right	17	9	2	27
cSH	1356	1233	389	702
Volume to Capacity	0.03	0.00	0.03	0.05
Queue Length 95th (m)	0.9	0.1	0.8	1.1
Control Delay (s)	1.3	0.1	14.5	10.4
Lane LOS	A	A	B	B
Approach Delay (s)	1.3	0.1	14.5	10.4
Approach LOS			B	B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	116	175	83	7	21	128
Future Volume (Veh/h)	116	175	83	7	21	128
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)	126	190	90	8	23	139
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	98				536	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98				536	94
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				95	86
cM capacity (veh/h)	1495				463	963

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	316	98	162
Volume Left	126	0	23
Volume Right	0	8	139
cSH	1495	1700	835
Volume to Capacity	0.08	0.06	0.19
Queue Length 95th (m)	2.2	0.0	5.7
Control Delay (s)	3.5	0.0	10.3
Lane LOS	A		B
Approach Delay (s)	3.5	0.0	10.3
Approach LOS			B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	991	229	106	746	0	91	0	149	0	0	0
Future Volume (vph)	0	991	229	106	746	0	91	0	149	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.13	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	238	3539			1770	1583			
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	1077	249	115	811	0	99	0	162	0	0	0
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	115	0	0	0
Lane Group Flow (vph)	0	1077	106	115	811	0	0	99	47	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		27.3	27.3	35.6	35.6			18.7	18.7			
Effective Green, g (s)		27.3	27.3	35.6	35.6			18.7	18.7			
Actuated g/C Ratio		0.42	0.42	0.55	0.55			0.29	0.29			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		1502	672	222	1959			514	460			
v/s Ratio Prot		c0.30		0.03	c0.23			c0.06				
v/s Ratio Perm			0.07	0.26					0.03			
v/c Ratio		0.72	0.16	0.52	0.41			0.19	0.10			
Uniform Delay, d1		15.3	11.4	9.6	8.3			17.1	16.7			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		1.7	0.1	2.0	0.1			0.8	0.4			
Delay (s)		17.0	11.5	11.6	8.5			18.0	17.1			
Level of Service		B	B	B	A			B	B			
Approach Delay (s)		15.9			8.8			17.4			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	19.5
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Appendix E:
Future Total Operations

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	136	38	7	207	2	34	0	5	6	0	38
Future Volume (Veh/h)	13	136	38	7	207	2	34	0	5	6	0	38
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)	14	148	41	8	225	2	37	0	5	7	0	41
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	227			189			480	440	168	444	459	226
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	227			189			480	440	168	444	459	226
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			92	100	99	99	100	95
cM capacity (veh/h)	1341			1385			466	503	876	515	491	813

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	203	235	42	48
Volume Left	14	8	37	7
Volume Right	41	2	5	41
cSH	1341	1385	493	750
Volume to Capacity	0.01	0.01	0.09	0.06
Queue Length 95th (m)	0.3	0.1	2.2	1.6
Control Delay (s)	0.6	0.3	13.0	10.1
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	0.3	13.0	10.1
Approach LOS			B	B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	105	42	93	24	19	122
Future Volume (Veh/h)	105	42	93	24	19	122
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)	114	46	101	26	21	133
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	127				388	114
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	127				388	114
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				96	86
cM capacity (veh/h)	1459				567	939

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	160	127	154
Volume Left	114	0	21
Volume Right	0	26	133
cSH	1459	1700	862
Volume to Capacity	0.08	0.07	0.18
Queue Length 95th (m)	2.0	0.0	5.2
Control Delay (s)	5.6	0.0	10.1
Lane LOS	A		B
Approach Delay (s)	5.6	0.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	372	86	128	798	0	206	0	134	0	0	0
Future Volume (vph)	0	372	86	128	798	0	206	0	134	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.37	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	692	3539			1770	1583			
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	404	93	139	867	0	224	0	146	0	0	0
RTOR Reduction (vph)	0	0	71	0	0	0	0	0	92	0	0	0
Lane Group Flow (vph)	0	404	22	139	867	0	0	224	54	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		11.9	11.9	21.4	21.4			18.2	18.2			
Effective Green, g (s)		11.9	11.9	21.4	21.4			18.2	18.2			
Actuated g/C Ratio		0.24	0.24	0.43	0.43			0.37	0.37			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		849	379	407	1526			649	580			
v/s Ratio Prot		0.11		0.03	c0.24			c0.13				
v/s Ratio Perm			0.01	0.11					0.03			
v/c Ratio		0.48	0.06	0.34	0.57			0.35	0.09			
Uniform Delay, d1		16.2	14.5	8.9	10.6			11.4	10.3			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		0.4	0.1	0.5	0.5			1.5	0.3			
Delay (s)		16.6	14.6	9.4	11.1			12.8	10.6			
Level of Service		B	B	A	B			B	B			
Approach Delay (s)		16.2			10.9			12.0			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	19.5
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	265	43	8	177	8	53	0	10	5	0	24
Future Volume (Veh/h)	41	265	43	8	177	8	53	0	10	5	0	24
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)	45	288	47	9	192	9	58	0	11	5	0	26
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	201			335			642	620	312	627	640	196
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	201			335			642	620	312	627	640	196
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			84	100	98	99	100	97
cM capacity (veh/h)	1371			1224			364	388	729	378	378	845

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	380	210	69	31
Volume Left	45	9	58	5
Volume Right	47	9	11	26
cSH	1371	1224	395	705
Volume to Capacity	0.03	0.01	0.17	0.04
Queue Length 95th (m)	0.8	0.2	5.0	1.1
Control Delay (s)	1.2	0.4	16.0	10.3
Lane LOS	A	A	C	B
Approach Delay (s)	1.2	0.4	16.0	10.3
Approach LOS			C	B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	167	80	7	26	112
Future Volume (Veh/h)	112	167	80	7	26	112
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)	122	182	87	8	28	122
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	95				517	91
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	95				517	91
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				94	87
cM capacity (veh/h)	1499				476	967

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	304	95	150
Volume Left	122	0	28
Volume Right	0	8	122
cSH	1499	1700	811
Volume to Capacity	0.08	0.06	0.19
Queue Length 95th (m)	2.1	0.0	5.4
Control Delay (s)	3.5	0.0	10.4
Lane LOS	A		B
Approach Delay (s)	3.5	0.0	10.4
Approach LOS			B

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	920	213	101	693	0	84	0	143	0	0	0
Future Volume (vph)	0	920	213	101	693	0	84	0	143	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.17	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	316	3539			1770	1583			
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	1000	232	110	753	0	91	0	155	0	0	0
RTOR Reduction (vph)	0	0	153	0	0	0	0	0	104	0	0	0
Lane Group Flow (vph)	0	1000	79	110	753	0	0	91	51	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		19.1	19.1	27.5	27.5			18.6	18.6			
Effective Green, g (s)		19.1	19.1	27.5	27.5			18.6	18.6			
Actuated g/C Ratio		0.34	0.34	0.49	0.49			0.33	0.33			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		1204	538	255	1734			586	524			
v/s Ratio Prot		c0.28		0.03	c0.21			c0.05				
v/s Ratio Perm			0.05	0.18					0.03			
v/c Ratio		0.83	0.15	0.43	0.43			0.16	0.10			
Uniform Delay, d1		17.0	12.8	10.0	9.3			13.2	13.0			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		5.0	0.1	1.2	0.2			0.6	0.4			
Delay (s)		22.0	13.0	11.2	9.4			13.8	13.3			
Level of Service		C	B	B	A			B	B			
Approach Delay (s)		20.3			9.7			13.5			0.0	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	47.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	145	38	7	222	2	34	0	5	7	0	39
Future Volume (Veh/h)	13	145	38	7	222	2	34	0	5	7	0	39
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)	14	158	41	8	241	2	37	0	5	8	0	42
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	243			199			506	466	178	470	485	242
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	243			199			506	466	178	470	485	242
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			92	100	99	98	100	95
cM capacity (veh/h)	1323			1373			446	486	864	495	474	797

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	213	251	42	50
Volume Left	14	8	37	8
Volume Right	41	2	5	42
cSH	1323	1373	473	726
Volume to Capacity	0.01	0.01	0.09	0.07
Queue Length 95th (m)	0.3	0.1	2.3	1.8
Control Delay (s)	0.6	0.3	13.4	10.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.6	0.3	13.4	10.3
Approach LOS			B	B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	112	45	100	25	21	131
Future Volume (Veh/h)	112	45	100	25	21	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)	122	49	109	27	23	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)						
pX, platoon unblocked						
vC, conflicting volume	136				416	122
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	136				416	122
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				96	85
cM capacity (veh/h)	1448				543	929

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	171	136	165
Volume Left	122	0	23
Volume Right	0	27	142
cSH	1448	1700	845
Volume to Capacity	0.08	0.08	0.20
Queue Length 95th (m)	2.2	0.0	5.8
Control Delay (s)	5.7	0.0	10.3
Lane LOS	A		B
Approach Delay (s)	5.7	0.0	10.3
Approach LOS			B

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	400	92	138	859	0	222	0	144	0	0	0
Future Volume (vph)	0	400	92	138	859	0	222	0	144	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.35	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	655	3539			1770	1583			
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	435	100	150	934	0	241	0	157	0	0	0
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	100	0	0	0
Lane Group Flow (vph)	0	435	25	150	934	0	0	241	57	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		12.4	12.4	21.9	21.9			18.2	18.2			
Effective Green, g (s)		12.4	12.4	21.9	21.9			18.2	18.2			
Actuated g/C Ratio		0.25	0.25	0.44	0.44			0.36	0.36			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		875	391	397	1546			642	575			
v/s Ratio Prot		0.12		0.04	c0.26			c0.14				
v/s Ratio Perm			0.02	0.13					0.04			
v/c Ratio		0.50	0.06	0.38	0.60			0.38	0.10			
Uniform Delay, d1		16.2	14.4	9.0	10.8			11.8	10.5			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		0.4	0.1	0.6	0.7			1.7	0.3			
Delay (s)		16.6	14.5	9.6	11.5			13.4	10.9			
Level of Service		B	B	A	B			B	B			
Approach Delay (s)		16.2			11.2			12.4			0.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	19.5
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	43	285	43	8	189	8	53	0	10	5	0	25
Future Volume (Veh/h)	43	285	43	8	189	8	53	0	10	5	0	25
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)	47	310	47	9	205	9	58	0	11	5	0	27
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	214			357			682	660	334	666	678	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			357			682	660	334	666	678	210
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			83	100	98	99	100	97
cM capacity (veh/h)	1356			1202			341	367	708	355	358	831

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	404	223	69	32
Volume Left	47	9	58	5
Volume Right	47	9	11	27
cSH	1356	1202	371	687
Volume to Capacity	0.03	0.01	0.19	0.05
Queue Length 95th (m)	0.9	0.2	5.4	1.2
Control Delay (s)	1.2	0.4	16.9	10.5
Lane LOS	A	A	C	B
Approach Delay (s)	1.2	0.4	16.9	10.5
Approach LOS			C	B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	120	179	85	7	28	119
Future Volume (Veh/h)	120	179	85	7	28	119
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)	130	195	92	8	30	129
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	100				551	96
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	100				551	96
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				93	87
cM capacity (veh/h)	1493				452	960

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	325	100	159
Volume Left	130	0	30
Volume Right	0	8	129
cSH	1493	1700	792
Volume to Capacity	0.09	0.06	0.20
Queue Length 95th (m)	2.3	0.0	6.0
Control Delay (s)	3.5	0.0	10.7
Lane LOS	A		B
Approach Delay (s)	3.5	0.0	10.7
Approach LOS			B

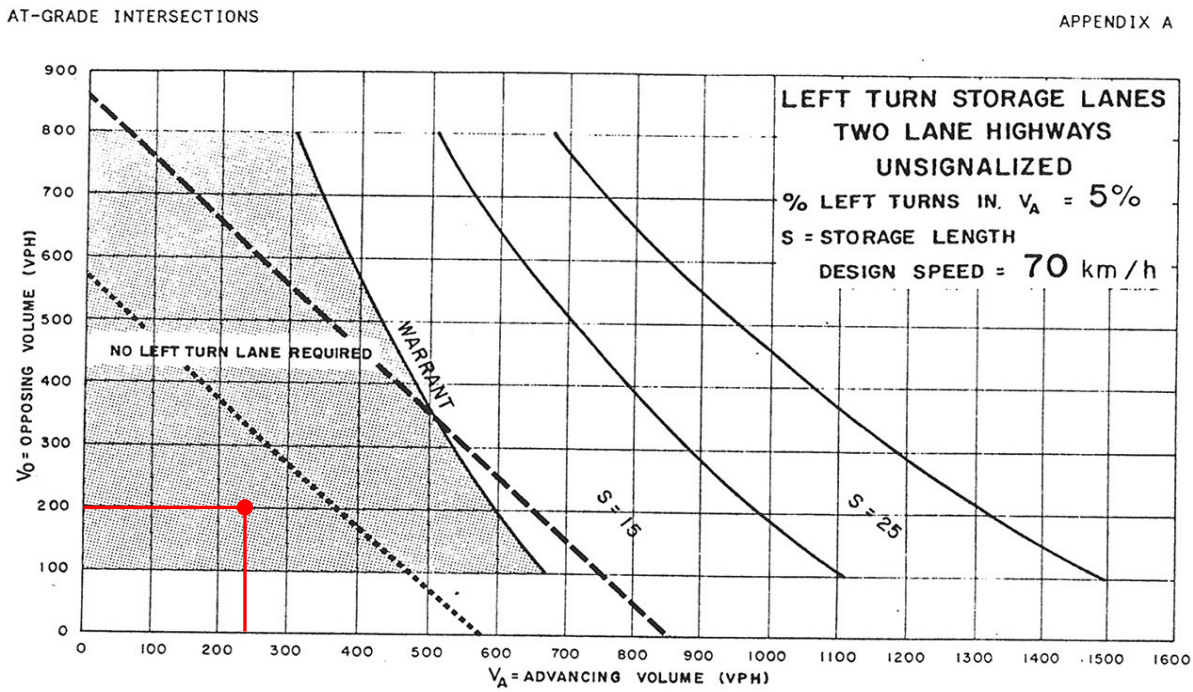
Intersection Summary			
Average Delay	4.9		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	991	229	108	746	0	91	0	153	0	0	0
Future Volume (vph)	0	991	229	108	746	0	91	0	153	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Lane Util. Factor		0.95	1.00	1.00	0.95			1.00	1.00			
Frt		1.00	0.85	1.00	1.00			1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3539	1583	1770	3539			1770	1583			
Flt Permitted		1.00	1.00	0.13	1.00			0.95	1.00			
Satd. Flow (perm)		3539	1583	238	3539			1770	1583			
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	1077	249	117	811	0	99	0	166	0	0	0
RTOR Reduction (vph)	0	0	143	0	0	0	0	0	118	0	0	0
Lane Group Flow (vph)	0	1077	106	117	811	0	0	99	48	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Split	NA	Perm	Perm		
Protected Phases		4		3	8		2	2			6	
Permitted Phases	4		4	8		8			2	6		
Actuated Green, G (s)		27.3	27.3	35.6	35.6			18.7	18.7			
Effective Green, g (s)		27.3	27.3	35.6	35.6			18.7	18.7			
Actuated g/C Ratio		0.42	0.42	0.55	0.55			0.29	0.29			
Clearance Time (s)		5.0	5.0	4.5	5.0			5.0	5.0			
Vehicle Extension (s)		3.0	3.0	3.0	3.0			3.0	3.0			
Lane Grp Cap (vph)		1502	672	222	1959			514	460			
v/s Ratio Prot		c0.30		0.03	c0.23			c0.06				
v/s Ratio Perm			0.07	0.26					0.03			
v/c Ratio		0.72	0.16	0.53	0.41			0.19	0.10			
Uniform Delay, d1		15.3	11.4	9.6	8.3			17.1	16.7			
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00			
Incremental Delay, d2		1.7	0.1	2.3	0.1			0.8	0.5			
Delay (s)		17.0	11.5	11.9	8.5			18.0	17.1			
Level of Service		B	B	B	A			B	B			
Approach Delay (s)		15.9			8.9			17.4			0.0	
Approach LOS		B			A			B			A	

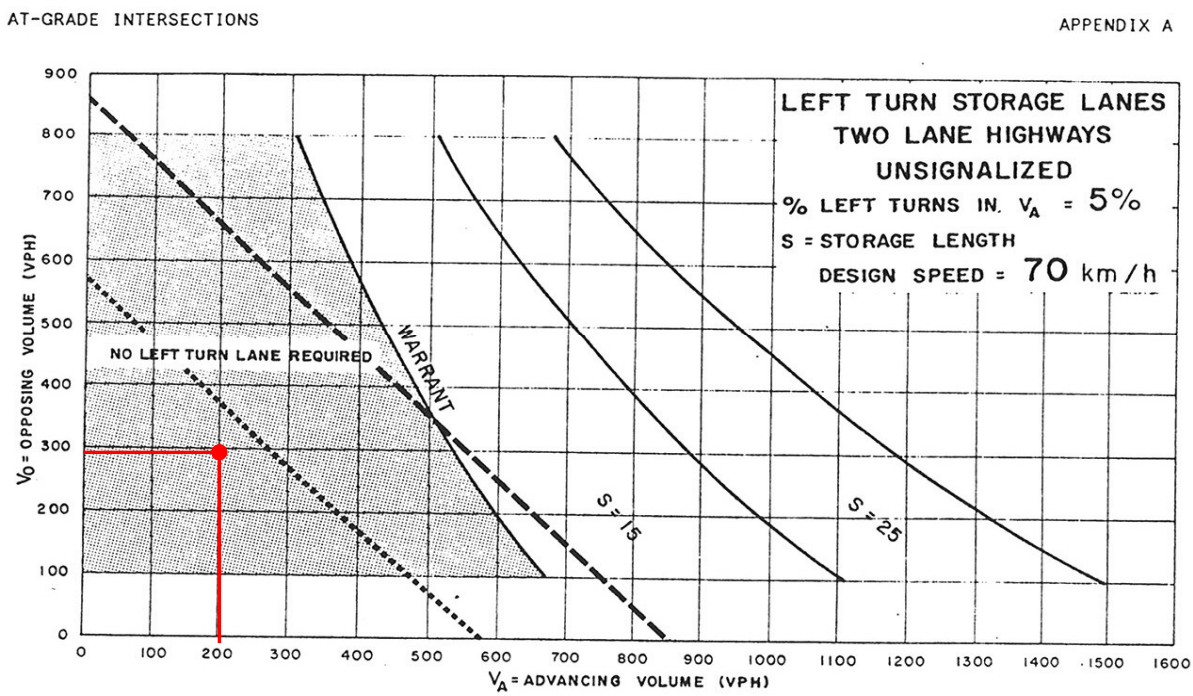
Intersection Summary			
HCM 2000 Control Delay	13.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	19.5
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Appendix F:
Left Turn Warrants



Left Turn Warrant – 2030 Total Conditions – AM Peak Hour



Left Turn Warrant – 2030 Total Conditions – PM Peak Hour