

TRAFFIC IMPACT & PARKING STUDY AND TRANSPORTATION DEMAND MANAGEMENT OPTIONS REPORT

Proposed Mixed Use Development 16 & 18 King Street West Stoney Creek, Hamilton, Ontario

Prepared for: A.J. Clarke and Associates Ltd.

May 2017





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May 11, 2017

c/o A.J. Clarke and Associates Ltd. 25 Main Street West, Suite 300 Hamilton, ON L8P 1H1

Re: 16 & 18 King Street West, Stoney Creek, Hamilton, ON, Proposed Mixed Use Development – Traffic Impact Study and Parking Study and Transportation Demand Management Options Report

TRANS-PLAN is pleased to submit this Traffic Impact & Parking Study and Transportation Demand Management Options Report in support of the proposed mixed use development located at 16 and 18 King Street West in Stoney Creek, Hamilton. The proposed development is an eight-storey building, consisting of 62 residential units on floors two to eight and 222 sq.m. of GFA of commercial uses on the ground floor.

Our traffic impact study findings indicate that no road improvements, apart from the construction of the proposed site access, are required to accommodate the proposed development. Our analysis results note that exiting vehicles making left turns out of the site driveway may see a delay of slightly over a minute during the weekday PM peak hour, which is typical for traffic exiting onto an arterial road.

A field study of similar residential developments (apartments) near the subject site at King Street West were conducted by Trans-Plan to confirm that the proposed parking supply of 66 spaces, less than the City's By-law requirement, would be acceptable, given the site area context and opportunities to travel by transit and other non-auto modes to the site. Our parking study findings indicate that the proposed parking supply, provided at an approximate rate of 1.06 spaces per unit, would be adequate to support the development.

This report follows the City of Hamilton's "TDM for Development" Guidelines, dated June 2015. The plan includes a review of the proposed site plan, a checklist of TDM measures to be reviewed and/or applied, a conceptual layout drawing of existing and future active transportation (pedestrian and cycling) connections between the site and the surrounding roadways, and overall TDM recommendations.

A. SEEGOBIN 100120450

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Sincerely,

Anil Seegobin, P.Eng. Partner, Engineer

Trans-Plan Transportation Inc.
Transportation Consultants

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Transmittal Letter

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1. INTRODUCTION

Trans-Plan has been retained by A. J. Clarke and Associates Ltd. to complete a Traffic Impact and Parking Study and Transportation Demand Management (TDM) Options Report for a proposed 8-storey residential building, with ground floor commercial space, located at 16 and 18 King Street West, Stoney Creek, Hamilton.

The traffic impact study includes the following:

- Review and assessment of the existing road network
- Review of existing and future active transportation connections in the study area to encourage nonauto modes of transportation
- Assessment of future background conditions based on anticipated traffic growth, area developments and planned transportation improvements in the study area
- Assessment of the impact of site-generated traffic on the adjacent roadway network under future background and total traffic conditions
- Determination of roadway and intersection improvements, as required, to accommodate the proposed development

The parking study includes the following:

- Review of the site parking requirements for the proposed land uses based on the City of Hamilton's Zoning By-law
- Parking review of other similar developments in the study area to note the existing parking supply, unit counts and site statistics, in comparison to the proposed development
- Review of the site area context such as transit use and amenities in the study area
- Review of Transportation Tomorrow Survey data to review existing auto ownership rates for apartment
 uses in the area
- Justification for the proposed parking supply of 66 parking spaces for the 62 residential units (provided at approximately 1.06 spaces per unit) based on our parking review

The TDM plan includes the following:

- A review of the existing and future study area for roadways with transit and active transportation facilities
- A review of the City's TDM guidelines to determine the TDM measures that would be appropriate for the planned development in terms of context, scale and land use
- A site plan review for the application of on-site TDM measures
- Determination of the estimated auto trip reduction for the site with the implementation of TDM measures





 A summary of recommended TDM measures for improving individuals' awareness of different travel options and to encourage a reduction in single-occupant vehicle travel to and from the site

Prior to commencing this study, Transportation and Planning staff at the City of Hamilton were provided a terms of reference detailing our proposed scope and methodology and comments received were incorporated. This report adheres to the City of Hamilton Traffic Impact Study Guidelines, dated July 2009 and follows the City of Hamilton's "TDM for Development" guidelines, dated June 2015.

2. SITE LOCATION

The site, shown in Figure 1, is located along the northeast quadrant of King Street West and 2nd Street North in Stoney Creek (Hamilton). The site is currently vacant and situated between a one-storey commercial building (with an optometry clinic and lawyers office) to the west and a three storey apartment building to the east.

Located in the vicinity of the site are a mix of single-detached homes, apartment buildings and commercial plazas. A number of retail, restaurant and commercial uses are situated along King Street West. The majority of uses within the interior roads connecting with King Street West are residential. Notable land uses include the Stoney Creek Recreation Centre, located approximately 300m west of the site and the Stoney Creek United Church, located approximately 100m east of the site. The R.L. Hyslop Elementary School is located approximately 200m south of the site, at the southern end of Lake Avenue South.

PROPOSED DEVELOPMENT

The site plan is shown in Figure 2. The subject site consists of an eight-storey mixed use building with 62 residential units (15 one-bedroom, 25 one-bedroom + den and 22 two-bedroom / two-bedroom + den units) on floors two through eight and 222 sq.m. of GFA of amenity commercial space on the ground floor.

A total of 66 parking spaces are provided through two levels of underground parking (19 residential spaces and 13 visitor spaces on Level 1 and 34 residential spaces on Level 2).

The site access is proposed to be located on the south side of the building, fronting on King Street West, with a full-moves configuration.

4. EXISTING ROAD CONDITIONS AND ACTIVE TRANSPORTATION NETWORK

4.1 Road Network

All roadways within the vicinity of the site are under the jurisdiction of the City of Hamilton. The boundary roadways located in the study area are described as follows:

King Street West is a minor arterial road that generally runs in an east-west direction and consists of two travel lanes: one in each direction, King Street West has a speed limit of 50 km/h in the vicinity of the site.

Lake Avenue Drive is a collector road that runs in a north-south direction with a speed limit of 40 km/h. It connects to residential areas and to Highway 8 north of the site.

1st Street and 2nd Street are local roads that run in a north-south direction with a speed limit of 40km/h. These local roads are for connections to residential areas and do not have direct connections to any arterial roads, other than King Street West.





King Street West and Lake Avenue Drive form a signalized intersection within the study area.

4.2 Traffic Counts

To determine existing operating conditions in the study area, Trans-Plan conducted a site visit and traffic observations along with Turning Movement Counts (TMCs) at the study area intersections. The traffic counts were conducted on a weekday between the hours of 7:00am and 9:30am in the morning and between the hours of 4:00pm and 6:30pm in the afternoon to capture the typical roadway peak periods. Table 1 provides a summary of the peak hours obtained for each intersection counted. TMC diagrams and current City of Hamilton signal timing plans are provided in Appendix A.

Table 1 – Intersection Turning Movement Count Details

Intersection	Date	Weekday AM Peak Hour	Weekday PM Peak Hour
King Street West and Lake Avenue	Wednesday April 26, 2017	8:00AM – 9:00AM	4:30PM – 5:30PM
King Street West and 1st Street	Wednesday April 26, 2017	8:00AM – 9:00AM	5:00PM - 6:00PM
King Street West and 2nd Street	Wednesday April 26, 2017	8:00AM – 9:00AM	4:45PM – 5:45PM

The existing traffic volumes along King Street West were reviewed for consistency of upstream and downstream traffic volumes and balanced between the intersections (by increasing the volumes), where required.

4.3 Transit Service

The area near the site is served by Hamilton Street Railway (HSR), which operates the following bus routes within the study area:

Route 58, Stoney Creek Local runs along King Street East and West between Centennial Parkway South and Queenston Road (where it loops around at Green Road). Route 58 connects with other major bus routes in Hamilton, such as Route 1 King (blue line) and Route 10 B-Line Express (red line), that operate along the major travel corridors of Queenston Road and Main Street East / West. The nearest bus stops are located on King Street West between 1st Street South and Lake Avenue Drive, approximately 60m east of the site.

Route 5, Delaware operates mainly along King Street East and West between Jones Street (just east of Lake Avenue) and Justine Avenue / Lawrence Road. East of Centennial Parkway, Route 5 shares the same bus stops along King Street as Route 58.

Service details for each transit route are provided in Table 2.



Table 2 – Study Area Transit Service

Route	No.	Nearest Bus Stop	Approximate S	Service Times		oximate I Frequen	
		at Site	Weekdays	Weekends	AM	PM	SAT
Stoney Creek Local	58	King Street, West of Lake Avenue	06:22 – 00:37	08:17 – 00:07	20	30	30
Delaware	5	King Street, West of Lake Avenue	06:04 – 01:16	05:57 – 01:13	30	30	30

Source: Hamilton Street Railway Website

5. FUTURE BACKGROUND CONDITIONS & ROADWAY IMPROVEMENTS

Future background traffic volumes for a five-year horizon were determined based on a review of planned developments and future traffic volume growth in the study area. Planned roadway improvements are also reviewed in this section.

5.1 Background Growth Rate

To establish predicted growth in roadway traffic volumes in the study area, an analysis of historical traffic volume data was completed along King Street West, east of Lake Avenue Drive. Detailed analysis is shown in Appendix B and the results are as shown in Table 3.

Table 3 – Traffic Volume Growth on King Street West

Peak	TM	C, Year 2014		TMC	C, Year 2017	
Hour	Eastbound	Westbound	Total	Eastbound	Westbound	Total
AM	519	641	1,160	472	589	1,061
PM	731	607	1,338	744	632	1,376
Total	1,250	1,248	2,498	1,216	1,221	2,437
Annual Growth						-0.8%

Given that the review of historical data was not conclusive (i.e. showing little or no growth); an annual growth rate of 1.0 percent per annum was conservatively applied to the through volumes along King Street West and the turning movements along Lake Avenue Drive.

5.2 Planned Background Developments

Based on a review of the City of Hamilton development applications map and a site visit of the study area, there are two other notable future developments in the area, in the planning stage, that are expected to occur within the planning horizon of our study. The future developments are described in Table 4.



Table 4 - Background Developments

No.	Location	Development Application Land Use Description
1	Lot adjacent 1 King Street East	Two-storey mixed use building
2	Southeast quadrant of Veterans Lane and Lake Avenue South	One-storey, 148 sq.m. pediatric clinic

Site trips were generated using the Institute of Transportation Engineers (ITE) Trip Generation manuals, 9th Edition (using residential and office trip rates for the development at 1 King Street East and using medical office uses for the development at Veterans Lane and Lake Avenue South). The above noted developments have been incorporated into our analysis of future background traffic conditions. Details, including trip generation tables and estimated site traffic assignment, are provided in Appendix B.

5.3 Planned Roadway and Transit Improvements

There are currently no planned roadway or transit improvements within the study area based on the City of Hamilton's Transportation Master Plan, dated 2007.

The City of Hamilton 10-year Local Transit Strategy mentions the Hamilton Light Rail Transit (LRT) with major construction slated for 2019-2024. The LRT is to be situated one major roadway north of the site, along Highway 8, which is approximately 1km north of the site. The proposed LRT may alleviate roadway traffic along King Street within the vicinity of the study area. However due to the proposed 2024 or later timing and not being along the study area roadway, the LRT is noted in our study, but to be conservative, no auto trip reductions (due to increased transit use) are provided in our analysis.

5.4 Planned Active Transportation Improvements

As per the City's Urban Official Plan and Transportation Master Plan, there are no planned active transportation improvements within the study area. According to City staff and the City's Cycling Master Plan, dated 2009, cycle lanes are identified along King Street West but are unable to be included due to the narrow road width in the vicinity of the subject site. The ultimate vision is to include cycle lanes along the entirety of King Street West but there are no plans in the immediate future.

Based on the review of background conditions, future background traffic volumes for the weekday AM and PM peak hours are shown in Figure 6.

6. SITE TRAFFIC

6.1 Trip Generation

Trips for the proposed residential development were generated using the Institute of Transportation Engineers (ITE) Trip Generation manuals, 9th Edition. Residential uses were generated based on ITE Land Use Code (LUC) 220 for residential apartment units and the ground floor commercial was based on LUC 814 for a retail use. An internal trip reduction was applied to the variety store land use as it is expected to be mainly a complimentary use for the residents within the building and mainly generate walk-in trips from the surrounding residential area. The site trip generation is provided in Table 5.





Table 5 – Site Trip Generation

Land Use		Size	AN	/I Peak H	our	P۱	/I Peak H	our
			In	Out	Total	In	Out	Total
Apartment	units:	62						
ITE Code 220		Distribution	20%	80%	100%	65%	35%	100%
		Equation	T =	0.49(X) +	3.73	T = 0).55(X) +	17.65
		Rate	0.11	0.44	0.55	0.55	0.29	0.84
		Trips	7	27	34	34	18	52
Variety Store	sq.ft.	2,390						
ITE Code 814		Distribution	50%	50%	100%	50%	50%	100%
		Rate	2.09	2.09	3.81	3.35	3.77	6.82
		Trips	5	5	10	8	9	17
Internal Trip Reduc	tion	15%	1	1	2	1	2	3
Total New Trips	5		11	31	42	41	25	66

The subject site is expected to generate approximately 42 and 66 two-way trips in the weekday AM and PM peak hours, respectively.

6.2 Trip Distribution and Assignment

Site trips were distributed to the surrounding area using 2011 TTS data for residential uses. Details are provided in Appendix C.

The resulting trip distribution for residential trips, travelling from the study area to surrounding municipalities in the morning period and returning to the study area in the afternoon period, is shown below.

		N		
		45%		
W	47%		4%	E
		4%		
		S		

According to the above noted distribution, the majority of trips leaving Stoney Creek travel west and north to other areas within Hamilton, likely using Highway 8 and Red Hill Valley Parkway. Due to the majority of trips within Hamilton, site trips were then assigned to major travel routes in and around the study area and then to the site driveway based on existing travel patterns along King Street West. The site traffic assignment for the weekday AM and PM peak hours are shown in Figure 7.

7. FUTURE TOTAL TRAFFIC CONDITIONS

Site traffic volumes were added to the future background traffic volumes to obtain future total traffic volumes for the weekday AM and PM peak hours and is provided in Figure 8.



8. CAPACITY AND VEHICLE QUEUING ANALYSIS

A capacity and queuing analysis was performed for the study area intersections using Synchro and SimTraffic analysis software. The capacity and vehicle queueing results of the weekday AM and PM peak hours are shown in Table 6 and Table 7. Capacity Analysis and Queueing Sheets and Level of Service (LOS) Definitions are provided in Appendix D and Appendix E, respectively. The vehicle queuing analyses were completed based on Sim-Traffic simulation runs to determine whether queues would exceed available storage lengths of turn lanes or block upstream intersections.

According to the City of Hamilton Traffic Impact Study Guidelines, at signalized intersections, a volume to capacity (v/c) ratio of 0.85 or less is considered acceptable for through movements or shared through / turning movements. A v/c ratio of 0.90 is considered acceptable for exclusive turn lanes. At unsignalized intersections, an LOS of D or better is considered acceptable for individual movements. The results of the capacity analysis and gueuing analysis are discussed in this section for each intersection:

King Street West & Lake Avenue

Under existing weekday AM peak hour conditions, the signalized intersection operates at an overall v/c ratio of 0.53 and an overall acceptable LOS of C. The westbound through / right movement operates at a v/c of 0.89 and an acceptable LOS of D, with average delays up to 40 seconds. All other movements operate at an acceptable LOS of B. During the weekday PM peak hour, the intersection operates at an overall v/c ratio of 0.71 and an acceptable LOS of C. The westbound through / right movement operates at a v/c of 0.93 and an acceptable LOS of D, with average delays up to 43 seconds. All other movements operate at an acceptable LOS of C or better.

Under future background and total conditions, minor signal timing adjustments were made to the signal splits while the cycle length of 110 remains unchanged.

During the weekday AM peak hour, with the signal timing adjustments, the intersection is expected to operate similarly to existing conditions at an overall v/c of 0.55 and an acceptable LOS of C. The westbound through / right movement is expected to operate at a v/c of 0.87 and an improved LOS of C, with average delays of up to 33 seconds. All other movements operate at an acceptable LOS of B. During the weekday PM peak hour, the intersection is expected to operate at an overall v/c ratio of 0.75 and an acceptable LOS of C. The westbound through / right movement is expected to operate at a v/c of 0.91 and an acceptable LOS of D, with delays up to 37 seconds. All other movements operate at an acceptable LOS of C or better.

The 95th percentile vehicle queue of the southbound right turn movement is expected to be approximately 24m and 43m during the weekday AM and PM peak hours, respectively, which may exceed the available storage length of 12m on occasion; however the existing 25m of taper length provides some additional length for vehicle storage during busier periods. It is noted that the subject site generates only approximately 1 and 4 vehicles during the weekday AM and PM peak hours, respectively, that are assigned to this southbound right turn movement.

Similarly, the eastbound left turn movement is expected to see queues of up to 34m, whereas the provided storage length is 23m; however, the additional taper length of 40m is expected to be adequate in provided room for up to two more vehicles to store during busier periods. Similarly, the northbound right lane is expected to exceed the provided storage length by up to one vehicle length, which could be contained





within a portion of the available taper length. The subject site is not expected to impact this turning movement directly.

Vehicle queues for the eastbound through / right movement may occasionally block the side street of 1st Street by one to two vehicle lengths on occasion. However 1st Street is a minor road with minimal traffic and vehicle queues along King Street are expected to clear after each cycle. The westbound through / right movement is expected to see queues of up to 136m during the weekday PM peak hour, which is similar to existing conditions.

King Street West & 1st Street

Under existing weekday AM and PM peak hour conditions, the northbound approach operate at an acceptable LOS of C and delays up to 23 seconds.

Under future conditions, during the weekday AM peak hour, the northbound approach is expected to operate similarly to existing conditions with an acceptable LOS of C. During the weekday PM peak hour, the northbound approach is expected to operate at an acceptable LOS of D with average delays up to 28 seconds.

The 95th percentile vehicle queues for side-street traffic are expected to be minimal with in approximate queue length of 9m.

King Street West & 2nd Street

Under existing weekday AM peak hour conditions, the northbound approach operates at an acceptable LOS of D with delays of 26 seconds. The southbound approach operates at an acceptable LOS of C. During weekday PM peak hour conditions, the northbound approach operates at an LOS of F with average delays up to 53 seconds and the southbound approach operates at an LOS of E with average delays up to 42 seconds.

Under future conditions, during the weekday AM peak hour, the northbound and southbound approaches are expected to operate similarly to existing conditions with an acceptable LOS of D and C, respectively. During weekday PM peak hour conditions, the northbound and southbound approaches are expected to operate at an LOS of F with delays up to 79 seconds (just over a one minute delay for traffic turning onto King Street West). With similar traffic operations during the future background and total conditions, the site generated traffic is not expected to notably impact these movements and the expected delays are typical for vehicles entering from a minor road onto an arterial road.

The 95th percentile vehicle queues for side-street traffic (on 2nd Street) are expected to be minimal, with an approximate queue length of up to 16m.

King Street West & Proposed Site Access

Under future total conditions, during the weekday AM peak hour, the site access is expected to operate at an acceptable LOS of D with delays up to 26 seconds. During the weekday PM peak hour, the site access is expected to operate at an LOS of F, with delays up to 82 seconds for exiting vehicles (just over a one-minute delay in the peak hours). However this type of delay is typical when exiting from a driveway access onto an arterial road (King Street West).





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Under future total conditions, the 95th percentile vehicle queue length for the site access (exiting traffic) is expected to be approximately 17m during the peak hours, which would be contained within the driveway throat length provided by the site plan for the development.



Table 6 - Capacity Analysis Results

Movement AM Per V/C De (se	kisting Irat	Existing Traffic Conditions	itions	_	-uture l	Future Background Traffic Conditions	nd Traf	fic Con	ditions	<u>д</u>	uture To	otal Tra	Future Total Traffic Conditions	ditions	
	AM Peak Hour	PM F	PM Peak Hour	r	AM Pe	Peak Hour	l 	PM Peak	Peak Hour	AM	Peak Hour	lour	PM P	PM Peak Hour	ını
	Delay LOS (sec.)	V/C	Delay L(N SOT	V/C D	Delay LOS (sec.)	S V/C	Delay (sec.)	y Los	N/C	Delay (sec.)	SOT	V/C (Delay (sec.)	LOS
King Street West & Lake Avenue 0.53 2	3 <i>L</i> z	0.71			.55		0.7		၁	0.55	24	၁	0.75	27	ပ
Eastbound Left 0.38 1	18 B	0.43			.43		0.5		C	0.45	17	В	0.54	22	S
Eastbound Through / Right 0.58 1	18 B	69.0	19	<u>В</u>	0.61	16 B	0.72	2 18	В	0.62	17	В	0.72	18	В
Westbound Left 0.06 1	18 B	0.01			90.		0.0		В	90.0	15	В	0.01	13	В
Westbound Through / Right 0.89 4	40 D	0.93			98'		0.9		D	0.87	33	C	0.91	37	
Northbound Left / Through 0.13 1	18 B	0.14			.14		0.16		C	0.14	18	В	0.16	23	ပ
Northbound Right 0.01 1	17 B	0.01			101		0.0		C	0.01	17	В	0.01	21	ပ
Southbound Left / Through 0.11 1	18 B	0.41			.12		0.4		C	0.12	18	В	0.45	28	ပ
Southbound Right 0.06	18 B	0.14			90.0		0.16		С	90.0	17	В	0.17	23	C
King Street West & 1st Street															
Eastbound Through / Right	0 A		0	⋖				0	A		0	⋖		0	A
Westbound Left / Through	0 A			⋖				0	A		0	⋖		0	A
Northbound Left / Right	21 C			C		24 C		26	D		25	С		28	О
King Street West & 2nd Street															
Eastbound Left / Through / Right	1 A			⋖				3	A		-	⋖		3	۷
Westbound Left / Through / Right	0 A		0	⋖				0	A		0	⋖		0	A
Northbound Left / Through / Right	26 D			ш		30 D		73	ட		30	Ω		6/	ட
Southbound Left / Through / Right	20 C		42	Е				29	F		22	С		63	Ь
King Street West & Proposed Site															
Access															
Eastbound Left / Through											0	⋖		_	۷
Westbound Through / Right											0	⋖		0	۷
Southbound Left / Right											26	Ω		82	ட



Table 7 - Vehicle Queue Analysis Results

Intersection	Distance to			95th Percentile	95th Percentile Vehicle Queues		
Movement	Nearest	Existing (Existing Conditions	Future Backgro	Future Background Conditions	Future Total Conditions	Conditions
	Upstream Intersection (m)	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour PM Peak Hour AM Peak Hour PM Peak Hour AM Peak Hour PM Peak Hour	PM Peak Hour
King Street West & Lake Avenue							
Eastbound Left	23 [40]	25	38	49	31	30	34
Eastbound Through / Right	80	70	88	83	98	78	93
Westbound Left	16 [50]	25	3	25	4	6	വ
Westbound Through / Right	110	128	136	122	123	110	136
Northbound Left / Through	200	29	26	27	37	22	28
Northbound Right	7 [10]	16	11	15	14	14	15
Southbound Left / Through	260	24	55	24	49	27	61
Southbound Right	12 [25]	22	42	22	40	24	43
King Street West & 1st Street							
Eastbound Through / Right	99	10	44	30	41	1	21
Westbound Left / Through	80	8	45	6	53	20	26
Northbound Left / Right	150	8	6	7	10	8	6
King Street West & 2nd Street							
Eastbound Left / Through / Right	80	43	88	51	88	44	105
Westbound Left / Through / Right	99	0	36	12	40	0	18
Northbound Left / Through / Right	150	3	10	8	2	6	2
Southbound Left / Through / Right	108	16	16	15	18	16	14
King Street West & Proposed Site							
Access							
Eastbound Left / Through	30					10	35
Westbound Through / Right	38					0	6
Southbound Left / Right	•					17	17

Note: Available Storage [Taper] Length of turn lane





9. PARKING STUDY

Trans-Plan completed this parking study for the site to review whether the proposed parking supply would be sufficient for the intended uses. A review of parking supplies at similar residential developments in the City of Hamilton were carried out as part of our review to establish appropriate parking rates.

9.1 Parking Supply and Requirements

A parking review based on the site plan was conducted. The proposed parking supply for the 62 residential unit development and commercial area is 66 spaces, provided at a rate of approximately 1.06 spaces per unit.

The Stoney Creek Zoning By-Law 3692-92, Section 4.10.9 (see Appendix F), was used to determine site parking requirements, as shown in Table 8.

Table 8 – Parking Requirements and Supply (Stoney Creek Zoning By-Law)

Heo	Size	Parking Requirement		Parking Supp	Deficiency		
Use Size		Rate (space / unit)	Spaces	Rate Spaces		Deliciency	
Apartment	42 unite	Resident: 1.00	00 62				
Buildings	62 units	Visitor: 0.25	16	1.06 spaces / room	66	-20	
Commercial	222 sq.m.	1 space / 28 sq.m.	8				

Source: Stoney Creek Zoning By-Law 3692-92, Section 4.10.9

Based on the Stoney Creek Zoning By-Law, the parking requirement for the site is 86 spaces (62 residential spaces, 16 visitor spaces, and 8 commercial spaces). The proposed parking supply for the site is 66, resulting in a deficiency of 20 parking spaces.

Additionally, the City of Hamilton Zoning By-Law 05-200 suggests different minimum parking requirements separate from the Stoney Creek Zoning By-Law. Table 12 below compares the consolidated City of Hamilton parking requirements and supply for the residential development.

Table 9 - Parking Requirements and Supply (City of Hamilton Zoning By-Law)

Ī	Use	Size	Parking Requirement		Parking Supp	Deficiency	
	use	Size	Rate	Spaces	Rate	Spaces	Deficiency
Ī	Residential	62 units	1 space / unit	62	1.04 chance / room	4.4	0
ſ	Commercial	222 sq.m.	1 space / 20sq.m	12	1.06 spaces / room	66	-8

Source: City of Hamilton Zoning By-Law No. 05-200, Section 5

The City of Hamilton Zoning By-Law requires 74 parking spaces for the site. The proposed parking supply is deficient by 8 parking spaces, which is less than the parking deficiency compared to the Stoney Creek Zoning By-Law parking requirements.





9.2 Apartment Auto Ownership Review

The proposed site is located in Ward 9 of the City of Hamilton. Using TTS data, the auto ownership per apartment type dwelling units within Ward 9 was determined for the years 2001, 2006 and 2011. Source information is provided in Appendix C and the results are summarized in Table 10.

Table 10 – Auto Ownership in the City of Hamilton, Ward 9

Area	Average Number of Vehicles Owned per Apartment Dwelling					
	2001 TTS Data	2006 TTS Data	2011 TTS Data			
Ward 9 of the City of Hamilton	1.14	0.70	0.83			

The results indicate that in Ward 9, where the site is situated, the auto ownership per apartment dwelling household is generally 0.83 vehicles per unit, which would result in an expected parking demand of 51 spaces for the site for the residential tenant uses. This demand is less than the City's Zoning By-law requirement of 62 spaces for residents.

9.3 Amenities in the Surrounding Study Area

Trans-Plan conducted a review of surrounding amenities within walking distance of the site that would be easily accessible to residents without the need for travel by auto, as summarized in Table 11.

Table 11 – Amenities in the Study Area

Amenity	Address	Distance from Subject Site (m)	
Commercial			
Shoppers Drug Mart	1 King Street East	160	
Tim Hortons	8 King Street East	170	
Elm Grocery & Deli Plaza	1-44 King Street East	350	
Office			
Barthmann Denture Clinic	11 King Street West	15	
Optometry Clinic / Personal Injury Lawyer	20 King Street West	20	
General Medical Practice	2 King Street West	50	
Various Office Uses	8 King Street West	110	
Village Green Denture Specialist	8 King Street East	170	
Stoney Creek Post Office	38 King Street East	280	
RBC Financial Group	42 King Street East	300	
Other			
Cheyne Presbyterian Church	7 King Street West	80	
Stoney Creek United Church	1 King Street West	100	
R. L. Hyslop Elementary School	20 Lake Avenue South	200	
Stoney Creek Recreation Centre	45 King Street West	300	



Based on a review of the surrounding area, there are a variety of amenities within walking distance, at most 400m (six to seven minute walk), to accommodate residents without the need to utilize an automobile.

9.4 Proxy Sites for Residential Uses

To gain a better understanding of the parking demands for typical apartment buildings in Stoney Creek, Trans-Plan conducted parking reviews at various other apartment buildings near the subject site and King Street West. Trans-Plan reviewed various proxy apartments, which had similar features as the proposed apartment. Characteristics such as the number of units, provision of surface parking and similar number of storeys were considered in the selection of the site. Table 12 provides details of the reviewed proxy sites.

Table 12 - Proxy Site Comparison

Apartment Address	# of	# of	Percentage of Units	Parking Supply (Spaces)			
·	Storeys	Units	Occupied	Resident	Visitor	Details	
Collingwood Manor, 28 King Street West	8	136	95-100%	149	0	Surface: 85 Underground: 64	
Glenview, 32 King Street West	4	48	100%	43	0	Surface: 43	
Access Midwives, 38 King Street West	8	64	90-95%	70	0	Surface: 70	
Evelyn Court, 12 Mountain Avenue	9	144	90-95%	148	10	Surface: 158	
Cherrywood, 2 Cherrywood Drive	7	112	100%	132	0	Surface: 132	
The Elizabeth, 90 King Street East	9	90	100%	93	10	Surface: 37 Underground: 66	
Robinson Tower, 100 King Street East	9	90	90-95%	93	10	Surface: 37 Underground: 66	

The proxy sites have been in operation for a long period of time, hence the high occupancy rate. Discussion with the property managers resulted in the majority of the parking spaces being leased out. Visitor parking spaces were noted from the supply where indicated. The existing parking supplies and parking supply rates for the proxy sites reviewed are shown in Table 13.



Table 13 – Parking Supply and Parking Supply Rates

Sites (in Stoney Creek)	No. of	Parking Supply					
	Units	(spaces)		rate (spaces pe		r unit)	
		Res.	Visitor	Total	Res.	Visitor	Total
28 King Street West	136	149	0	149	1.10	0.00	1.10
32 King Street West	48	43	0	43	0.90	0.00	0.90
38 King Street West	64	70	0	70	1.09	0.00	1.09
12 Mountain Avenue	144	148	10	158	1.03	0.07	1.10
2 Cherrywood Drive	112	132	0	132	1.18	0.00	1.18
90 King Street East	90	93	10	103	1.03	0.11	1.14
100 King Street East	90	93	10	103	1.03	0.11	1.14
Average	98	104	4	108	1.05	0.04	1.09

For typical apartments, the average parking rate is approximately 1.09 spaces per unit, which is similar to the proposed parking rate for the subject site of 1.06 spaces per unit (66 spaces / 62 units). Based on this review, the underground parking supply of 66 spaces for residential and visitor uses is expected to be adequate for the site.

The visitor spaces could be for both visitors of the apartment uses and of the commercial component of the building. A review of visitor parking is discussed further in the next section.

9.5 On-Street Parking Review for Visitor Uses

The commercial area of the building is expected to function as a complimentary use to the residents and mainly serve the surrounding residential area (i.e. mainly generating walk trips rather than auto trips). If vehicle parking is required, there are nearby on-street parking spaces that could be utilized for short visits to the commercial area. Table 14 summarizes the on-street parking within walking distance of the subject site.

Table 14 – On-street Parking within the Study Area

Street Area	Approximate Parking Supply (spaces)	Approximate Walking Distance from Site	Time Restrictions
King Street West, from 2 nd Street to 1 st Street	18	Fronting the site	2 hours from 9am – 9pm; overnight parking allowed
1st Street South, east side, adjacent the Stoney Creek United Church	6	50m	None
2nd Street North, west side, adjacent Collingwood Manor, 28 King Street West	10	55m	None
Total Parking Supply:	34 spaces		



Traffic Impact & Parking Study and TDM Options Report
Proposed Mixed Use Development
16 & 18 King Street West, Stoney Creek, Hamilton

The available on-street parking supply in the immediate area (within 100m of the site) is approximately 34 spaces, which would be adequate to meet commercial parking demands (although it is assumed that trips to the commercial use would be mainly walk trips).





10. TRANSPORTATION DEMAND MANAGEMENT OPTIONS REPORT

Transportation Demand Management (TDM) measures include policies, programs, services and products that influence whether, why, when, where and how people travel. They work by shaping the economic and social factors behind personal travel decisions. TDM is not a substitute for investment in infrastructure but it complements investments in walking, cycling and transit facilities by making them more effective.

By improving individuals' awareness of different travel options, their understanding of how to use those options, and their willingness to try those options, TDM increases the likelihood that they will make informed choices.

10.1 TDM Infrastructure

10.1.1 Transit Services

As previously noted in Section 4.3 Transit Services, HSR transit services are provided by Routes 58 and 5, with service frequencies of a half hour or less during peak periods, and with connections to other higher-order transit services in Hamilton, such as Route 1 King (blue line) and Route 10 B-Line Express (red line), that operate along the major travel corridors of Queenston Road and Main Street East / West. The nearest bus stops are located on King Street West between 1st Street South and Lake Avenue Drive, approximately 60m east of the site.

10.1.2 Cycling & Pedestrian Connectivity

King Street West is a shared roadway for vehicles and cyclists. Signs are provided intermittently along King Street West, advising vehicles and cyclists to share the roadway. Sharrows (designated by pavement markings) are provided along Lake Avenue Drive to connect cyclists to Highway 8 and along King Street East, east of Lake Avenue. Posted signage is provided along King Street West advising vehicles and cyclists to share the road.

Future cycle lanes are identified along King Street West within the City's Cycling Master Plan, dated 2009. However due to the narrow road widths, the sharrows currently in place are being utilized. The ultimate vision is to include cycle lanes along the entirety of King Street West, similar to the cycle lanes provided on King Street East, west of Battlefield Drive, approximately 400m west of the site. There are currently no plans in the immediate future.

Sidewalks with a curb are provided along all study roadways to connect pedestrians to bus stops and other key areas.

10.1.3 Car Share and Bike Share

There are currently no car share services located in close proximity to the site. The nearest car share vehicle is located near the intersection of Quigley Drive and Greenhill Avenue, approximately 3km southwest of the site. Car share facilities are operated by the Community CarShare and Zip Car.

Bike share is operated by Social Bicycles (SoBi) Hamilton which is currently not operational in Stoney Creek.





10.2 TDM Initiatives for Consideration

Based on a review of the City of Hamilton's TDM Guidelines, the TDM measures reviewed for the subject site (and corresponding level of analysis applied) is consistent with a mixed use development with high density residential and commercial frontage.

A detailed list of all potential measures to be considered for the proposed development are provided in Appendix G, including our feedback as to whether the application of each measure being considered is feasible or not for the subject site. The measures that we propose to be carried forward are further summarized in Table 15.

Table 15 - Proposed TDM Measures for 16 & 18 King Street West, Stoney Creek, Hamilton

Category	TDM Initiative / Incentives	Initiatives to be
- Jacogo. j		Considered
	Visible, well-lit, short-term bicycle parking for visitors (above minimum provisions or recommendations)	\checkmark
Cycling	Secure, indoor bicycle parking storage spaces for tenants/residents	√
	Ensure development connects to bicycle network	\checkmark
Walking	Safe, attractive and direct walkways for pedestrians linking building entrances with public sidewalks and with key destinations such as schools	✓
	Enhanced pedestrian amenities on-site (e.g., benches, landscaping, lighting)	✓
Transit	Enhance walking routes between main building entrance(s) and transit stops/stations	✓
Wayfinding and Travel Planning	Travel planning resources for residents (individualized marketing, active transportation maps, community resources)	✓
Education /	Contribute to building a strong TDM brand	√
Promotion, Incentives	Include transit and active transportation maps, carshare memberships, and/or bikeshare memberships with new tenants	√

10.3 Site Plan Review of TDM Measures

This section reviews how TDM measures could be incorporated on the site plan and provides a further understanding of the connectivity of the site to and from the pedestrian and cycling network and to and from the nearest transit stops. Figure 9 provides a map of the existing and future transportation connectivity regarding pedestrian sidewalks, cycle lanes, and bus stops.



10.3.1 Pedestrian & Transit Stop Connectivity

A proposed pedestrian connection is provided from the multiple entrances fronting the site (for residential and commercial uses) to allow pedestrians to easily access the provided sidewalks along King Street West which can then connect them to other areas within the study area such as the transit stops. The transit stops are located within 60m of the site, which is an approximate walk time of one minute (at an average walking speed of 1.0 m/s).

10.3.2 Cycle Connectivity

Bicycle parking on-site is recommended to encourage more people to cycle, especially for utilitarian purposes, would result in taking more cars off the road during peak hours, helping to reduce traffic congestion, and is more environmentally friendly.

The City of Hamilton's TDM Guidelines provides typical bicycle parking rates for the mixed use developments. In the Guidelines, long-term and short-term bicycle spaces are to be considered. Long-term spaces are generally rooms located within or a part of a building, exclusive for bicycle parking. Short-term spaces are designated areas for bicycle parking with racks/stands designed to lock the wheel and frame of a bicycle. Table 16 provides the typical range of bicycle parking requirements recommended by the TDM Guidelines.

Table 16 - Bicycle Parking Requirements

Land Use	Number of Units	,	Requirements er dwelling)	Bicycle Parking Spaces		
	UI UIIIIS	Short-term	Long-term	Short-term	Long-term	
Mixed Use	62	0.05 to 0.20	0.50 to 1.25	3 to 13	31 to 78	

Note: Values are a range of typical bicycle parking requirements

As per the City's TDM guidelines, a minimum of 3 short-term bicycle parking spaces and 31 long-term bicycle parking spaces are recommended to serve the development.

Short-term bicycle parking spaces could be located near the outdoor amenity area at the northeast corner of the site. The site plan includes 38 storage lockers, provided within the two levels of underground parking.

10.4 Projected Trip Reductions for TDM Measures

The implementation of the TDM measures is expected to encourage a reduction in single-occupant auto trips to and from the site. This section provides an estimate of this possible resultant auto trip reduction.

Based on our traffic analysis, the site is expected to generate approximately 42 and 66 new two-way trips during the weekday AM and PM peak hour.

Based on the 2011 Transportation Tomorrow Survey data for Hamilton Ward 9 (See Appendix C), the 2011 transit mode split during the peak hour was five percent and the walking & cycling mode split was six percent.

The expected transit and walking / cycling auto trip percent reduction for non-auto travel was applied to the site trip generation, as shown in Table 17.





Table 17 - Auto Trip Reduction for TDM

Size		AM Peak Hour			PM Peak Hour			
		In	Out	Total	In	Out	Total	
Auto Trips (vehicles)		11	31	42	41	25	66	
Transit Trips	5%	0	-2	-2	-2	-1	-3	
Walking / Cycling Trips	6%	-1	-2	-3	-2	-2	-4	
Net Auto Trips		10	27	37	37	22	59	

The estimated auto trip reduction is from 42 to 37 trips in the weekday AM peak hour and from 66 to 58 trips in the weekday PM peak hour, as a result of TDM initiatives.

11. SUMMARY AND RECOMMENDATIONS

Our Traffic Impact and Parking Study and TDM Options Report findings and recommendations for the proposed mixed use development located at 16 and 18 King Street West in Stoney Creek, Hamilton are provided as follows:

11.1 Summary of Traffic Impact Study

- The proposed development is an eight-storey mixed use development consisting of 62 residential units on floors two to eight and 222 sq.m. of commercial space on the ground floor. A parking supply of 66 spaces is proposed through two levels of underground parking.
- A review of active transportation in the study area shows sufficient transit connectivity and shared cycle lanes along King Street West.
- The intersection at King Street West and Lake Avenue is expected to operate well, similar to the existing conditions, with minor signal timing adjustments. Vehicle queues may slightly extend past the provided storage lengths but there is adequate taper to provide space for additional vehicles. During the weekday PM peak hour, the westbound through queues may extend past the adjacent signalized intersection on occasion; however, signal times were optimized and this occurrence is similar to existing conditions (with little or no impact created by site traffic).
- The site access (exiting traffic) is expected to operate at an LOS of F with delays up to 82 seconds; however, this delay is typical when exiting from a driveway onto an arterial road (King Street West).
- No further road improvements are required to support the proposed development, aside from construction of the site access.

11.2 Summary of Parking Study

- The proposed development has a proposed parking supply of 66 spaces, provided at an approximate rate of 1.06 spaces per unit.
- Based on the Stoney Creek Zoning By-law 3692-92, 86 parking spaces are required for the proposed development, resulting in a deficiency of 20 spaces.
- According to the consolidated City of Hamilton Zoning By-law 05-200, 74 parking spaces are required for the proposed development, resulting in a smaller deficiency of 8 spaces.





- A review of TTS data resulted in an auto ownership of approximately 0.83 vehicles per apartment dwelling unit which would result in an expected parking demand of 51 spaces for the site for the residential tenant uses.
- A review of local amenities within walking distance from the subject site was conducted. A variety
 of commercial and office uses (such as a Shoppers Drug Mart) are located within walking distance
 and are easily accessible to residents. Transit stops are also located only 60m away from the
 subject site to accommodate residents without the need to utilize an automobile.
- To gain a better understanding of parking demands for apartment buildings in Stoney Creek, a parking review of similar apartments was completed near King Street West. Based on the existing parking supply for the proxy site locations, the average parking rate is approximately 1.09 spaces per unit, which is similar proposed parking rate for the subject site of 1.06 spaces per unit.
- Various on-street parking opportunities near the proposed site are expected to be sufficient to accommodate parking for the commercial uses (although the commercial use is expected to mainly generate walk trips from the local area).

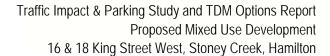
11.3 Summary of TDM Measures

- Provide at least 3 short-term bicycle parking spaces (cycle racks) in a well-lit area at the surface and provide at least 31 long-term bicycle parking spaces within the building or underground parking area.
- Pedestrian connections are provided on-site (at the building entrances), to connect residents and customers to the municipal sidewalk along King Street West.
- The site is currently served by the Hamilton Street Railway transit service through Route 5 and 58, with peak service frequencies of 20- to 30-minutes during the week. Transit-stops are provided within an acceptable distance of 60m from the site, just west of the intersection of King Street West and Lake Avenue. Routes 5 and 58 connect to higher order transit services, such as the Route 1 King (blue line) and the Route 10 B-Line (red line). The site is therefore adequately serviced by transit.
- The applicant would organize the distribution of resident packages (containing transit service schedules / maps, cycling routes / pedestrian trails maps and a list / description of available community services) to new tenants at such time as the building is first occupied. Information should also be displayed at a suitable location at the building entrance.

11.4 Recommendations

- The proposed site access is expected to operate acceptably in future conditions without any road improvements required to accommodate the development.
- The proposed parking supply of 66 spaces is expected to be sufficient for the proposed development for the resident, visitor and commercial uses.
- The above noted TDM measures in Section 11.3 would be applicable to the proposed development.







Respectfully submitted,

Anil Seegobin, P.Eng. Partner, Engineer

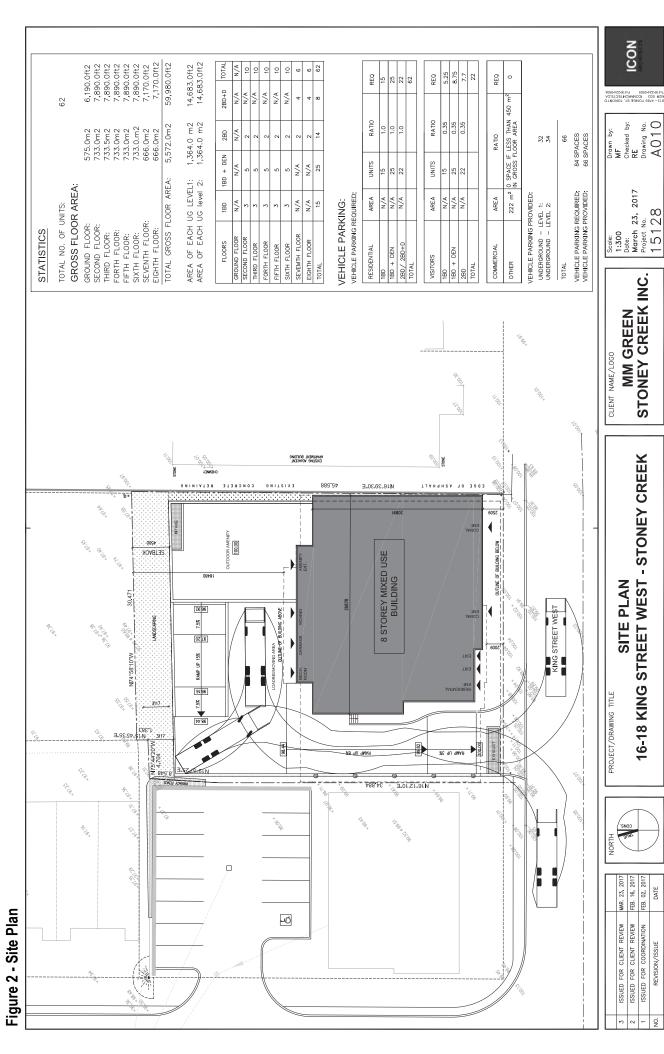
Trans-Plan Transportation Inc. Transportation Consultants



Figure 1 – Site Location



Source : Google Earth



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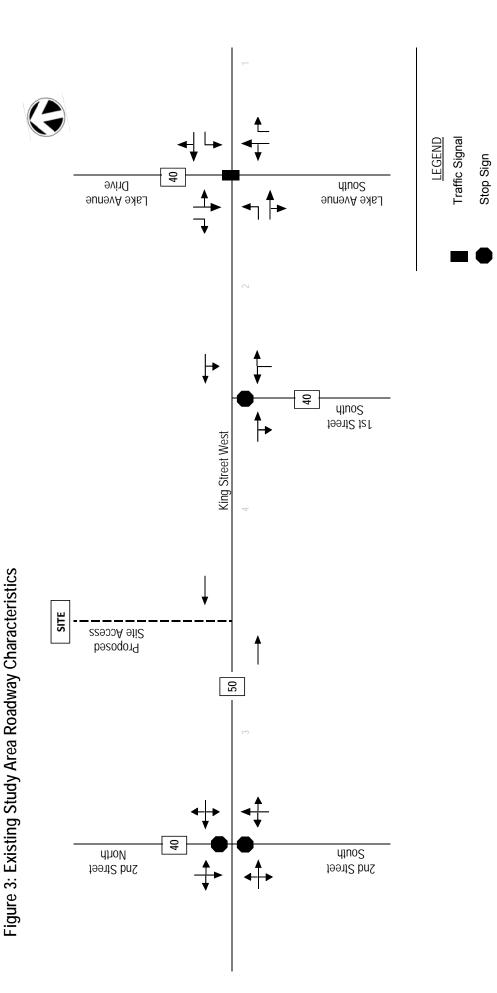
16-18 KING STREET WEST - STONEY CREEK

DATE



Proposed Mixed Use Development

16 & 18 King Street West, Stoney Creek, Hamilton



Posted Speed Limit

09

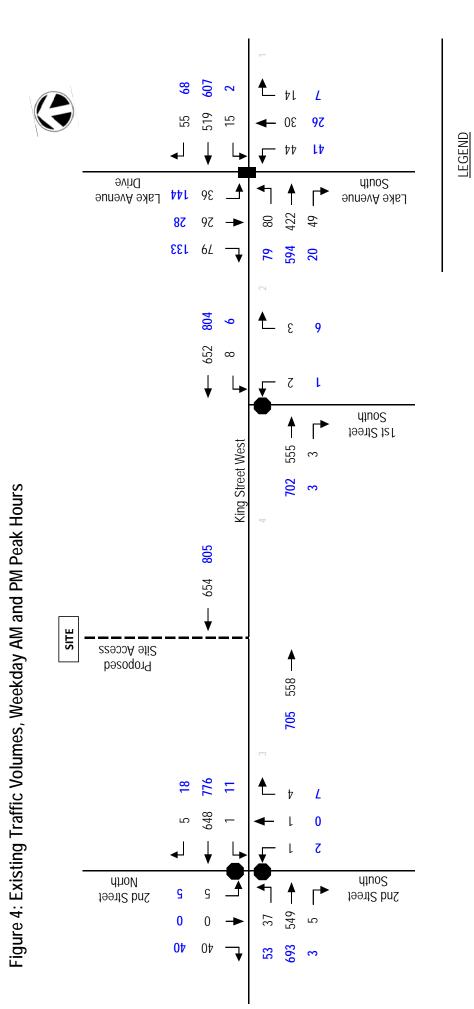
Lane Configuration

Schematic; Not To Scale



Proposed Mixed Use Development

16 & 18 King Street West, Stoney Creek, Hamilton



AM / PM Peak Hour

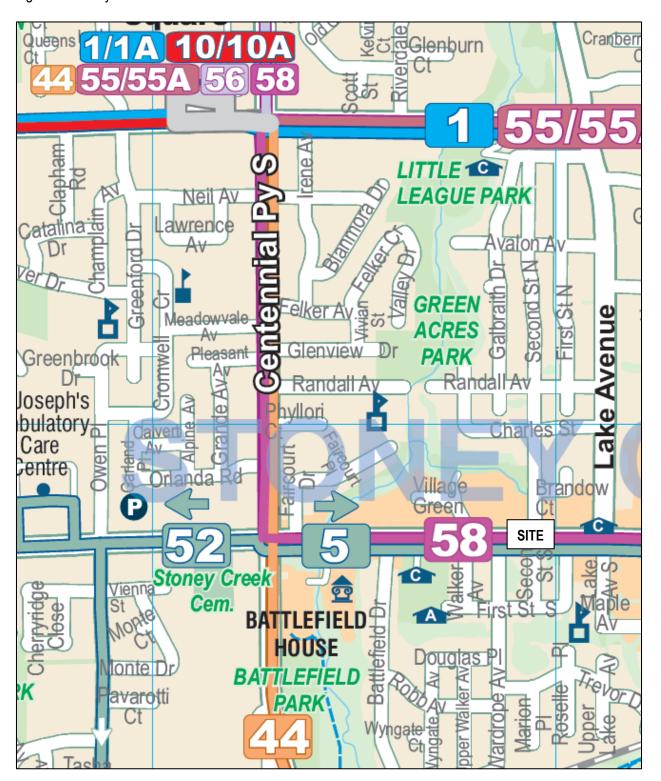
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Traffic Signal

Stop Sign



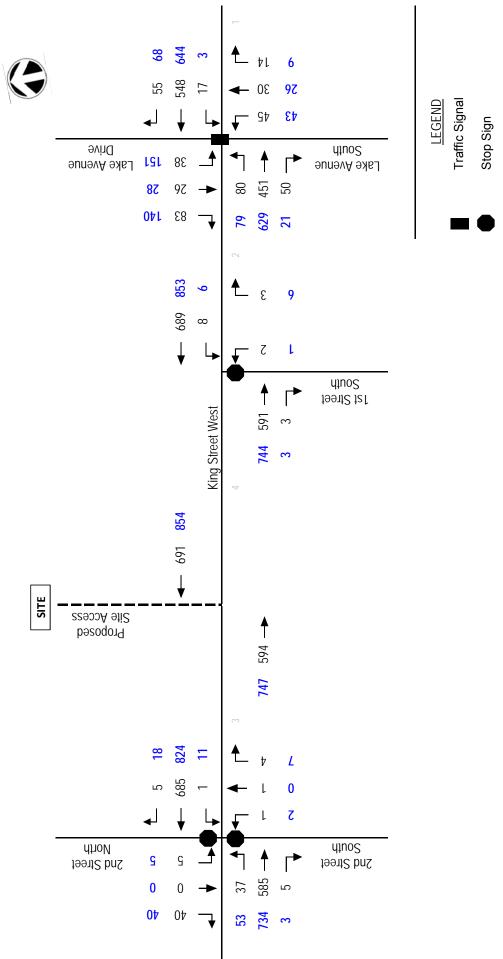
Figure 5 – Study Area Transit Service





Proposed Mixed Use Development 16 & 18 King Street West, Stoney Creek, Hamilton

Figure 6: Future Background Traffic Volumes, Weekday AM and PM Peak Hours



AM / PM Peak Hour

Schematic; Not To Scale



Proposed Mixed Use Development

16 & 18 King Street West, Stoney Creek, Hamilton

0 LEGEND Pake Avenue South Drive Lake Avenue 0 0 0 0 9 0 0 0 1st Street South King Street West Figure 7: Site Traffic Assignment, Weekday AM and PM Peak Hours SITE Proposed Site Access ш 15 61 0 2nd Street North South South 0 0 0 0 0 0 23

AM / PM Peak Hour

Schematic; Not To Scale

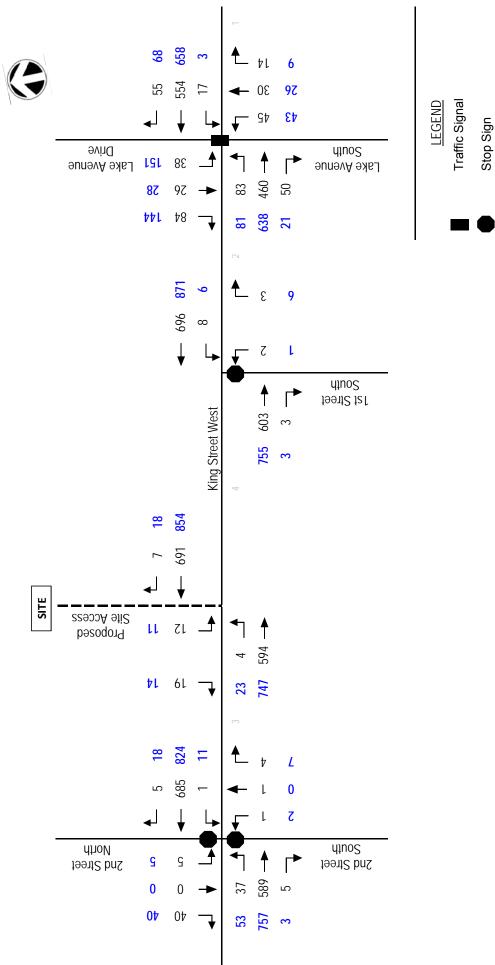
Stop Sign

Traffic Signal



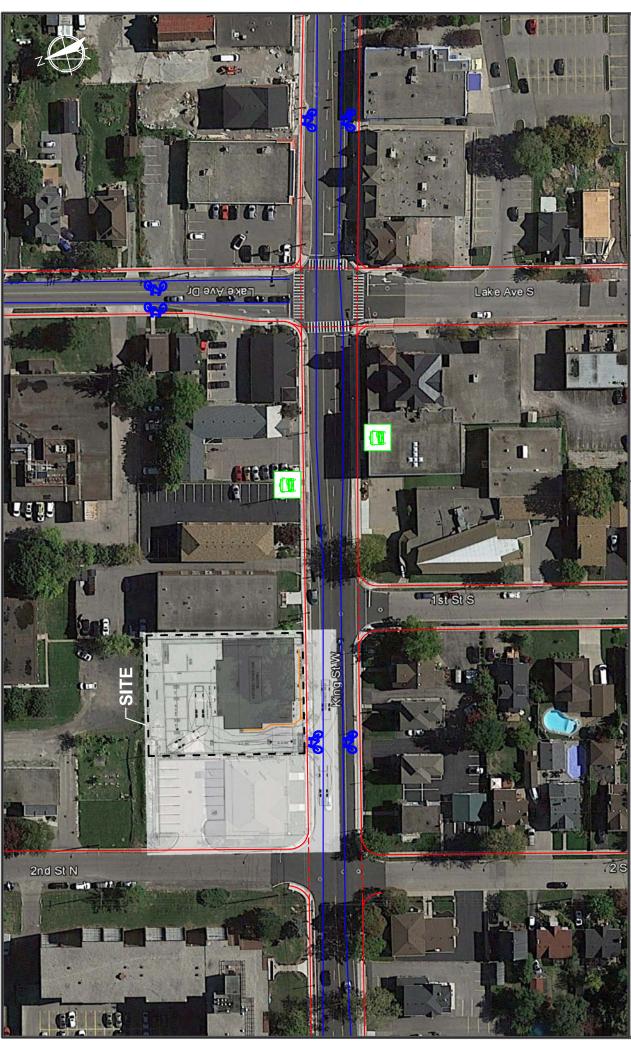
Proposed Mixed Use Development 16 & 18 King Street West, Stoney Creek, Hamilton

Figure 8: Future Total Traffic Volumes, Weekday AM and PM Peak Hours



AM / PM Peak Hour

Schematic; Not To Scale



Active Transportation Connectivity Map Figure 9

PROPOSED MIXED USE DEVELOPMENT

Stoney Creek, Hamilton, Ontario 16 & 18 KING STREET WEST

Legend

Existing Pedestrian Connections

Future Pedestrian Connections

Existing Shared Bicycle Lanes

Existing HSR Transit Bus Stop



17 Atlantic Avenue

Toronto, Ontario, M6K 3E7 tel. (647) 931-7383

website: www.trans-plan.com



APPENDICES

Appendix A – Turning Movement Counts and Signal Timing Plans

Appendix B – Background Traffic Information

Appendix C – Transportation Tomorrow Survey Data

Appendix D - Capacity and Queue Analysis Sheets

Appendix E – Level of Service Definitions

Appendix F – City of Hamilton Parking Requirements

Appendix G – City of Hamilton's TDM Initiatives for Mixed Use Developments





APPENDIX A

Turning Movement Counts and Signal Timing Plans

Trans-Plan Transportation Inc.
Site ID Code:
Intersection Location:
Municipality:
Count Date:
Weather and Temperature:
Surveyor:

King Street West at Lake Avenue Stoney Creek, Hamilton, Ontario Wednesday April 26, 2017 Cloudy TP

Grand	Total F	- Otal	185	221	328	328	345	315	332	378	299	305		361	397	410	396	418	456	391	390	324	309	
	Total		92	91	152	137	140	117	124	171	136	112		150	186	173	174	166	181	174	175	137	139	
	Dodo	cnal	1	1	2	2	1	3	1	2	1	-		2	9	2	4	7	2	4	8	3	1	
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>		В	1	3	8	4	11	10	6	19	13	14		7	8	9	4	7	4	4	9	9	10	
	CAR	T	62	74	124	113	104	87	26	123	91	73		128	147	149	143	142	151	147	145	111	105	
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ROAC		R	0	0	0	0	1	0	0	0	0	0		0	0	0	0	1	0	0	0	0	0	
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	CYCLISTS	⊥	0	0	0	1	0	0	0	0	0	-		0	0	0	0	0	0	0	1	0	1	
CH	ပ	7	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
PR0/	S	2	0	0	0	0	0	0	0	1	1	0		0	0	2	1	0	0	0	0	0	0	
EAST APPROACH	TRUCKS	⊢	2	4	3	3	3	-	4	4	2	3		2	1	4	4	3	2	1	-	-	3	
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		R	4	6	13	14	16	18	7	13	14	13		12	13	16	15	18	16	7	10	10	8	
	CAR	⊢	91	06	115	131	140	125	130	112	90	110		123	128	139	119	130	161	122	128	124	102	
		7	0	0	0	0	2	2	2	9	4	9		2	0	0	0	2	0	2	4	9	1	
	Total		11	18	34	56	28	38	39	36	34	38		44	22	69	72	69	80	74	53	41	41	
	- Pool	spal	1	0	1	0	1	1	1	2	2	2		9	2	7	2	9	4	2	3	5	3	
	s.	ĸ	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
	CYCLIST	۲	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
DACH	ζ	7	0	0	0	0	0	0	0	0	0	1		0	1	0	0	0	0	0	0	0	0	
NORTH APPROACH	,,	В	0	0	0	0	0	1	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
RTH /	TRUCKS	۲	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
ON	Ŧ	7	0	1	0	0	0	1	0	0	1	0		0	1	0	0	0	0	1	0	0	0	
		R	6	6	24	14	17	26	21	14	17	14		14	24	18	26	31	33	56	18	16	20	
	CAR	L	2	0	2	2	3	3	6	11	4	7		2	2	8	7	2	8	2	6	4	9	
		_	0	8	8	10	8	. 7	6	11	12	16		0 25	5 26	33	5 39	33	S 39	0 40	5 26	0 21	5 15	
	Ā		7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00	9:15	PM	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	





Turning Movement Count Diagram

Intersection: King Street West at Lake Avenue Municipality: Stoney Creek, Hamilton, Ontario

Count Times: 7:00am - 9:30am, 4:00pm - 6:30pm

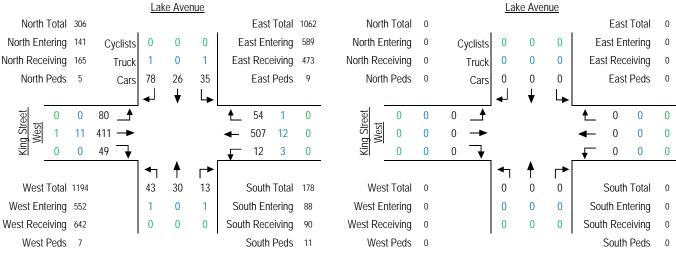
Date: Wednesday April 26, 2017

to

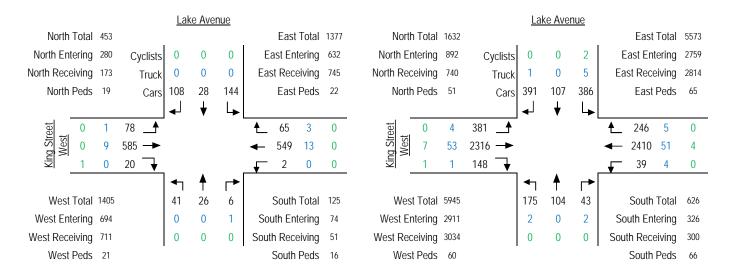
MD Peak Hour:

AM Peak Hour: 8:00 to 9:00

<u>Lake Avenue</u>



PM Peak Hour: 16:30 to 17:30 Total 5-Hour Count



Trans-Plan Transportation Inc.

Site ID Code: Intersection Location: Municipality: Count Date: Weather and Temperature: Surveyor:

King Street West at 1st Street South Stoney Creek, Hamilton, Ontario Wednesday April 26, 2017 Cloudy TP

	Grand	- OI 81	168	203	286	298	313	290	292	317	275	244		311	354	359	347	385	395	361	361	288	305	
(Total		22	88	148	140	136	127	117	167	143	115		140	184	172	164	174	188	156	187	141	140	
	Topod	sna	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
		2	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
	CYCLISTS	_	1	1	1	0	0	0	0	0	0	0		0	0	0	0	0	0	0	1	0	0	
	λЭ	_	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
WEST APPROACH	S	~	0	0	0	0	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
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VEST	_	7	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
_		œ	0	0	0	0	0	0	1	1	2	2		0	1	2	1	1	0	1	1	0	2	
	CAR	۰	72	82	143	134	133	125	113	166	137	109		135	182	167	161	171	187	153	185	139	137	
		_	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
	Total		2	1	2	1	0	2	2	-	1	2		0	1	0	2	3	0	2	2	3	4	
	Dodo	Spal	6	-	2	0	2	-	-	2	8	1		4	4	7	0	2	-	2	-	5	-	
	TS	R	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
	CYCLISTS	۲	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
ACH	O	٦	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
SOUTH APPROACH	S)	œ	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
UTH A	TRUCKS	۰	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
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		~	2	1	1	1	0	1	2	0	1	1		0	1	0	1	2	0	2	2	3	3	
	CAR	-	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
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	S.	R				_									1	•							`	
	S.		0	0	0	0	. 2	0	0	0	0	0		0	0	0	0	0	0	-	0	0	0	
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PROACH	CYCLISTS		0 0 0	0 0 0	0 0 0	1 0 0 1	0 0 2	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0		0 0 0	1 0 0 1	0 0 0	0 0 0	0 0 0	0 0 0	0 0 1	0 0 0	0 0 0	0 0 0	
ST APPROACH	CYCLISTS	LTR	0 0 0 0	0 0 0 0	0 0 0 0	0 1 0 0	0 0 0 2	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0		0 0 0	0 1 0 0	0 0 0 0	0 0 0	0 0 0 0	0 0 0 0	0 0 0 1	0 0 0 0	0 0 0 0	0 0 0 0	
EAST APPROACH	S.	LTR	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 1 0 0	0 0 0 0 2	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	00:00	0 0 0 0	0 0 1 0 0	0 0 0 0 0	0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 1	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	
EAST APPROACH	TRUCKS CYCLISTS BOOK	LTR	2 0 0 0 0 0	0 0 0 0 0	4 0 0 0 0 0 0	3 0 0 1 0 0	3 0 0 0 0 2	3 0 0 0 0 0	2 0 0 0 0 0	0 0 0 0 0 9	2 0 0 0 0 0	4 0 0 0 0 0	0:00	1 0 0 0 0 0	4 0 0 1 0 0	3 0 0 0 0 0	2 0 0 0 0 0	0 0 0 0 0	4 0 0 0 0 0	2 0 0 0 0 1	1 0 0 0 0 0	1 0 0 0 0 0	2 0 0 0 0 0	
EAST APPROACH	CYCLISTS	L T R L T R	0 2 0 0 0 0 0	0 0 0 0 0 0 0	0 4 0 0 0 0 0 0	0 3 0 0 1 0 0	0 3 0 0 0 0 2	0 0 0 0 0 0 0	0 2 0 0 0 0 0	0 0 0 0 0 0	0 2 0 0 0 0 0	0 4 0 0 0 0 0	0:00	0 1 0 0 0 0 0	0 4 0 0 1 0 0	0 0 0 0 0 0	0 2 0 0 0 0 0	0 0 0 0 0 0 0	0 4 0 0 0 0 0	0 2 0 0 0 0 1	0 1 0 0 0 0 0	0 1 0 0 0 0 0	0 2 0 0 0 0 0	
EAST APPROACH	TRUCKS CYCLISTS BOOK	L T R L T R	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 1 0 0 1 0 0 0	0 0 3 0 0 0 0 2	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0:00	0 0 0 0 0 0 0	0 0 1 0 0 1 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 2 0 0 0 0 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	
EAST APPROACH	TRUCKS CYCLISTS BOOK	L T R L T R	89 0 0 2 0 0 0 0 0	111 0 0 3 0 0 0 0 0	132 0 0 4 0 0 0 0 0	153 0 0 3 0 0 1 0 0	174 0 0 3 0 0 0 0 2	158 0 0 3 0 0 0 0 0	167 0 0 2 0 0 0 0 0	140 0 0 5 0 0 0 0 0	127 0 0 2 0 0 0 0 0	122 0 0 4 0 0 0 0 0	00:0	0 0 0 0 0 0 0 0 0	164 0 0 4 0 0 1 0 0	183 0 0 3 0 0 0 0 0 0	179 0 0 2 0 0 0 0 0	205 0 0 3 0 0 0 0 0	202 0 0 4 0 0 0 0 0	200 0 0 2 0 0 0 0 1	167 0 0 1 0 0 0 0 0	141 0 0 1 0 0 0 0 0 0	158 0 0 2 0 0 0 0 0	
EAST APPROACH	CAR TRUCKS CYCLISTS Book	L T R L T R L T R	0 89 0 0 2 0 0 0 0	0 111 0 0 3 0 0 0 0 0	0 132 0 0 4 0 0 0 0 0	0 153 0 0 3 0 0 1 0 0 0	0 174 0 0 3 0 0 0 0 2	0 158 0 0 3 0 0 0 0 0 0	4 167 0 0 2 0 0 0 0 0	4 140 0 0 5 0 0 0 0 0	2 127 0 0 2 0 0 0 0 0	1 122 0 0 4 0 0 0 0 0	00:0	0 170 0 0 1 0 0 0 0 0	0 164 0 0 4 0 0 1 0 0 0	1 183 0 0 3 0 0 0 0 0 0	0 179 0 0 2 0 0 0 0 0	0 205 0 0 3 0 0 0 0 0 0	1 202 0 0 4 0 0 0 0 0	1 200 0 0 2 0 0 0 0 1	4 167 0 0 1 0 0 0 0	2 141 0 0 1 0 0 0 0 0 0	1 158 0 0 2 0 0 0 0 0	
EAST APPROACH	Total CAR TRUCKS CYCLISTS Park	L T R L T R L T R	0 0 89 0 0 0 2 0 0 0 0 0 0	0 0 111 0 0 3 0 0 0 0 0	0 0 132 0 0 4 0 0 0 0 0 0	0 0 153 0 0 3 0 0 1 0 0 0	0 0 174 0 0 3 0 0 0 0 2	0 0 158 0 0 3 0 0 0 0 0 0	0 4 167 0 0 2 0 0 0 0 0	0 4 140 0 0 5 0 0 0 0 0	0 2 127 0 0 2 0 0 0 0 0 0	0 1 122 0 0 4 0 0 0 0 0 0	00:0	0 0 0 0 0 1 0 0 0 0 0 0 0	0 0 164 0 0 4 0 0 1 0 0 0	0 1 183 0 0 3 0 0 0 0 0	0 0 179 0 0 2 0 0 0 0 0	0 0 205 0 0 3 0 0 0 0 0	0 1 202 0 0 4 0 0 0 0 0	0 1 200 0 0 2 0 0 0 0 1	0 4 167 0 0 1 0 0 0 0 0	0 2 141 0 0 1 0 0 0 0 0	0 1 158 0 0 2 0 0 0 0 0 0	
	Total CAR TRUCKS CYCLISTS Park	L T R L T R L T R	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 3 0 0 0 0 0	0 0 0 0 0 4 0 0 0 0 0	0 0 0 153 0 0 3 0 0 1 0 0	0 0 0 174 0 0 3 0 0 0 0 2	0 0 0 0 0 3 0 0 0 0 0	0 0 4 167 0 0 2 0 0 0 0 0 0	0 0 4 140 0 0 5 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 1 122 0 0 4 0 0 0 0 0	0:00	0 0 0 0 0 1 0 0 1 0 0 0 0 0 0	0 0 164 0 0 4 0 0 1 0 0	0 0 1 183 0 0 3 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 3 0 0 0 0	0 0 1 202 0 0 4 0 0 0 0 0	0 0 1 200 0 0 2 0 0 0 0 1	0 0 0 0 0 1 0 0 1 0 0 0 0 0	0 0 0 0 0 141 0 0 1 0 0 0 0 0 0	0 0 1 158 0 0 2 0 0 0 0 0	
	Total CAR TRUCKS CYCLISTS Parts	L T R L T R L T R	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 3 0 0 0 0 0	0 0 0 0 0 4 0 0 0 0 0 0	0 0 0 0 0 153 0 0 3 0 0 1 1 0 0	0 0 0 0 0 3 0 2 0 2	0 0 0 0 0 0 3 0 0 0 0 0	0 0 0 0 0 7 167 0 0 2 0 0 0 0 0 0	0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 2 127 0 0 0 2 0 0 0 0 0 0	0 0 0 0 0 4 0 0 0 0 0	0:00	0 0 0 0 0 1 0 0 1 0 0 0 0 0 0	0 0 0 164 0 0 4 0 0 1 1 0 0	0 0 0 0 0 3 0 0 3 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 3 0 0 3 0 0 0	0 0 0 0 0 4 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1	0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0	0 0 0 0 0 141 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0 1 158 0 0 2 0 0 0 0 0 0	
	CYCLISTS Dead Total CAR TRUCKS CYCLISTS Dead	L T R L T R L T R	0 0 0 0 0 0 89 0 0 0 2 0 0 0 0 0 0	0 0 0 0 0 0 111 0 0 3 0 0 0 0 0	0 0 0 0 0 0 0 132 0 0 4 0 0 0 0 0 0	0 0 0 0 0 0 153 0 0 3 0 0 0 1	0 0 0 0 0 0 174 0 0 3 0 0 0 0 2	0 0 0 0 0 0 0 3 0 0 3 0 0 0 0	0 0 0 0 0 0 0 10 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 2 127 0 0 2 0 0 0 0 0 0	0 0 0 0 0 0 0 1 122 0 0 4 0 0 0 0 0 0	0:00	0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 164 0 0 4 0 0 1 0 0 1	0 0 0 0 0 0 3 0 0 3 0 0 0	0 0 0 0 0 0 0 179 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 3 0 0 3 0 0 0	0 0 0 0 0 0 1 202 0 0 4 0 0 0 0 0	0 0 0 0 0 0 1 200 0 0 2 0 0 0 0 1	0 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 0 0	0 0 0 0 0 0 141 0 0 1 0 0 0 0 0	0 0 0 0 0 0 1 158 0 0 2 0 0 0 0 0 0	
	CYCLISTS Dead Total CAR TRUCKS CYCLISTS Dead	L T R reus L T R L T R	0 0 0 0 0 0 0 89 0 0 0 2 0 0 0 0 0 0	0 0 0 0 0 0 111 0 0 3 0 0 0 0 0	0 0 0 0 0 0 0 132 0 0 4 0 0 0 0 0 0	0 0 0 0 0 0 0 163 0 0 0 3 0 0 0 1	0 0 0 0 0 0 174 0 0 0 3 0 0 0 0 2	0 0 0 0 0 0 0 3 0 0 3 0 0 0 0	0 0 0 0 0 0 0 7 167 0 0 2 0 0 0 0 0 0	0 0 0 0 0 0 0 4 140 0 0 5 0 0 0 0 0 0	0 0 0 0 0 0 0 2 127 0 0 2 0 0 0 0 0	0 0 0 0 0 0 1 122 0 0 4 0 0 0 0 0 0	0:00	0 0 0 0 0 0 1 0 0 021 0 0 0 0 0 0	0 0 0 0 0 0 0 164 0 0 4 0 0 1 0 0 1	0 0 0 0 0 0 0 3 0 0 3 0 0 0 0	0 0 0 0 0 0 0 179 0 0 2 0 0 0 0 0 0	0 0 0 0 0 0 0 205 0 0 0 3 0 0 0 0 0	0 0 0 0 0 0 0 1 202 0 0 4 0 0 0 0 0 0	0 0 0 0 0 0 1 200 0 0 2 0 0 0 0 1	0 0 0 0 0 0 1 0 0 4 167 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0 1 0 0 141 0 0 1 0 0 0 0 0 0	0 0 0 0 0 0 0 1 158 0 0 0 2 0 0 0 0 0 0	
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Turning Movement Count Diagram

Intersection: King Street West at 1st Street South Municipality: Stoney Creek, Hamilton, Ontario

Count Times: 7:00am - 9:30am, 4:00pm - 6:30pm Date: Wednesday April 26, 2017

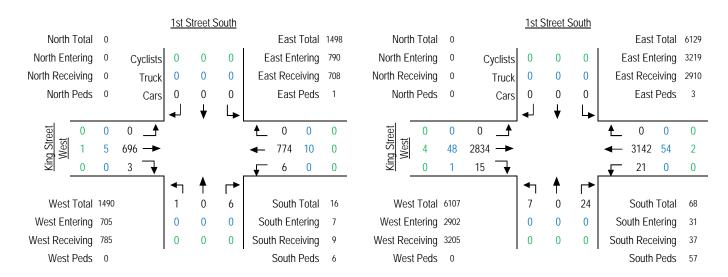
to

MD Peak Hour:

AM Peak Hour: 8:00 to 9:00

1st Street South 1st Street South North Total East Total 1207 North Total East Total Cyclists North Entering 0 0 East Entering 660 North Entering 0 0 East Entering Cyclists North Receiving 0 0 East Receiving 547 North Receiving 0 0 0 East Receiving 0 0 Truck Truck North Peds 0 0 0 East Peds North Peds 0 0 0 East Peds Cars Cars 0 0 0 0 0 0 King Street 0 0 Street 0 0 West West 7 0 0 537 639 13 0 0 0 0 0 2 8 0 0 0 0 0 0 ┍╸ West Total 1201 3 2 0 South Total 16 West Total 0 0 0 0 South Total 0 0 0 0 West Entering 547 0 South Entering 0 West Entering South Entering 0 0 0 South Receiving 0 0 0 South Receiving West Receiving 654 West Receiving 0 West Peds South Peds West Peds South Peds

> **Total 5-Hour Count** PM Peak Hour: 17:00 to 18:00



Trans-Plan Transportation Inc.

Site ID Code: Intersection Location: Municipality: Count Date: Weather and Temperature: Surveyor:

King Street West at 2nd Street Stoney Creek, Hamilton, Ontario Wednesday April 26, 2017 Cloudy TP

7	Grand	Otal	186	234	331	318	317	293	319	334	262	268		346	393	383	379	418	411	402	340	339	300	
	Total		81	104	163	146	146	120	138	188	139	122		160	209	179	189	192	180	189	157	170	130	
	٦	reas	0	0	-	0	0	0	0	0	2	0		0	0	0	0	0	0	0	0	0	0	
	TS	ď	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
	CYCLISTS	_	1	2	0	0	0	0	0	1	0	0		0	1	0	0	0	0	1	0	0	0	
Ŧ	<u>၁</u>	7	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
WEST APPROACH	,KS	~	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
T APP	TRUCKS		2	3	2	4	9	3	2	1	2	2		9	0	2	1	2	3	2	1	1	1	
WES		R .	0 0	0 0	1 0	0 0	1 0	0 0	1 0	3 0	2 1	0 0		2 0	2 0	2 0	2 0	0 0	1 0	0 0	1 0	1 0	1 0	
	CAR	_	72 (94 (154	134 (137	108 (126	166	129 2	107 (147	185	166 2	172	175 (166	172 (151	154	123	
	Ö		2 9	9	1 9	1	2 1	9	9	17 1	2 1	13 1		5 1.	21 1.	1	14 1	15 1	10 1	14 1	1	14	5 1	
	Total	L	1	0	4	1	0	3	2	1	3	2		4	2 2	4	1	3 ,	, 4	1	2	. 0	0	
	To	sns	3	2	0	0	2	0	2	2	8	1		3	3	1	0	1	0	3	0	4	2	
		R	0	0	0	0	0	0	0	0	0	. 0		0	0	0	0	0	0	0	0	7 0	0	
	CYCLISTS		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
Ŧ	CYC		0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
SOUTH APPROACH		В	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
н АРР	TRUCKS	_	0	0	0	0	0	1	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
SOUT	Ŧ	٦	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
		~	0	0	-	-	0	2	2	0	-	2		3	1	0	0	3	3	1	0	0	0	
	CAR	_	0	0	-	0	0	0	0	0	-	0		0	0	0	0	0	0	0	0	0	0	
		٦	1	0	2	0	0	0	0	1	1	0		1	1	4	1	0	1	0	2	0	0	
	Total		96	122	153	155	158	160	166	136	110	132		171	174	189	181	207	217	201	170	154	164	
	opod	spal	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
	s.	æ	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
	CYCLIST	_	0	0	0	0	0	0	0	0	0	0		0	0	1	0	0	1	0	1	0	1	
H	ပ်	L	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
PROA	S	R	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
EAST APPROACH	TRUCKS	⊥	7	4	4	7	4	1	9	7	0	3		2	1	4	3	3	2	1	1	2	3	
EA		7	0	0	0	0	0	0	0	0	3	0		0	0	0	0	0	0	0	0	0	0	
		æ	0	2	1	1	1	2	0	2	0	2		1	3	4	2	2	2	3	9	4	1	
	CAR	ı	63	115	148	151	153	157	161	131	107	127		167	169	179	169	196	206	196	161	148	159	
	Ļ	-	1	1	0	1	0	0	0	1	0	0		1	1	1	4	3	3	1	1	0	0	
	Total	•	8	8	11	16	13	10	13	6	10	12		11	8	11	8	16	10	11	11	15	9	
	Dodo	Leas	3	1	2	2	11	1	2	3	3	1		10	2	3	9	3	6	9	9	9	4	
	TS	R	1	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
I	CYCLISTS	T	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
ROAC	ပ	7	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
H APP	KS	ď	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
NORTH	TRUC	Ι.	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	
			0 2	9	0 0	0 9	2 0	0 8	2 0	9	0 0	1 0		1 0	9	0 8	3 0	3 0	0 6	0 0	0 0	3 0	0 0	
	AR	T R																					9 0	
	0		0	0	1	0	1 (2 (-	1	0	1		0	0	3 (0	3 (1	1 (1	2 (0	
	Ā		7:00	7:15	7:30	7:45	8:00	8:15	8:30	8:45	9:00	9:15	PM	16:00	16:15	16:30	16:45	17:00	17:15	17:30	17:45	18:00	18:15	
NORTH APPROACH	M CAR TRUCKS	TRLT	0 0 2 0 0	0 0 8 0 0	1 0 10 0 0	0 0 16 0 0	1 0 12 0 0	2 0 8 0 0	1 0 12 0 0	1 0 8 0 0	0 0 10 0 0	1 0 11 0 0	N	0 0 11 0 0	0 0 8 0 0	3 0 8 0 0	0 0 8 0 0	3 0 13 0 0	1 0 9 0 0	1 0 10 0 0	1 0 10 0 0	2 0 13 0 0	0 0 9 0	





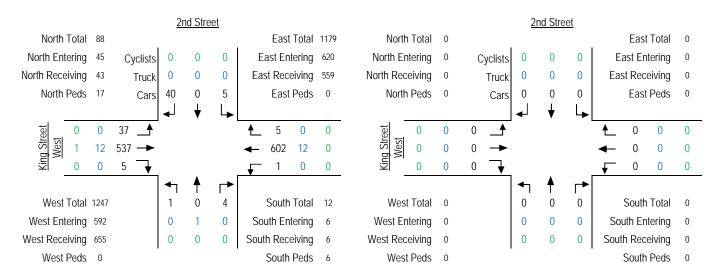
Turning Movement Count Diagram

Intersection: King Street West at 2nd Street
Municipality: Stoney Creek, Hamilton, Ontario

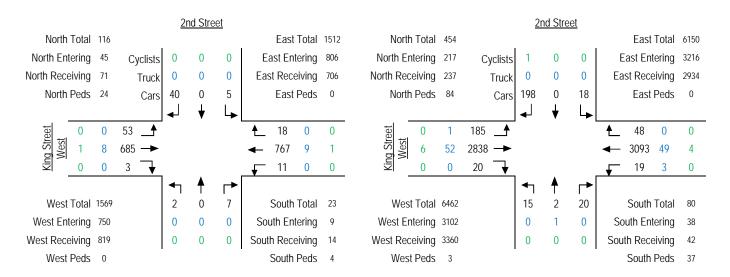
Count Times: 7:00am - 9:30am, 4:00pm - 6:30pm Date: Wednesday April 26, 2017

to

AM Peak Hour: 8:00 to 9:00 MD Peak Hour:



PM Peak Hour: 16:45 to 17:45 Total 5-Hour Count

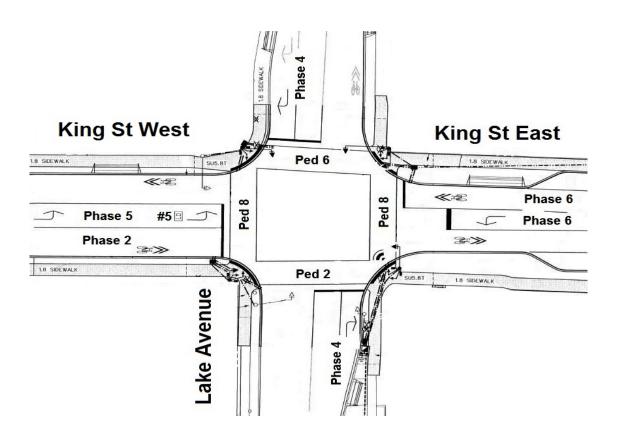


City of Hamilton - Traffic Traffic Signal Controller Timing Data

Intersection: King St @ Lake Ave (Int# 106)

Controller Type: 3000E Page 1 of 16
Programmed By: MF Installed By: MF

Date: **July 24/15** Date: **Dec 8/15**



ф1:

φ2: King - EB, South Xwalk

 $\phi3\colon \mbox{No Output}$ - Timing for Advance Ped

φ4: Lake - NB/SB (Vehicle Phase)

φ5: King - EBLT

φ6: King - WB, North Xwalk

ф7:

φ8: Lake - E/W Xwalks (Ped Phase)

Flash Operation: Red: King

Red: Lake

CONTROLLER DATA

King St @ Lake Ave

																	7																
	16																		16														
	15																		15														
	14																		14														
	13																		13														
	12																		12														
	11																		11														
	10																		10														
	6																		6														
TP2	8	10		3.3	2.0	18	12	40										TP3	8	10		3.3	2.0	18	12	40							
	7																		7														
	9	10		3.3	2.1	12	12	22											9	10		3.3	2.1	12	12	22							
	2	2	2.0	3.0				15											2	2	2.0	3.0				15							
	4	10		3.3	2.0	0	0	40											4	10		3.3	2.0	0	0	40							
	3	2		3.0				3											3	2		3.0				3							
	2	10		3.3	2.1	12	12	22											2	10		3.3	2.1	12	12	22							
	1																		1														
		Initial	Passage	Yellow	Red	Walk	Ped Clr	Max 1	Max 2	Mx 3 Lim	Mx 3 Adh	TBR	TTR	Min Gap	AI/Act	Max In				Initial	Passage	Yellow	Red	Walk	Ped Clr	Max 1	Max 2	Mx 3 Lim	Mx 3 Adh	TBR	TTR	Min Gap	AI/Act
			PHASE	TIMES																	PHASE	TIMES											

Max In



APPENDIX B

Background Traffic Information

Turning Movement Count Report King Street East & Elm Avenue Intersection ID: 2918 Thursday September 25, 2014



	LEFT	NORHTBOUND THROUGH	RIGHT	LEFT	EASTBOUND THROUGH	RIGHT	LEFT	WESTBOUND THROUGH	RIGHT	Total
7:00 AM	0	0	1	0	88	1	0	95	0	185
7:15 AM	1	0	3	0	107	2	1	118	0	232
7:30 AM	0	0	2	0	147	3	5	154	0	311
7:45 AM	0	0	0	0	152	4	10	160	0	326
8:00 AM	1	0	5	0	108	3	10	163	0	290
8:15 AM	1	0	0	0	123	4	7	145	0	280
8:30 AM	1	0	6	0	123	2	10	170	0	312
8:45 AM	2	0	2	0	126	8	21	142	0	301
9:00 AM	1	0	5	0	114	0	8	117	0	245
9:15 AM	3	0	4	0	121	2	16	91	0	237
9:30 AM	1	0	4	0	109	5	1	119	0	239
9:45 AM	2	0	6	0	109	5	7	114	0	243
1:30 PM	3	0	9	0	122	5	5	114	0	258
1:45 PM	3	0	6	0	144	5	9	127	0	294
2:00 PM	3	0	12	0	128	2	6	120	0	271
2:15 PM	2	0	7	0	129	1	4	115	0	258
2:30 PM	0	0	3	0	157	5	13	136	0	314
2:45 PM	2	0	5	0	151	3	10	149	0	320
3:00 PM	1	0	8	0	158	2	8	161	0	338
3:15 PM	1	0	9	0	188	3	13	155	0	369
4:00 PM	0	0	4	0	159	6	8	158	0	335
4:15 PM	1	0	2	0	160	3	7	148	0	321
4:30 PM	0	0	7	0	171	1	7	127	0	313
4:45 PM	1	0	11	0	172	1	12	151	0	348
5:00 PM	0	0	10	0	189	3	5	153	0	360
5:15 PM	2	0	12	0	174	1	8	159	0	356
5:30 PM	1	0	5	0	186	5	2	140	0	339
5:45 PM	2	0	5	0	158	4	7	125	0	301
6:00 PM	3	0	5	0	146	0	6	134	0	294
6:15 PM	1	0	3	0	146	4	3	119	0	276
6:30 PM	1	0	5	0	148	2	7	107	0	270
6:45 PM	6	0	6	0	144	4	1	110	0	271
AM Peak Hour	;	3 0	11	C	506	13	37	638	C)
PM Peak Hour		4 0	38	0	721	10	27	603	C)

Growth along King Street East, East of Lake Avenue

Peak	٦	TMC, Year 2014			TMC, Year 2017	1
Hour	Eastbound	Westbound	Total	Eastbound	Westbound	Total
AM	519	641	1,160	472	589	1,061
PM	731	607	1,338	744	632	1,376
Total	1,250	1,248	2,498	1,216	1,221	2,437
Annual Growth		•				-0.8%

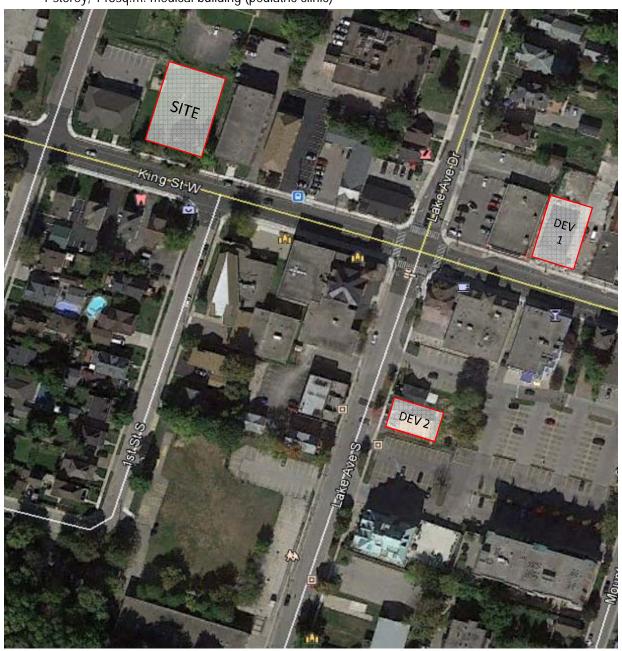
Source 2014 traffic data obtained from the City of Hamilton, Turning Movement Count at King Street East & Elm Avenue 2017 traffic data obtained by Trans-Plan, count conducted at King Street West & Lake Avenue

16 &18 King Street West Background Development Map



1 DA-12-001 Two-storey mixed use building

2 DA-14-070 1 storey, 148sq.m. medical building (pediatric clinic)



16 &18 King Street West Background Development Trip Generation



1. DA-12-001 2 storey mixed use building

11 11 12 001	2 010101	iinoa aso ballali	<u>'9</u>					
Land Use		Size	AM	l Peak H	lour	PM	l Peak H	lour
			In	Out	Total	In	Out	Total
General Office	Sq Ft.	2,500						
ITE Code 820		Distribution	88%	12%	100%	17%	83%	100%
		Equation	Ln(T)=	0.80Ln(X)+1.57		-	
		Rate	3.87	0.53	4.40	0.25	1.24	1.49
		Trips	10	1	11	1	3	4
Apartment	Units:	12						
ITE Code 220		Distribution	20%	80%	100%	65%	35%	100%
		Equation	T = 0	.49(X) +	- 3.73	T = 0.	.55(X) +	17.65
		Rate	0.17	0.67	0.83	1.30	0.70	2.00
		Trips	2	8	10	16	8	24
		Total Trips	12	9	21	17	11	28

2. DA-14-070 148 sq.m medical clinic (pediatric)

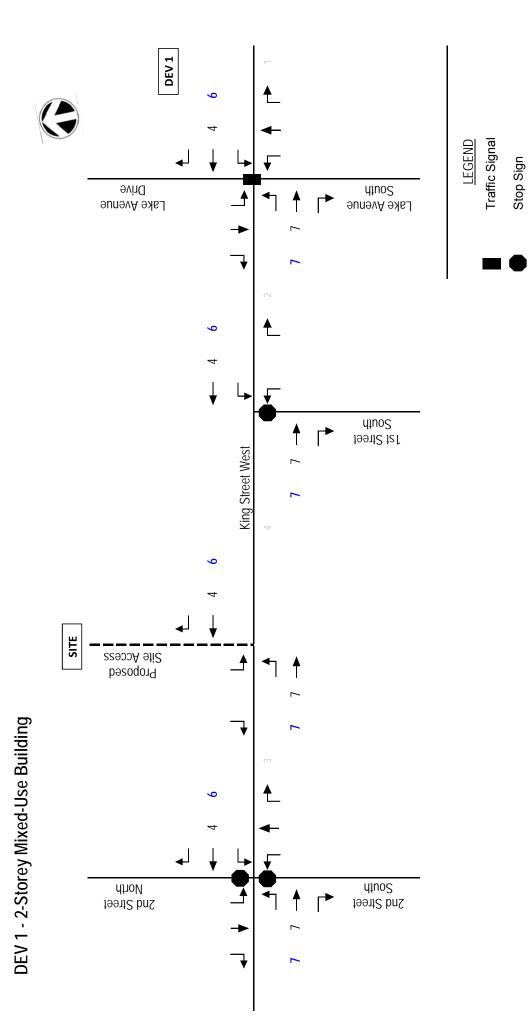
Land Use		Size	AM	Peak F	lour	PM	Peak F	lour
			In	Out	Total	In	Out	Total
Medical-Dental Office	Sq Ft.	1,593						
ITE Code 820		Distribution	79%	21%	100%	28%	72%	100%
		Equation		n/a			n/a	
		Rate	1.86	0.63	2.49	1.06	2.51	3.57
		Trips	3	1	4	2	4	6



TRAFFIC IMPACT STUDY

Proposed Mixed Use Development

16 & 18 King Street West, Stoney Creek, Hamilton



AM / PM Peak Hour

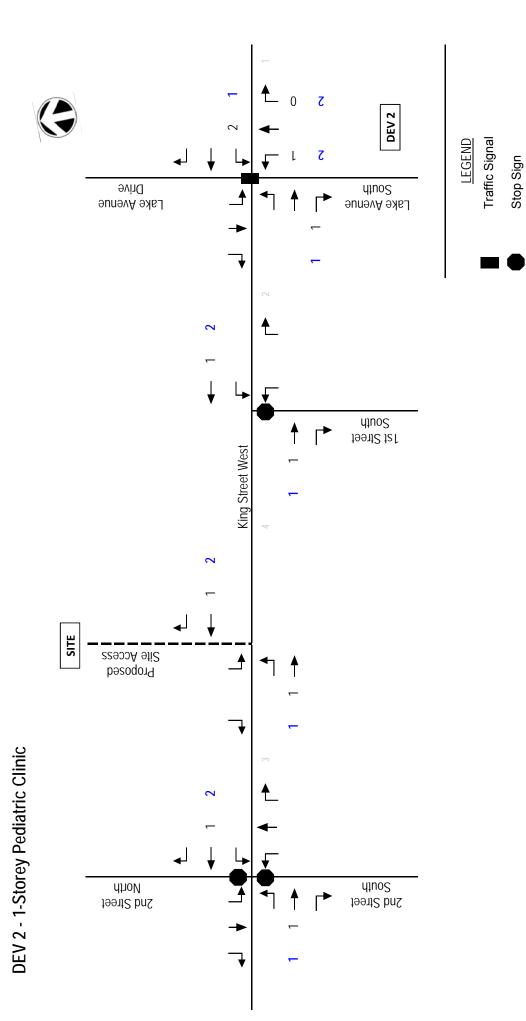
Schematic; Not To Scale



TRAFFIC IMPACT STUDY

Proposed Mixed Use Development

16 & 18 King Street West, Stoney Creek, Hamilton



AM / PM Peak Hour

Schematic; Not To Scale



APPENDIX C

Transportation Tomorrow Survey Data

USER : TRANS-PLAN

DATE : May 3 2017 (15:59:59)

DATA : 2011 TTS V1.0 Trips

TABLE : purp_orig (Home)

FILTER 1 : ward_orig => 179

FILTER 2 : purp_orig => Home

FILTER 3 : start_time => 600-900

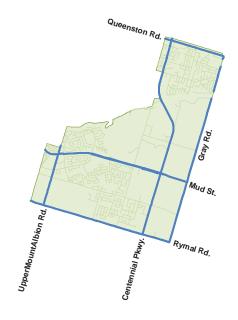
ROW: pd_dest
COLUMN: ward_orig

		N 45%		
w	48%		4%	E
		4% S		

Destination Zone	No. of Trips from Ward 179	Percent of Trips from Ward 179	Location respect to site
PD 1 of Toronto	210	2%	N
PD 4 of Toronto	26	0%	N
PD 8 of Toronto	45	1%	N
PD 16 of Toronto	23	0%	N
Markham	26	0%	N
Vaughan	51	1%	N
Mississauga	214	2%	N
Milton	17	0%	N
Oakville	269	3%	N
Burlington	782	9%	N
Dundas	45	1%	W
Ancaster	223	3%	W
Hamilton			
171	528	6%	W
172	655	7%	W
173	490	6%	W
174	352	4%	N
175	1318	15%	N
176	775	9%	W
177	524	6%	W
178	488	6%	W
179	2839	Inter	nal
180	586	7%	N
181	290	3%	S
182	223	3%	W
183	45	1%	W
Grimsby	25	0%	E
Lincoln	42	0%	Е
St Catharines	70	1%	E
Niagara Falls	68	1%	E
Welland	48	1%	E
West Lincoln	42	0%	E
North Dumfries	23	0%	W
Rest of Wellington	22	0%	S
Haldimand-Norfoll		0%	E
East Garafraxa	22	0%	N
Brantford	218	2%	W
Total	8827	100%	

CITY OF HAMILTON WARD 9







						HOU	SEHO	LD C	HAR	ACTE	RISTIC	CS						
	Dw	elling Ty	ре		Нос	usehold S	Size		N	lumber o	f Availabl	e Vehicle	es		House	ehold Ave	erages	
Households	House	Townhouse	Apartment	-	2	3	4	5+	0	-	2	3		Total num	(Househonber of trip	s by perso	ns of age	
9,500	64%	16%	20%	18%	32%	18%	19%	13%	8%	37%	41%	10%	3%	2.8	1.3	1.9	1.6	6.0

						POPU	LATIO	N CH	IARAC	CTERIST	ICS					
				Age				<u>-</u> +	sd		Em	ployment 1	Гуре			
Population								Trips per (age 11+	Vork Trip Worker	Population	Full Time	Part Time	At Home	Student	Licenced	Transit
	10	15	25	45	64		ian	aily [.] son	y V er				Male			
	1		- 9	26 -	- 9	2+	1edian	Da ers)ail	13,000	41%	6%	2%	22%	71%	7%
	0			7	4	9	2	<u>п</u>					Female			
26,700	14%	7%	13%	27%	26%	13%	37.8	2.5	0.74	13,700	30%	10%	2%	22%	64%	7%

			TRIP	S MA	DE B	Y RES	IDENT	S OF C	CITY OI	F HAMI	LTON -	WARE	9			
Time	Trips	% 24 hr		Trip Pu	urpose				Mode c	of Travel			Me	edian Trip	Length (F	km)
Period	Period		HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Wlk & Cy	Other	Driver	Pass.	Transit	GO Train
6-9 AM	12,700	22.0%	43%	24%	22%	12%	69%	11%	3%	2%	6%	9%	7.2	4.5	10.0	61.2
24 Hours	57,700		27%	12%	44%	18%	70%	18%	3%	1%	4%	4%	5.5	4.3	9.2	61.2

					TRIF	PS TO	CITY (OF HAI	MILTO	I - WAF	RD 9					
Time	Trips	% 24 hr		Trip Pu	urpose				Mode c	of Travel			Me	edian Trip	Length (k	m)
Period	od '			School	Home	Other	Driver	Pass.	Transit	GO Train	Wlk & Cy	Other	Driver	Pass.	Transit	GO Train
6-9 AM	8,000	15.7%	25%	38%	10%	27%	57%	14%	5%	*	12%	12%	3.8	1.6	3.6	*
24 Hours	50,900		7%	7%	47%	40%	68%	19%	3%	0%	5%	4%	4.7	3.7	5.7	61.4

2001, 2006 and 2011 TTS

City of Hamilton, Ward 179, Auto Ownership Data, Apartment Dwelling Types

DATA : 2001, 2006, 2011 TTS V1.0 Households

TABLE : n_vehicle (0)

TABLE : dwell_type (Apartment)
FILTER 1 : ward_hhld => 179

FILTER 2 : dwell_type => Apartment

ROW: ward_hhld COLUMN: n_vehicle

Results

179

Number of Vehicles	Apartments	Average
C	20	0.00
1	80	0.57
2	2 40	0.57
3	3 0	0.00
4	0	0.00
Total	140	1.14

Number of Vel	hicles	Apartments	Average
	0	1326	0.00
	1	1869	0.54
	2	201	0.12
	3	18	0.02
	4	22	0.03
Total		3436	0.70

Number of Vehicles	Apartments	Average
0	521	0.00
1	1168	0.62
2	197	0.21
3	0	0.00
4	0	0.00
Total	1886	0.83



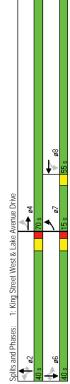


APPENDIX D

Capacity and Queue Analysis Sheets

<Existing> AM Peak Hour 5/05/2017 Timings 1: King Street West & Lake Avenue Drive

	4	†	>	ţ	•	←	*	۶	→	*	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	<i>y</i> -	æ,	*	2		₩	¥.		€	¥L.	
Volume (vph)	8	422	15	519	44	30	14	36	26	6/	
Turn Type	pm+pt		Perm		Perm		Perm	Perm		Perm	
Protected Phases	7	4		00		2			9		
Permitted Phases	4		∞		2		2	9		9	
Detector Phase	7	4	00	∞	2	2	2	9	9	9	
Switch Phase											
Minimum Initial (s)	2.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	0.6	29.4	29.4	29.4	35.3	35.3	35.3	35.3	35.3	35.3	
Total Split (s)	15.0	70.0	55.0	22.0	40.0	40.0	40.0	40.0	40.0	40.0	
Total Split (%)	13.6%	63.6%	20.0%	20.0%	36.4%	36.4%	36.4%	36.4%	36.4%	36.4%	
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	0.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.4	5.4	5.4	5.3	5.3	5.3	5.3	5.3	5.3	
Lead/Lag	Lead		Lag	Lag							
Lead-Lag Optimize?	Yes		Yes	Yes							
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max	
Act Effct Green (s)	46.9	44.4	34.9	34.9		35.8	35.8		35.8	35.8	
Actuated g/C Ratio	0.51	0.49	0.38	0.38		0.39	0.39		0.39	0.39	
v/c Ratio	0.33	0.59	90:0	0.89		0.13	0.03		0.11	0.13	
Control Delay	13.2	18.4	18.1	41.7		24.0	11.6		23.8	6.5	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.2	18.4	18.1	41.7		24.0	11.6		23.8	6.5	
FOS	В	В	В	Ω		U	В		S	A	
Approach Delay		17.7		41.1		22.1			14.1		
Approach LOS		Ω		٥		O			В		
Intersection Summary											
Cycle Length: 110											
Actuated Cycle Length: 91.2											
Natural Cycle: 80											
Control Type: Semi Act-Uncoord	ord										
Maximum v/c Ratio: 0.89											
Intersection Signal Delay: 27.7	7			드	Intersection LOS: C	LOS: C					
Intersection Capacity Utilization 94.0%	on 94.0%			2	ICU Level of Service F	of Service	LL.				
Alialysis Pellou (IIIII) 13											



Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Synchro 7 - Report Page 1

HCM Signalized Intersection Capacity Analysis 1: King Street West & Lake Avenue Drive

<Existing> AM Peak Hour 5/05/2017

	4	†	~	-	ţ	4	•	←	•	۶	→	•
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	r	Ŷ.		F	2			4	*		÷	*
Volume (vph)	8	422	46	15	519	22	44	30	14	36	56	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.0	3.6	3.6	3.6	3.6	3.0	3.6	3.6	3.6
Total Lost time (s)	3.0	5.4		5.4	5.4			2.3	2.3		2.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	9.5	8.6		00.1	00.1			00.1	100		00.0	0.97
ripo, pedibines	8.0	00.0		1.00	000			1.00	0.85		1.00	9. 6
Fit Protected	0.95	100		0.95	100			0.97	100		0.97	100
Satd. Flow (prot)	1770	1767		1636	1831			1799	1428		1797	1535
Fit Permitted	0.12	1.00		0.44	1.00			0.83	1.00		0.84	1.00
Satd. Flow (perm)	215	1767		750	1831			1537	1428		1548	1535
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)	87	459	53	16	264	09	48	33	15	36	78	98
RTOR Reduction (vph)	0	2	0	0	4	0	0	0	6	0	0	52
Lane Group Flow (vph)	87	207	0	16	620	0	0	81	9	0	19	34
Confl. Peds. (#/hr)	2		1	=		2	7		6	6		7
Confl. Bikes (#/hr) Heavy Vehicles (%)	7%	3%	7%	7%	7%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	9	0	0	0	0	0	0	0	0	0	0
Turn Type	pm+pt			Perm			Perm		Perm	Perm		Perm
Protected Phases	7	4			00			2			9	
Permitted Phases	4			∞			2		2	9		9
Actuated Green, G (s)	45.1	45.1		34.9	34.9			35.8	35.8		35.8	35.8
Effective Green, g (s)	45.1	45.1		34.9	34.9			35.8	35.8		35.8	35.8
Actuated g/C Ratio	0.49	0.49		0.38	0.38			0.39	0.39		0.39	0.39
Clearance Time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	228	870		286	869			601	228		909	009
v/s Ratio Prot	0.03	c0.29			c0.34							
v/s Ratio Perm	0.16	i.		0.02	0			0.05	0.00		0.04	0.02
Wc Katlo	0.38	0.58		0.00	0.89			17.0	0.01		0.1	0.00
Drogression Factor	- 6	100		100	1.00			100	1.00		0.7	1.4
Incremental Delay, d2	118	10		0.0	13.2			0.5	000		0.4	0.0
Delay (s)	18.2	17.6		18.0	39.7			18.4	17.1		18.1	17.6
Level of Service	В	B		В	Q			B	В		В	В
Approach Delay (s)		17.6			39.2			18.2			17.8	
Approach LOS		В			Q			В			В	
Intersection Summary												
HCM Average Control Delay			27.0	Ξ	HCM Level of Service	of Service			ပ			
HCM Volume to Capacity ratio	_		0.53									
Actuated Cycle Length (s)			91.6	Su	Sum of lost time (s)	ime (s)			16.1			
Intersection Capacity Utilization	E		94.0%	೦	ICU Level of Service	Service			ш			
Analysis Period (min)			15									
c Critical Lane Group												

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

<Existing> AM Peak Hour 5/05/2017 HCM Unsignalized Intersection Capacity Analysis 2: King Street West & 1st Street South

																																							A		
•	NBR		33			0.92	3										614			-	6.2				488														ICU Level of Service		
•	NBL	>	2		%0		2	6	3.6	1.2	_					0.68	1340			1265	6.4		3.5	86	125														ICU Level		
ţ	WBT	₩	652	Free	%0	_	709						None		91																										
-	WBL		8			0.92	6										616			616	4.1		2.2	66	957	NB 1	5	2	3	226	0.02	0.4	21.3	U	21.3	S		0.2	50.7%	12	
1	EBR		33			0.92	3																			WB1	717	6	0	957	0.01	0.5	0.2	⋖	0.2						
†	EBT	£	255	Free	%0	0.92	603						None													EB 1	209	0	က	1700	0.36	0.0	0.0		0.0				ization		
	Movement	Lane Configurations	Volume (veh/h)	Sign Control	Grade	Peak Hour Factor	Hourly flow rate (vph)	Pedestrians	Lane Width (m)	Walking Speed (m/s)	Percent Blockage	Right turn flare (veh)	Median type	Median storage veh)	Upstream signal (m)	pX, platoon unblocked	vC, conflicting volume	vC1, stage 1 conf vol	vC2, stage 2 conf vol	vCu, unblocked vol	tC, single (s)	tC, 2 stage (s)	tF (s)	p0 queue free %	cM capacity (veh/h)	Direction, Lane #	Volume Total	Volume Left	Volume Right	SSH	Volume to Capacity	Queue Length 95th (m)	Control Delay (s)	Lane LOS	Approach Delay (s)	Approach LOS	Intersection Summary	Average Delay	Intersection Capacity Utilization	Analysis Period (min)	

HCM Unsignalize 3: King Street We

<existing> AM Peak Hour</existing>	5/05/2017	
ilized Intersection Capacity Analysis	West & 2nd Street North	

-	4	†	<i>></i>	\	ţ	4	•	←	•	۶	→	*
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			€			4	
Volume (veh/h)	37	549	വ	-	648	വ	-	,	4	2	0	40
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)	40	262	2	-	704	2	-	-	4	2	0	43
Pedestrians								9			17	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								-			_	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					165							
D.	89.0						89.0	89.0		89.0	89.0	89.0
vC, conflicting volume	727			809			1439	1415	909	1411	1415	724
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			809			1410	1375	909	1370	1375	365
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			100			86	66	66	93	100	91
cM capacity (veh/h)	802			965			89	92	495	77	92	458
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	642	711	7	49								
Volume Left	40	-	-	2								
Volume Right	2	2	4	43								
cSH	802	965	178	296								
Volume to Capacity	0.02	0.00	0.04	0.16								
Queue Length 95th (m)	6:0	0.0	0.7	3.5								
Control Delay (s)	1.3	0.0	26.0	19.5								
Lane LOS	A	V	۵	O								
Approach Delay (s)	1.3	0.0	26.0	19.5								
Approach LOS			۵	O								
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			68.3%	⊇	J Level o	ICU Level of Service			O			
Analysis Period (min)			12									

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Timings <Existing> PM Peak Hour 1: King Street West & Lake Avenue Drive 5/05/2017

•	SBR	R.	133	Perm		9	9		10.0	35.3	40.0	36.4%	3.3	2.0	0.0	5.3			Max	35.5	0.36	0.24	9.6	0.0	9.6	Α									
→	SBT	4	28		9		9		10.0	35.3			3.3	2.0	0.0	5.3			Max	35.5	0.36	0.40	30.5	0.0	30.5	O	21.4	ပ							
۶	SBL		144	Perm		9	9		10.0	35.3	40.0	36.4%	3.3	2.0	0.0	5.3			Max																
*	NBR	R.	7	Perm		2	2		10.0	35.3	40.0	36.4%	3.3	2.0	0.0	5.3			Max	35.5	0.36	0.02	14.1	0.0	14.1	В									
←	NBT	₹	26		2		2		10.0	35.3	40.0	36.4%	3.3	2.0	0.0	5.3			Max	35.5	0.36	0.14	26.6	0.0	26.6	O	25.4	S						0	Intel Section LOS: C
•	NBL		41	Perm		2	2		10.0	35.3	40.0	36.4%	3.3	2.0	0.0	5.3			Max															- Chococo	mersection Los: C
ţ	WBT	£\$	607		00		00		10.0	29.4	22.0	20.0%	3.3	2.1	0.0	5.4	Lag	Yes	None	42.8	0.43	0.92	44.6	0.0	44.6	Ω	44.5	Ω						.5	= 9
-	WBL	*	2	Perm		∞	∞		10.0	29.4	22.0	20.0%	3.3	2.1	0.0	5.4	Lag	Yes	None	42.8	0.43	0.01	16.0	0.0	16.0	В									
†	EBT	æ,	594		4		4		10.0	29.4	70.0	63.6%	3.3	2.1	0.0	5.4			None	52.1	0.53	0.70	20.9	0.0	20.9	O	20.1	U							
1	EBL	*	79	pm+pt	7	4	7		2.0	0.6	15.0	13.6%	3.0	0.0	0.0	3.0	Lead	Yes	None	54.5	0.55	0.37	13.9	0.0	13.9	В					.5		coord		50.0
	Lane Group	Lane Configurations	Volume (vph)	Turn Type	Protected Phases	Permitted Phases	Detector Phase	Switch Phase	Minimum Initial (s)	Minimum Split (s)	Total Split (s)	Total Split (%)	Yellow Time (s)	All-Red Time (s)	Lost Time Adjust (s)	Total Lost Time (s)	Lead/Lag	Lead-Lag Optimize?	Recall Mode	Act Effct Green (s)	Actuated g/C Ratio	v/c Ratio	Control Delay	Queue Delay	Total Delay	TOS	Approach Delay	Approach LOS	Intersection Summary	Cycle Lenath: 110	Actuated Cycle Length: 98.5	Natural Cycle: 90	Control Type: Semi Act-Uncoord	Maximum v/c Ratio: 0.92	mersection signal Delay: 30.0

			80 ♣	
Avenue Drive	→ 84	70%	20 €	
Splits and Phases: 1: King Street West & Lake Avenue Drive				
Splits and Phases:	♣ ø2	40 s	90 🐴	

<Existing> PM Peak Hour 5/05/2017

FB1 FB1 WB1 WB1 NB1 NB2 NB2 NB2 NB2 NB2 <th>PIS 1900 1 1900 1 1900 1 1 1000 1 100</th> <th></th> <th></th> <th></th> <th></th> <th>26 26 3.6 3.6 5.3 1.00 0.98 1.00 0.97 1.778 0.77 0.77 2.8 2.8 2.8 2.8</th> <th>NBR 7 7 1900 3.0 5.3 1.00 0.94 1.00 1.396 1.00 1.396 1.00 3.3</th> <th>144 1900 3.6 3.6 157 157 0 0</th> <th>\$8 1900 3.6 5.3 1.00 1.00 0.97 1.00 0.71 1.286 0.092 3.0 0.71 1.87 0.71 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 0.71 1.87 0.71 1.87 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.7</th> <th>SSR 133 3.6 3.6 5.3 5.3 5.3 1.00 0.95 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0</th>	PIS 1900 1 1900 1 1900 1 1 1000 1 100					26 26 3.6 3.6 5.3 1.00 0.98 1.00 0.97 1.778 0.77 0.77 2.8 2.8 2.8 2.8	NBR 7 7 1900 3.0 5.3 1.00 0.94 1.00 1.396 1.00 1.396 1.00 3.3	144 1900 3.6 3.6 157 157 0 0	\$8 1900 3.6 5.3 1.00 1.00 0.97 1.00 0.71 1.286 0.092 3.0 0.71 1.87 0.71 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 1.87 0.71 0.71 1.87 0.71 1.87 0.71 0.71 0.71 0.71 0.71 0.71 0.71 0.7	SSR 133 3.6 3.6 5.3 5.3 5.3 1.00 0.95 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0
1900 1900	DOTS 79 1900 1900 1900 1900 1900 1900 1900 1					26 26 1900 3.6 5.3 1.00 1.00 0.98 1.778 0.77 1415 0.92 28 28 28	7 1900 3.0 5.3 1.00 0.94 1.00 1.00 1.396 0.92 8 8 1.00 1.00 1.00 1.396 8 3	144 1900 3.6 0.92 157 157 0 0	1900 3.6 3.6 5.3 1.00 1.00 0.97 1.00 0.71 1286 0.71 1286 0.71 1286 0.71 1286	1333 3.6 3.6 3.6 5.3 3.6 5.3 1.00 0.05 1.00 1.00 1.00 1.00 1.00 1.00
190 294 20 2 607 68 41 26 7 144 28 38 38 38 38 38 38 38	1979 1970 1970 1970 1970 1970 1970 1970					26 1900 3.6 5.3 1.00 1.00 0.97 1778 0.77 1415 0.92 28	3.0 5.3 1.00 0.94 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	3.6 3.6 3.6 157 0 0	28 1900 3.6 5.3 1.00 1.00 0.97 1738 0.71 1286 0.92 0.92 0.92	133 3.6 5.3 3.6 5.3 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.
1900 1900	1900 1 3.6 3.6 3.6 3.0 1.00 1.00 1.00 1.00 1.00 1.00 1.00					3.6 5.3 1.00 1.00 0.98 1.00 0.97 1778 0.77 1415 0.92 28	3.0 3.0 5.3 1.00 0.94 1.00 0.85 1.00 1.396 1.00 1.396 1.00 1.396 1.00 3.3	3.6 0.92 157 0 0	3.6 3.6 5.3 1.00 1.00 0.97 1738 0.71 1286 0.92 30 0 0	3.6 3.6 5.3 5.3 1.00 0.05 1.00 1.00 1.00 1.00 1.00 1.00
3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.0 5.4 5.4 5.4 5.3 5.3 5.3 5.3 5.3 1.00 1	3.6 3.0 1.00 1.00 1.00 1.00 0.095 1.770 1.770 1.86 ((ph) 86 ((ph) 86				3.6 0.92 45 0 0 0 21 21	3.6 5.3 1.00 1.00 0.97 1.778 0.77 1415 0.92 28 0	3.0 1.00 0.94 1.00 0.85 1.00 1.396 1.396 1.00 1.396 1.092 8 8	3.6 0.92 157 0 0 22	3.6 5.3 1.00 1.00 0.97 1738 1738 0.07 178 0.07 186 0.07 186	3.6 5.3 5.3 1.00 0.95 1.00 0.85 0.92 1.49 1.49 1.49 1.49 1.49 0.92 2.1 7.1 7.4 7.4 7.4 7.4 7.4 7.4 7.4 7.4 7.4 7.4
100 100	3.0 1.00 1.00 1.00 1.00 1.00 0.05 0.05 0.	Ö		0	0.92 45 0 0 0 21 21 Perm	5.3 1.00 1.00 0.98 1.00 0.97 1778 0.77 1415 0.92 28	5.3 1.00 0.94 1.00 1.00 1.396 1.00 1.396 0.92 8	0.92 157 0 0 22	5.3 1.00 1.00 0.97 1.00 0.73 1.286 0.73 30 30	5.3 1.00 0.95 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0
1,00	1.00 1.00 1.00 1.00 1.00 0.95 1.00 0.09 ((ph) 0 ((ph) 86 ((ph) 19	O		O	0.92 0 0 0 21 0 0	1.00 1.00 0.98 1.00 0.97 1778 0.77 0.92 28 28 73	1.00 0.94 1.00 0.85 1.00 1.396 1.00 1.396 0.92 8	0.92 157 0 0 0 22	1.00 0.97 1.00 0.96 1738 0.71 30 30 0	1.00 0.95 1.00 0.85 1.00 1498 1.00 1498 0.92 74 74 21
1.00	100 100 100 100 100 100 100 100 100 100	O		Ö	0.92 0 0 0 21 0 Perm	0.98 1.00 0.97 1778 0.77 1415 0.92 28 0	1.00 0.85 1.00 1.396 1.00 1.396 0.92 8	0.92 157 0 0 22	0.97 1.00 0.96 1738 0.71 1286 0.92 30 0 187	0.95 0.85 1.00 1.00 1.00 1.00 1.498 0.92 74 74 21
1.00	(vph) 86 (vph) 19	Ö		O	0.92 45 0 0 0 21 21	1.00 0.97 1778 0.77 1415 0.92 28 28 0	1.00 1.00 1.00 1.00 1.396 0.92 8	0.92 157 0 0 22	1.00 0.06 1738 0.71 1286 0.92 30 0 187	0.85 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0
1770 1806 1403 1244 1778 1396 1738 1700 0.96 1738 1700 0.96 1738 1700 0.96 1738 1700	0.95 1770 0.09 0.00 163 163 19 (kph) 86 (kph) 86	0		O	0.92 45 0 0 0 21 21	0.97 1778 0.77 1415 0.92 28 0	1.00 1.396 1.00 1396 0.92 8	0.92 157 0 0 22	0.71 1286 0.71 1286 0.92 30 0 187	1.00 1.00 1.00 1.00 0.92 1.45 71 74 21
1770 1806 1635 1824 1778 1396 1738 1738 1806 1603 1000	1770 1770 009 009 009 86 (vph) 0 (vph) 86 009 19 009 19 009 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 000 10 00	Ö		0	0.92 45 0 0 21 0 Perm	1778 0.77 1415 0.92 28 0	1396 1.00 1396 0.92 8 8 5 5	0.92 157 0 0 22	1738 0.71 1286 0.92 30 0 187	11.00 11.00 1458 0.92 71 74 21 Perm
100 100 100 0.30 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.77 100 0.72 0.92 0.	((ph)) 0.09 ((ph)) 0 0.09 ((ph)) 0	0		0	0.92 45 0 0 21 0 Perm	0.77 1415 0.92 28 0 0	1.00 1396 0.92 8 8 5	0.92 157 0 0 22	0.92 30 0 0.92	1.00 1498 0.92 145 71 74 21 0
163 1806 511 1824 1415 1396 1286 12	163 0.92 86 0 0 0 19	0	`	0	0.92 45 0 0 21 21	1415 0.92 28 0 0	1396 0.92 8 8 5	0.92 157 0 0	0.92 30 0 187	1498 0.92 145 71 74 21 0
F 092 093	0.92 86 0 0 0 86 19	0		0	0.92 45 0 0 21 21	0.92 28 0 0 73	0.92	0.92 157 0 0 22	0.92 30 0 187	0.92 145 71 74 21 0
No.	(vph) 86 (vph) 86 19		2 0 2 2 16 0 Perm		45 0 0 21 0 Perm	28 0 73	യ വ യ	157 0 0 22	30 0 187	145 71 74 21 Perm
h) 6 6 47 0 0 0 4 0 0 5 0 0 10 19 19 16 16 16 19 21 22 22 22 22 22 22 22 22 22 22 22 22	(vph) 0 (vph) 86		0 2 2 0 0 Perm		21 0 0 0 Perm	73	വ വ	0 0 2	187	74 21 0 Perm
h) 86 667 0 2 730 0 0 73 3 0 187 19	(vph) 86 19		16 16 0 Perm	_	21 0 0 Perm	73	3	22	187	74 21 Perm
19			16 0 Perm		21 0 Perm			72	c	21 0 Perm
Pinth Perm	1200		Derm		Perm		22		C	Perm
Pin+pi	c		Perm		Perm	C	_	_		Perm
1	to turnil of	4	_ cc	80	5		Dorm	Dorm	>	5
1	hases		α	,		2	3	5	9	
52.8 52.8 42.8 42.8 35.5 35.3 35.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.3 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0 <th< td=""><td></td><td></td><td>2</td><td></td><td>2</td><td>1</td><td>2</td><td>9</td><td>></td><td>9</td></th<>			2		2	1	2	9	>	9
528 528 42.8 42.8 35.5 35.3 35.5 35.3 35.5 35.3 3	s (s) 52.8	00		12.8		35.5	35.5		35.5	35.5
0.53 0.53 0.53 0.43 0.43 0.36 0.36 0.36 0.36 0.36 0.36 0.36 0.3	52.8			12.8		35.5	35.5		35.5	35.5
3.0 5.4 5.4 5.4 5.3 5.3 3.0 3.0 3.0 3.0 3.0 3.0 3.0 201 963 2.21 789 507 501 461 0.03 0.37 2.21 789 507 501 461 0.20 0.20 0.00 0.00 0.05 0.00 0.01 604 1.00	0.53	3		.43		0.36	0.36		0.36	0.36
3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 201 963 221 789 507 501 461 0.03 0.03 0.04 0.04 0.05 0.00 0.015 0.20 0.04 0.01 0.93 0.14 0.01 0.04 1.88 1.71 16.0 26.6 21.5 20.4 2.38 1.90 1.00 1.00 1.00 1.00 1.00 1.00 2 1.5 2.2 0.0 16.5 0.6 0.0 2.6 3 0.3 19.3 16.0 43.1 22.1 20.4 26.5 4 8 D C C C 5 8 B D C C 6 9 9 0.01 0.05 0.05 7 1.5 2.2 0.0 1.05 0.05 8 1.5 2.2 0.0 1.05 0.05 9 1.5 2.2 0.0 1.05 0.05 10 1.00 1.00 1.00 1.00 10 1.00 1.00 1.00 1.00 10 1.00 1.00 1.00 1.00 10 1.00 1.00 1.00 10 1.00 0.01 0.01 10 1.00 0.01 0.01 10 1.00 0.01 0.01 10 1.00 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 10 1.01 0.01 0.01 0.01 10 1.01 0.01 0.01 0.01 10 1.01 0.01 0.01 0.01 10 1.01 0.01 0.01 0.01 10 1.01 0.01 0.01 0.01 0.01 10 1.01 0.01 0.01 0.01 0.01 10 1.01 0.01 0.01 0.01 0.01 0.01 10 1.01 0.01 0.01 0.01 0.01 0.01 0.01 10 1.01 0.0	3.0	4	5.4	5.4		5.3	5.3		5.3	5.3
201 963 221 789 507 501 461 003 c037	3.0	0	3.0	3.0		3.0	3.0		3.0	3.0
0.20 0.20 0.00 0.00 0.015 0.00 0.015 0.00 0.016 0.00 0.016 0.000 0.016 0.017 0	201	7 33		789		207	201		461	537
0.43	0.03			0+.4		0.05	000		71.00	70
188 17.1 16.0 26.6 21.5 20.4 23.8 20.4 23.8 20.4 23.8 20.4 2	0.20	6		.93		0.03	0.00		0.41	0.03
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	18.8	_		9.97		21.5	20.4		23.8	21.4
2 1.5 2.2 0.0 16.5 0.6 0.0 2.6 2.6 2.3 19.3 16.0 43.1 22.1 20.4 26.5 2.6 2.3 19.3 16.0 43.1 22.1 20.4 26.5 2.6 2.0 2.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3	1.00	0		00:1		1.00	1.00		1.00	1.00
20.3 19.3 16.0 43.1 22.1 20.4 26.5 C C B B D C C C C C C C C C C C C C C C	1.5	2		16.5		9.0	0.0		5.6	0.5
C B B D C C 19.4 43.0 21.9 N B D C C 19.4 63.0 21.9 C C C dily ratio 0.71 In (s) 99.6% ICU Level of Service F 15.1 16.1	20.3	3		13.1		22.1	20.4		26.5	22.0
19.4 43.0 21.9 B D C C I Delay 29.5 HCM Level of Service C O/71 99.0 Sum of lost time (s) 16.1 Utilization 99.6% ICU Level of Service F	U	Ω.		۵		ပ	O		ပ	O
Modera B D C C IDelay 29.5 HCM Level of Service C C adity ratio 0.71 C Sum of lost time (s) 16.1 Utilization 99.6% ICU Level of Service F	y (s)	4	7	13.0		21.9			24.5	
1	Approach LOS	2		D		U			O	
M Delay 29.5 HCM Level of Service addy ratio 0.71 O.71 h (s) 99.0 Sum of lost time (s) Utilization 99.6% ICU Level of Service 15 15	Intersection Summary									
ady ratio 0.71 h (s) 99.0 Sum of lost time (s) Ullization 99.6% ICU Level of Service 15	HCM Average Control Delay	29.5	HCM	Level of Servi	ce		ပ			
n (s) 94.0 Sum of lost time (s) Utilization 99.6% ICU Level of Service 15	HCM Volume to Capacity ratio	0.71	c				,			
Utilization 99.6% 15	Actuated Cycle Length (s)	0.66	uns.	of lost time (s)			16.1			
	Intersection Capacity Utilization	%9.66		evel of Servic	æ		_			
	Analysis Period (min)	15								

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

HCM Unsignalized Intersection Capacity Analysis <Existing> PM Peak Hour 2: King Street West & 1st Street South

																																						B		
•	NBR		9		0	7.0										771			771	6.2		3.3	88	398														of Servic		
•	NBL	>		Stop	%0	1 0.72	9	3.6	1.2						0.61	1658			1757	6.4		3.5	86	22														ICU Level of Service		
ţ	WBT	€	804	Free	%	874						None		91																								0		
>	WBL		9		000	7										772			772	4.1		2.2	66	839	NB 1	8	-	7	214	0.04	0.7	22.5	O	22.5	ပ		0.2	57.1%	12	
<i>></i>	EBR		3		000	3.72																			WB1	880	7	0	836	0.01	0.1	0.2	⋖	0.5						
†	EBT	æ	702	Free	%0	763						None													EB 1	991	0	3	1700	0.45	0:0	0.0		0.0				ion		
	Movement	Lane Configurations	Volume (veh/h)	Sign Control	Grade	Hourly flow rate (vph)	Pedestrians	Lane Width (m)	Walking Speed (m/s)	Percent Blockage	Right turn flare (veh)	Median type	Median storage veh)	Upstream signal (m)	pX, platoon unblocked	vC, conflicting volume	vC1, stage 1 conf vol	vC2, stage 2 conf vol	vCu, unblocked vol	tC, single (s)	tC, 2 stage (s)	tF (s)	p0 queue free %	cM capacity (veh/h)	Direction, Lane #	Volume Total	Volume Left	Volume Right	cSH	Volume to Capacity	Queue Length 95th (m)	Control Delay (s)	Lane LOS	Approach Delay (s)	Approach LOS	Intersection Summary	Average Delay	Intersection Capacity Utilization	Analysis Period (min)	

HCM Unsignalized Intersection Capacity Analysis 3: King Street West & 2nd Street North

<Existing> PM Peak Hour 5/05/2017

	4	†	<i>></i>	>	ļ	4	•	←	•	۶	→	•
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		÷			4			4			Q	
Volume (veh/h)	23	693	3	7	77.6	18	2	0	7	2	0	40
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)	28	753	r	12	843	20	2	0	∞	2	0	43
Pedestrians								4			24	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					165							
pX, platoon unblocked	0.61						0.61	0.61		0.61	0.61	0.61
vC, conflicting volume	887			761			1795	1785	759	1779	1777	877
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	201			761			1980	1965	759	1955	1951	485
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
po dueue free %	16			66			06	100	86	79	100	88
cM capacity (veh/h)	639			849			22	34	405	26	32	350
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	814	875	10	46								
Volume Left	28	12	2	2								
Volume Right	m	20	∞	43								
CSH	639	846	84	146								
Volume to Capacity	0.09	0.01	0.12	0.34								
Queue Length 95th (m)	1.8	0.3	2.3	8.2								
Control Delay (s)	2.5	0.4	53.3	41.8								
Lane LOS	V	A	ш	ш								
Approach Delay (s)	2.5	0.4	53.3	41.8								
Approach LOS			ш	ш								
Intersection Summary												
Average Delay			2.8									
Intersection Capacity Utilization	u		78.3%	೨	ICU Level of Service	f Service			Ω			
Analysis Period (min)			15									

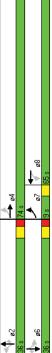
Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Timings <Future Background> AM Peak Hour 1: King Street West & Lake Avenue Drive 5/08/2017

•	SBR	W.	83	Perm		9	9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.6	0.37	0.14	6.3	0.0	6.3	Α											
→	SBT	₩	26		9		9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.6	0.37	0.12	22.9	0.0	22.9	U	13.5	В									
۶	SBL		38	Perm		9	9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max																		
•	NBR	¥	14	Perm		2	2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.6	0.37	0.03	11.6	0.0	11.6	В									L	-	
←	NBT	÷	30		2		2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.6	0.37	0.14	23.1	0.0	23.1	O	21.4	U							Intersection LOS: C		
•	NBL		45	Perm		2	2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max																Intersection LOS: C		
ţ	WBT	÷	548		∞		∞		10.0	29.4	65.0	59.1%	3.3	2.1	0.0	5.4	Lag	Yes	None	34.9	0.41	0.86	34.4	0.0	34.4	O	33.9	U							⊆ ⊆	2	
-	WBL	*	16	Perm		8	∞		10.0	29.4	65.0	59.1%	3.3	2.1	0.0	5.4	Lag	Yes	None	34.9	0.41	90.0	14.6	0.0	14.6	В											
†	EBT	÷	451		4		4		10.0	29.4	74.0	67.3%	3.3	2.1	0.0	5.4			None	41.7	0.49	0.62	17.6	0.0	17.6	В	17.0	В									
4	EBL	*	8	pm+pt	7	4	7		2.0	0.6	0.6	8.2%	3.0	0.0	0.0	3.0	Lead	Yes	None	44.2	0.52	0.37	13.1	0.0	13.1	В							ord		2 nn 95 6%		
	Lane Group	Lane Configurations	Volume (vph)	Turn Type	Protected Phases	Permitted Phases	Detector Phase	Switch Phase	Minimum Initial (s)	Minimum Split (s)	Total Split (s)	Total Split (%)	Yellow Time (s)	All-Red Time (s)	Lost Time Adjust (s)	Total Lost Time (s)	Lead/Lag	Lead-Lag Optimize?	Recall Mode	Act Effct Green (s)	Actuated g/C Ratio	v/c Ratio	Control Delay	Queue Delay	Total Delay	FOS	Approach Delay	Approach LOS	Intersection Summary	Cycle Length: 110	Actuated Cycle Length: 84.3	Natural Cycle: 80	Control Type: Semi Act-Uncoord	Maximum v/c Ratio: 0.86	Intersection Signal Delay: 24.2 Intersection Canacity Hilization 05.6%	Analysis Period (min) 15	

Splits and Phases: 1: King Street West & Lake Avenue Drive



Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Synchro 7 - Report Page 1

HCM Signalized Intersection Capacity Analysis <Future Background> AM Peak Hour 5/08/2017

			Þ-	•		/		_	•	٠	→	*
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	£		×	÷			₹	*		€	*-
Volume (vph)	8	451	20	16	548	22	45	30	14	38	26	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.6	3.6	3.6	3.0	3.6	3.6	3.6	3.6	3.0	3.6	3.6	3.6
Total Lost time (s)	3.0	5.4		5.4	5.4			5.3	5.3		2.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.97
Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99	1.00		0.99	1.00
- L	1.00	0.99		1.00	0.99			1.00	0.85		0.1	0.85
HI Protected	0.95	1.00		0.95	1.00			0.67	1.00		0.97	9.1
Satd. Flow (prot)	1770	1768		1638	1832			1799	1430		1797	1536
Fit Permitted	0.13	1.00		0.39	1.00			0.83	1.00		0.83	1.00
Satd. Flow (perm)	240	1768		672	1832			1532	1430		1538	1536
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)	87	490	24	17	296	09	49	33	15	41	28	8
RTOR Reduction (vph)	0	2	0	0	4	0	0	0	6	0	0	29
Lane Group Flow (vph)	87	539	0	17	652	0	0	82	9	0	69	34
Confl. Peds. (#/hr)	2		7	11		2	7		6	6		7
Confl. Bikes (#/hr)			-									
Heavy Vehicles (%)	7%	3%	7%	%7.	%7.	7%	7%	7%	7%	7%	7%	7%
Bus Blockages (#/nr)		٥							۰			
Turn Type	pm+pt			Perm	c		Perm	c	Perm	Perm	,	Perm
Protected Priases		4		0	o		c	7	c	7	0	7
Actuated Pridaes	4 CV	N CV		3/10	3/1 0		7	31.6	21 6	0	31.6	21 6
Ffective Green a (s)	1.2r	N CN		34.0	34.0			31.6	31.6		31.6	31,6
Actuated of C Ratio	0.50	0.50		0.41	0.41			0.37	0.37		0.37	0.37
Clearance Time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	201	885		277	755			572	534		574	573
v/s Ratio Prot	0.02	c0.30			c0.36							
v/s Ratio Perm	0.19			0.03				c0.05	0.00		0.04	0.02
v/c Ratio	0.43	0.61		90.0	0.86			0.14	0.01		0.12	0.0
Uniform Delay, d1	15.7	15.2		15.0	22.7			17.6	16.7		17.4	17.0
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1:00	1.8
Incremental Delay, d2	1.5	1.2		0.1	10.1			0.5	0.0		0.4	0.2
Delay (s)	17.2	16.4		15.1	32.8			18.1	16.7		17.9	17.2
Level of Service	B	ω ;		В	O			B	B		e i	Ω
Approach Delay (s)		16.5			32.3			17.9			17.5	
Approach LOS		В			O			В			В	
Intersection Summary												
HCM Average Control Delay			23.5	윈	HCM Level of Service	of Service	a		ပ			
HCM Volume to Capacity ratio	Q.		0.55									
Actuated Cycle Length (s)	g		84.7	ns s	Sum of lost time (s)	time (s)			16.1			
Analysis Period (min)	5		15	2	ם בעגעם	201 VICE			-			
c Critical Lane Group												

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

HCM Unsignalized Intersection Capacity Analysis <Future Background> AM Peak Hour 5/08/2017

<Future Background> AM Peak Hour

HCM Unsignalized Intersection Capacity Analysis 3: King Street West & 2nd Street North

40

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Stop 0% 0.92 0 17 17 1.2

3.6

0.92

0.92

0.92

0.92

0.92

0.92

0.92

Peak Hour Factor Hourly flow rate (vph)

Stop 0% 0.92

685 0% 0.92 745

585 585 0% 0.92 636

37

Lane Configurations Volume (veh/h)

Sign Control

EBT	3 C C S S S S S S S S S S S S S S S S S	WBL 8	↓ MBT	₩ E	daw	
EBT 591 591 Free 0% 0% 0.92 0.92 0) 642			WBT	NBL	NDD	
591 Free 0% 0.92 0.92 0.92 0.942 0.9		8 3.92 9	4	**	INDIK	
Free 0% (vph) 642 (vph) 642 (veh) None (veh) (im)		8 0.92 9	ě	<u>ş</u>		
Free 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%		9.92	689	5	n	
actor 0.92 ate (vph) 642 ad (m/s) ad (m/s) er (veh) None ge veh)		9.92	Free	Stop		
ate (vph) 642 m) 642 m) 642 ad (m/s) 8439 re (veh) None ge veh) nai (m)		9.92	%0	%0		
ate (vph) m) acd (m/s) kage re (veh) ge veh) nai (m)	m	6	0.92	0.92	0.92	
m) sed (m/s) kage re (veh) ge veh)			749	2	33	
				6		
				3.6		
				1.2		
				-		
Median storage veh) Upstream signal (m)		_	None			
Upstream signal (m)						
			16			
pX, platoon unblocked				19.0		
vC, conflicting volume		655		1419	653	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		929		1380	653	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		66		86	66	
cM capacity (veh/h)		925		105	464	
Direction Lane # FB 1 WF	WR1 N	NR 1				
446		- 1				
9	90	o c				
*	, ,	7 0				
1700		ر 196				
ne to Capacity 0.38		0.03				
(m) 0.0		0.5				
0.0		23.9				
	A	U				
Delay (s) 0.0		23.9				
Approach LOS		ပ				
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization	52	52.6%	ICN	ICU Level of Service	Service	
Analysis Period (min)		15				

0.67

0.67

0.67

645

0.67

0.67

647

797

Lane Width (m)
Walking Speed (m/s)
Percent Blockage
Bight un flare (veh)
Median type
Median storage veh)
Uspream signal (m)
pX, platoon unblocked
C, conflicting volume
vC1, stage 1 conf vol
vC2, stage 2 conf vol
vC2, unblocked vol

None 165

None

405

6.5

7.1

645

1491

527

4.1

409

3.3 90 428

100

3.5

3.3

4.0 99 77

3.5 98 55

2.2

2.2 95 762

> p0 queue free % cM capacity (veh/h)

tC, single (s) tC, 2 stage (s) tF (s) 49

751

EB 1

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

Synchro 7 - Report Page 3

Synchro 7 - Report Page 4

ICU Level of Service

1.5 70.3% 115

Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach LOS

43 260 0.19 4.1 22.0 C C C

151 0.04 0.8 30.0 D

934 0.00 0.0 0.0 A 0.0

682 40 5 762 0.05 1.0 1.4 A

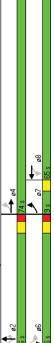
Volume Total
Volume Total
Volume Right
CESH
Volume to Capacity
Courto Deay (s)
Approach Delay (s)

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Timings <Future Background> PM Peak Hour 1: King Street West & Lake Avenue Drive 5/08/2017

*	SBR	W.	140	Perm		9	9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.26	11.5	0.0	11.5	В										
→	SBT	€	28		9		9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.45	32.4	0.0	32.4	ပ	23.2	O								
۶	SBL		151	Perm		9	9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max																	
•	NBR	₩.	6	Perm		2	2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.05	14.8	0.0	14.8	В									ن	
—	NBT	₹	79		2		2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.16	27.9	0.0	27.9	O	26.4	U						0	ntersection LOS: C	
•	NBL		43	Perm		2	2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max																Intersection LOS: C	
ļ	WBT	æ,	644		00		00		10.0	29.4	65.0	59.1%	3.3	2.1	0.0	5.4	Lag	Yes	None	43.3	0.47	0.00	37.1	0.0	37.1	Ω	37.0	Ω							<u> </u>	2
*	WBL	*	m	Perm		∞	∞		10.0	29.4	65.0	59.1%	3.3	2.1	0.0	5.4	Lag	Yes	None	43.3	0.47	0.01	12.3	0.0	12.3	В										
†	EBT	2	629		4		4		10.0	29.4	74.0	67.3%	3.3	2.1	0.0	5.4			None	50.1	0.54	0.72	19.8	0.0	19.8	В	19.3	В							9	
1	EBL	<i>y</i> -	6/	pm+pt	7	4	7		2.0	0.6	0.6	8.2%	3.0	0.0	0.0	3.0	Lead	Yes	None	52.6	0.57	0.43	14.6	0.0	14.6	В							ord		1 nn 101 59	2.0
	Lane Group	Lane Configurations	Volume (vph)	Turn Type	Protected Phases	Permitted Phases	Detector Phase	Switch Phase	Minimum Initial (s)	Minimum Split (s)	Total Split (s)	Total Split (%)	Yellow Time (s)	All-Red Time (s)	Lost Time Adjust (s)	Total Lost Time (s)	Lead/Lag	Lead-Lag Optimize?	Recall Mode	Act Effct Green (s)	Actuated g/C Ratio	v/c Ratio	Control Delay	Queue Delay	Total Delay	ros	Approach Delay	Approach LOS	Intersection Summary	Cycle Length: 110	Actuated Cycle Length: 92.8	Natural Cycle: 90	Control Type: Semi Act-Uncoord	Maximum V/C Ratio: 0.90	Intersection Signal Delay: 27.1 Intersection Canacity Hilization 101 5%	Analysis Period (min) 15

Splits and Phases: 1: King Street West & Lake Avenue Drive



Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

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HCM Signalized Intersection Capacity Analysis <Future Background> PM Peak Hour 5082017

EBI EBI WBL WBT WBR NBI SBI T		1	†	<u> </u>	-	Ļ	1	✓	—	4	۶	→	*
1,	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
79 629 21 3 644 68 43 26 9 151 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 100	Lane Configurations	*	£,		F	£,			₩	*		4	*
1900 1900	Volume (vph)	79	629	21	ω.	644	89	43	26	6	151	78	140
36 36 36 36 36 36 36 36	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
3.0 5.4 5.4 5.4 5.3 5.3 1.00	Lane Width	3.6	3.6	3.6	3.0	3.6	3.6	3.6	3.6	3.0	3.6	3.6	3.6
1.00	Total Lost time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
1,00	Lane Util. Factor	8.5	00.1		00.1	00.1			00.1	00.1		3 5	9.9
1.00	Finh ned/hikes	8.6	100		0000	100			0.00	100		0 97	1.73
1770 1806 1806 1907 100 1770 1806 1638 1826 1779 1399 1806 1638 1826 1779 1399 1806 1826 1779 1399 1399 1806 1826 1826 1779 1399 1806 1826 1826 1399 1399 1806 1826 1826 1839 1399 1806 1826 1826 1839 1399 1806 1826 1826 1839 1399 1807 1826 1826 1826 1826 1808 1826 1826 1826 1826 1908 1826 1826 1826 1826 1908 1826 1826 1826 1826 1908 1826 1826 1826 1826 1908 1826 1826 1826 1826 1908 1826 1826 1826 1826 1909 1826 1826 1826 1826 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1800 1900 1800 1800 1900 1800 1800 1900 1800 1800 1900	TH.	1.00	1.00		1.00	0.99			1.00	0.85		1.00	0.85
1770 1806 1638 1826 1779 1399 1406 1606 1006	Fit Protected	0.95	1.00		0.95	1.00			16.0	1.00		96:0	1.00
1009 1,000 0,26 1,000 0,76 1,000 0,92	Satd. Flow (prot)	1770	1806		1638	1826			1779	1399		1741	1501
166 1806	Fit Permitted	60.0	1.00		0.26	1.00			91.0	1.00		0.71	1.00
Name	Satd. Flow (perm)	166	1806		454	1826			1399	1399		1283	1501
86 684 23 3 700 74 47 28 10 164 86 706 0 3 770 0 0 75 3 0 87 706 0 3 770 0 0 75 3 0 88 706 0 3 770 0 0 75 3 0 89 706 0 3 770 0 0 75 3 0 90 19 16 16 16 19 21 22 22 90 8 508 8 43.3 43.3 31.7 31.7 90 8 50.8 43.3 43.3 43.3 31.7 31.7 90 8 50.8 43.3 43.3 43.3 31.7 31.7 90 90 90 90 90 90 90 90 90 90 90 90 90 9	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
National Processing	Adj. Flow (vph)	%	684	23	es .	700	74	47	28	10	164	8	152
86 706 0 3 770 0 75 3 0 19 16 16 16 16 16 19 21 22 22 10 6 0 0 0 0 0 0 0 11 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 0	RTOR Reduction (vph)	0	-	0	0	4	0	0	0	7	0	0	7
19	Lane Group Flow (vph)	% ;	706	0 ;	m ;	170	0 ;	0 ;	75	m (0 8	194	<u></u>
0 6 0	Confl. Peds. (#/hr)	19		16	16		19	21		22	7.7		21
Perm Perm Perm Perm Perm Perm 7	Rus Blockanes (#/hr)	_	9	- c	C	0	C	0	C	C	C	C	
1		to to	0	0	Perm	>		Perm	>	Perm	Perm		Perm
4 8 2 2 6 508 508 43.3 43.3 3.17 31.7 31.7 508 50.8 60.8 60.46 0.46 0.46 0.46 0.34 31.7 31.7 3.0 5.4 5.4 5.4 5.4 5.3 5.3 5.3 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 1.0 1.0 2.0 0.01 0.04 476 476 476 0.26 0.03 0.01 0.04 0.04 0.04 476 476 476 0.26 0.02 0.01		_	4		5	00		5	2	5	5	9	-
508 508 43.3 43.3 43.3 43.3 43.3 43.7 31.7 3	Permitted Phases	4			80			2		2	9		9
508 508 43.3 43.3 31.7 31.7 0.55 0.55 0.56 0.46 0.46 0.34 0.34 3.0 5.4 5.4 5.4 5.3 5.3 5.3 1.68 984 2.11 848 476 476 476 0.02 0.03 0.01 0.91 0.05 0.00 0.0 0.0 0.51 0.72 0.01 0.91 0.16 0.01 0.0	Actuated Green, G (s)	20.8	20.8		43.3	43.3			31.7	31.7		31.7	31.7
0.55 0.55 0.46 0.46 0.34 0.34 0.34 0.34 0.34 0.34 0.34 0.34 0.34 0.34 0.34 0.34 0.30	Effective Green, g (s)	50.8	20.8		43.3	43.3			31.7	31.7		31.7	31.7
3.0 5.4 5.4 5.4 5.4 5.3 5.3 3.0 3.0 3.0 3.0 3.0 3.0 3.0 168 984 21 848 476 476 0.02 c.0.39 0.01	Actuated g/C Ratio	0.55	0.55		0.46	0.46			0.34	0.34		0.34	0.34
3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Clearance Time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
168 984 211 848 476 476 476 600	Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
0.02 c0.39	Lane Grp Cap (vph)	168	984		211	848			476	476		436	511
0.26 0.01 0.01 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0.05 0.00 0	v/s Ratio Prot	0.02	c0.39			c0.42							
10.51 0.72 0.01 0.91 0.01	v/s Ratio Perm	0.26			0.01				0.05	0.00		00.15	0.02
17.7 15.8 13.4 2.3.1 2.1.4 20.3 1.00 1.00 1.00 1.00 1.00 1.00 2.6 2.5 2.6 0.0 13.3 0.7 0.0 2.0.4 18.4 13.5 36.4 22.1 20.4 C B B D C C B B D C C C R 36.3 21.9 C C Inalia 0.7.4 HCM Level of Service C 37.0 0.0 C C C C C C C C C C C C C C C C C C C	v/c Ratio	0.51	0.72		0.01	0.91			0.16	0.01		0.44	0.16
100 100	Uniform Delay, d'I	1.7.1	15.8		13.4	23.1			21.4	20.3		23.9	21.5
2.6 2.5 0.0 13.3 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Progression Factor	00.1	00.1		1.00	1.00			1.00	1.00		00.1	90.
22.1 20.4 C B B C C C 18.6 36.3 21.9 C C C 18.7 4.0	Incremental Delay, d2	5.6	2.5		0.0	13.3			0.7	0.0		3.3	0.7
18.6 36.3 21.9 C 18.6 B D C 19.7 HCM Level of Service C 24.7 HCM Level of Service C 25.7 HCM Level of Service C 25.7 HCM Level of Service C 25.7 HCM Level of Service G 25.7 HCM Level	Delay (s)	4.02	10.4 D		0.51	20.4			1.22	50.4 C		7.17	77.1
Section Color Color	Approach Dolay (c)	ر	10 A		۵	24.2			2 0 1	ر		ט פ	٥
ay 26.7 HCM Level of Service C ratio 0.74 Sum of lost time (s) 16.1 zation 101.5% ICU Level of Service G 15 15 16.1	Apploacii Delay (s)		0.0			20.2			61.7			23.0	
ay 26.7 HCM Level of Service ratio 0.74 HCM Level of Service ration 101.5% ICU Level of Service 15 ICU Level of Service	Approach LOS		מ						د			د	
(a) 26.7 HCM Level of Service ratio 0.74 Sum of lost time (s) 16 zation 101.5% ICU Level of Service 15	Intersection Summary												
93.2 Sum of lost time (s) 16 zation 101.5% ICU Level of Service 15	HCM Average Control Delay			26.7	Ĭ	CM Level	of Servic	a)		U			
zation 101.5% ICU Level of Service 15	Actuated Oucle Length (s)			03.7	Ū	im of loci	(c) omit			141			
15	Intersection Capacity Utilization			01.5%	3 5	III evel o	f Service			_ C			
5	Analysis Period (min)			15	2)			
C Critical Lane Group	c Critical Lane Group			!									

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

HCM Unsignalized Intersection Capacity Analysis <Future Background> PM Peak Hour 5/08/2017

																																							В		
•	NBR		9			0.92	7										816			816	6.2		3.3	86	375														of Service		
•	NBL	>	-	٠,		0.92	-	9	3.6	1.2	-					09:0	1757			1928	6.4		3.5	46	43														ICU Level of Service		
ţ	WBT	₹	853	Free	%0	0.92	927						None		91																								_		
\	WBL		9			0.92	7										818			818	4.1		2.2	66	908	NB 1	8	-	7	179	0.04	0.8	26.0	٥	26.0	Ω		0.2	29.7%	15	
1	EBR		33			0.92	3																			WB1	934	7	0	806	0.01	0.1	0.2	⋖	0.2						
†	EBT	2	744	Free	%0	0.92	800						None													EB 1	812	0	c	1700	0.48	0.0	0.0		0.0				ation		
	Movement	Lane Configurations	Volume (veh/h)	Sign Control	Grade	Peak Hour Factor	Hourly flow rate (vph)	Pedestrians	Lane Width (m)	Walking Speed (m/s)	Percent Blockage	Right turn flare (veh)	Median type	Median storage veh)	Upstream signal (m)	pX, platoon unblocked	vC, conflicting volume	vC1, stage 1 conf vol	vC2, stage 2 conf vol	vCu, unblocked vol	tC, single (s)	tC, 2 stage (s)	tF (s)	p0 queue free %	cM capacity (veh/h)	Direction, Lane #	Volume Total	Volume Left	Volume Right	CSH	Volume to Capacity	Queue Length 95th (m)	Control Delay (s)	Lane LOS	Approach Delay (s)	Approach LOS	Intersection Summary	Average Delay	Intersection Capacity Utilization	Analysis Period (min)	

HCM Unsignalized Intersection Capacity Analysis <Future Background> PM Peak Hour Sing Street West & 2nd Street North

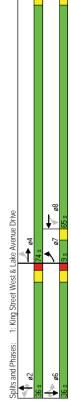
Movement Lane Configurations Volume (veh/h)	ב											
Lane Configurations Volume (veh/h)	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (veh/h)		4			4			4			4	
	23	734	က	1	824	18	2	0	7	2	0	40
Sign Control		Free			Free			Stop			Stop	
Grade		%0			%0			%0			%0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	798	3	12	968	20	2	0	00	2	0	43
Pedestrians								4			24	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					165							
pX, platoon unblocked	09:0						09:0	09:0		09.0	09:0	09.0
vC, conflicting volume	636			802			1892	1882	803	1876	1874	929
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	290			802			2156	2140	803	2130	2126	544
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	8			66			98	100	86	71	100	88
cM capacity (veh/h)	291			817			16	25	382	19	26	315
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	826	927	10	46								
Volume Left	28	12	2	2								
Volume Right	m	70	∞	43								
cSH	591	817	62	114								
Volume to Capacity	0.10	0.01	0.16	0.43								
Queue Length 95th (m)	1.9	0.3	3.1	1.1								
Control Delay (s)	2.8	0.4	73.0	28.7								
Lane LOS	V	V	ш	ш								
Approach Delay (s)	2.8	0.4	73.0	28.7								
Approach LOS			ш	ш								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			80.9%	2	U Level o	ICU Level of Service			Q			
Analysis Period (min)			15									

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

<Future Total> AM Peak Hour 5/08/2017 Timings 1: King Street West & Lake Avenue Drive

	4	†	>	ţ	€	←	*	۶	→	*	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	je-	\$	je-	æ		4	*		₩	¥C.	
Volume (vph)	83	460	16	554	45	30	14	38	26	84	
Turn Type	pm+pt		Perm		Perm		Perm	Perm		Perm	
Protected Phases	7	4		∞		2			9		
Permitted Phases	4		∞		2		2	9		9	
Detector Phase	7	4	80	00	2	2	2	9	9	9	
Switch Phase											
Minimum Initial (s)	2.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	0.6	29.4	29.4	29.4	35.3	35.3	35.3	35.3	35.3	35.3	
Total Split (s)	0.6	74.0	65.0	65.0	36.0	36.0	36.0	36.0	36.0	36.0	
Total Split (%)	8.2%	67.3%	59.1%	59.1%	32.7%	32.7%	32.7%	32.7%	32.7%	32.7%	
Yellow Time (s)	3.0	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	
All-Red Time (s)	0.0	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	5.4	5.4	5.4	5.3	5.3	5.3	5.3	5.3	5.3	
Lead/Lag	Lead		Lag	Lag							
Lead-Lag Optimize?	Yes		Yes	Yes							
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max	
Act Effct Green (s)	44.6	42.1	35.3	35.3		31.6	31.6		31.6	31.6	
Actuated g/C Ratio	0.53	0.50	0.45	0.42		0.37	0.37		0.37	0.37	
v/c Ratio	0.38	0.63	90:0	0.86		0.14	0.03		0.12	0.14	
Control Delay	13.4	17.8	14.5	34.5		23.4	11.6		23.2	6.4	
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	13.4	17.8	14.5	34.5		23.4	11.6		23.2	6.4	
LOS	В	В	В	O		U	В		ပ	A	
Approach Delay		17.1		34.0		21.6			13.6		
Approach LOS		В		S		S			Ω		
Intersection Summary											
Cycle Length: 110											
Actuated Cycle Length: 84.7											
Natural Cycle: 80											
Control Type: Semi Act-Uncoord	p										
Maximum v/c Ratio: 0.86				ľ		0					
Intersection Signal Delay: 24.3 Intersection Capacity Utilization 95.9%	%6:36 ر			<u>⊆</u> ∪	Intersection LOS: C ICU Level of Service	Intersection LOS: C CU Level of Service F	L.				
Analysis Period (min) 15											



Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

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HCM Signalized Intersection Capacity Analysis 1: King Street West & Lake Avenue Drive

<Future Total> AM Peak Hour 5/08/2017

Controlled Con		1	Ť	<u> </u>	-	ļ	1	•	—	4	۶	→	*
190 190	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
83 460 50 16 554 55 45 30 14 38 26 1900	Lane Configurations	*	£,		r	2			₩	*		₩	*-
1900 1900	Volume (vph)	83	460	20	16	554	22	45	30	14	38	56	84
36 36<	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
30 54 54 54 54 53 53 53 53 53 100	Lane Width	3.6	3.6	3.6	3.0	3.6	3.6	3.6	3.6	3.0	3.6	3.6	3.6
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Total Lost time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
1.00	Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
1.00 1.00 0.99 1.00 0.85 1	Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.97
1700 0.99 1.00 0.99 1.00 0.85 1.00 0.99 1.00 0.85 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 1.00 0.99 0.92 0.92 0.92 0.92 0.92 0.92 0	Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.99	1.00		0.99	1.00
1770 1769 1095 1000 0997 1770 1769 1009 1770 1769 1009 10997 1770 1769 1009 10099 1770 1769 1009 10099 1770 1769 1009 10099 1009 10099 1009 10099 1009 10099 1009	Ē	1.00	0.99		1.00	0.99			1.00	0.85		0.1	0.83
1770 1769 1639 1833 1790 1430 1797 17 1770 1769 666 1833 1790 1638 1700 1789 1430 1797 17 286 1769 666 1833 150 1531 1430 1797 17 29 1092 092 092 092 092 092 092 092 092 092	Fit Protected	0.95	1.00		0.95	1.00			0.97	1.00		0.97	1.00
236 1,00 0.38 1,00 0.08 1,00 0.08 1,00 0.08 1,00 0.08 1,00 0.08 1,00 0.08 1,00 0.08 0.09	Satd. Flow (prot)	1770	1769		1639	1833			1799	1430		1797	1536
236 1769 656 1833 1531 1430 1537 11 092 </td <td>Flt Permitted</td> <td>0.13</td> <td>1.00</td> <td></td> <td>0.38</td> <td>1.00</td> <td></td> <td></td> <td>0.83</td> <td>1.00</td> <td></td> <td>0.83</td> <td>1.00</td>	Flt Permitted	0.13	1.00		0.38	1.00			0.83	1.00		0.83	1.00
092 092 092 092 092 092 092 092 092 092	Satd. Flow (perm)	236	1769		929	1833			1531	1430		1537	1536
90 500 54 17 602 60 49 33 15 41 28 0 550 17 602 60 49 33 15 41 28 0 550 17 658 0 0 0 0 0 0 0 0 0 6 0 17 658 0 0 0 0 0 0 0 0 6 0 0 0 0 0 0 0 0 0 0 6 0 0 0 0	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
0 4 0 0 9 9 0 0 9	Adj. Flow (vph)	06	200	24	17	602	09	49	33	15	41	78	91
90 550 0 17 658 0 0 82 6 0 69 111 11 658 0 0 82 6 0 69 28 38 28 28 28 28 28 28 28 28 28 10 6 0 0 0 0 0 0 0 0 0 0 10 6 0 0 0 0 0 0 0 0 0 0 10 6 0 0 0 0 0 0 0 0 0 0 10 7 4 8 8 2 2 6 10 890 272 760 890 890 872 890 891 20 60 890 272 760 890 890 803 20 890 272 760 890 890 872 891 10 10 0 10 0 10 0 10 0 10 0 10 0 10	RTOR Reduction (vph)	0	4	0	0	4	0	0	0	6	0	0	27
5 11 11 5 7 9 9 2% 3% 2%	Lane Group Flow (vph)	8	220	0	17	929	0	0	82	9	0	69	34
2% 3% 2%<	Confl. Peds. (#/hr)	2		=	7		2	7		6	6		_
2% 3% 2%<	Confl. Bikes (#/hr)			-									
Market	Heavy Vehicles (%)	2%	3%	2%	7%	2%	7%	2%	2%	2%	2%	2%	7%
m+pt Perm Perm <th< td=""><td>Bus Blockages (#/hr)</td><td>0</td><td>9</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>\Box</td></th<>	Bus Blockages (#/hr)	0	9	0	0	0	0	0	0	0	0	0	\Box
7 4 8 2 2 6 4 8 8 2 2 6 42.8 35.3 35.3 35.3 31.6 <	Turn Type	pm+pt			Perm			Perm		Perm	Perm		Perm
4 8 2 6 6 4.2.8 35.3 35.3 35.3 35.3 31.6	Protected Phases	7	4			∞			2			9	
428 428 35.3 35.3 35.3 31.6 31.6 31.6 31.6 31.6 31.6 31.6 31	Permitted Phases	4			8			2		2	9		9
42.8 42.8 35.3 35.3 31.6 <td< td=""><td>Actuated Green, G (s)</td><td>42.8</td><td>45.8</td><td></td><td>35.3</td><td>35.3</td><td></td><td></td><td>31.6</td><td>31.6</td><td></td><td>31.6</td><td>31.6</td></td<>	Actuated Green, G (s)	42.8	45.8		35.3	35.3			31.6	31.6		31.6	31.6
0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.50 0.57 0.37 <th< td=""><td>Effective Green, g (s)</td><td>45.8</td><td>45.8</td><td></td><td>35.3</td><td>35.3</td><td></td><td></td><td>31.6</td><td>31.6</td><td></td><td>31.6</td><td>31.6</td></th<>	Effective Green, g (s)	45.8	45.8		35.3	35.3			31.6	31.6		31.6	31.6
3.0 5.4 5.4 5.4 5.3 5.3 5.3 5.3 3.0 5.3 3.0 5.3 3.0 5.3 3.0 5.3 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3	Actuated g/C Ratio	0.50	0.50		0.41	0.41			0.37	0.37		0.37	0.37
30 3.0	Clearance Time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
200 890 272 760 569 531 571 0.02 c.031 c.036 c.005 c.006 c.006 c.006 c.004	Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	89
0.02	Lane Grp Cap (vph)	200	890		272	760			269	531		571	570
0.20 0.03 0.04 0.05 0.06 0.08 0.07 0.06 0.08 0.08 0.08 0.08 0.08 0.08 0.08	v/s Ratio Prot	0.02	c0.31			c0.36							
0.45 0.62 0.06 0.87 0.14 0.01 0.17 15.8 15.2 15.0 22.7 17.8 16.9 17.6 15.8 15.2 15.0 22.7 17.8 16.9 17.6 16. 1.3 0.1 10.1 10.1 0.5 0.0 0.4 17.4 16.5 15.1 32.9 18.3 16.9 18.0 16.7 23.6 HCM Level of Service C 0.55 8.51 Sum of lost time (s) 16.1 15.1 15.1 15.1 15.1 15.1 15.1 15.1 15	v/s Ratio Perm	0.20			0.03				c0.05	0.00		0.04	0.02
158 15.2 15.0 22.7 17.8 16.9 17.6 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	v/c Ratio	0.45	0.62		90.0	0.87			0.14	0.01		0.12	0.0
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Uniform Delay, d1	15.8	15.2		15.0	22.7			17.8	16.9		17.6	17.2
116 1.3 0.1 10.1 0.5 0.0 0.4 174 16.5 15.1 32.9 18.3 16.9 18.0 18 B B C B B B B B 16.7 32.4 18.1 17.7 23.6 HCM Level of Service C 0.55 0.0 16.1 16.1 95.9% (CU Level of Service F 15	Progression Factor	1:00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
17.4 16.5 15.1 32.9 18.3 16.9 18.0 B	Incremental Delay, d2	1.6	1.3		0.1	10.1			0.5	0.0		0.4	0.5
B B C B B B B B B B B B B B B B B B B	Delay (s)	17.4	16.5		15.1	32.9			18.3	16.9		18.0	17.4
16.7 32.4 18.1 B C B B C 23.6 HCM Level of Service C 0.55 85.1 Sum of lost time (s) 16.1 95.9% ICU Level of Service F 15	Level of Service	B	В		В	ပ			В	В		В	ш
23.6 HCM Level of Service 0.55 85.1 Sum of lost time (s) 95.9% ICU Level of Service 15	Approach Delay (s)		16.7			32.4			18.1			17.7	
23.6 HCM Level of Service 0.55 85.1 Sum of lost time (s) 95.9% ICU Level of Service 15	Approach LOS		В			O			В			В	
23.6 HCM Level of Service 0.55 85.1 Sum of lost time (s) 95.9% ICU Level of Service 15	Intersection Summary												
0.55 85.1 Sum of lost time (s) 95.9% ICU Level of Service 15	HCM Average Control Delay	>		23.6	ĮΥ	:M Level	of Service	۵		ပ			
85.1 Sum of lost time (s) 95.9% ICU Level of Service 15	HCM Volume to Capacity ra	atio		0.55									
95.9% 15	Actuated Cycle Length (s)			85.1	Su	m of lost	time (s)			16.1			
Analysis Period (min)	Intersection Capacity Utiliza	ation		95.9%	⊇	U Level o	Service			ш.			
	Analysis Period (min)			12									

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

HCM Unsignalized Intersection Capacity Analysis 2: King Street West & 1st Street South

HCM Unsignalized Intersection Capacity Analysis 2: King Street West & 1st Street South	tersec	ersection Capaci 1st Street South	apacit	/ Anal	/sis		<future total=""> AM Peak Hour</future>
	†	>	>	ļ	•	•	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	æ			₩	>		
Volume (veh/h)	603	3	∞	969	2	က	
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)	929	co	6	757	2	က	
Pedestrians					6		
Lane Width (m)					3.6		
Walking Speed (m/s)					1.2		
Percent Blockage					-		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)				91			
pX, platoon unblocked					0.67		
vC, conflicting volume			899		1440	999	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			899		1410	999	
tC, single (s)			4.1		6.4	6.2	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			66		8	66	
cM capacity (veh/h)			915		100	456	
Direction, Lane #	EB 1	WB1	NB 1				
Volume Total	629	765	2				
Volume Left	0	6	2				
Volume Right	3	0	3				
CSH	1700	915	188				
Volume to Capacity	0.39	0.01	0.03				
Queue Length 95th (m)	0.0	0.2	0.5				
Control Delay (s)	0.0	0.3	24.7				
Lane LOS		A	U				
Approach Delay (s)	0.0	0.3	24.7				
Approach LOS			O				
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization	_		53.0%	⊇	ICU Level of Service	Service	А
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis 3: King Street West & 2nd Street North

<Future Total> AM Peak Hour

3: King Street West & 2nd Street North	2nd	Street	North								2/0	5/08/2017
	4	†	>	>	Į.	4	•	—	•	۶	-	*
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Volume (veh/h)	37	289	2	-	989	2	-		4	2	0	40
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)	40	640	2	-	745	2	-	-	4	2	0	43
Pedestrians								9			17	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								_			-	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					165							
pX, platoon unblocked	89.0						89.0	89.0		89.0	89:0	89.0
vC, conflicting volume	191			652			1522	1499	649	1495	1499	764
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	416			652			1533	1498	649	1492	1498	412
tC. single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
po dueue free %	95			100			86	66	66	16	100	06
cM capacity (veh/h)	762			930			24	77	467	63	11	427
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	989	751	7	46								
Volume Left	40	-	-	2								
Volume Right	2	2	4	43								
CSH	762	930	150	259								
Volume to Capacity	0.05	0.00	0.04	0.19								
Queue Length 95th (m)	1.0	0.0	8.0	4.1								
Control Delay (s)	1.4	0.0	30.1	22.1								
Lane LOS	V	A	Ω	O								
Approach Delay (s)	1.4	0.0	30.1	22.1								
Approach LOS			D	S								
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization	ر		70.5%	2	U Level o	ICU Level of Service			ပ			
Analysis Period (min)			15									

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

HCM Unsignalized Intersection Capacity Analysis 4: King Street West & Proposed Site Access

<Future Total> AM Peak Hour 5/08/2017

		١		,			
	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	¢		×		
	4	594	169	7	12	19	
		Free	Free		Stop		
		%0	%0		%0		
	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	4	646	751	00	13	21	
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
		None	None				
Median storage veh)							
Jpstream signal (m)			122				
- R	19.0				0.67	29:0	
	759				1409	755	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	390				1364	384	
	4.1				6.4	6.2	
	2.2				3.5	3.3	
	66				88	95	
cM capacity (veh/h)	780				108	443	
ш	EB 1	WB1	SB 1				
	920	759	34				
	4	0	13				
	0	∞	21				
	780	1700	201				
	0.01	0.45	0.17				
Queue Length 95th (m)	0.1	0.0	3.5				
	0.2	0.0	26.4				
	٧		Ω				
Approach Delay (s)	0.2	0.0	26.4				
			О				
ntersection Summary							
			0.7				
ntersection Capacity Utilization			46.8%	೦	ICU Level of Service	Service	A
Analysis Dorlod (min)			7				

Synchro 7 - Report Page 5

Timings < Future Total> PM Peak Hour 1: King Street West & Lake Avenue Drive 5/08/2017

*	SBR	*	144	Perm		9	9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.27	11.8	0.0	11.8	В											
→	SBT	₩	28		9		9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.45	32.9	0.0	32.9	O	23.5	O									
۶	SBL		151	Perm		9	9		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max																		
•	NBR	*	6	Perm		2	2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.02	14.9	0.0	14.9	В										G	
←	NBT	₩	26		2		2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max	31.7	0.34	0.16	28.4	0.0	28.4	O	26.8	O							Intersection LOS: C	ICU Level of Service G	
•	NBL		43	Perm		2	2		10.0	35.3	36.0	32.7%	3.3	2.0	0.0	5.3			Max																tersection	U Level	
↓	WBT	æ,	929		∞		∞		10.0	29.4	65.0	59.1%	3.3	2.1	0.0	5.4	Lag	Yes	None	44.3	0.47	0.91	37.9	0.0	37.9	Ω	37.8	Ω							드	2	
-	WBL	*	'n	Perm		∞	∞		10.0	29.4	65.0	59.1%	3.3	2.1	0.0	5.4	Lag	Yes	None	44.3	0.47	0.01	12.3	0.0	12.3	В											
†	EBT	æ,	638		4		4		10.0	29.4	74.0	67.3%	3.3	2.1	0.0	5.4			None	51.1	0.54	0.73	19.8	0.0	19.8	В	19.3	В								vo.	
4	EBL	<i>y-</i>	8	pm+pt	7	4	7		2.0	0.6	0.6	8.2%	3.0	0.0	0.0	3.0	Lead	Yes	None	53.6	0.57	0.45	15.2	0.0	15.2	В							ord		2	on 102.39	
	Lane Group	Lane Configurations	Volume (vph)	Turn Type	Protected Phases	Permitted Phases	Detector Phase	Switch Phase	Minimum Initial (s)	Minimum Split (s)	Total Split (s)	Total Split (%)	Yellow Time (s)	All-Red Time (s)	Lost Time Adjust (s)	Total Lost Time (s)	Lead/Lag	Lead-Lag Optimize?	Recall Mode	Act Effct Green (s)	Actuated g/C Ratio	v/c Ratio	Control Delay	Oueue Delay	Total Delay	SOT	Approach Delay	Approach LOS	Intersection Summary	Cycle Length: 110	Actuated Cycle Length: 93.8	Natural Cycle: 90	Control Type: Semi Act-Uncoord	Maximum v/c Ratio: 0.91	Intersection Signal Delay: 27.6	Intersection Capacity Utilization 102.3%	Analysis Period (min) 15

Spills and Phases: 1: King Street West & Lake Avenue Drive



Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

HCM Signalized Intersection Capacity Analysis <Puture Total> PM Peak Hour 1: King Street West & Lake Avenue Drive

Mocenerar EBI EBI EBI WBI RBI ABI A													
1	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Sign	Lane Configurations	×	£3		K	£3			4	×		4	×
190 190	Volume (vph)	83	638	21	m	929	89	43	26	6	151	28	144
(c) 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
(c) 3.0 5.4 5.4 5.4 5.4 5.3 5.3 5.3 5.3 5.3 5.3 5.3 5.3 5.3 5.3	Lane Width	3.6	3.6	3.6	3.0	3.6	3.6	3.6	3.6	3.0	3.6	3.6	3.6
1,00	Total Lost time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
τ, τ	Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
1,00	Frpb, ped/bikes	1:00	1.00		1.00	0.99			1.00	0.95		1.00	0.95
1.00	Flpb, ped/bikes	1.00	1.00		0.99	1.00			0.98	1.00		0.97	1.00
1, 17, 18, 18, 18, 18, 18, 18, 18, 18, 18, 18	Frt	1:00	1.00		1.00	0.99			1.00	0.85		1.00	0.85
1770 1866 1658 1827 7779 7389 7740 1781 1866 1658 1827 7779 7389 7440 1781 1806 468 1827 7739 7389 7470 1881 1806 448 448 725 0.92 0.92 0.92 0.92 1881 693 23 3 715 74 47 28 10 164 30 1881 693 23 3 715 74 47 28 10 164 30 1981 715 0 0 0 0 0 0 0 0 1981 715 0 0 0 0 0 0 0 0 1981 715 0 0 0 0 0 0 0 0 1981 715 714 44 44 44 44 44 44 4	FIt Protected	0.95	1.00		0.95	1.00			0.97	1.00		96:0	1.00
m) 158 160 0.26 1.00 0.74 1.01 0.13 1.73 1.39 1.	Satd. Flow (prot)	1770	1806		1638	1827			1779	1398		1740	1501
March 158 1806 448 1827 1399 1398 1283 1283 1388 693 203 092 0	FIt Permitted	0.08	1.00		0.26	1.00			0.76	1.00		0.71	1.00
NY PHF 0.92 0 0 0 0 0 0 0 0 0 0<	Satd. Flow (perm)	158	1806		448	1827			1397	1398		1283	1501
n (γμη) 88 693 23 3 715 74 47 28 10 164 30 m (γμη) 88 715 0 4 0 <th< td=""><td>Peak-hour factor, PHF</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td><td>0.92</td></th<>	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
w(γμη) β 71 0 0 4 0 0 7 0 194 hη) 19 16 16 16 16 16 19 7 0	Adj. Flow (vph)	88	693	23	3	715	74	47	28	9	164	30	157
with(ph) 88 715 0 3 785 0 75 3 0 194 hth) 19 16 16 16 16 16 19 21 22 22 hth) 19 16 16 16 16 16 16 16 16 16 0	RTOR Reduction (vph)	0	-	0	0	4	0	0	0	7	0	0	73
In 19	Lane Group Flow (vph)	88	715	0	e	785	0	0	75	m	0	194	84
Harry December D	Confl. Peds. (#/hr)	19		16	16		19	21		22	22		21
	Confl. Bikes (#/hr)			-									
es pm+pt Perm Perm Perm Perm Perm Fem F	Bus Blockages (#/hr)	0	9	0	0	0	0	0	0	0	0	0	0
ess 7 4 8 8 2 2 6 6 6 6 6 6 6 6 7 8 8 9 2 7 6 6 6 6 6 7 8 9 8 9 2 7 6 6 6 6 6 6 7 8 9 8 9 2 7 6 6 6 6 6 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Turn Type	pm+pt			Perm			Perm		Perm	Perm		Perm
ess 4 8 2 6 (s) 518 518 443 443 23 2 6 atio 518 518 443 443 443 316 317 317 318 31	Protected Phases	7	4			∞			2			9	
O (\$) 518 518 443 443 443 316 317 317 316 316 317 317 317 318 317 318 318 316 316 316 317 318 </td <td>Permitted Phases</td> <td>4</td> <td></td> <td></td> <td>00</td> <td></td> <td></td> <td>2</td> <td></td> <td>2</td> <td>9</td> <td></td> <td>9</td>	Permitted Phases	4			00			2		2	9		9
(yg (s) 51.8 51.8 44.3 40.3	Actuated Green, G (s)	51.8	51.8		44.3	44.3			31.6	31.6		31.6	31.6
ailio 0.55 0.55 0.47 0.47 0.47 0.43 0.34 0.34 0.34 0.34 0.34 0.34 0.34	Effective Green, g (s)	51.8	51.8		44.3	44.3			31.6	31.6		31.6	31.6
(yh) 3.0 5.4 5.4 5.4 5.3 5.3 5.3 5.3 (or) (yh) 16.4 994 211 860 469 469 469 431 0.03 c.0.40 0.03 c.0.40 211 860 469 469 4431 0.03 c.0.40 0.01 c.0.43 0.05 0.00 c.0.15 0.04 0.01 0.01 0.01 0.01 0.01 0.01 0.01	Actuated g/C Ratio	0.55	0.55		0.47	0.47			0.34	0.34		0.34	0.34
(vph) 30 30 30 30 30 (vph) 164 994 211 860 469 469 431 (vph) 0.03 c.040 c.043 0.05 0.00 c.015 0.27 0.27 0.01 0.01 0.01 0.01 0.04 0.01 0.04 d.1 1.8 0.7 0.01 0.01 0.01 0.04 0.0	Clearance Time (s)	3.0	5.4		5.4	5.4			5.3	5.3		5.3	5.3
(vph) 164 994 211 860 469 469 431 0.03 c.0.40 c.0.43 0.05 0.00 c.0.15 0.27 0.27 0.01 0.91 0.05 0.00 c.0.15 dor 0.54 0.72 0.01 0.91 0.16 0.01 0.45 dor 1.00	Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
0.03 c.0.40 c.0.43 c.0.15 c.0	Lane Grp Cap (vph)	164	994		211	860			469	469		431	504
0.27	v/s Ratio Prot	0.03	c0.40			c0.43							
18	v/s Ratio Perm	0.27			0.01				0.05	0.00		c0.15	0.0
d1 18.1 15.7 13.3 23.1 21.9 20.8 24.5 cdor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	v/c Ratio	0.54	0.72		0.01	0.91			0.16	0.01		0.45	0.17
Control Delay	Uniform Delay, d1	18.1	15.7		13.3	23.1			21.9	20.8		24.5	22.0
lay, d2 34 2.5 0.0 13.9 0.7 0.0 3.4 e 2.1.5 18.3 13.3 37.0 2.7 20.8 27.8 27.8 27.8 27.8 27.8 27.8 27.8 27.8 27.9 27.9 27.4 25.5 C	Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
State	Incremental Delay, d2	3.4	2.5		0.0	13.9			0.7	0.0		3.4	0.7
C B B D C C	Delay (s)	21.5	18.3		13.3	37.0			22.7	20.8		27.8	22.7
y (s) 18.6 36.9 22.4 mmary D C Control Delay 27.1 HCM Level of Service C Length (s) 94.1 Sum of lost time (s) 16.1 pacity Utilization 102.3% ICU Level of Service G ((min) 15 16.1 16.1	Level of Service	O	В		В	Ω			ပ	ပ		ပ	O
mmary D C Control Delay 27.1 HCM Level of Service C Control Delay 0.75 C C Length (s) 94.1 Sum of lost time (s) 16.1 pacity Unitzation 102.3% ICU Level of Service G I (min) 15 G G	Approach Delay (s)		18.6			36.9			22.4			25.5	
27.1 HCM Level of Service 0.75 94.1 Sum of lost time (s) 102.3% ICU Level of Service 15	Approach LOS		В			۵			ပ			U	
27.1 HCM Level of Service 0.75 94.1 Sum of lost time (s) 102.3% ICU Level of Service 15	Intersection Summary												
0.75 94.1 Sum of lost time (s) 102.3% (CU Level of Service 15	HCM Average Control Delay			27.1	ľ	M Level	of Service			U			
94.1 Sum of lost time (s) 102.3% (CU Level of Service 15	HCM Volume to Capacity rati	o.		0.75									
102.3% ICU Level of Service 15	Actuated Cycle Length (s)			94.1	Su	m of lost	time (s)			16.1			
	Intersection Capacity Utilizati	ion		102.3%	⊡	U Level o	Service			G			
	Analysis Period (min)			13									

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

HCM Unsignalized Intersection Capacity Analysis 2: King Street West & 1st Street South

<Future Total> PM Peak Hour 5/08/2017

	†	<i>></i>	>	ļ	•	•	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	־			4	>		
Volume (veh/h)	755	33	9	871	,	9	
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)	821	3	7	947	_	7	
Pedestrians					9		
Lane Width (m)					3.6		
Walking Speed (m/s)					1.2		
Percent Blockage					-		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)				91			
pX, platoon unblocked					0.59		
vC, conflicting volume			830		1788	828	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			830		1989	828	
tC, single (s)			4.1		6.4	6.2	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			66		4	86	
cM capacity (veh/h)			798		39	369	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	824	953	∞				
Volume Left	0	7	-				
Volume Right	3	0	7				
CSH	1700	798	167				
Volume to Capacity	0.48	0.01	0.05				
Queue Length 95th (m)	0.0	0.1	6.0				
Control Delay (s)	0.0	0.2	27.6				
Lane LOS		⋖ :	۵				
Approach Delay (s)	0.0	0.2	27.6				
Approach LOS			Ω				
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization	on		%9.09	2	ICU Level of Service	Service	m
Analysis Period (min)			2				

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

HCM Unsignalized Intersection Capacity Analysis <Future Total> PM Peak Hour 3: King Street West & 2nd Street North

Wovement EBL Lane Configurations 53 Volume (veh/h) 53 Sign Control Sign Control Cardee Peak Hour Factor 0.92 Hourly flow rate (vph) 58 Pedestrians ane width (m)	EBT	EBR	WBL	WBT	WRR	NRI	HOIN	NRR	SBL	CRT	CDD
rrations (h) actor 0.	*				VICAN	INDL	NBI	NON		וחר	NOC
h) actor 0. ate (vph)	\$			4			4			4	
actor 0.	757	က	1	824	18	2	0	7	2	0	40
our Factor 0. flow rate (vph) ians	Free			Free			Stop			Stop	
ó	0 0%	0 00	0 00	0 0%	0 00	0 00	000	000	0 0 0	0.00	000
strians Width (m)	823	3 %	12	896	20.75	7.5	0.72	2 00	5 2	0.72	43
Width (m)							4			24	
							3.6			3.6	
Walking Speed (m/s)							1.2			1.2	
Percent Blockage							0			2	
Right turn flare (veh)											
Median type	None			None							
Median storage veh)											
Jpstream signal (m)				165							
oX, platoon unblocked 0.60						09:0	09:0		09.0	09:0	09:0
vC, conflicting volume 939			830			1916	1907	828	1901	1899	929
vC1, stage 1 conf vol											
/C2, stage 2 conf vol											
ed vol			830			2200	2184	828	2173	2170	541
C, single (s) 4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
C, 2 stage (s)											
			2.2			3.5	4.0	3.3	3.5	4.0	3.3
			66			82	100	86	89	100	98
cM capacity (veh/h) 591			799			15	24	370	17	24	315
Direction, Lane # EB 1	WB1	NB1	SB 1								
	927	10	46								
	12	2	2								
Volume Right 3	70	∞	43								
	799	28	108								
Volume to Capacity 0.10	0.01	0.17	0.45								
ith (m)	0.3	3.3	11.8								
Control Delay (s) 2.8	0.4	78.8	63.4								
Lane LOS A	A	ш	ш								
Approach Delay (s) 2.8	0.4	78.8	63.4								
Approach LOS		ш	ш								
ntersection Summary											
Average Delay		3.6									
ntersection Capacity Utilization		82.0%	2	ICU Level of Service	Service			ш			
Analysis Period (min)		15									

HCM Unsignalized Intersection Capacity Analysis <Future Total> PM Peak Hour 5/08/2017

Movement Lane Configurations	FBI	TOT	HOW				
Lane Configurations	בטר	LBI	WBI	WBR	SBL	SBR	
		₩	£		>		
Volume (veh/h)	23	747	854	18	=	14	
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)	22	812	928	20	12	15	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage veh)							
Upstream signal (m)			125				
pX, platoon unblocked	0.59				0.59	0.59	
vC, conflicting volume	948				1800	938	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	291				2010	545	
tC, single (s)	4.1				6.4	6.2	
tC, 2 stage (s)							
tF (s)	2.2				3.5	3.3	
p0 queue free %	96				19	95	
cM capacity (veh/h)	294				37	317	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	837	948	27				
Volume Left	22	0	12				
Volume Right	0	20	15				
cSH	594	1700	72				
Volume to Capacity	0.04	0.56	0.38				
Queue Length 95th (m)	0.8	0.0	9.8				
Control Delay (s)	1.2	0.0	81.9				
Lane LOS	A		ш				
Approach Delay (s)	1.2	0.0	81.9				
Approach LOS			ш.				
Intersection Summary							
Average Delay			1.8				
Intersection Capacity Utilization	zation		%67.9%	Ō	U Level o	ICU Level of Service	O
Analysis Period (min)			2				

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Queuing and Blocking Report <Existing> AM Peak Hour

Intersection: 1: King Street West & Lake Avenue Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB	
Directions Served	_	TR	_	TR	그	2	Ц	Я	
Maximum Queue (m)	32.1	72.1	8.59	118.7	34.5	15.8	27.8	28.6	
Average Queue (m)	12.6	44.1	4.9	91.6	12.8	5.1	10.6	9.6	
95th Queue (m)	25.4	9.69	24.6	127.6	29.4	15.6	23.6	22.0	
Link Distance (m)		72.1		114.1	206.7		215.9		
Upstream Blk Time (%)		-		co					
Queuing Penalty (veh)		2		0					
Storage Bay Dist (m)	23.0		16.0			7.0		12.0	
Storage Blk Time (%)	—	70	0	37	79	7	7	8	
Queuing Penalty (veh)	7	16	0	2	4	_	9	വ	

Intersection: 2: King Street West & 1st Street South

Movement	EB	WB	NB	
Directions Served	TR	П	LR	
Maximum Queue (m)	28.1	15.7	9.3	
Average Queue (m)	1.5	1.4	2.1	
95th Queue (m)	10.4	7.7	8.4	
Link Distance (m)	55.2	72.1	151.9	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: King Street West & 2nd Street North

Movement	EB	NB	SB	
Directions Served	LTR	LTR	LR	
Maximum Queue (m)	85.4	0.6	21.2	
Average Queue (m)	10.9	0.3	8.4	
95th Queue (m)	42.6	3.0	16.1	
Link Distance (m)	80.9	158.6	220.1	
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	0			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 49

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

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Queuing and Blocking Report

<Existing> PM Peak Hour
Intersection: 1: King Street West & Lake Avenue Drive

5/08/2017

SB	R	37.0	24.3	42.2				12.0	16	28
SB	L				215.9				40	53
B	~	16.8	2.0	10.7				7.0	0	0
B	L	34.4	13.5	26.4	206.7				32	2
WB	TR	124.5	106.7	136.3	114.1	1	0		47	-
WB	_	7.5	0.2	2.5				16.0		
EB	TR	77.1	53.7	88.4	72.1	2	33		24	19
EB	_	97.79	16.0	38.0				23.0	-	9
Movement	Directions Served	Maximum Queue (m)	Average Queue (m)	95th Queue (m)	Link Distance (m)	Upstream Blk Time (%)	Queuing Penalty (veh)	Storage Bay Dist (m)	Storage Blk Time (%)	Queuing Penalty (veh)
	EB EB WB WB NB SB	EB EB WB WB NB NB SB L TR L TR LT R LT	EB EB WB WB NB NB SB LT C2.6 77.1 7.5 124.5 34.4 16.8 66.0 3	EB EB WB WB NB NB SB L TR L TR LT R LT 62.6 77.1 7.5 124.5 34.4 16.8 66.0 3 16.0 53.7 0.2 106.7 13.5 2.0 32.6 2	Hermonia Branch	(m) 62.6 77.1 7.5 124.5 34.4 16.8 66.0 3 38.0 88.4 2.5 136.3 26.4 10.7 54.9 17.1 14.1 206.7 15.9	(m) 62.6 77.1 7.5 124.5 34.4 16.8 66.0 3 16.0 83.7 0.2 106.7 13.5 20.4 10.7 54.9 6.0 80.4 2.5 136.3 26.4 10.7 54.9 6.0 (9.8) 5	EB EB WB WB NB NB SB L TR L TR LT R LT 62.6 77.1 7.5 124.5 34.4 16.8 66.0 3 16.0 53.7 0.2 106.7 13.5 2.0 32.6 3 38.0 88.4 2.5 136.3 26.4 10.7 54.9 4 72.1 114.1 206.7 215.9 33 0	EB EB WB WB NB NB SB C2.6 77.1 75 124.5 34.4 16.8 66.0 31.6 0.5 53.7 0.2 106.7 13.5 2.0 32.6 38.0 88.4 2.5 136.3 26.4 10.7 54.9 5.7 114.1 206.7 215.9 5.3 16.0 16.0 7.0 17.0 17.0 17.0 17.0 17.0 17.0 17.	EB EB WB WB NB NB SB L TR L TR LT R LT 62.6 77.1 7.5 124.5 34.4 16.8 66.0 3 16.0 53.7 0.2 106.7 13.5 2.0 32.6 32.6 32.6 32.6 32.6 32.6 32.6 32.6

Intersection: 2: King Street West & 1st Street South

Movement	EB	WB	NB	
Directions Served	TR	П	LR	
Maximum Queue (m)	60.4	72.1	15.1	
Average Queue (m)	12.1	9.3	1.9	
95th Queue (m)	44.4	44.8	8.7	
Link Distance (m)	55.2	72.1	151.9	
Upstream Blk Time (%)		0		
Queuing Penalty (veh)	2	m		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: King Street West & 2nd Street North

LTR LTR LR 85.5 14.9 55.2 14.9 33.7 9.4 2.8 88.2 36.2 10.2 5 60.9 55.2 158.6 22 0 4	Movement	EB	WB	NB	SB	
(%) 55.2 14.9 33.7 9.4 2.8 88.2 36.2 10.2 88.2 36.2 10.2 88.9 5.6 188.6 2 (%) 5 0 eh) 0 4		꼳	LTR	LR	LR	
33.7 9.4 2.8 88.2 36.2 10.2 88.2 36.2 10.2 86.9 55.2 158.6 2 ech 0 4 4 9.0 0 4		35.5	55.2	14.9	16.3	
88.2 36.2 10.2 89.9 55.2 186.6 2 (%) 5 0 eth) 0 4 m)		33.7	9.4	2.8	8.3	
80.9 55.2 158.6 (%) 5 0 4 (et) 0 4 (h) 6 %%, %,		38.2	36.2	10.2	15.8	
o o		30.9	55.2	158.6	20.1	
Oueuing Penalty (veh) 0 4 Slorage Bay Dist (m) Slorage Bir Time (%) Ouening Penalty (veh)	Upstream Blk Time (%)	2	0			
Storage Bay Dist (m) Storage Bit Time (%) Chicating Powerlat (with	Queuing Penalty (veh)	0	4			
Storage BIK Time (%) Orianing Penalty (veh)	Storage Bay Dist (m)					
Olieling Denalty (veh)	Storage Blk Time (%)					
	Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 155

Queuing and Blocking Report <Future Background> AM Peak Hour

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Intersection: 1: King Street West & Lake Avenue Drive

Movement	EB	EB	WB	WB		NB	SB	SB
Directions Served	_	TR	_	TR	П	2	L	R
Maximum Queue (m)	62.7	76.4	0.99	119.1		15.6	27.8	22.1
Average Queue (m)	18.2	49.4	5.9	9.9/		4.9	9.1	11.0
95th Queue (m)	49.0	83.0	25.3	122.0		15.0	24.0	21.7
Link Distance (m)		72.1		114.5			215.9	
Upstream Blk Time (%)		က		2				
Queuing Penalty (veh)		16		0				
Storage Bay Dist (m)	23.0		16.0			7.0		12.0
Storage Blk Time (%)	2	70	0	34	31	4	00	7
Queuing Penalty (veh)	12	16	0	2	4	က	7	4

Intersection: 2: King Street West & 1st Street South

Movement	EB	WB	NB	
Directions Served	TR	П	LR	
Maximum Queue (m)	55.2	16.1	9.3	
Average Queue (m)	6.3	1.8	1.5	
95th Queue (m)	30.0	9.1	7.1	
Link Distance (m)	55.2	72.1	151.9	
Upstream Blk Time (%)	0			
Queuing Penalty (veh)	-			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: King Street West & 2nd Street North

Movement	EB	WB	NB	SB	
Directions Served	LTR	LTR	LTR	LR	
Maximum Queue (m)	85.4	34.8	15.5	15.4	
Average Queue (m)	17.1	1.2	1.8	7.4	
95th Queue (m)	6.03	11.5	8.1	14.8	
Link Distance (m)	80.9	55.2	158.6	220.1	
Upstream Blk Time (%)	-				
Queuing Penalty (veh)	0				
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 69

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

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Queuing and Blocking Report <Future Background> PM Peak Hour

5/08/2017

Intersection: 1: King Street West & Lake Avenue Drive

Movement	EB	EB	WB	WB	8	8	SB	SB	
Directions Served	_	TR	_	TR	5	~	5	~	
Maximum Queue (m)	62.6	9.9/	7.4	116.5	60.3	17.0	54.3	37.0	
Average Queue (m)	11.2	55.8	0.7	82.8	14.9	3.9	28.5	21.9	
95th Queue (m)	30.9	87.3	3.8	122.8	37.0	14.3	49.3	39.7	
Link Distance (m)		72.1		111.9	206.7		215.9		
Upstream Blk Time (%)		4		3					
Queuing Penalty (veh)		31		0					
Storage Bay Dist (m)	23.0		16.0			7.0		12.0	
Storage Blk Time (%)	2	22		40	32	7	32	18	
Queuing Penalty (veh)	1	17		-	c	_	49	33	

Intersection: 2: King Street West & 1st Street South

Movement	EB	WB	NB	
Directions Served	TR	LT	LR	
Maximum Queue (m)	60.4	73.1	9.3	
Average Queue (m)	6.6	12.4	3.1	
95th Queue (m)	41.1	52.5	6.6	
Link Distance (m)	55.2	72.1	151.9	
Upstream Blk Time (%)	-	2		
Queuing Penalty (veh)	11	18		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: King Street West & 2nd Street North

Moyomont	and a	M/D	aN	CD	
MOVEMENT	בה	0 0 0	מא	JU	
Directions Served	LTR	LTR	LR	LR	
Maximum Queue (m)	85.1	26.0	9.3	21.3	
Average Queue (m)	33.1	8.8	6.0	10.1	
95th Queue (m)	88.3	39.8	5.3	18.1	
Link Distance (m)	80.5	55.2	158.8	220.1	
Upstream Blk Time (%)	2	2			
Queuing Penalty (veh)	0	16			
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 190

Queuing and Blocking Report <Future Total> AM Peak Hour

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Intersection: 4: King Street West & Proposed Site Access

Queuing and Blocking Report <Future Total> AM Peak Hour

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LR 20.9 6.9 16.8 16.3

Movement
Directions Served
Maximum Queue (m)
Average Oueue (m)
Spith Queue (m)
Link Distance (m)
Upsteam Bik Time (%)
Oueuing Beralty (veh)
Storage Bik Time (%)
Queuing Peralty (veh)

LT 22.1 1.4 10.4 28.2

Intersection: 1: King Street West & Lake Avenue Drive

SB	R	28.6	10.2	23.5				12.0	6	9
	П				215.9				1	6
NB	2	15.8	4.4	14.3				7.0	2	2
NB	П	28.7	10.5	21.8	206.6				21	က
WB	TR	119.1	73.2	110.0	114.5	-	0		32	9
WB	_	7.6	3.3	8.8				16.0		
EB	TR	76.3	53.7	78.2	72.1	-	9		23	19
EB	٦	59.4	12.5	29.7				23.0	0	-
Movement	Directions Served	Maximum Queue (m)	Average Queue (m)	95th Queue (m)	Link Distance (m)	Upstream Blk Time (%)	Queuing Penalty (veh)	Storage Bay Dist (m)	Storage Blk Time (%)	Queuing Penalty (veh)

Intersection: 2: King Street West & 1st Street South

Network wide Queuing Penalty: 55 Network Summary

Movement	EB	WB	NB	
Directions Served	TR	П	LR	
Maximum Queue (m)	16.9	34.8	9.5	
Average Queue (m)	2.4	3.8	2.0	
95th Queue (m)	10.7	20.2	8.1	
Link Distance (m)	10.0	72.1	151.9	
Upstream Blk Time (%)	-			
Queuing Penalty (veh)	က			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: King Street West & 2nd Street North

Movement	EB	NB	SB	
Directions Served	LTR	LTR	LR	
Maximum Queue (m)	8.79	9.5	16.5	
Average Queue (m)	12.6	2.4	8.5	
95th Queue (m)	43.9	8.9	16.2	
Link Distance (m)	80.9	158.6	220.3	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Proposed Residential Development, 16 & 18 King Street West, Stoney Greek, Hamilton Trans-Plan

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Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

Queuing and Blocking Report <Future Total> PM Peak Hour

5/08/2017

Intersection: 4: King Street West & Proposed Site Access

Queuing and Blocking Report <Future Total> PM Peak Hour

5/08/2017

SB LR 22.6 5.5 16.6 18.0

LT LT 15.8 35.2 24.2 7

Movement
Directions Served
Maximum Queue (m)
Average Oueue (m)
Spith Queue (m)
Link Distance (m)
Upsteam Bik Time (%)
Oueuing Beralty (veh)
Storage Bik Time (%)
Queuing Peralty (veh)

Drive
Avenue
Lake,
∞
West
Street
King
Intersection:

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	_	TR	_	TR	П	×	L	R
Maximum Queue (m)	62.7	77.0	9.7	120.0	34.5	17.0	67.1	37.0
Average Queue (m)	14.4	26.7	1.0	7.86	14.8	3.8	33.0	23.4
95th Queue (m)	34.1	92.7	4.9	136.0	28.2	14.6	6.09	43.3
Link Distance (m)		72.1		111.9	206.7		215.9	
Upstream Blk Time (%)		9		6				
Queuing Penalty (veh)		44		0				
Storage Bay Dist (m)	23.0		16.0			7.0		12.0
Storage Blk Time (%)	2	21		41	41	7	36	22
Queuing Penalty (veh)	15	17		_	4	_	29	40

Intersection: 2: King Street West & 1st Street South

Network wide Queuing Penalty: 322 Network Summary

Movement	EB	WB	NB	
Directions Served	TR	ᄓ	LR	
Maximum Queue (m)	26.1	74.3	9.3	
Average Queue (m)	7.8	12.8	5.6	
95th Queue (m)	21.4	55.7	9.3	
Link Distance (m)	13.8	72.1	151.9	
Upstream Blk Time (%)	2	co		
Queuing Penalty (veh)	36	78		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Orienting Penalty (veh)				

Intersection: 3: King Street West & 2nd Street North

Movement	EB	WB	NB	SB	
Directions Served	LTR	LTR	LR	LR	
Maximum Queue (m)	6.06	28.8	9.3	16.5	
Average Queue (m)	48.4	3.6	0.8	7.3	
95th Queue (m)	104.6	18.1	4.8	14.4	
Link Distance (m)	80.5	24.2	158.8	220.4	
Upstream Blk Time (%)	10	2			
Queuing Penalty (veh)	0	16			
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan

SimTraffic Report Page 1

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Proposed Residential Development, 16 & 18 King Street West, Stoney Creek, Hamilton Trans-Plan



APPENDIX E

Level of Service Definitions

LEVEL OF SERVICE ANALYSIS AT SIGNALIZED INTERSECTIONS

To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to "Level of Service". The term Level of Service implies a qualitative measure of traffic flow at an intersection. It is dependent upon vehicle delay and vehicle queue lengths at the approaches. Specifically, Level of Service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The following table describes the characteristics of each level:

Level of Service	<u>Features</u>	Stopped Delay per Vehicle (sec)
A	At this level of service, almost no signal phase is fully utilized by traffic. Very seldom does a vehicle wait longer than one red indication. The approach appears open, turning movements are easily made and drivers have freedom of operation.	<u>≤</u> 5.0
В	At this level, an occasional signal phase is fully utilized and many phases approach full use. Many drivers begin to feel somewhat restricted within platoons of vehicles approaching the intersection.	$> 5.0 \text{ and} \le 15.0$
С	At this level, the operation is stable though with more frequent fully utilized signal phases. Drivers feel more restricted and occasionally may have to wait more than one red signal indication, and queues may develop behind turning vehicles. This level is normally employed in urban intersection design.	> 15.0 and \le 25.0
D	At this level, the motorist experiences increasing restriction and instability of flow. There are substantial delays to approaching vehicles during short peaks within the peak period, but there are enough cycles with lower demand to permit occasional clearance of developing queues and prevent excessive backups.	> 25.0 and \le 40.0
Е	At this level, capacity is reached. There are long queues of vehicles waiting upstream of the intersection and delays to vehicles may extend to several signal cycles.	> 40.0 and <u><</u> 60.0
F	At this level, saturation occurs, with vehicle demand exceeding the available capacity.	> 60.0

LEVEL OF SERVICE ANALYSIS AT UNSIGNALIZED INTERSECTIONS⁽¹⁾

The term "level of service" implies a qualitative measure of traffic flow at an intersection. It is dependent upon the vehicle delay and vehicle queue lengths at approaches. The level of service at unsignalized intersections is often related to the delay accumulated by flows on the minor streets, caused by all other conflicting movements. The following table describes the characteristics of each level.

Level of Service	Features
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.
В	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.
Е	Very long traffic delays occur. Operations approach the capacity of the intersection.
F	Saturation occurs, with vehicle demand exceeding the available capacity. Very long traffic delays occur.

⁽¹⁾ Highway Capacity Manual - Special Report No. 209, Transportation Research Board, 1985.



APPENDIX F

City of Hamilton Parking Requirements

4.10.8 Calculation Of Required Spaces

- (a) Rounding Where the calculation of parking space requirements in accordance with this By-law results in a fraction of a parking space being required for a lot, any fraction in excess of 0.5 shall be rounded up to the next whole number.
- (b) More than One Use Except as expressly provided elsewhere in this By-law, where more than one type of use is located on a lot, the total number of parking spaces required for such lot shall be the sum of the parking space requirements for each separate use.
- (c) Where the number of parking spaces required in accordance with this By-law is based upon the "capacity" of a use, such capacity shall be equal to the design capacity of any building or structure pertaining to such use, as determined by the Building Code Act, R.S.O. 1990, c.B.13.

4.10.9 Schedule Of Minimum Parking Requirements

Except as specifically provided elsewhere in this By-law the parking standards as set out in the following Schedule shall be held to be the minimum.

USE	MINIMUM PARKING SPACES REQUIRED
APARTMENT BUILDINGS IN CENTRAL COMMERCIAL "CA1" ZONE AND CENTRAL COMMERCIAL "CA2" ZONE	1 PARKING SPACE FOR EACH DWELLING UNIT AND 0.25 VISITOR PARKING SPACES FOR EACH DWELLING UNIT
BANK AND FINANCIAL INSTITUTIONS	1 PARKING SPACE FOR EACH 15 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF
BILLIARD PARLOURS	1 PARKING SPACE FOR EACH TABLE
BOWLING ALLEYS	4 PARKING SPACES FOR EACH ALLEY
BOARDING HOUSE TYPE "B"	1 PARKING SPACE FOR EACH 4 BEDS
BUSINESS, PROFESSIONAL AND MEDICAL OFFICES NOT LOCATED IN A SHOPPING CENTRE	1 PARKING SPACE FOR EACH 30 SQ.M. OR GROSS FLOOR AREA OR PART THEREOF
BUSINESS, COMMERCIAL OR TRADE SCHOOLS	1 PARKING SPACE FOR EACH 20 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF
CAR WASHES (MANUAL OR SELF SERVE)	1.2 PARKING SPACE FOR EACH CAR WASH BAY PLUS 3 CAR STORAGE SPACES PER BAY WHICH MAY BE TANDEM PARKING SPACES
CAR WASHES (AUTOMATED)	1 PARKING SPACE PER BAY PLUS 4 CAR STORAGE SPACES PER BAY
COMMUNITY CENTRES	1 PARKING SPACE FOR EACH 10 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF

GENERAL PROVISIONS

MOTOR VEHICLE SERVICE STATION	1 PARKING SPACE FOR EACH 23.3 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
NURSERY GARDEN CENTRES (By-Law 03-283)	1 PARKING SPACE FOR EACH 30 SQ.M. OF GROSS FLOOR AREA DEVOTED TO RETAIL SALES AND DISPLAY OF PRODUCTS AND/OR OFFICES; AND, 1 SPACE FOR EACH 100 SQ.M. OF GROSS FLOOR AREA, OR PART THEREOF USED FOR WAREHOUSING AND/OR WHOLESALING	
NURSING HOMES	1 PARKING SPACE FOR EACH 4 BEDS	
PERSONAL SERVICE SHOPS	1 PARKING SPACE FOR EACH 18.5 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
PLACES OF WORSHIP	1 PARKING SPACE FOR EACH 10 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
PLACES TO WHICH THE PUBLIC RESORT FOR RECREATION ENTERTAINMENT, AMUSEMENT, SPORTS OR EDUCATION	1 PARKING SPACE FOR EACH 13.3 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
PRIVATE OR COMMERCIAL CLUBS	1 PARKING SPACE FOR EACH 16.5 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
RENTAL OUTLETS	1 PARKING SPACE FOR EACH 20 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
RESTAURANTS - COVERED OUTDOOR PATIO IN CONJUNCTION WITH A RESTAURANT (By-law 4513-97)	1 PARKING SPACE FOR EACH 4 SEATS	
RESTAURANTS - OUTDOOR PATIO IN CONJUNCTION WITH A RESTAURANT	NO ADDITIONAL PARKING IS REQUIRED	
RESTAURANTS AND TAVERNS EXCEPT WHEN LOCATED IN A SHOPPING CENTRE	1 PARKING SPACE FOR EACH 4 SEATS	
RETAIL LUMBER AND BUILDING SUPPLIES OUTLETS	1 PARKING SPACE FOR EACH 33.3 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF WITH A MINIMUM OF 15 PARKING SPACES	
(RETAIL STORES NOT LOCATED IN A SHOPPING CENTRE OR OTHERWISE SPECIFIED WITHIN THIS BY-LAW (By-law 3863-93)	1 PARKING SPACE FOR EACH 28 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
SHOPPING CENTRES	1 PARKING SPACE FOR EACH 20.5 SQ.M. OF GROSS FLOOR AREA OR PART THEREOF	
SHOWROOMS	1 PARKING SPACE FOR EACH 30 SQ.M. OF SHOWROOM FLOOR SPACE OR PART THEREOF	
SINGLE DETACHED, DUPLEX, AND SEMI-DETACHED DWELLING UNITS	2 PARKING SPACES FOR EACH DWELLING, TANDEM PARKING IS PERMITTED	
THEATRES	1 PARKING SPACE FOR EACH 6 SEATS	
TOWNHOUSE, MAISONETTE (By-law 4770-98)	2 PARKING SPACES FOR EACH DWELLING UNIT	

4.10.10 Parking Requirements for Cellars (By-law 5068-00)

Notwithstanding the definition of "floor area gross", should any part of a cellar or sub-cellar be utilized as gross leasable floor area, said area shall be subject to the provisions of Subsection 4.10.9 "Schedule of Minimum Parking Requirements."

SECTION 5: PARKING

ZONING BY-LAW

Column 1	Column 2		
i. Residential Uses			
Single Detached Dwelling, Semi-Detached Dwelling, Duplex Dwelling Dwelling Unit	1 for each dwelling unit		
Multiple Dwelling Street Townhouse Dwelling	1 for each dwelling unit, except where a dwelling unit is 50 square metres in gross floor area or less, in which case, parking shall be provided at a rate of 0.3 spaces for each such unit.		
Residential Care Facility, Emergency Shelter, Corrections Residence, Lodging House, Retirement Home	1 for each 3 persons accommodated or designed for accommodation.		
ii. Institutional			
Long Term Care Facility	1 for each 3 patient beds.		
Day Nursery	i. 1 for each 125.0 square metres of gross floor area which accommodates such use. ii. Notwithstanding i. above, no parking shall be required where a Day Nursery is located within an Education Establishment. (By-law 07-321, November 14, 2007)		
Social Services Establishment	1 for each 50.0 square metres of gross floor area which accommodates such use. (By-law 07-321, November 14, 2007)		
iii. Educational Establishments (By-law 06-324, October 25, 2006) (By-law 14-238, September 10, 2014)			

ZONING BY-LAW

	floor area, which accommodates such use. (By-law 10-128, May 26, 2010)		
Motor Vehicle Service Station	4 for each service bay (By-law 07-043, February 15, 2007)		
Marina	1 for each boat slip		
Office	1 for each 30 square metres of gross floor area, which accommodates such use. (By-law 07-043, February 15, 2007)		
Personal Services	1 for each 16.0 square metres of gross floor area which accommodates such use. (By-law 10-128, May 26, 2010)		
Restaurant	 i) 1 for each 8.0 square metres of gross floor area which accommodates such use. ii) Notwithstanding i) above, where there are no seats provided for dining purposes, a minimum 3 spaces shall be required. (By-law 10-128, May 26, 2010) 		
Retail	1 for each 20.0 square metres of gross floor area which accommodates such use. (By-law 10-128, May 26, 2010)		
Transportation Depot	1 for each 30.0 square metres of gross floor area which accommodates the Office component of the use. (By-law 10-128, May 26, 2010)		
Warehouse	1 for each 30.0 square metres of gross floor area which accommodates the office component of the use. (By-law 10-128, May 26, 2010)		
Other Commercial Uses not	1 for each 30 square metres of gross		

May 2016 5-13



APPENDIX G

City of Hamilton's TDM Initiatives for Mixed Use Developments

Transportation Demand Management Initiatives / Incentive Summary



Category	TDM Initiative / Incentives	Inititatives to be Considered	Description	
	Visible, well-lit, short-term bicycle parking for visitors (above minimum provisions or recommendations)	✓	Provide well-lit short-term bicycle racks at the northwest corner of the site in the amenity area.	
	Secure, indoor bicycle parking storage spaces for tenants/residents	✓	Storage to be provided through the lockers in the underground parking levels	
Cycling	Provide end-of-trip amenities for employees (e.g. showers, change rooms, lockers)	N/A	Not likely due to the small space of the commercial area	
	Ensure development connects to bicycle network	✓	King Street West and Lake Avenue provide shared cycle lanes, designated by pavement markings or posted signage	
Walking	Safe, attractive and direct walkways for pedestrians linking building entrances with public sidewalks and with key destinations such as schools	✓	Safe and direct walkways for pedestrians within the site is to be provided and connect them to King Street West	
	Enhanced pedestrian amenities on-site (e.g., benches, landscaping, lighting)	\checkmark	Pedestrian amenitites on site will be provided.	
	Enhance walking routes between main building entrance(s) and transit stops/stations	✓	Safe and direct walking routes from the site to the nearest transit stops are provided by connecting residents to the municipal sidewalks along King	
Transit	Provide weather-protected waiting areas Bicycle parking located at or near transit stops	N/A N/A	Currently not available at the bus stops near the subject site.	
	Provision of transit information on-site and adjacent to stops/stations	N/A	Transit information packages should be provided directly to new home owners.	
	Implement transit priority measures (queue jump lanes, traffic signal priority, bus only lanes)	N/A	Based on traffic analysis, priority measures are not required.	
	Provide no more than the minimum number of required spaces for residents and visitors	N/A		
	Reduced minimum parking requirements based on proximity to transit	N/A	The site is expected to have an adequate parking	
Parking	Cash-in-lieu of parking to fund public parking or fund sustainable transportation	N/A	supply based on a review of similar apartment developments near King Street West	
r driving	Shared parking with nearby developments or on-street spaces	N/A		
	Implement paid parking for employees and visitors	N/A		
	Reduced minimum parking requirements based on provision of dedicated carshare vehicle parking spaces	N/A	There are currently no car share services in close proximity of the site.	
	Unbundle parking costs from unit costs	N/A		
Carpool	Preferential carpool parking spaces for employees	N/A	Not expected to have any carpool spaces for employees in the underground parking levels	
Car Share / Bike Share	On-site carshare vehicle(s)	N/A	Currently not readily available in Stoney Creek. Nearest car share is approximately 3km away from	
our share r blice share	On-site bikeshare facility	N/A	the subject site.	
Wayfinding and Travel Planning	Travel planning resources for residents (individualized marketing, active transportation maps, community resources)	✓	Provide active transportation maps and a list / details of nearby community resources offered (i.e. medical care, public libraries, community centres, government serves, etc.)	
	Wayfinding signage to major destinations such as schools, public amenities, and commercial areas	N/A	A direct connection to King Street West has been provided.	
Education / Promotion, Incentives	Contribute to building a strong TDM brand	\checkmark		
	Include transit and active transportation maps, carshare memberships, and/or bikeshare memberships with new home/condo purchase	✓	Provide transit maps / schedules and bicycle routes & pedestrian trail maps to new residents at closing.	
	Include discounted transit passes, carshare memberships, and/or bikeshare memberships with new home/condo purchase or commercial space purchase/rental	N/A	Transit passes for residents and employees may be an option to consider	
	Membership in a Transportation Management Association (TMAs defined under "Education/Promotion and Incentives)	N/A	Possibility for the commercial land use	



3.D Mixed Use (Residential and Commercial)

		Low density residential, commercial	High density residential, commercial	High density residential, large
Category	TDM Initiative Visible, well-lit, short-term bicycle parking for visitors and	frontage	frontage	commercial
	customers (above minimum provisions or recommendations)	•	•	•
Cycling	Secure, indoor bicycle parking storage spaces for residents and employees	0	•	•
	Provide end-of-trip amenities for employees (e.g. showers, change rooms, lockers)	0	0	•
Walking	Safe and attractive walkways for pedestrians linking building entrances with public sidewalks	•	•	•
waiking	Enhanced pedestrian amenities on-site (benches, landscaping, lighting)	•	•	•
	Enhance walking routes between main building entrance(s) and transit stops/stations	•	•	•
T	Provide weather-protected waiting areas	•	•	•
Transit	Bicycle parking located at or near transit stops	•	•	•
	Provision of transit information on-site and adjacent to stops/ stations	•	•	•
	Provide no more than the minimum number of required spaces for residents, employees, and visitors	•	•	•
	Reduced minimum parking requirements based on proximity to transit	•	•	•
	Implement paid parking for employees and visitors	•	•	•
Parking	Unbundle parking costs from residential unit costs	•	•	•
	Shared parking with nearby developments or on-street spaces	0	•	•
	Cash-in-lieu of parking to fund public parking or fund sustainable transportation	-	•	•
	Reduced minimum parking requirements for dedicated car share vehicle parking spaces	-	•	•
Carpool	Preferential carpool parking spaces for employees	0	0	•
Carshare/	On-site carshare vehicle(s)	-	•	•
Bikeshare	On-site bikeshare facility	-	•	•
Wayfinding and Travel Planning	Travel planning resources for residents and employees (individualized marketing, trip planning tools, active transportation maps, information resources)	_	•	•
	Wayfinding signage	-	•	•
Education/	Include discounted transit passes, carshare memberships, and/ or bikeshare memberships with new home/condo purchase or commercial space purchase/rental	•	•	•
Promotion, Incentives	Membership in a Transportation Management Association (TMAs defined under "Education/Promotion and Incentives)	0	0	•
	Contribute to building a strong TDM brand	-	•	•

Legend: • Low Priority • High Priority