









May 2, 2022

Sunray Group Mr. Ken Michaud 515 Consumers Road, Suite 701 Toronto, ON M2J 4Z2

c/o Mr. Richard Domes, Principal Planner Gagnon Walker Domes Ltd. 21 Queen Street East, Suite 500 Brampton, ON, L6W 3P1

Re: <u>Proposed Multi-Building, Mixed-Use Development, 10 Aspen Springs Drive, Municipality of Clarington (Bowmanville), ON – Transportation Study</u>

Dear Mr. Michaud,

TRANS-PLAN is pleased to submit this Transportation Study, consisting of Traffic Impact Study, Parking Study, Traffic Demand Management Plan, and Site Plan Review, for the proposed multi-building mixed-use development at 10 Aspen Springs Drive in the Town of Bowmanville. The development consists of one 25-storey twin-tower mixed-use building including 485 dwelling units, with commercial/retail-at-grade, and a 9-storey mid-rise residential building with 122 dwelling units.

Our traffic impact study findings indicate that the proposed development would be accommodated by the existing road network and no future road improvements (other than construction of the site access) are necessary. Both site entrances are expected to operate well.

The proposed auto parking supply is expected to be sufficient based on the site context, access to transit facilities and the proximity to future Bowmanville GO station. A review of parking layout requirements and site circulation is also provided herein. Traffic and parking activity at the proposed development will function in an acceptable manner.

Sincerely,

Anil Seegobin, P.Eng. Partner, Engineer

Trans-Plan Transportation Inc. Transportation Consultants

A. SEEGOBIN 100120450
May 3,2023

Jing Min, E.I.T. Traffic Analyst

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Transmittal Letter

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1. INTRODUCTION

Trans-Plan has been retained by Sunray Group to provide Traffic Impact, Parking Study, TDM Plan and Site Plan Review for a proposed multi-building, mixed-use development at 10 Aspen Springs Drive, Town of Bowmanville, Municipality of Clarington. This study includes the following components and tasks:

Traffic Impact Study

- A review and assessment of the existing road network
- A review of the site context and development proposal
- An assessment of future background conditions based on anticipated traffic growth, area developments and planned transportation improvements in the study area
- An assessment of the impact of site-generated traffic on the adjacent roadway network under future background and total traffic conditions at full build-out and a 5-year planning horizon after build-out
- Determination of roadway improvements and transit and pedestrian / cycling infrastructure improvements, as required, to accommodate the proposed development

Parking Review

- A review of on-site parking requirements, as per the Municipality of Clarington Zoning By-law, in comparison to the proposed parking supply
- A review of public parking opportunities and alternative modes of travel, including transit, cycling and walking

Traffic Demand Management (TDM) Plan

- a review of the study area roadways for transit and active transportation facilities
- a review of TDM guidelines to determine the TDM measures that would be appropriate for the planned development in terms of context, scale and land use

Site Plan Review

- A review of the proposed access location, design, configuration and operation
- A review of fire routes, walkaways, loading area and parking stall dimensions and other proposed traffic features
- A review of on-site circulation for passenger vehicles, loading/waste collection trucks, and fire trucks, including turning templates for all design vehicles

Prior to conducting this study, transportation staff at Municipality of Clarington and Durham Region were provided a term of reference (TOR) to confirm the study scope and methodology, and this report adheres to the Region of Durham's Traffic Impact Study Guidelines, dated October 2011, and the Municipality of Clarington's Traffic Impact Study Guidelines, dated January 2015.

2. SITE LOCATION

The subject site, shown in Figure 1, is located on the northwest quadrant of the intersection of Bowmanville Avenue and Aspen Springs Drive, located in the Town of Bowmanville, Municipality of



Clarington, Durham Region. The lot is currently vacant, with surrounding land uses consisting of mainly residential, including single family detached dwellings, and three mid-rise condominiums west of the site. South of the site includes a small commercial plaza providing various amenities such as food and beverage, dentistry, physical therapy clinic, and a convenience store. Highway 401 is also located approximately 1.5km south of the site. The CN railway track runs approximately 200m north parallel to Aspen Springs Drive. Further north includes a retirement community, commercial retail plazas, and a recreational center.

3. PROPOSED DEVELOPMENT

The site plan, prepared by Mataj Architects Inc., is shown in Figure 2. The proposed development consists of the following changes to the lot:

- One twin-tower mixed-use building (two residential towers and a podium) rising 25-storeys, with 433.4 sq.m. of commercial floor area at grade, and a total of 485 dwelling units
- One mid-rise residential building, rising 9-storeys, with 191.4 sq.m. of commercial floor area at grade, and a total of 122 dwelling units

Parking is to be provided via surface parking area and three underground levels, with vehicular access to the site provided from two accesses: one full-moves driveway on Aspen Springs Drive approximately 75-meters west of its intersection with Bowmanville Avenue, and a right-in/right-out (RIRO) access (RO only until Metrolinx lands are developed) along Bowmanville Avenue which is ultimately to be shared with the adjacent Metrolinx lands (once the lands are fully developed), approximately 120m north of Aspen Springs Drive.

4. EXISTING CONDITIONS

4.1 Road Network

The boundary roadways located in the study area are described as follows:

King Street West / Highway 2 is an arterial roadway running in an east-west orientation, under the jurisdiction of the Region of Durham. It consists of four travel lanes, two in each direction. The posted speed limit east of within the study area is 60km/h and reduces to 50km/h east of Bowmanville Avenue.

Bowmanville Avenue / Martin Road (Reginal Road 57) is a collector roadway running in a north-south direction, under the jurisdiction of the Region of Durham. It consists of two travel lanes, one in each direction. The posted speed limit within the study area is 60km/h.

Aspen Springs Drive is a local road under the jurisdiction of the Town of Bowmanville, running in an eastwest direction. The roadway includes existing unbuffered cycling lanes on the north and south sides. The speed limit is unposted, and thus is assumed to be 50 km/h.

Bonnycastle Drive is a local road under the jurisdiction of the Town of Bowmanville, running in a north-south direction. The posted speed limit within the study area is 50 km/h.

Fry Crescent is a local road under the jurisdiction of the Town of Bowmanville, generally running in a north-south direction as it intersects with Aspen Springs Drive twice. The east node is configured as a 3-legged T-intersection, and the west node includes a north leg which is the driveway access to another condominium development. The speed limit is unposted, and thus is assumed to be 50 km/h.



The study area intersections and driveways reviewed in our analysis are as follows:

- Bowmanville Avenue and Regional Highway 2 / King Street West (signalized intersection)
- Bowmanville Avenue and Aspen Springs Drive (signalized intersection)
- Bowmanville Avenue and Hartwell Avenue (signalized intersection)
- Aspen Springs Drive and Bonnycastle Drive (unsignalized / stop-controlled)
- Aspen Springs Drive and Fry Crescent (unsignalized / stop-controlled)
- Bowmanville Avenue and Proposed RIRO Site Driveway
- Aspen Springs Drive and Proposed Site Driveway

The existing study area roadway characteristics are shown in Figure 3.

4.2 Traffic Counts

Detailed TMC data for the three (3) signalized Bowmanville Avenue intersections were obtained from Durham Region's Open Data website, and current signal timing plans for the signalized intersections from Durham Region Transportation Staff. It should be noted TMC data available for the Bowmanville Avenue and Hartwell Avenue intersection did not reflect westbound volumes from the condominium which has been constructed since counts were last conducted.

With no available TMC data for the study area intersections along Aspen Springs Drive, as well as the east leg from the Hartwell Avenue intersection, Trans-Plan conducted our own counts on Wednesday November 10, 2021 (a typical weekday) during Step Three of Ontario's Roadmap to Reopen.

The detailed TMC data is provided in Appendix A, and the count dates, times and peak hours are summarized below in Table 1.

Table 1 – Turning Movement Counts, Study Area Intersections and Driveways

Location	Source	Count Date	Count Hours	Peak Hours
Bowmanville Avenue and Regional Highway 2		Wednesday		8:00am – 9:00am 4:00pm – 5:00pm
Bowmanville Avenue and Aspen Springs Drive	Durham Region	November 20, 2019	6:00am – 9:30am 3:30pm –	8:00am – 9:00am 4:45pm – 5:45pm
Bowmanville Avenue and Hartwell Avenue / Condo Access (North, South, and West legs)		Tuesday May 28, 2019	6:30pm	7:45am – 8:45am 4:00pm – 5:00pm
Bowmanville Avenue and Hartwell Avenue / Condo Access (East leg, Condo Access)		Wednesday	7:00am –	8:30am- 9:30am 3:00pm - 4:00pm
Aspen Springs Drive and Bonnycastle Drive	Trans-Plan	November 10, 2021	9:30am 3:00pm –	8:15am – 9:15am 3:30pm – 4:30pm
Aspen Springs Drive and Fry Crescent (East and West nodes)			6:00pm	8:15am – 9:15am 3:30pm – 4:30pm



Traffic volumes along the study area roadways were balanced (increased) for corridor volume consistency, where appropriate. Existing traffic volumes for the weekday AM and PM peak hours are illustrated in Figure 4.

4.3 Signal Timing Plans

The signal timing plans (STP's) for the intersections along Bowmanville Avenue at; Regional Highway 2, Aspen Springs Drive, and Hartwell Avenue, were obtained from Durham Region which manages the signals for the Town of Bowmanville. The signal timings which were provided are attached in Appendix A.

4.4 Transit Service

The site is served by GO Transit and Durham Region Transit; the route details are as follows:

Route 88 Peterborough/Oshawa is a bus route that generally operates in a north-south orientation, connecting riders from the Oshawa GO Station to Trent University in Peterborough. The nearest stop is at the intersection of Aspen Springs Drive and Bowmanville Avenue.

Route 902A King is a bus route that generally operates in an east-west orientation, connecting riders from the Oshawa Station to Simpson Avenue in Bowmanville. The nearest stop is at the intersection of Highway 2 and Bowmanville Avenue.

The approximate service times and peak service frequencies for the transit routes are shown below in Table 2.A study area route map is provided in Figure 5, and a route map for the GO Peterborough/Oshawa line is provided in Figure 6.

Table 2 - Transit Service

Transit Route	Nearest Transit Stop	Approximate	Service Times	Approximate Peak Service Frequency (min)		
	to Site	Weekday	Weekend	Weekday	Weekday	SAT
		vveekuay	weekend	AM Peak	PM Peak	peak
GO Route 88	Bowmanville Avenue & Aspen Springs Drive	05:29 – 23:04	07:06 – 23:06	25-35	30	60
902A	Bowmanville Avenue & Highway 2	05:26 – 22:25	05:26 – 22:25	30	30	30

Source: GO Transit & Durham Region Transit Website

5. FUTURE BACKGROUND CONDITIONS

The future background traffic volumes for the weekday AM and PM peak hours were determined based on a review of background traffic growth, planned developments and roadway improvements.

5.1 Horizon Years

A 5-year horizon period beyond the expected build-out year of 2024 was analyzed. As such, years 2024 and 2029 were considered in our analysis of future background traffic conditions.

5.2 Background Growth Rate

Horizon year 2024



Typically, traffic growth in the study area is analyzed through a linear regression analysis of aggregate Annual Average Daily Traffic (AADT) mid-block volumes, which were obtained from Durham Region's Open Data Website. However, as the results were inconclusive (negative results), a 2% growth rate was carried forward through the analysis of 2024 future background traffic conditions. Detailed growth rate calculations are provided in Appendix B.

Horizon year 2029

Transportation Planning staff from Durham Region has suggested the following annual growth rates for year 2024-2029 with proposed roadway improvements and the Bowmanville GO station:

- RR57, south of Hwy 2 2.0%
- RR57, south of Aspen Springs Dr 1.5%
- Hwy 2, between Green Rd and RR57 2.5%
- Hwy 2, west of Green Rd 2.0%

As suggested, a 2.5% growth rate was applied along Hwy 2 (between Green Rd and RR57), and a 2% growth rate was applied at all other roadway segments to be conservative. Detailed growth rate calculations are provided in Appendix B.

5.3 Background Developments

Based on correspondence with Region of Durham, and Municipality of Clarington Staff, there are four notable background developments near the site that may have traffic impacts on the study area intersections and driveways. These developments and their details are listed below in Table 3.

Table 3 - Planned Background Developments

No.	Location	Description of Application	Trip Generation Source
DEV 1	Green Road & Highway 2 (Southwest Corner)	Proposed multi-residential development consisting of two 11-storey buildings (228 units) with 1 st floor commercial (371m²)	Figure 8 of Traffic Impact Study, Parking and Site Circulation Review, dated January 2017, prepared by Trans-Plan
DEV 2	215, 219 & 223 King Street West	Proposed residential development consisting of 3 condominium buildings (425 units)	Figure 4–1 and Figure 4–2 of Transportation Impact Study, Proposed Multi-Residential Development, dated September 2021 by Nextrans
DEV 3	51 – 55 Clarington Boulevard	Apartment building (134 units) and 215 townhouse units	Exhibit 3.2, Memorandum: Update Traffic Impact Study, dated February 2017
DEV 4	Metrolinx Lands adjacent North and West of Site	Metrolinx Transit Hub	Durham Region

DEV 1's traffic study was referenced to obtain trip generation and distribution; however, it should be noted it is not directly located in the vicinity of the study area analyzed in this report. To adjust, the westbound (inbound) and eastbound (outbound) trips were carried through to the Highway 2 and



Bowmanville Avenue intersection, which were then distributed to the road network based on the traffic patterns derived from the TMC counts conducted for this report.

DEV 2's traffic study was referenced to obtain trip generation and distribution, which was then distributed to the study area intersections based on existing traffic patterns.

Similarly, DEV 3's traffic study was referenced to obtain trip generation and distribution, however the road network analyzed in their report did not include Highway 2. In this case, inbound and outbound site generated trips were carried to/from Highway 2 and distributed to the intersections at Clarington Boulevard and Green Road, based on traffic patterns at the Green Road and Highway 2 intersection, as derived from the DEV 1 traffic study.

Metrolinx and Durham Region staff were contacted to confirm access locations and estimated trip generation for the future GO Station. However, as the development is still in its early planning stages this information is not yet available. Metrolinx staff were also contacted to obtain any potential ridership information or future train schedules, however this information was also unavailable. As a result, Durham Region provided growth rates for the study area roadways to reflect the anticipated increase in traffic, which were applied to the appropriate road sections and are included in our analysis of future background traffic conditions.

As per correspondence with Metrolinx staff there are no confirmed design plans or access locations. Durham Region Transportation Staff were also contacted, in which it was advised to assume the RIRO access on Bowmanville Avenue, as well as the full-moves access on Aspen Springs Drive. For this study, the north leg of the Fry Crescent (east) intersection was analyzed as a full-moves access point. It was also assumed the RIRO driveway along Bowmanville Avenue north of Aspen Springs Drive would be shared with the subject development (with only outbound traffic generated by the subject site intended to utilize this access until the GO station is fully in operation).

For this study, the assumed design features mentioned above were incorporated into our analysis of future background traffic conditions for horizon year 2029, given the transit hub is expected to be operational sometime between 2024 and 2029.

The trip generation and assignment figures for these above background developments, and excerpts of the referenced traffic studies, are provided in Appendix B.

5.4 Planned Roadway Improvements

Based on review of Durham Region's Public Works Projects, there are currently plans to widen Bowmanville Avenue between Baseline Road, and beyond Regional Highway 2. Additional road improvements affecting Bowmanville Avenue were noted, and are as follows:

- Road widening from 2 to 4 lanes
- Exclusive southbound right-turn lanes at Aspen Springs Drive, and Hartwell Avenue
- Relocation of existing bus stop at Aspen Springs Drive (mentioned previously in Section 4.4) to the SW corner

Regional Transportation Staff were contacted to confirm design features, as well as any anticipated year of completion for the road improvements. As per correspondence with the Region, construction of the road-widening along Bowmanville Avenue is scheduled to start in 2023 and is projected to take at least two years. As such, the above road improvements will be included in the analysis of future 2029



background traffic conditions in capacity/queuing analysis. The referenced design drawings obtained from the Regions website are attached in Appendix B.

The future study area roadway characteristics are shown in Figure 8. The future background traffic volumes for the horizon years 2024 and 2029, during the AM and PM peak hours are provided in Figure 7 and Figure 9, respectively.

6. SITE TRAFFIC

6.1 Trip Generation

The auto trip rates from the Institute of Transportation Engineers (ITE) Trip Generation manuals, 10th Edition, Land Use Codes (LUC) 222 – Multi-Family Housing (High-rise), LUC 221 for Multifamily Housing (Mid-Rise), and LUC 820 for Shopping Center were referenced to estimate the trip volumes generated by the site. A summary of the estimated trip generation is provided below in Table 4.

Table 4 – Site Trip Generation

Land	Unit		Weekday AM Peak Hour			Weekday PM Peak Hour		
Use	Count		In	Out	Total	In	Out	Total
		Distribution	23%	77%	100%	63%	37%	100%
1110 222	485	Equation	(T) =	0.28(X) + 1	12.86	(T) =	0.34(X) + 8	3.56
LUC 222	Units	Rate	0.07	0.23	0.31	0.26	0.15	0.42
		Trips	36	113	149	127	75	202
	122 Units	Distribution	26%	74%	100%	61%	39%	100%
LUC 221		Equation	Ln(T) = 0.98Ln(X) - 0.98			Ln(T) = 0.96Ln(X) - 0.63		
100 221		Rate	0.09	0.25	0.34	0.27	0.17	0.44
		Trips	11	31	42	33	21	54
	6,526	Distribution	62%	38%	100%	48%	52%	100%
LUC 820	Sq.ft.	Rate	0.58	0.36	0.94	1.83	1.98	3.81
		Trips	4	2	6	12	13	25
Total Trips		51	146	197	172	109	281	

Based on ITE's base rates, the site is expected to generate approximately 197 and 281 two-way trips during the weekday AM and PM peak hours, respectively.

6.2 Trip Distribution and Assignment

The site trips for the proposed development were distributed to / from the subject site and the boundary roadways by considering the existing travel patterns at the study area intersections, and 2016 TTS data for overall travel patterns in the GTA. Based on the TTS data, the directional distribution of home-based trips from Clarington Ward 2 to the surrounding wards and other municipalities in the morning (and returning in the evening) is shown as follows:



		North 1%		
West	48%		23%	East
		28%		
		South		

A summary of the source TTS data is provided in Appendix C. The site traffic assignment for the weekday AM and PM peak hours is shown in Figure 10.

6.3 Modal Trip Generation

2016 Transportation Tomorrow Survey (TTS) data for the Regional Municipality of Durham, was used to obtain the mode of travel percentages within the subject site, which falls under the Municipality of Clarington, Ward 2. Applying the results of the auto trip generation and the TTS mode of travel percentages, the trip generation for all other modes was estimated for the site for the weekday AM and PM peak hours, as summarized in Table 5. Source information for TTS data, mode of travel percentages, is provided in Appendix C.

Table 5 – Modal Trip Generation

Mode of Travel		Weekday AM Peak Hour			Weekday PM Peak Hour		
Mode	Percentage	In	Out	Total	In	Out	Total
Driver	75%	44	126	170	148	94	242
Passenger	12%	7	20	27	24	15	39
Transit	2%	1	3	4	3	2	5
GO Train	3%	2	4	6	5	3	8
Walk & Cycle	6%	3	10	13	12	7	19
Other	3%	2	5	7	6	4	10
Total	100%	FO	168	227	100	124	222
Total Trips for All Modes		59	108	227	198	124	323

Source: 2016 Transportation Tomorrow Survey – Trips Made by Residents of Municipality of Clarington – Ward 2 (6am-9am)

Passenger Trips

Approximately 12% of trips from Ward 2 are passenger trips. The site is expected to generate 27 and 39 two-way passenger trips during the weekday AM and PM peak hours, respectively.

Transit Trips

Approximately 3% of trips from Ward 2 are made by GO Transit. The site is expected to generate 6 and 8 two-way passenger trips during the weekday AM and PM peak hours, respectively. Significantly more GO Transit trips are expected after the future GO station is in operation.



The site is expected to generate 4 and 5 two-way passenger trips during the weekday AM and PM peak hours, respectively.

Walk & Cycle Trips

Approximately 6% of trips within Ward 2 are walk / cycle trips. The site is expected to generate approximately 13 two-way walk trips in the weekday AM peak hour and 19 two-way walk trips in the weekday PM peak hours (excluding walk trips to and from the nearby transit stops).

7. FUTURE TOTAL CONDITIONS

The future total traffic volumes for horizon years 2024 and 2029 during the weekday AM and PM peak hours were obtained by adding the site trip assignment to the future background traffic volumes and are provided in Figure 11 and Figure 12.

8. CAPACITY AND VEHICLE QUEUING ANALYSIS

A capacity analysis was performed for the study area intersections and driveways using Synchro 10 analysis software. The following traffic conditions, during the weekday AM and PM peak hours, were analyzed:

- Existing Traffic Conditions
- Future 2024 and 2029 Background and Total Traffic Conditions

According to the Traffic Impact Study Guidelines of Durham Region and the Municipality of Clarington, a Level of Service (LOS) of D or better is considered acceptable in an urban setting.

The capacity analysis results are provided in Table 9 and the critical movements are discussed below. A vehicle queuing analysis was performed for the study area intersections and driveways using SimTraffic analysis software, under the critical future 2024 and 2028 total traffic conditions. The 95th percentile queue results are shown in Table 11. The detailed Synchro output sheets and LOS definitions are provided in Appendix D and Appendix E, respectively.

The results for the study area intersections and driveway(s) are summarized as follows:

Bowmanville Avenue at Highway 2

Under existing conditions, this intersection operates at an overall LOS of D with a v/c ratio at 0.88 in the weekday AM peak hour and 1.02 in the weekday PM peak hour. During the PM peak hour, the southbound left, through and the eastbound left movements operate at an LOS E or F with a critical capacity of 1.0.

Horizon Year 2024

Adjustments to the traffic signal timings were made to improve operational efficiency and accommodate motorists in the interim while the Bowmanville Avenue Road improvements (contemplated through the municipal EA Study) are not completed. The existing cycle lengths were maintained as 90 seconds. The signal timing adjustments applied to this intersection are summarized in Table 6.

Table 6 - Future Signal Ti	iming Adjustments at Highway	2 and Bowmanville Avenue, 20	24
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Dhasa	Mayamant	Adjustments (seconds)						
Phase	Movement	Weekday AM Peak Hour	Weekday PM Peak Hour					
1	WB Left	+1.1	-0.9					
2	EB Through	+0.3	-4.7					
3	NB Left	-4.3	-1.5					
4	SB/ SB Through	+2.9	+1.1					
5	EB Left	+1.1	+2.2					
6	WB Through	+0.3	-7.8					
8	NB Through	-1.4	-0.4					

Under 2024 future background and total conditions, with the STP adjustments, the intersection is expected to operate similarly to the existing conditions. The intersection is expected to operate at an acceptable LOS of D with an overall v/c ratio of 0.94 during weekday AM peak hour. All the movements are expected to operate under a v/c ratio of 1.0. During PM peak hour, the intersection is expected to operate at an LOS of E with a v/c ratio of 1.18 during PM peak hour. The eastbound, northbound left and southbound through movements are expected to operate at a critical capacity.

Horizon Year 2029

The signal timing adjustments were applied to 2029 future background and total conditions to improve operational efficiency and accommodate the EA improvements of Bowmanville Avenue Road. A protected left turn phase was introduced during PM peak hour. The existing cycle lengths were maintained as 90 seconds. The signal timing adjustments applied to this intersection are summarized in Table 7.

Table 7 – Future Signal Timing Adjustments at Highway 2 and Bowmanville Avenue, 2029

Phase	Movement	Adjustments (seconds)					
Pilase	Movement	Weekday AM Peak Hour	Weekday PM Peak Hour				
1	WB Left	+8.1	+0.1				
2	EB Through	-0.7	+2.3				
3	NB Left	-2.8	+0.5				
4	SB /SB Through	-4.6	-2.9				
5	EB Left	+3.1	+7.2				
6	WB Through	+4.3	-4.8				
7	SB Left	n/a	+10				
8	NB Through	-7.4	-12.4				

Under 2029 future background and total conditions, with the STP adjustments, the intersection is expected to operate similarly to the existing conditions. The intersection is expected to operate at an acceptable LOS of D with an overall v/c ratio of 1.01 during weekday AM peak hour. All the movements are expected to operate at a LOS of D or better. During weekday PM peak hour, the intersection is expected to operate at an LOS of E with a v/c ratio of 1.21 and a delay of 70 seconds. The eastbound left, northbound left and westbound movements are expected to operate over capacity.

Summary

In summary, the intersection is currently operating at acceptable capacity. In the horizon years 2024 and 2029, background traffic growth is causing the intersection to operate at critical capacity in the weekday



peak hours. Given the signal timing plan at this intersection is coordinated along a corridor, no adjustment on cycle length has been made in this analysis. Longer cycle length may further improve the operation.

The results of the background conditions compared to the total conditions is similar. Therefore, the proposed site is expected to have minimal effect to this intersection and is not expected to cause any excess delay to this intersection.

Bowmanville Avenue at Aspen Springs Drive

Under existing conditions, this intersection operates at an overall good LOS of B with a v/c ratio at 0.78 in the weekday AM peak hour and 0.75 in the weekday PM peak hour. All the movements operate at an acceptable LOS of D or better

Horizon Year 2024

Adjustments to the traffic signal timings were made to improve operational efficiency and accommodate motorists in the interim while the Bowmanville Avenue Road improvements are not completed. A protected left turn phase was introduced during PM peak hour. The existing cycle lengths were maintained as 90 seconds. The signal timing adjustments applied to this intersection are summarized in Table 8.

Table 8 – Future Signal Timing Adjustments at Aspen Springs Drive and Bowmanville Avenue, 2029

Dhasa	Movement	Adjustments (seconds)						
Phase		Weekday AM Peak Hour	Weekday PM Peak Hour					
2	NB Through	+2.7	+5.7					
4	EB Left/Right	-2.7	-5.7					
5	NB Left	n/a	+9 (new)					
6	SB Through	+2.7	-3.3					

Under 2024 future background and total conditions, with the STP adjustments, the intersection is expected to operate at an acceptable LOS of C with an overall v/c ratio of 0.94 during weekday AM peak hour. All the movements are expected to operate under a v/c ratio of 1.0. During PM peak hour, the intersection is expected to operate at an LOS of E with a v/c ratio of 1.07 during PM peak hour. The eastbound, northbound left and southbound movements are expected to operate at a critical capacity. However, this is an interim condition before the EA Bowmanville Avenue improvements are completed, the operation will be improved after the widening.

Horizon Year 2029

No signal timing adjustments were applied to 2029 future background and total conditions. Under 2029 future background and total conditions, the intersection is expected to operate similarly to the existing conditions. The intersection is expected to operate at a good LOS of B with an overall v/c ratio of 0.57 and 0.68 during weekday AM and PM peak hour, respectively. All the movements are expected to operate at a LOS of D or better.

The 95th percentile vehicle queue for eastbound movements were observed to reach up to 47m and 54m under 2024 and 2029 future conditions, respectively. It is not expected to exceed the available storage length provided or block the site access. The southbound through and right movement may slightly exceed the available storage length provided under 2024 future conditions, but the situation will be greatly



improved after the widening along Bowmanville Avenue is completed. The traffic queues are not expected to have any adverse impact on intersection operation under 2029 future conditions.

Summary

The intersection is currently operating at acceptable capacity. Longer cycle length may further improve the operation. Although the intersection is expected to operate over capacity during weekday PM peak hour under 2024 future conditions, it is an interim condition. The proposed widening along Bowmanville Avenue would greatly improve the operation once completed (The road improvements are scheduled to start in 2023). Given the signal timing plan at this intersection is coordinated along a corridor, no adjustment on cycle length has been made in this analysis.

Bowmanville Avenue at Hartwell Avenue / Existing Condo Access

Under existing conditions, this intersection operates at an overall LOS of A with a v/c ratio of 0.65 and 0.70 during the AM and PM peak hours, respectively. All the movements operate at a LOS of D or better.

Horizon Year 2024

Under 2024 future background and total conditions, the intersection is expected to operate similarly to the existing conditions. The intersection is expected to operate at a good LOS of B or better with an overall v/c ratio of 0.72 and 0.81 during weekday AM and PM peak hour, respectively. All the movements are expected to operate at a LOS of D or better.

Horizon Year 2029

Under 2029 future background and total conditions, with the roadway improvements, the intersection is expected to operate better than the existing conditions. The intersection is expected to operate at a good LOS of A with an overall v/c ratio of 0.44 and 0.52 during weekday AM and PM peak hour, respectively. All the movements are expected to operate at a LOS of D or better.

The 95th percentile vehicle queue for southbound movements were observed to reach up to 113m and 32m under 2024 and 2029 future conditions, respectively. It is not expected to exceed the available storage length provided. The lane configuration changes at this intersection improve traffic queues at this intersection. The traffic queues are not expected to have any adverse impact on intersection operation under 2029 future conditions.

Summary

In summary, the intersection is expected to operate well and is not expected to experience any major delays.

Bonnycastle Drive at Aspen Springs Drive

Under existing conditions, all the movements operate at a good LOS of B or better with a delay up to 12 seconds during weekday peak hours.

Under 2024 and 2029 future conditions, all the movements at this intersection are expected to operate and at a good LOS of B or better with a delay up to 15 seconds.



The 95th percentile vehicle queue was observed to reach up to 23m (approximately 4-5 vehicles) and it is not expected to exceed the available storage length provided. The vehicle queues are not expected to have any adverse impact on intersection operation.

Summary

In summary, the intersection is expected to operate well and is not expected to experience any major delays.

Fry Crescent (East) at Aspen Springs Drive

Under existing conditions, all the movements operate at a good LOS of B or better with a delay up to 11 seconds during weekday peak hours.

Under 2024 and 2029 future conditions, all the movements at this intersection are expected to operate and at a good LOS of B or better with a delay up to 13 seconds.

Summary

In summary, the intersection is expected to operate well and is not expected to experience any major delays.

Fry Crescent (West) / Existing Condo Access at Aspen Springs Drive

Under existing conditions, all the movements operate at a good LOS of B or better with a delay up to 13 seconds during weekday peak hours.

Under 2024 and 2029 future conditions, all the movements at this intersection are expected to operate and at a LOS of C or better with a delay up to 16 seconds.

Summary

In summary, the intersection is expected to operate well and is not expected to experience any major delays.

Aspen Springs Drive at Proposed Site Driveway

Under 2024 and 2029 future conditions, all the movements at the proposed site access are expected to operate and at a LOS of C or better with a delay up to 16 seconds.

The 95th percentile vehicle queue was observed to reach up to 16m (approximately 3 vehicles) and it is expected to be contained within the site. The vehicle queue for eastbound and westbound are not expected to have any adverse impact on intersection operation.

Summary

In summary, the access is expected to operate well and is not expected to experience any major delays.

Bowmanville Avenue at Proposed Right-In/Right-Out Access (RO only for the subject site)

Under 2024 future conditions, all the movements at the proposed site access are expected to operate and at a LOS of C or better with a delay up to 20 seconds.



Under 2029 future conditions, with the EA roadway improvements completed, all the movements at the proposed site access are expected to operate and at a LOS of B or better with a delay up to 11 seconds.

The 95th percentile vehicle queue was observed to reach up to 17m (approximately 3 vehicles) under 2024 future conditions and 13m (approximately 2-3 vehicles) under 2029 total conditions, which are expected to be contained within the site. The EA widening improvements along Bowmanville Avenue would improve traffic queues at this intersection.

Summary

In summary, the access is expected to operate well and is not expected to experience any major delays.

Overall Summary

Overall, the traffic analysis indicates that the site accesses would operate well in future conditions with no roadway improvements necessary to accommodate the subject site. The intersection of Bowmanville Avenue and Highway 2 is expected to operate at critical or over capacity in future conditions due to background traffic growth with signal timing adjustments. The subject site is not expected to cause any major delays to the intersection.

Further, the vehicle queuing analysis indicates that 95th percentile queues are also expected to be acceptable in horizon years. It can be concluded that no road improvements, other than the site driveway, are necessary for the site to function.



Intersection		Existir	ng Traff	ic Conc	litions			Backgro	und Tra	affic Co	nditions	5		Tota	l Traffic	Condi	tions	
Movement	Weel	kday AN	1 Peak	Weel	kday PN	1 Peak		2024 Weekday AM 2024 Weekday PM			2024	Weekda	ay AM	2024	Weekd	ay PM		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Bowmanville Avenue & Highway 2	0.88	36	D	1.02	43	D	0.94	40	D	1.10	61	Е	0.98	43	D	1.18	67	Е
Eastbound Left	0.84	48	D	1.00	69	Ε	0.88	53	D	0.97	63	Ε	0.91	60	Ε	0.98	68	Ε
Eastbound Through	0.74	36	D	0.96	46	D	0.83	41	D	1.14	103	F	0.83	41	D	1.14	103	F
Eastbound Right	0.20	27	С	0.31	22	С	0.23	27	С	0.38	24	С	0.27	28	С	0.42	25	С
Westbound Left	0.79	39	D	0.77	36	D	0.85	46	D	0.82	44	D	0.90	58	Ε	0.94	71	Ε
Westbound Through	0.91	47	D	0.74	28	С	0.97	57	Ε	1.04	70	Ε	0.97	57	Ε	1.04	70	Ε
Westbound Right	0.05	25	С	0.06	19	В	0.05	25	С	0.06	22	С	0.05	25	С	0.06	22	С
Northbound Left	0.65	21	С	0.94	53	D	0.83	37	D	0.94	58	Ε	0.94	58	Ε	1.10	106	F
Northbound Through	0.47	14	В	0.80	31	С	0.51	14	В	0.81	30	С	0.57	15	В	0.86	33	С
Northbound Right	0.08	10	В	0.13	18	В	0.08	9	Α	0.14	16	В	0.09	10	В	0.15	16	В
Southbound Left	0.14	21	С	1.00	121	F	0.14	21	С	0.62	33	С	0.15	20	С	0.70	40	D
Southbound Through	0.95	56	Ε	1.00	79	Ε	0.95	56	Ε	0.95	60	Ε	0.97	60	Ε	1.04	84	F
Southbound Right	0.25	22	С	0.24	28	С	0.27	22	С	0.29	25	С	0.28	21	С	0.31	25	С
Bowmanville Avenue & Aspen			_			_			_									
Springs Drive	0.78	13	В	0.75	14	В	0.84	17	В	0.93	32	С	0.94	29	С	1.07	62	E
Eastbound Left	0.62	40	D	0.68	40	D	0.64	40	D	0.71	44	D	0.77	44	D	0.84	54	D
Eastbound Right	0.09	33	С	0.09	31	С	0.10	32	С	0.09	32	С	0.13	30	С	0.11	31	С
Northbound Left	0.37	7	Α	0.40	9	Α	0.49	11	В	0.58	32	С	0.87	52	D	0.93	76	Ε
Northbound Through	0.41	5	Α	0.73	10	В	0.45	5	Α	0.76	9	Α	0.47	6	Α	0.79	9	Α
Southbound Through / Right	0.82	11	В	0.77	9	Α	0.89	17	В	1.01	49	D	0.99	34	С	1.17	108	F
Bowmanville Avenue & Hartwell		_	_					_						_				
Avenue/Existing Condo Access	0.65	7	Α	0.70	10	Α	0.70	8	Α	0.76	11	В	0.72	8	Α	0.81	14	В
Eastbound Through / Left	0.27	41	D	0.4	41	D	0.28	41	D	0.42	42	D	0.28	41	D	0.42	42	D
Eastbound Right	0.03	39	D	0.05	38	D	0.03	39	D	0.05	38	D	0.03	39	D	0.05	38	D
Westbound Through / Left / Right	0.02	39	D	0.05	38	D	0.02	39	D	0.05	38	D	0.02	39	D	0.05	38	D
Northbound Left	0.11	3	Α	0.24	4	Α	0.13	3	Α	0.28	5	Α	0.14	3	Α	0.29	5	Α
Northbound Through / Right	0.45	5	Α	0.73	9	Α	0.48	5	Α	0.79	11	В	0.50	5	Α	0.86	15	В
Southbound Left	0.01	3	Α	0.01	3	Α	0.01	3	Α	0.01	4	Α	0.01	3	Α	0.01	4	Α
Southbound Through / Right	0.69	6	Α	0.62	6	Α	0.75	7	Α	0.66	7	Α	0.76	8	Α	0.69	9	Α
Bonnycastle Drive & Aspen Springs																		
Drive																		ı
Eastbound Through / Right		0	Α		0	Α		0	Α		0	Α		0	Α		0	Α
Westbound Through / Left		1	Α		1	Α		1	Α		1	Α		1	Α		1	Α
Northbound Left / Right		11	В		12	В		11	В		13	В		12	В		13	В
Fry Crescent (East) & Aspen Springs																		
Drive																		
Eastbound Through / Right		0	Α		0	Α		0	Α		0	Α		0	Α		0	Α
Westbound Through / Left		0	Α		0	Α		0	Α		1	Α		0	Α		0	Α
Northbound Left / Right		11	В		11	В		11	В		11	В		11	В		12	В
Fry Crescent (West)/Existing Condo																		
Access & Aspen Springs Drive																		
Eastbound Through / Left / Right		1	Α		1	Α		1	Α		1	Α		1	Α		1	Α
Westbound Through / Left / Right		0	Α		0	Α		0	Α		0	Α		0	Α		0	Α
Northbound Through / Left / Right		10	В		13	В		11	В		14	В		11	В		15	В
Southbound Through / Left / Right		11	В		13	В		12	В		13	В		12	В		14	В
Aspen Springs Drive & 10 Aspen																		
Springs Drive Access																		ı
Eastbound Through / Left								0	Α		0	Α		0	Α		1	Α
Westbound Through / Right								0	Α		0	Α		0	Α		0	Α
Southbound Left / Right								0	Α		0	Α		13	В		15	В
Bowmanville Avenue & Shared																		
Site/Metrolinx Laneway																		
Eastbound Right								0	Α		0	Α		20	С		17	C
Northbound Through								0	Α		0	Α		0	Α		0	Α
Southbound Through / Right								0	Α	l	0	Α	l	0	Α		0	Α



Intersection		Existin	g Traff	ic Cond	ditions		ı	Backgro	und Tra	affic Co	onditions	<u> </u>		Tota	l Traffic	Condi	tions	lineering
Movement	Weel	day AM	l Peak	Weel	kday PIV	l Peak	2029	Weekda	ay AM	2029	Weekda	y PM	2029	Weekda	ay AM	2029	Weekda	ay PM
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Bowmanville Avenue & Highway 2	0.88	36	D	1.02	43	D	0.96	39	D	1.15	67	E	1.01	40	D	1.21	70	E
Eastbound Left	0.84	48	D	1.00	69	Ε	0.87	48	D	0.90	48	D	0.87	48	D	0.91	49	D
Eastbound Through	0.74	36	D	0.96	46	D	0.94	51	D	1.15	105	F	0.95	53	D	1.15	105	F
Eastbound Right	0.20	27	С	0.31	22	С	0.37	29	С	0.46	24	С	0.40	30	С	0.49	24	С
Westbound Left	0.79	39	D	0.77	36	D	0.92	52	D	1.03	93	F	0.93	55	D	1.12	122	F
Westbound Through	0.91	47	D	0.74	28	С	0.95	47	D	1.11	95	F	0.95	48	D	1.10	91	F
Westbound Right	0.05	25	С	0.06	19	В	0.07	21	С	0.07	22	С	0.07	21	С	0.07	22	С
Northbound Left	0.65	21	С	0.94	53	D	0.85	39	D	1.06	80	F	0.93	54	D	1.17	119	F
Northbound Through	0.47	14	В	0.80	31	С	0.36	16	В	0.79	25	С	0.40	16	В	0.83	28	С
Northbound Right	0.08	10	В	0.13	18	В	0.10	10	В	0.41	17	В	0.11	11	В	0.38	17	В
Southbound Left	0.14	21	С	1.00	121	F	0.26	28	С	0.71	36	С	0.26	28	С	0.67	34	С
Southbound Through	0.95	56	Ε	1.00	79	Ε	0.77	36	D	0.73	38	D	0.79	37	D	0.80	42	D
Southbound Right	0.25	22	С	0.24	28	С	0.36	29	С	0.25	31	С	0.37	29	С	0.28	31	С
Bowmanville Avenue & Aspen	0.70	43	,	0.75	1.0	,	0.51	10		0.57	- 11	_	0.57	42	_	0.00	42	-
Springs Drive	0.78	13	В	0.75	14	В	0.51	10	Α	0.57	11	В	0.57	13	В	0.68	13	В
Eastbound Left	0.62	40	D	0.68	40	D	0.67	40	D	0.73	41	D	0.77	43	D	0.80	42	D
Eastbound Right	0.09	33	С	0.09	31	С	0.24	33	С	0.10	29	С	0.33	31	С	0.17	27	С
Northbound Left	0.37	7	Α	0.40	9	Α	0.38	8	Α	0.38	8	Α	0.48	12	В	0.63	13	В
Northbound Through	0.41	5	Α	0.73	10	В	0.28	5	Α	0.52	8	Α	0.29	5	Α	0.54	10	Α
Southbound Through							0.47	4	Α	0.40	5	Α	0.50	7	Α	0.43	5	Α
Southbound Through / Right	0.82	11	В	0.77	9	Α												
Southbound Right							0.13	2	Α	0.15	2	Α	0.16	5	Α	0.24	2	Α
Bowmanville Avenue & Hartwell		_				_			_		_	_		_			_	
Avenue/Existing Condo Access	0.65	7	Α	0.70	10	Α	0.43	4	Α	0.49	6	Α	0.44	4	Α	0.52	7	Α
Eastbound Through / Left	0.27	41	D	0.4	41	D	0.30	41	D	0.45	41	D	0.30	41	D	0.45	41	D
Eastbound Right	0.03	39	D	0.05	38	D	0.03	39	D	0.06	38	D	0.03	39	D	0.06	38	D
Westbound Through / Left / Right	0.02	39	D	0.05	38	D	0.02	38	D	0.06	38	D	0.02	38	D	0.06	38	D
Northbound Left	0.11	3	A	0.24	4	Α	0.14	3	A	0.29	5	A	0.14	3	Α	0.3	5	Α
Northbound Through / Right	0.45	5	Α	0.73	9	Α	0.29	3	Α	0.49	5	Α	0.30	3	Α	0.53	5	Α
Southbound Left	0.01	3	Α	0.01	3	Α	0.01	2	Α	0.01	2	Α	0.01	2	Α	0.02	2	Α
Southbound Through		_			-		0.44	2	Α	0.36	3	Α	0.45	2	Α	0.37	3	Α
Southbound Through / Right	0.69	6	Α	0.62	6	Α												
Southbound Right		-			-		0.04	1	Α	0.06	2	Α	0.04	1	Α	0.06	2	Α
Bonnycastle Drive & Aspen Springs																		
Drive																		
Eastbound Through / Right		0	Α		0	Α		0	Α		0	Α		0	Α		0	Α
Westbound Through / Left		1	Α		1	Α		1	Α		1	Α		1	Α		1	Α
Northbound Left / Right		11	В		12	В		12	В		14	В		12	В		15	В
Fry Crescent (East) & Aspen Springs			_															
Drive																		
Eastbound Through / Right		0	Α		0	Α		0	Α		0	Α		0	Α		0	Α
Westbound Through / Left		0	Α		0	Α		0	Α		1	Α		0	Α		0	Α
Northbound Left / Right		11	В		11	В		11	В		12	В		12	В		13	В
Fry Crescent (West)/Existing Condo						·			-			•			-			
Access & Aspen Springs Drive																		
Eastbound Through / Left / Right		1	Α		1	Α		1	Α		1	Α		1	Α		1	Α
Westbound Through / Left / Right		0	Α		0	Α		0	Α		0	Α		0	Α		0	Α
Northbound Through / Left / Right		10	В		13	В		11	В		15	В		11	В		16	c
Southbound Through / Left / Right		11	В		13	В		12	В		14	В		13	В		15	В
Aspen Springs Drive & 10 Aspen			•			·			-			•						
Springs Drive Access																		
Eastbound Through / Left								0	Α	Ī	0	Α		0	Α		1	Α
Westbound Through / Right								0	Α		0	Α		0	Α		0	Α
Southbound Left / Right								0	Α		0	Α		14	В		16	C
Bowmanville Avenue & Shared																		
Site/Metrolinx Laneway																		
Eastbound Right								0	Α		0	Α		11	В		11	В
Northbound Through								0	A		0	A		0	A		0	A
Southbound Through								0	A		0	A		0	A		0	A
Southbound Through / Right								0	A		0	A		0	A		0	A
Journbound Hirough / Night	1							U	А	l	U	А		U	А	l	U	А



Table 11 – Vehicle Queuing Analysis Results, Future 2024 and 2029 Total Traffic Conditions

Intersection	Available	95th I	Percentile Ve	hicle Queues	s (m)
Movement	Storage Length	2024	Total	2029	Total
	(m)	AM Peak	PM Peak	AM Peak	PM Peak
	(111)	Hour	Hour	Hour	Hour
Bowmanville Avenue & Aspen					
Springs Drive					
Eastbound Left	60	47	47	45	54
Eastbound Right	60	39	27	26	54
Southbound Through / Right	120	129	125	15	18
Northbound Left	130	130	97	39	62
Bowmanville Avenue & Hartwell					
Avenue					
Southbound Left	130	0	9	7	32
Southbound Through/Right	130	113	100	23	18
Bonnycastle Drive & Aspen Springs					
Drive					
Eastbound Through / Right	85	0	5	0	0
Westbound Left / Through	95	0	15	7	18
Northbound Left / Right	55	14	18	16	23
Aspen Springs Drive & Site Access					
Eastbound Left / Through	95	10	16	7	37
Westbound Through / Right	60	0	5	0	0
Southbound Left / Right	30	14	16	16	15
Bowmanville Avenue & Site Access					
Eastbound Right	70	17	6	13	9
Southbound Through / Right	>300	63	56	0	0

9. PARKING STUDY

9.1 Parking Supply and Requirements

Auto parking is to be provided via three underground parking levels, along with an at-grade parking area, which are broken down as follows:

- At-Grade (visitor/customer parking): 18 spaces
- Underground Parking Levels 1, 2 & 3 (visitor/resident parking): 757 spaces

A total of 775 parking spaces are provided on site. The parking requirements for the proposed uses on site were calculated based on the Municipality of Clarington's By-law 84-63, dated July 2015. Table 12 below shows a breakdown of the parking requirements, with relevant excerpts of the by-law provided in Appendix F.



Table 12 – Auto Parking Requirements and Supply, Zoning By-Law

		Size	Minimum Requiremen	ts	Proposed		
Land U	Land Use		Rate	Spaces	Supply		
	Bachelor/ 1-bedroom	385	1 parking space / unit	385			
Dwelling	2-bedroom	212	1.25 parking spaces / unit	265	665		
Units	3-bedroom	10	1.5 parking spaces / unit	15			
	Visitors	607	0.25 parking spaces / unit	151.8	89		
Retail G	iFA	624.8	1 parking space / 30m ² of GFA	20.8	21		
Ac	Accessible Parking: 2% of total space required						
	Total (including accessible parking)						

Source: Municipality of Clarington By-law 84-63

Based on the site plan, 775 parking spaces are provided on site, including 665 spaces for residents, 89 spaces for visitors and 21 spaces for visitors and customers. Based on the zoning by-law the required parking supply is 837 spaces, compared to the proposed supply of 775 spaces, resulting in a shortfall of 62 spaces. Overall, the parking requirement is met by 93%, and the shortage is fairly minor. A total of 17 accessible parking spaces are provided on site, which meets the Zoning By-law requirements.

The subject site is located within Urban Centra land use area based on Municipality of Clarington's Official Plan, and Urban Centre Mixed-Use (MU3) zoning requirements are considered to be comparable for the subject site. MU3 zone has a minimum required parking rate of 1 space per unit for apartment and 1 space for every 40 sqm for retail uses. The parking requirements based on MU3 zone have been summarized in Table 13 for comparison purposes. The relevant excerpts of the by-law provided in Appendix F.

Table 13 – Auto Parking Requirements and Supply, MU3 Zone

	Size	Minimum Requiremen	ts	Proposed Supply	
Land Use	(units / sq.m)	Rate	Spaces		
Apartment Dwelling	607	1 parking space / unit	607	754	
Retail GFA	624.8	1 parking space / 40m ² of GFA	15.6	21	
Accessible Parkir	12.5	17			
Total (inclu	623	775			

Source: Municipality of Clarington By-law 84-63

Based on the parking requirements for MU3 zone, the required parking supply is 623 spaces, compared to the proposed supply of 775 spaces, resulting in a surplus of 152 spaces. A total of 775 parking spaces are provided on site, which exceeds the requirements for MU3 zone.



9.2 Alternative Modes of Transpiration

Existing Transit Infrastructure

As mentioned earlier in Section 4.4, the subject site is located with in the service area of Durham Region Transit and GO Transit. Residents and visitors from the site can easily access the transit.

Durham Region Transit's Route 902 operates along Highway 2 from an area near the Lakeridge Health Bowmanville Hospital, and the Oshawa Centre Terminal, providing a connection to the local routes servicing the Oshawa area. The nearest bus stops are located at the Highway 2 and Bowmanville Avenue intersection located approximately 500m north of the subject site. Although the bus stops are just beyond a preferred walkable distance (400m), the eventual widening of Bowmanville Avenue is to include new multi-use paths, improving connections to these bus stops for residents and visitors.

GO Transit's Route 88 currently services the site, with a bus stop located on the northwest corner of Bowmanville Avenue and Aspen Springs Drive, just next to the subject site. The route provides locals a connection further east to Trent University in Peterborough, or west to the Oshawa GO Station, which can then be utilized to access other major transit hubs such as Union Station, in the City of Toronto.

Future Bowmanville GO Expansion

As previously mentioned in this report, Metrolinx is in the preliminary planning stages of developing a new GO Station in the Town of Bowmanville, which is to be located within the lot adjacent west of the subject development. The new extension to the Lakeshore East line will link Bowmanville and the downtown Oshawa core to downtown Toronto in the form of four (4) new GO Stations, to be constructed along the existing railway infrastructure. The Bowmanville station is to be the eastern most node of the extension that will connect to the Lakeshore East line, and project completion is anticipated sometime between 2024 and 2029. A map providing an overview of the new extension is provided in Figure 13.

As anticipated ridership for the Bowmanville expansion was unavailable, a review of the Fiscal Year-To-Date Ridership Report, obtained from Metrolinx's Open Datasets was conducted to further understand ridership statistics and growth along the Lakeshore East line. It should be noted the 2020 results from Metrolinx's Fiscal-Year-To-Date Ridership report were significantly affected because of the COVID-19 pandemic. Subsequently the results are not considered to accurately reflect the current demand of the GO Train service and were left out of this review. Table 14 provides a breakdown of total ridership for 2018 and 2019, with source information provided in Appendix B.

Table 14 – Summary of Ridership Performance, GO Train Lakeshore East (2018 & 2019)

Year	Total Ridership	Average Daily Ridership	Average Daily Ridership (%)		
2018	5.3 M	21.6 K	4.5 %		
2019	6.3 M	22.7 K	7.1 %		

As noted above, there was an approximate 2.5% increase in average daily ridership along the Lakeshore East line between 2018 and 2019.

The future transit hub is expected to generate some ridership from the surrounding residential uses, including the subject development given its proximity to the site. Durham Region also indicated that train schedules are anticipated to have a headway frequency of 30 minutes during the peak hours, allowing



passengers greater flexibility when considering the time, they have to leave their home or work to catch their desired departure time. This will provide a convenient mode of transportation to accommodate residents on their daily commute, as well as visitors to the development, and should help reduce overall auto parking demand on-site.

9.3 Public Parking Opportunities

There is currently on-street parking (approximately 25 spaces) available along the north and south sides of Aspen Springs Drive, beginning from the west leg of the Bonnycastle Drive intersection to a point approximately 30m east of Green Road (coinciding with the existing bicycle lanes). Both the north and south sides of the roadway allow for on-street parking, which will provide visitors/customers to the building potential parking opportunities. Figure 14 provides a map illustrating the areas within a 200-m radius (2-3 minutes) in which on-street parking is available along the study area roadways.

In conclusion, given the site context, access to transit facilities and the proximity to future Bowmanville GO station, the proposed development could be accommodated by the proposed parking supply (775 spaces) on site, alternative travel modes and on-street parking availability.

10. TRANSPORTATION DEMAND MANAGEMENT PLAN

A Transportation Demand Management (TDM) Plan is provided as part of this report in an effort to minimize parking demands, traffic congestion, improve air quality, reduce greenhouse gas emissions, and improve public health in the long-term. The plan will help provide the public greater choice, incentives, and opportunities to choose travel modes other than single-occupant vehicles. Our proposed TDM plan for the site is outlined as follows:

Pedestrian & Cycling

There is existing sidewalk infrastructure along all study area roadways, with pathways to extend from the main access allowing for connectivity to the sidewalk network on both Aspen Springs Drive and Bowmanville Avenue. There are also currently bicycle lanes provided along Aspen Springs Drive, which start at Bonnycastle Drive and continue to Green Road. There are bicycle parking spaces on-site, providing visitors to the residence a means of securing their bike should they choose cycling over driving.

The widening of Bowmanville Avenue, proposed through the municipal EA Study, is also to include the construction of new multi-use paths on both the east and west sides, extending along the corridor within the study area. This multi-use path is to connect with the existing sidewalk network along Hartwell Avenue, Aspen Springs Drive, and Regional Highway 2.

Multi-use pathway facilities are encouraged as both a means of travel and recreation. Sidewalks and off-road pathways are intended to be integrated into a continuous pedestrian system that includes local roads, arterial roads, collector roads and off-road pathways. Connecting pedestrian systems to major roadways such as Highway 2 encourages a healthier and more environmentally friendly lifestyle. A total of 252 bicycle spaces (including 18 outdoor spaces and 234 indoor spaces) is provided on site to encourage cycling.



Transit Services

As discussed in Section 4.4, the subject site is served by GO Transit's Route 88, allowing for connectivity between the Oshawa GO Station and Trent University in Peterborough, at which other major transit routes can be accessed. The nearest bus stop is located at the Bowmanville Avenue and Aspen Springs Drive intersection, adjacent to the site.

Furthermore, the previously mentioned improvements to Bowmanville Avenue, such as the multi-use trail will provide a viable connection from the subject site to the Bowmanville Avenue / Highway 2 intersection, where Durham Region Transit's Route 902 bus stops are located, which will help establish a viable connection to other local routes operated by Durham Region Transit in the Bowmanville and Oshawa areas.

The future Bowmanville GO station is expected to generate ridership from the surrounding residential uses, including the subject development given its proximity to the site. This will provide a convenient mode of transportation to accommodate residents on their daily commute, as well as visitors to the development, and should help reduce overall auto parking demand on-site.

Increasing public transit use has many benefits such as protecting the environment, reducing traffic congestion on regional roads, providing convenience, saving energy, strengthening communities, and improving liveability. To encourage travel by transit, transit information packages containing route maps, schedules and other useful information should be readily available for residents and visitors within an accessible location, such as the entrance lobby of each building.

Carpooling / Ridesharing

To help reduce travel by single-occupant automobiles, staff and visitors should be encouraged to carpool where possible. Smart Commute is one of a network of local transportation management associations across the GTA delivering TDM programs and services.

Ridesharing is a growing trend within the GTA, allowing people without a vehicle to share a vehicle with others to their specified location. Uber was one of the first to start the ridesharing movement within the GTA. The ease of use with the smartphone application (app) is popular with young professionals who may look for other options than owning a personal vehicle for travel.

Communication Strategy

We recommend distribution of Information packages and pre-loaded Presto cards to new residents. The Applicant is encouraged to reach out to Durham Region for assistance in the provision of these items:

- Durham Region / GO Transit route maps and schedules
- Cycling and Trails Map
- Instructions for validating / pre-loading and using Transit Passes

As the residences get occupied, Information packages can be provided to residents so as to encourage alternative modes of travel. It is recommended that resident profile survey questionnaires be distributed to new residents at 50% occupancy of the buildings, in order to determine mode of travel characteristics. These surveys would identify whether the resident owns a personal vehicle, travels by transit, or would



use transit if service was improved - thus identifying resident's interest in transit and other modes of travel.

11. SITE PLAN REVIEW

11.1 Site Access Review

A review of the proposed site access design was completed using Carington's Zoning By-Law and Transportation Association of Canada's (TAC) Geometric Design Guidelines for Canadian Roads. Source information is provided in Appendix F and Appendix G. TAC defines the minimum spacing for residential driveways to be a minimum of 2m apart. Table 15 summarized the spacing requirement and proposed spacing.

Table 15 – Required and Proposed Dimensions of Site Driveway

		Distance to Street Corner	Curb Radius	Driveway Width	
Requirements		2.0m	3.0 - 4.5m	Minimum 4.5m for One- way, 6.0m for two-way	
Dunnand	Aspen Springs Drive Access	67.7m	6.0m	6.5m (two-way)	
Proposed	Bowmanville Avenue Access	130.5m	6.0m	4.5m (one-way)	

Sources: Clarington's Zoning By-law 84-63, TAC Guidelines

The proposed site access off Aspen Springs Drive is approximately 67.7m to the intersection of Bowmanville Avenue and Aspen Springs and has a width of 6.5m; the proposed site access off Bowmanville Avenue is approximately 130.5m to the intersection of Bowmanville Avenue and Aspen Springs and has a width of 4.5m, which meet the requirements of spacing and width. Although TAC identifies typical curb radius for residential developments as 3.0m to 4.5m, a radius of 6.0m is proposed at both site access to allow smooth vehicle turning movements. Details are discussed in Section 11.3, the site circulation review.

11.2 Parking Design Review

Table 16 summarized the dimension requirements and proposed dimensions for parking stalls and layout. Source information is provided in Appendix F.

Table 16 – Required and Proposed Dimensions of Parking Layout

	Space Width (m)	Space Length (m)	Aisle Width (m)	
Minimum	2.75	E 7	Minimum 4.5 (one-way)	
Requirements	4.5 (accessible space)	5.7	6.0 (two-way)	
Dranasad	2.75	г 7	4.5 (one-way)	
Proposed	4.5 (accessible space)	5.7	6.0-6.5 (two-way)	

Sources: Clarington's Zoning By-law 84-63

The proposed parking stalls have a width of 2.75m (4.5m for accessible parking spaces) and a length of 5.7m. The driving aisle at grade is proposed to be 6.25m to 6.5m and the aisles underground are 6.0m. All



the dimensions of parking spaces meet the Town's zoning By-law's minimum requirements. Source information is provided in Appendix F.

11.3 Site Circulation Review

A site circulation review was completed using AutoTurn vehicle turning template software to simulate design vehicles expected to use the site, including a loading vehicle (for moving, delivery, etc.), a waste collection vehicle and a passenger vehicle. Details of the site circulation review for each vehicle type is provided in this section:

Passenger Vehicles

Figure 15 and Figure 16 show passenger vehicles accessing the site via the driveway off Aspen Springs Drive, parking into critical spaces, and then exiting via the proposed two accesses.

Figure 17 and Figure 18 show a passenger vehicle accessing the parking garage via ramp and parking into critical spaces, and then exiting via the same ramp. The parking layout for all the parking levels (P1 to P3) are identical.

Loading Vehicles

Figure 19, Figure 20 and Figure 21 show a Medium Sing-Unit (MSU) vehicle accessing the driveway off Aspen Springs Drive and parking into the loading areas on ground floor, and exiting the site from the same access.

Waste Collection Vehicles

Figure 22 and Figure 23 demonstrate that a typical 12m waste collection vehicle is able to access and exit from the loading spaces and site adequately.

Overall, the figures indicated that the proposed site plan layout is adequate for the circulation of passenger vehicles, loading vehicles, and waste collection vehicles. Vehicles larger than a 12m waste collection truck are not expected to enter the site.

12. SUMMARY AND CONCLUSIONS

12.1 Summary

This Transportation Study, prepared for the proposed residential condominium development at 10 Aspen Springs Drive, Clarington (Bowmanville), ON, is summarized as follows:

Traffic Impact Study

- Based on ITE's Trip Generation manual, the site is expected to generate approximately 197 and 281 two-way trips during the weekday AM and PM peak hours, respectively.
- For the intersection of Highway 2 and Bowmanville Avenue, background traffic growth is causing the intersection to operate at critical capacity, with signal timing plan adjustments, during weekday peak hours in horizon years.
- The intersection of Bowmanville Avenue and Aspen Springs Drive is expected to operate over capacity during weekday PM peak hour under 2024 future conditions (with STP adjustments), but it is an interim



condition. The proposed widening road improvements along Bowmanville Avenue, as proposed through the municipal EA Study, would greatly improve the operation once completed.

The capacity and queuing analysis indicates that the proposed site driveway and all other the
intersections in the study area are expected to operate acceptably with reserve capacity in horizon
year 2024 and 2029. No road improvements (other than constructing the site driveway) or additional
signal timing adjustments are required to accommodate the traffic generated by the development.

Parking Study

- A total of 775 parking spaces are provided on site, including 665 spaces for residents,89 spaces for visitors and 21 spaces for retail uses. Based on the Zoning by-law, the required parking supply is 837 spaces, compared to the proposed supply of 775 spaces, resulting in a shortfall of 62 spaces. Overall, the parking requirement is met by 93%. A total of 17 accessible parking spaces are provided on site, which exceeds the Zoning By-law requirements.
- Based on the parking requirements for MU3 zone, the required parking supply is 623 spaces, compared to the proposed supply of 775 spaces, resulting in a surplus of 152 spaces. A total of 775 parking spaces are provided on site, which exceeds the requirements for MU3 zone.
- The future Bowmanville GO Station, just north of the subject site is expected to generate some
 ridership from the surrounding residential uses, including the subject development given its proximity
 to the site. It will provide a convenient mode of transportation to accommodate residents on their
 daily commute, as well as visitors to the development, and should help reduce overall auto parking
 demand on-site.
- Given the site context, access to transit facilities and the proximity to future Bowmanville GO station, the proposed development could be accommodated by the proposed parking supply on site, alternative travel modes and on-street parking availability.

TDM Plan

- Pedestrian connections are provided on-site to connect residents, visitors and patrons to the municipal sidewalk along Aspen Springs Drive and Bowmanville Avenue. Transit stops are provided within a walking distance from the site, and the site is therefore adequately serviced by transit.
- The applicant would distribute transit service schedules / maps, cycling routes / pedestrian trails maps and a list / description of available community services in the area to new tenants as part of a welcome package.

Site Plan Review

- The Municipality of Clarington Zoning By-law and TAC guidelines were reviewed to ensure proper access and parking layout design. The proposed site accesses, parking stalls and parking aisles meet the design requirements.
- The vehicle turning templates show that the proposed driveway and internal drive aisles can accommodate waste collection, loading / delivery, and passenger vehicles. Vehicles larger than a waste collection vehicle are not expected at the site.



12.2 Conclusions

To conclude, our traffic findings for horizon year 2024 and 2029 indicate that the proposed development can be accommodated by surrounding road network and no improvements are required. The proposed auto parking supply is expected to be sufficient based on the site context, access to transit facilities and the proximity to future Bowmanville GO station. A review of parking layout requirements and site circulation is also provided herein. Traffic and parking activity at the proposed development will function in an acceptable manner.

Respectfully submitted,

Anil Seegobin, P.Eng.

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Partner, Engineer

Trans-Plan Transportation Inc.

Transportation Consultants

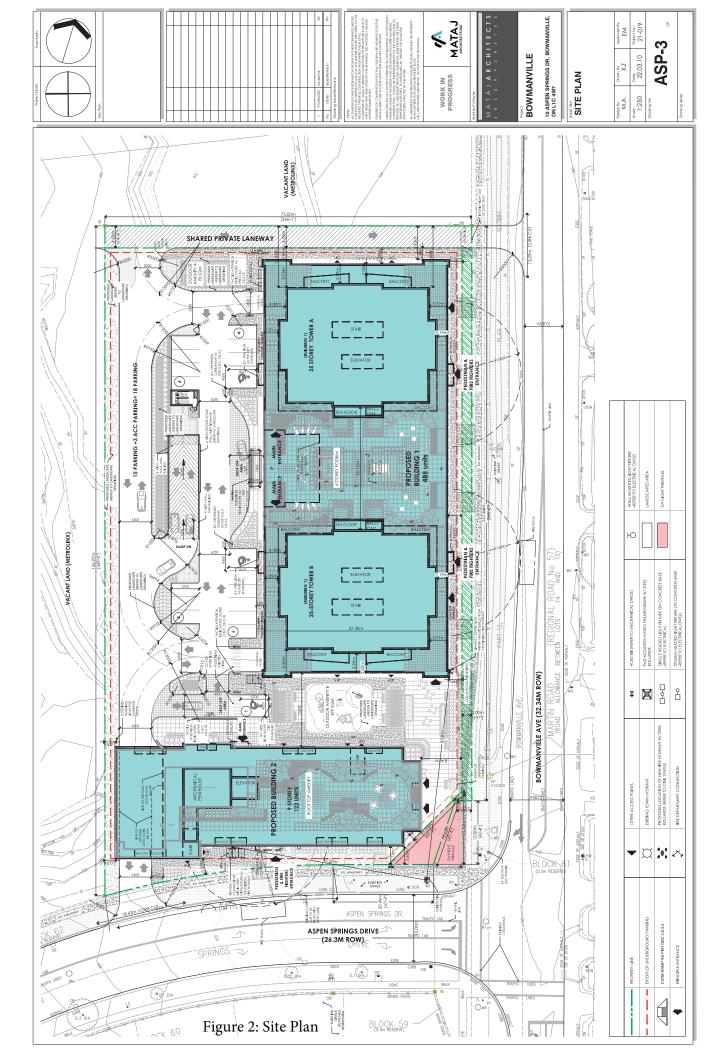
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Figure 1 – Site Location



Source: Google Earth



TRANSPORTATION STUDY

Proposed Residential Multi-Building, Mixed-Use Development 10 Aspen Springs Drive, Bowmanville, ON

Figure 3: Existing Study Area Roadway Characteristics

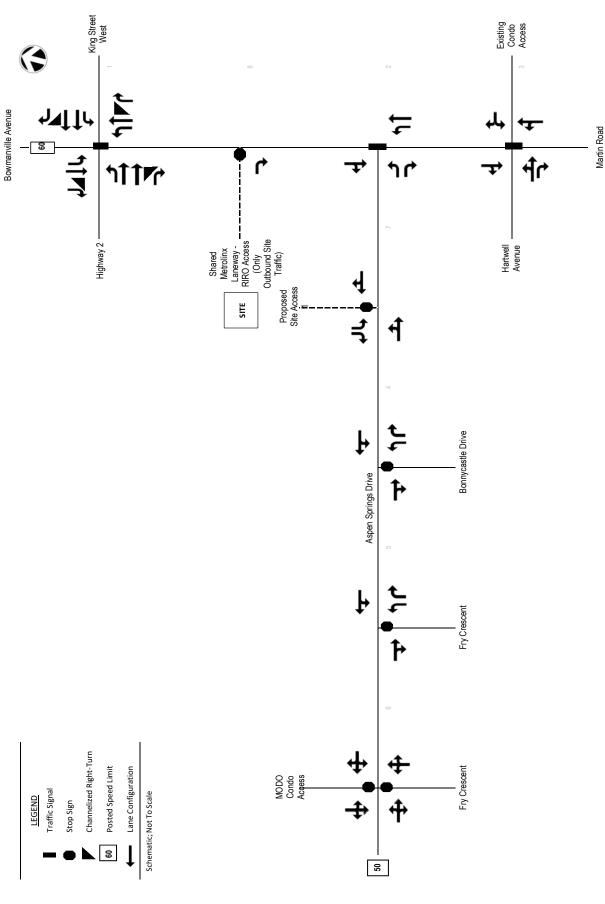


Figure 4: Existing Traffic Volumes, Weekday AM and PM Peak Hours

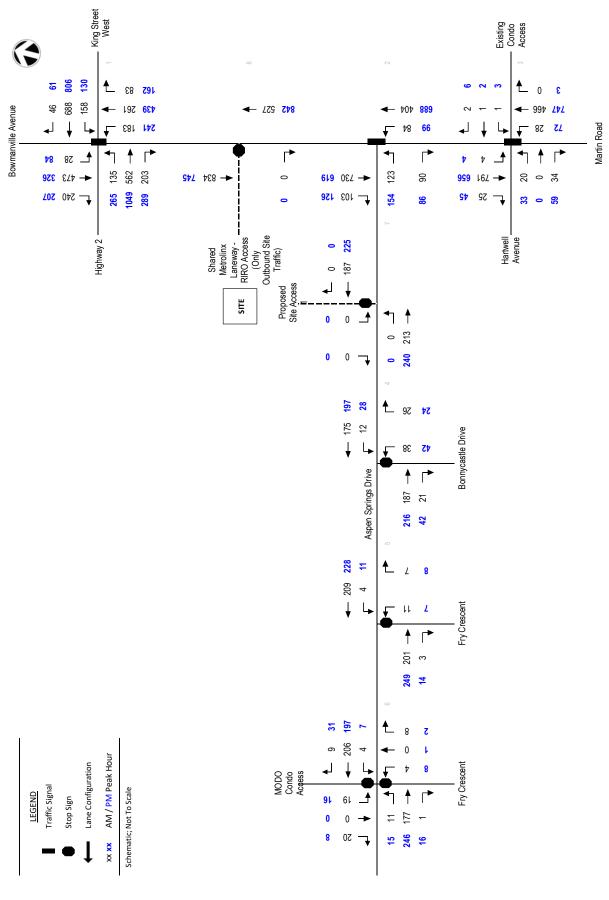
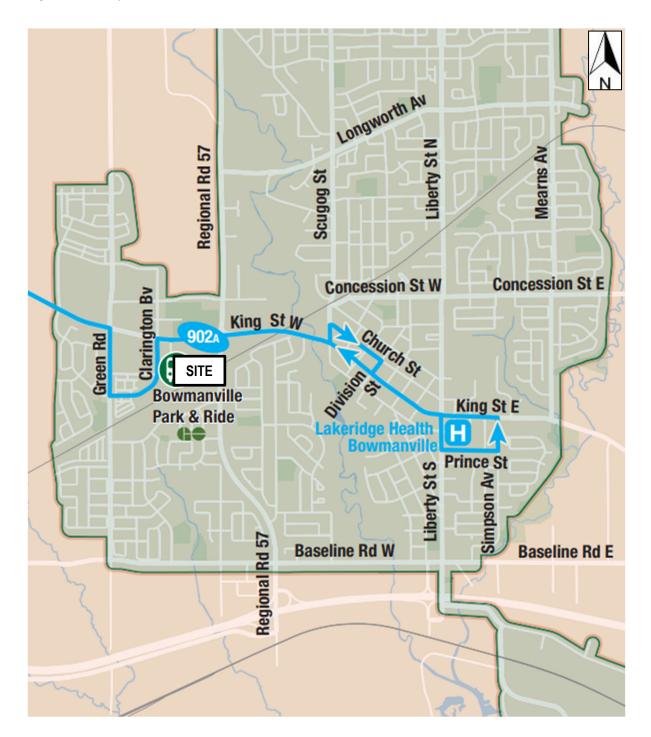




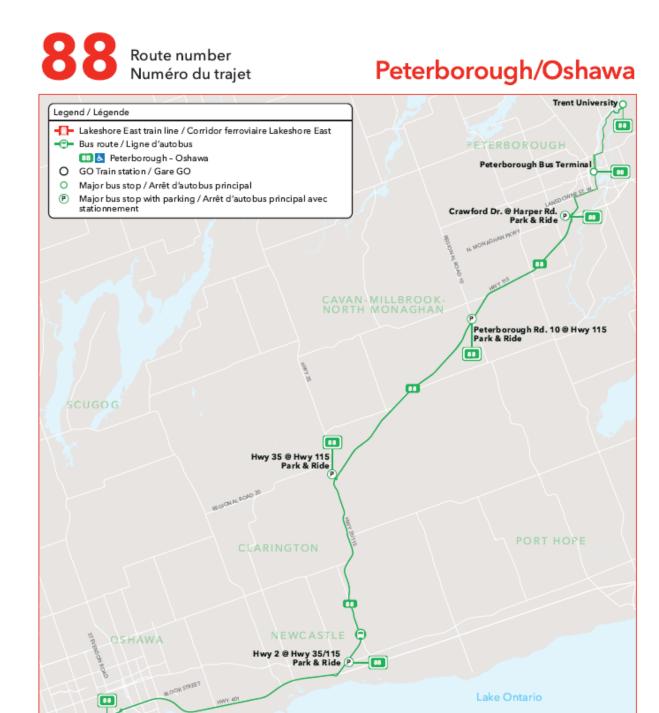
Figure 5 – Study Area Transit Service



Source: Durham Region Transit



Figure 6 – Route Map of Line Peterborough/Oshawa



Source: GO Transit

Oshawa

Figure 7: 2024 Future Background Traffic Volumes, Weekday AM and PM Peak Hours

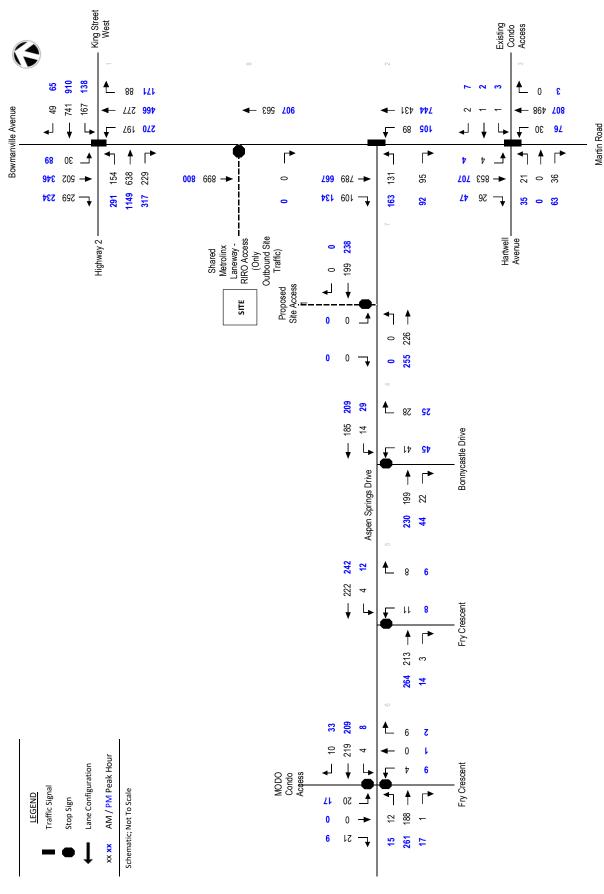


Figure 8: Future Study Area Roadway Characteristics (2029)

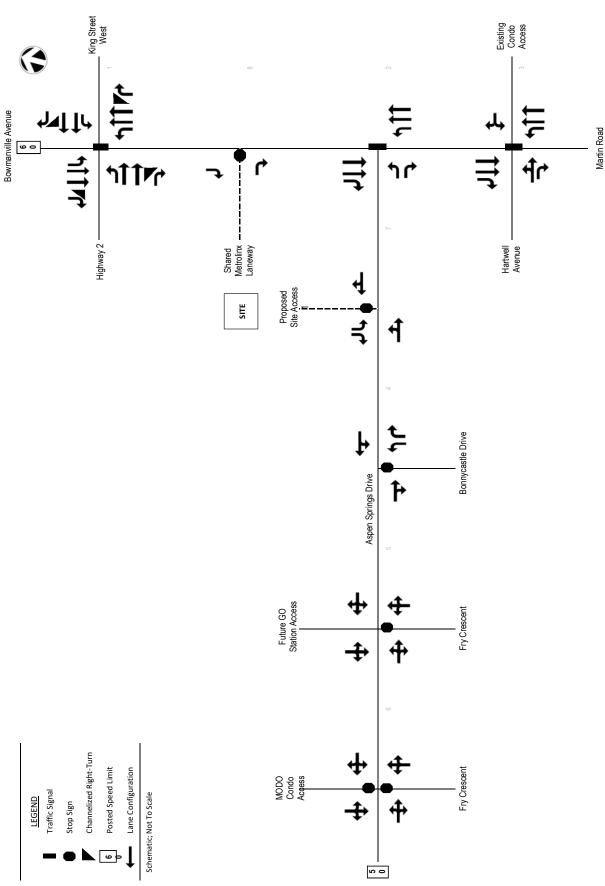


Figure 9: 2029 Future Background Traffic Volumes, Weekday AM and PM Peak Hours

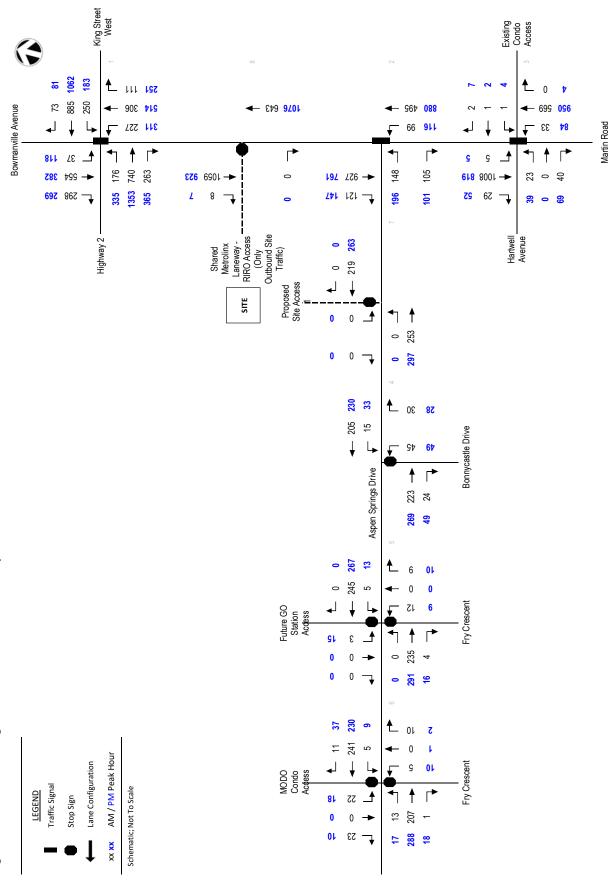


Figure 10: Site Traffic Assignment, Weekday AM and PM Peak Hours

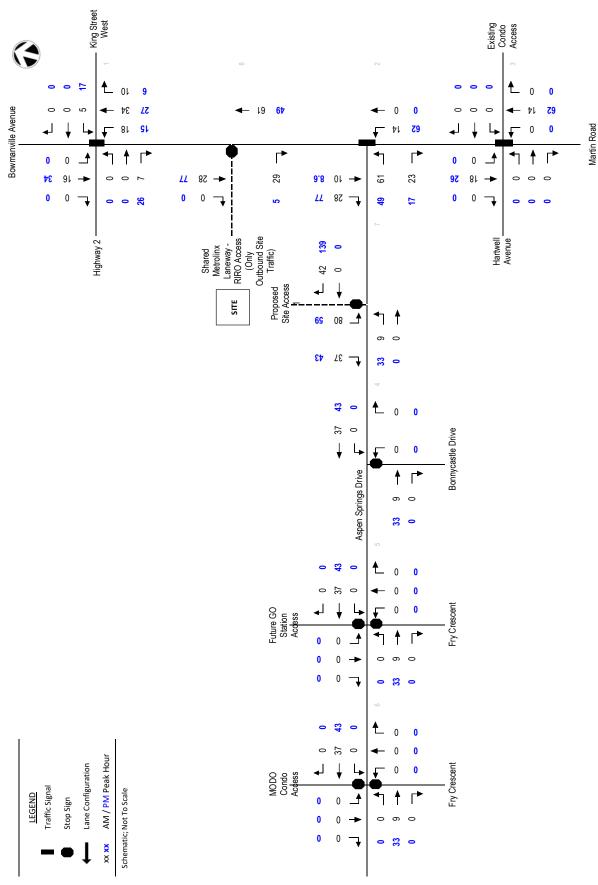


Figure 11: 2024 Future Total Traffic Volumes, Weekday AM and PM Peak Hours

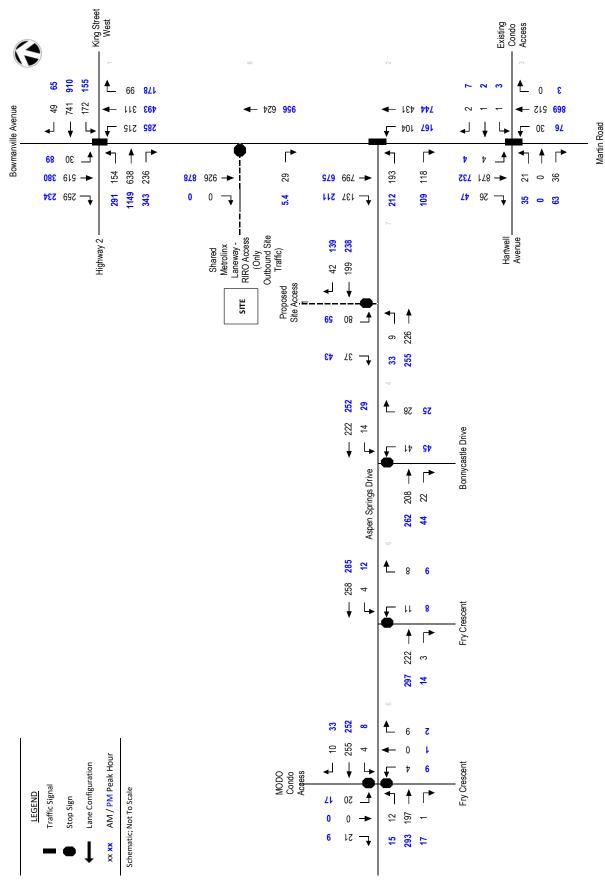


Figure 12: 2029 Future Total Traffic Volumes, Weekday AM and PM Peak Hours

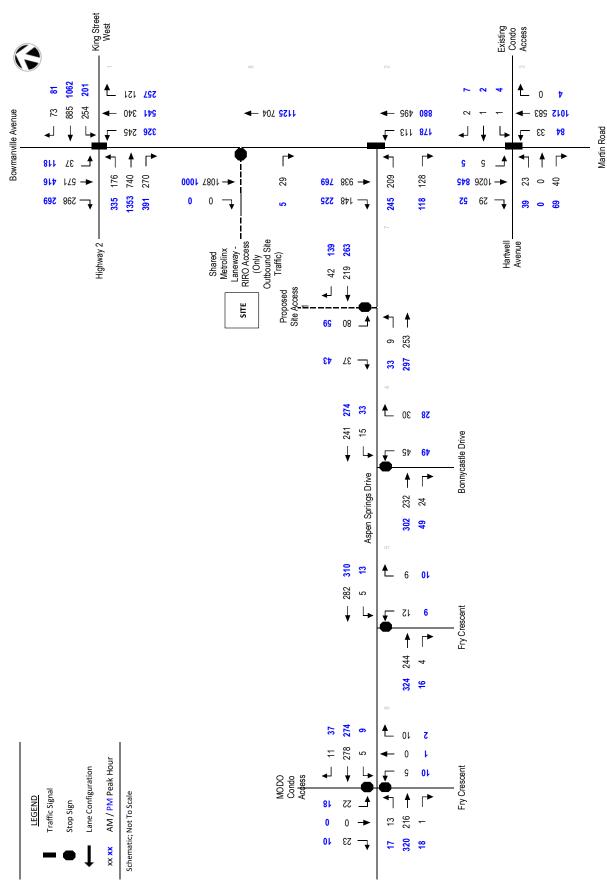
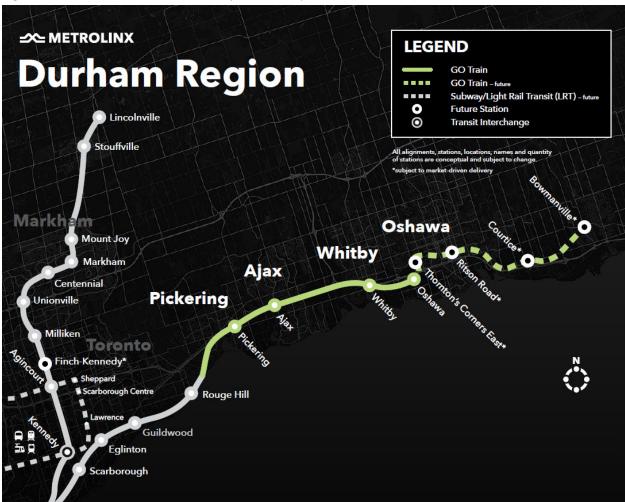




Figure 13 – Future Bowmanville GO Expansion Map



Source: Metrolinx



Figure 14 – Map of Available On-Street Parking



Source: Google Earth

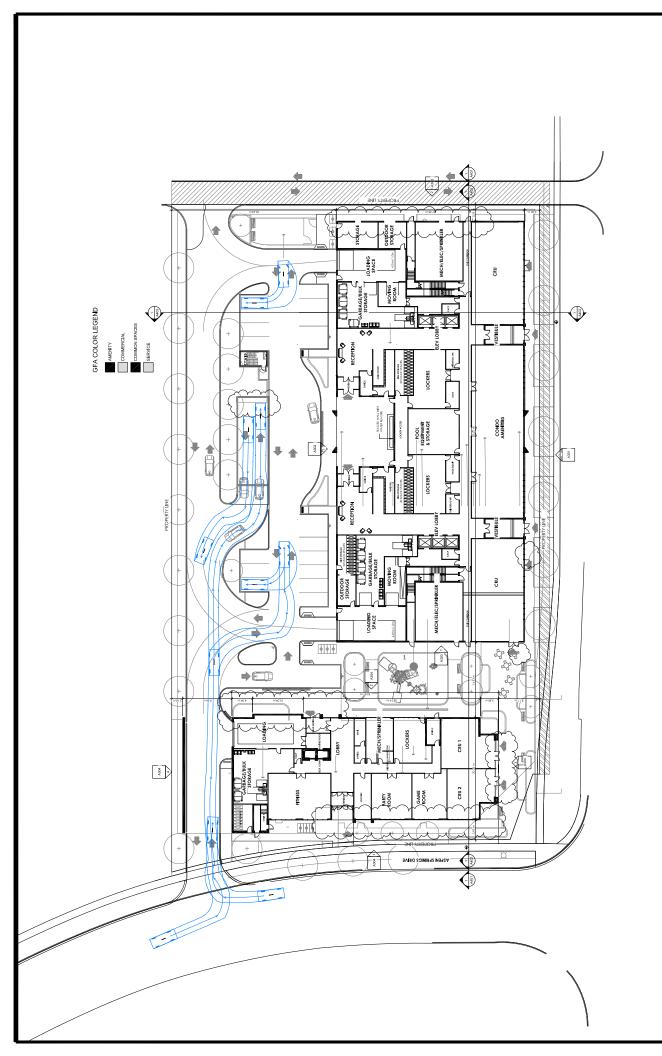
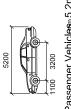


Figure 15 - Passenger Vehicle, Entering the Site and the Ground Floor

PROPOSED MIXED-USE DEVELOPMENT

10 Aspen Springs Drive, Bowmanville, ON



Passenger Vehicles 5.2m 2000 2000 6.0 36.2 Width Track Lock to Lock Time Steering Angle



785 Dundas Street West Toronto, Ontario, M6J 1V2 tel: (647) 931-7383 website: www.trans-plan.com

SCALE: 1.750 UNITS: m

Source. Site Plan by Mataj Architects Inc., dated March 16, 2022

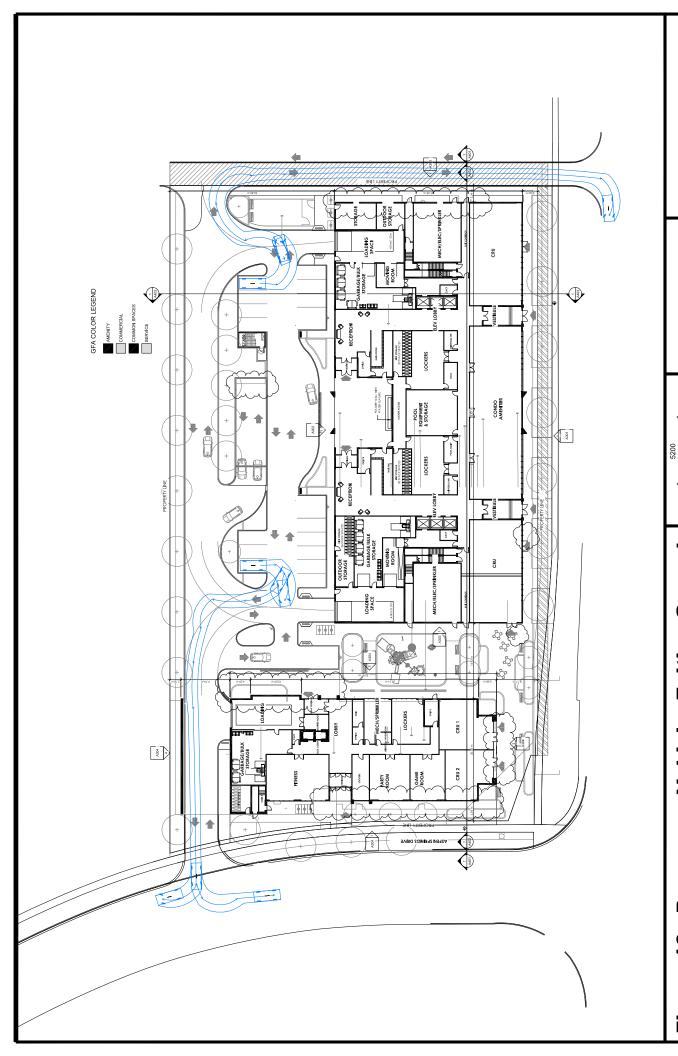
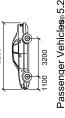


Figure 16 - Passenger Vehicle, Exiting Ground Floor and the Site

PROPOSED MIXED-USE DEVELOPMENT

10 Aspen Springs Drive, Bowmanville, ON



2000 2000 6.0 36.2 Width Track Lock to Lock Time Steering Angle



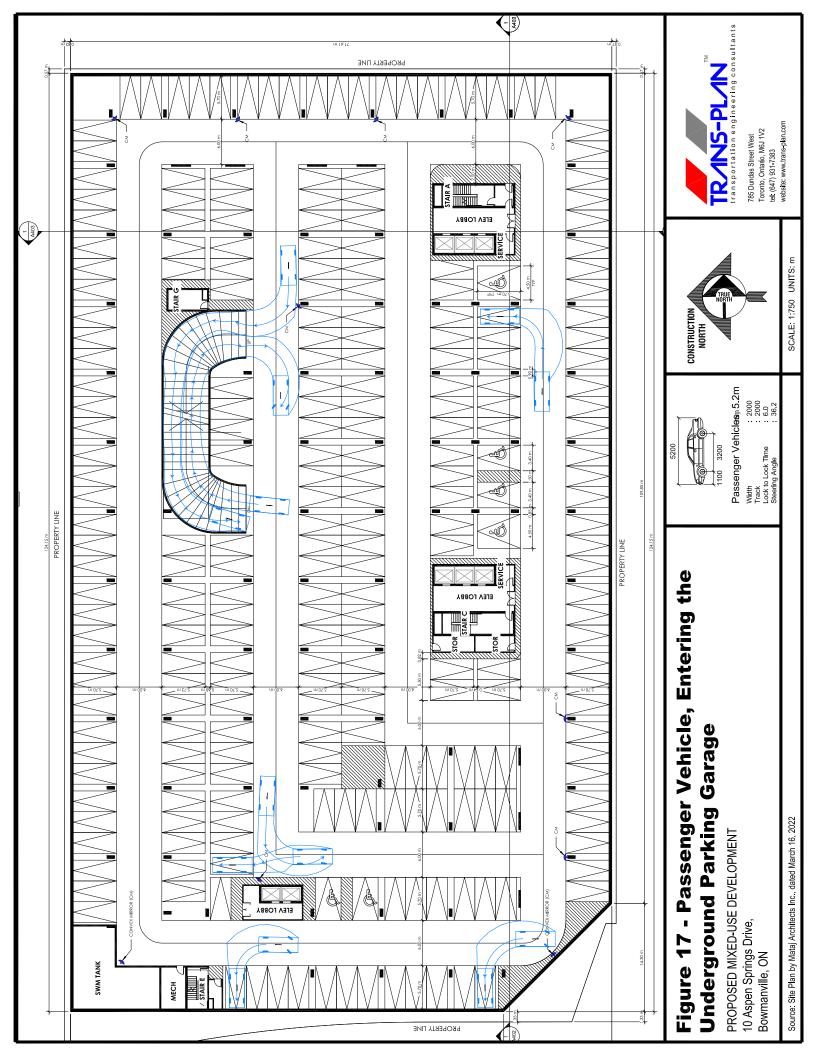
Passenger Vehicles 5.2m

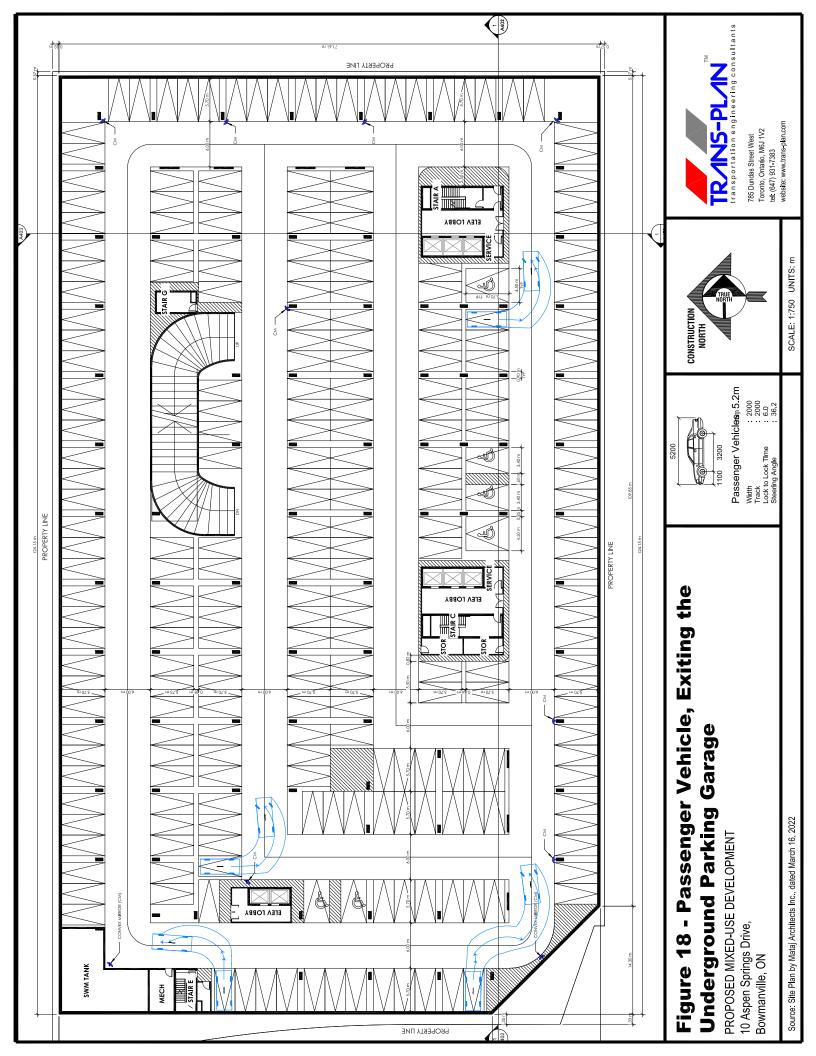


785 Dundas Street West Toronto, Ontario, M6J 1V2 tel: (647) 931-7383 website: www.trans-plan.com

SCALE: 1.750 UNITS: m

Source. Site Plan by Mataj Architects Inc., dated March 16, 2022





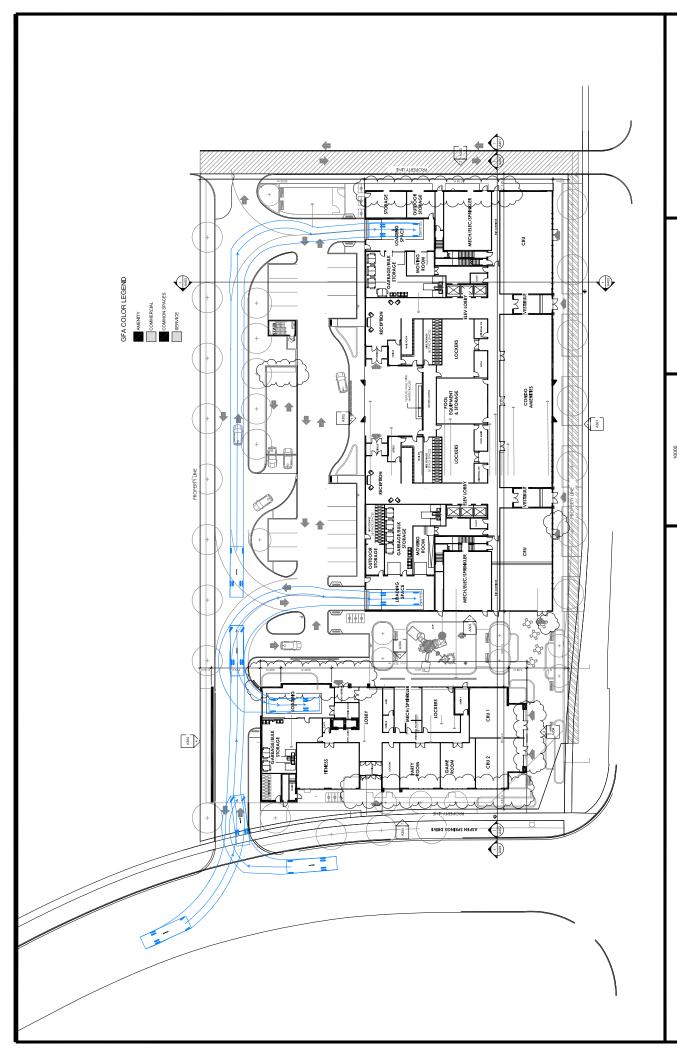
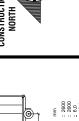


Figure 19 - Loading Vehicle, Entering Site and **Loading Area**

PROPOSED MIXED-USE DEVELOPMENT

10 Aspen Springs Drive, Bowmanville, ON



Width Track Lock to Lock Time Steering Angle MSU





785 Dundas Street West Toronto, Ontario, M6J 1V2 tel: (647) 931-7383 website: www.trans-plan.com

SCALE: 1.750 UNITS: m

Source. Site Plan by Mataj Architects Inc., dated March 16, 2022

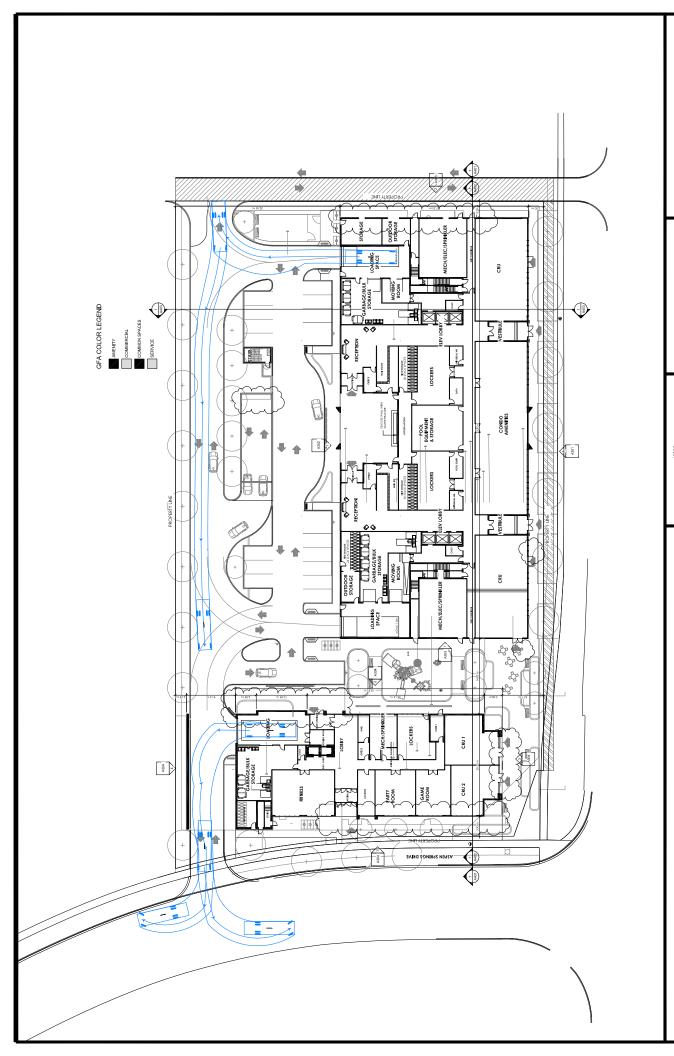
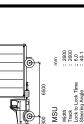


Figure 20 - Loading Vehicle, Exiting Loading Area (Mid-Rise and Tower A) and the Site

PROPOSED MIXED-USE DEVELOPMENT

10 Aspen Springs Drive, Bowmanville, ON







785 Dundas Street West Toronto, Ontario, M6J 1V2 tel: (647) 931-7383 website: www.trans-plan.com

SCALE: 1:750 UNITS: m

Source: Site Plan by Mataj Architects Inc., dated March 16, 2022

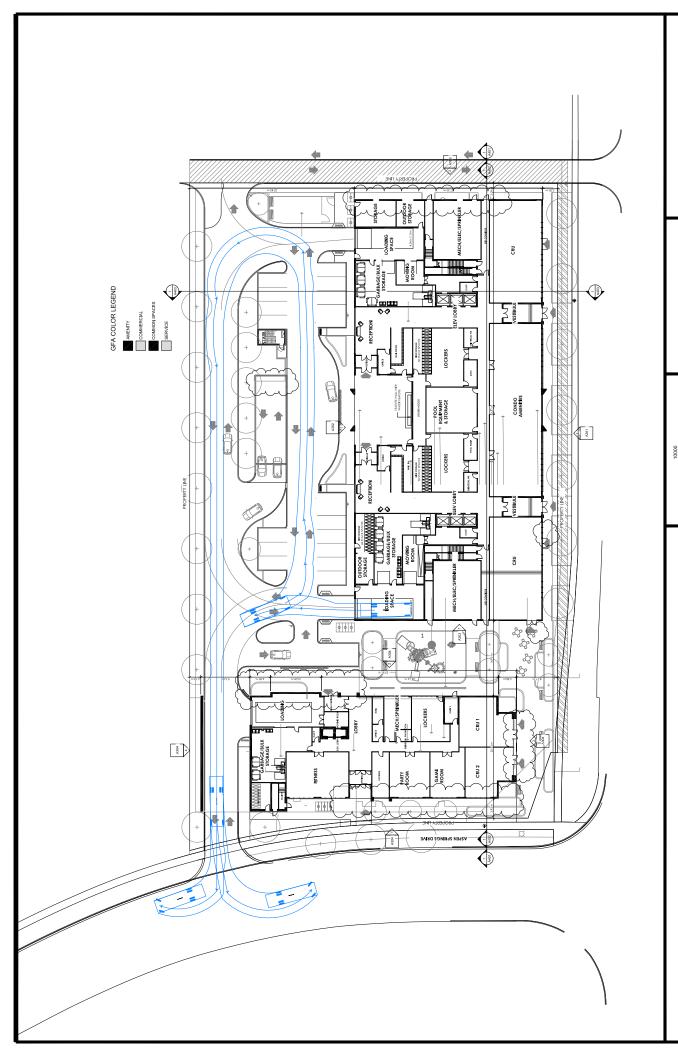
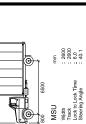


Figure 21 - Loading Vehicle, Exiting Loading Area (Tower B) and the Site

PROPOSED MIXED-USE DEVELOPMENT 10 Aspen Springs Drive, Bowmanville, ON







SCALE 1.750 UNITS: m

Source: Site Plan by Mataj Architects Inc., dated July 19, 2021

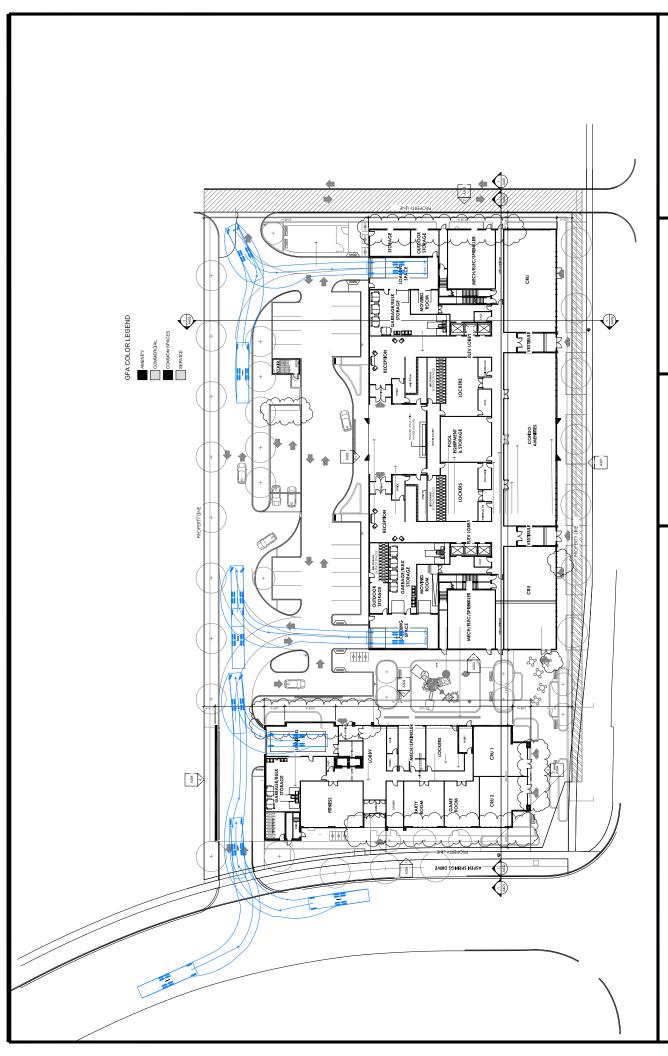
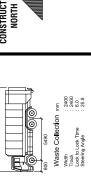


Figure 22 - Waste Collection Vehicle, Entering Site and Loading Area

PROPOSED MIXED-USE DEVELOPMENT

10 Aspen Springs Drive, Bowmanville, ON







SCALE: 1.750 UNITS: m

Source: Site Plan by Mataj Architects Inc., dated March 16, 2022

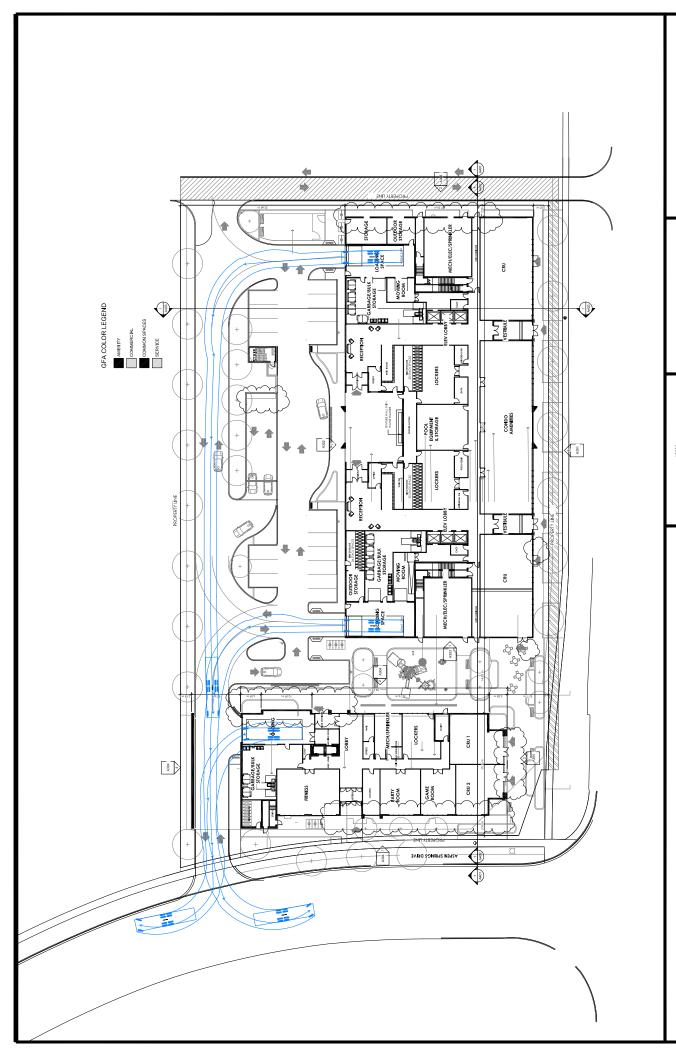
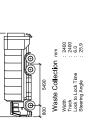


Figure 23 - Waste Collection Vehicle, Exiting Loading Area, and the Site

PROPOSED MIXED-USE DEVELOPMENT

10 Aspen Springs Drive, Bowmanville, ON

Source: Site Plan by Mataj Architects Inc., dated March 16, 2022







SCALE: 1.750 UNITS: m



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 Vehicle Queuing Analysis Sheets

Appendix E – Level of Service Definitions

Appendix F – Municipality of Clarington By-law 84-63, Excerpts

Appendix G – TAC Guidelines, Excerpts



Traffic Count Data and Signal Timing Plans





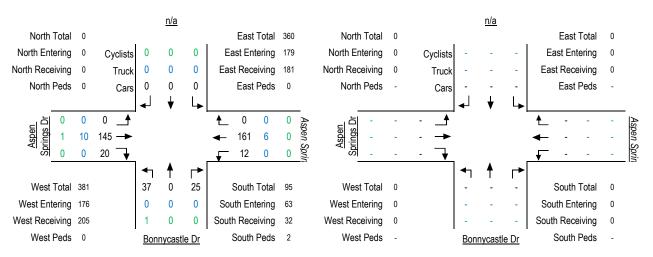
Intersection: Aspen Springs Drive and Bonnycastle Drive

Municipality: Bowmanville, Ontario

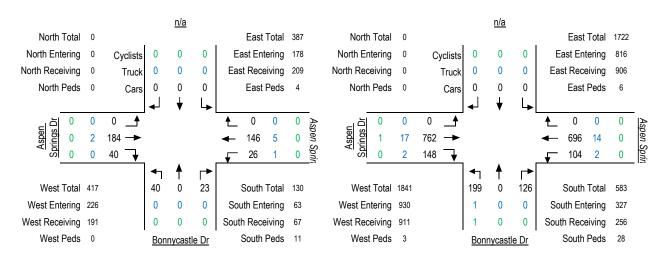
Intersection ID:

Date: Tuesday, November 16, 2021

AM Peak Hour: 8:15 to 9:15 MD Peak Hour: - to



PM Peak Hour: 15:30 to 16:30 Total 8-Hour Count





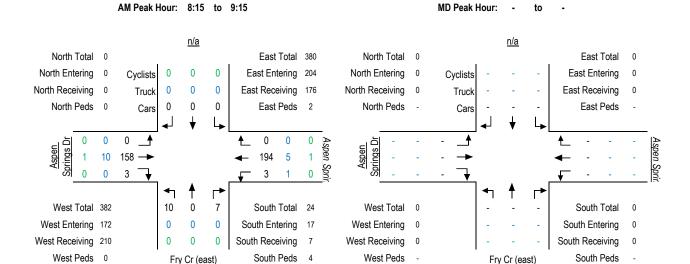


Intersection: Aspen Springs Drive and Fry Crescent (East)

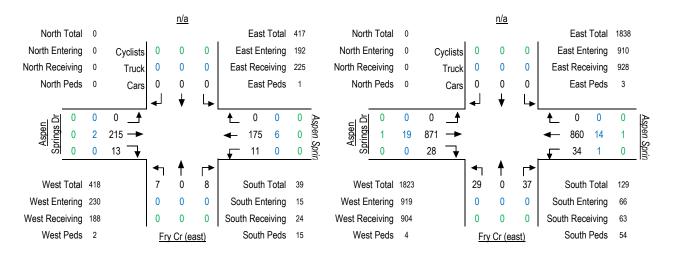
Municipality: Bowmanville, Ontario

Intersection ID:

Date: Tuesday, November 16, 2021



PM Peak Hour: 15:30 to 16:30 Total 8-Hour Count







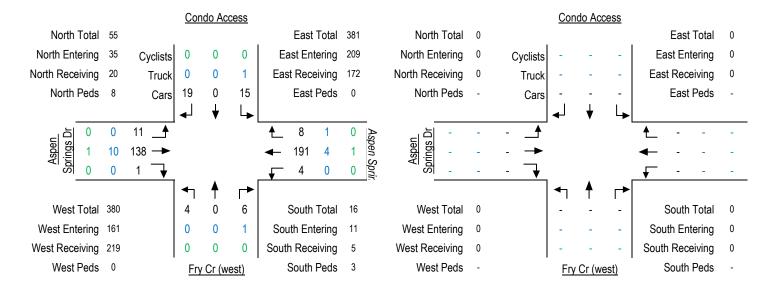
Intersection: Aspen Springs Drive and Condo Access Fry Crescent (West)

Municipality: Bowmanville, Ontario

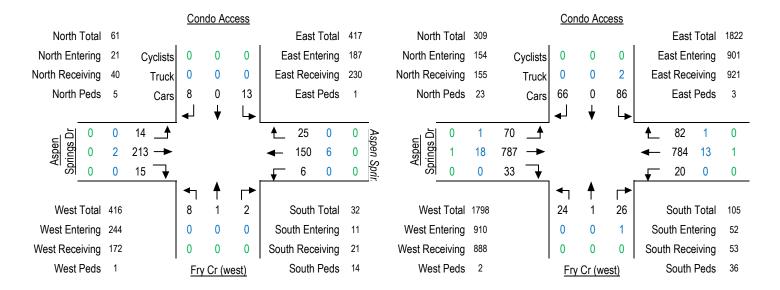
Intersection ID:

Date: Tuesday, November 16, 2021

AM Peak Hour: 8:15 to 9:15 MD Peak Hour:



PM Peak Hour: 15:30 to 16:30 Total 8-Hour Count







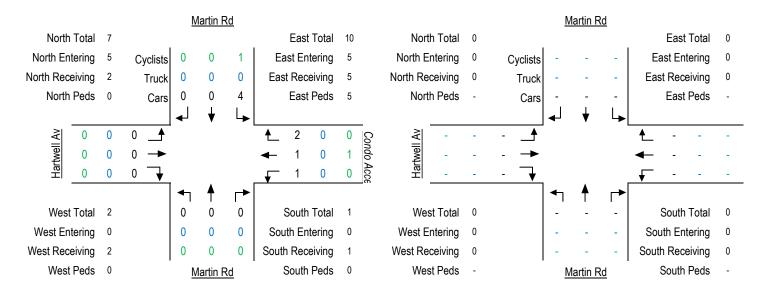
Intersection: Martin Road and Hartwell Avenue

Municipality: Bowmanville, Ontario

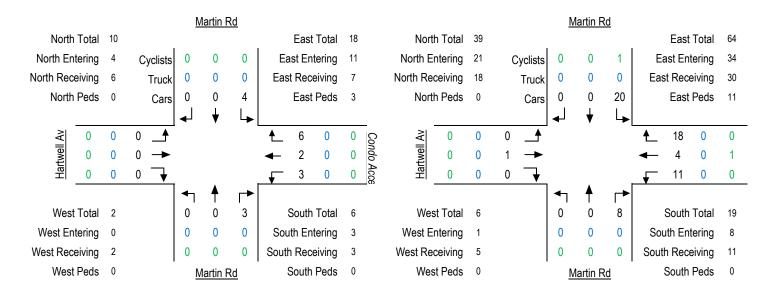
Intersection ID:

Date: Tuesday, November 16, 2021

AM Peak Hour: 8:30 to 9:30 MD Peak Hour: - to -



PM Peak Hour: 15:00 to 16:00 Total 8-Hour Count



TMC Tabular Report

TMC No:

	11/20/2019, Wed		
	Count Date:	Trucks % PHF 0% 0.00 0% 0.00 Ped. →	Trucks % PHF 0% 0% C% ↑ Ped.
	35702018202	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
Bowmanville Av (R.R.57) @ Aspen Springs Dr	Count ID:	12:30 ↑ Ped. 3 ← 14 102 0.75 13% 12 81 0.00 0% 0 0 0.84 8% 3 34 PHF Trucks % Trucks Cars	Total Count 8 hours* 14 Ped. 31 ← 149 902 12% 100 705 0% 0 1 12% 58 439 PHF Trucks % Trucks Cars 7 7
owmanville Av (R.R.5	5157	Ped ← Cars Trucks Trucks % PHF 0 0 0 0 0.00 0 0 0 0 0.00 0 0 0 Ped. Ped.	Ped. ← Cars Trucks Trucks % PHF 0 0 0 0 0.00 0 0 0 0 0.00 0 0 0 0 0
B	Intersection ID:	← 93 408 ← ↓ ↓ ↑ ↑ 0 0 0% 0.00	0.00 0% 0 0 0
	0270600000	08:00 ↑ Ped. 9 0.74 6% 0.00 0% 0.65 8% PHF Truck	PM Peak 16:45 ↑ ↑ Ped. 0.86 14% 0.00 0% 0.68 11% PHF Truck

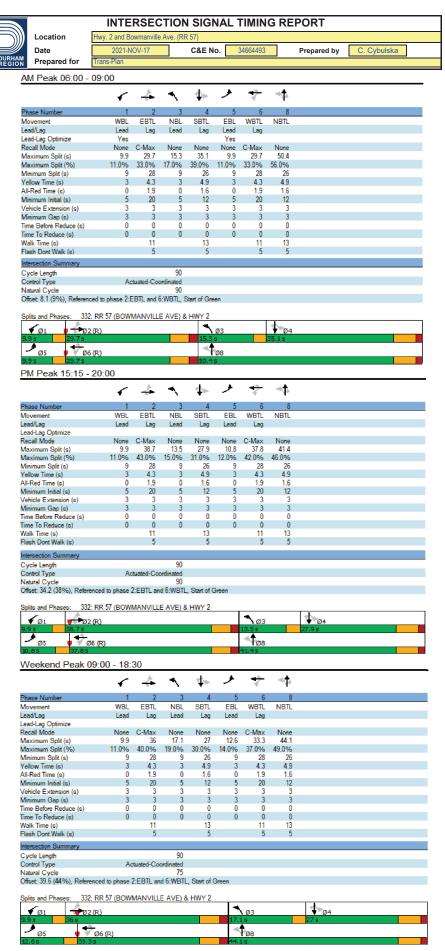
Bowmanville Av (R.R.57) @ Hartwell Av

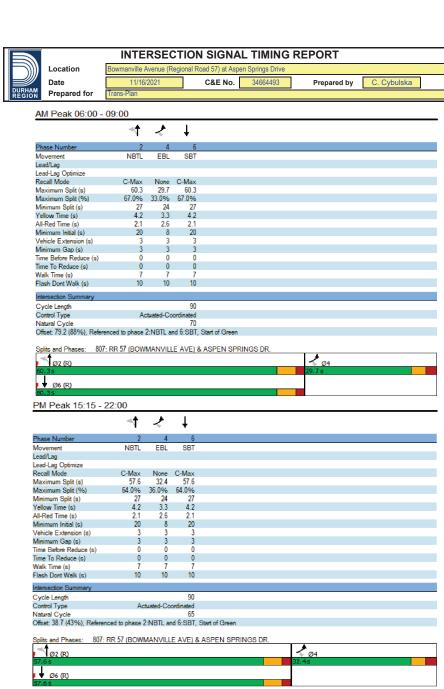
TMC No:

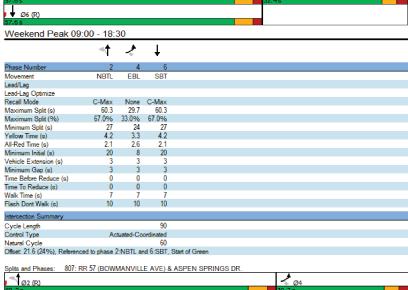
TMC Tabular Report

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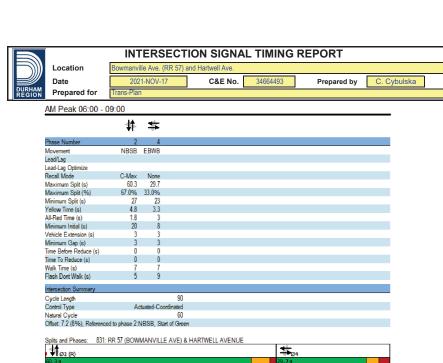
				יין אר פווואווומווואטם	DOWINALIVING AV (R.R.S.) @ nignway 2			
TMC No:	0570200000	Intersection ID:	n ID:	4718	Count ID:	35702018206	Count Date:	11/20/2019
	AM Peak 08:00	0.86	0.75 0.95	^ .	MD Peak 12:15	0.83 0.97 0.89		
		16%	← 26% 20%			← 17% 27% 17%		
		38	87 7 88			90 12 55 26		
	Ped.	193	331 20 345	Trucks Trucks % PHF	√	324 58 151 130	Trucks % PHF	
	→ + 0.79 15%	167 896 ←J	← ← 32 ← ← 32 ← ← 562 ← ← 562 ← ← 562 ← ← ← 562 ← ← ← 562 ← ← ← 562 ← ← ← 662 ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← ← 662 ← ← ← 662 ← ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← ← 662 ← ← 662 ← ← 662 ← ← 662 ← ← 662 ← 662		181 964 0 900 20% 35 144	7	11% 0.77	
		88 452	↓	15%	16% 126	} } }		
	0.75 18% PHF Truc	18% 32 149 Trucks % Trucks % Trucks 09 Example 12 Example 12 Example 12 Example 13 Example 14 Example 14 Example 15 Examp	↑ 71 ← 189 ↓ 141	102	0.81 21% 43 165 PHF Trucks % Trucks Cars	£§£	↑ Ded:	
		141	7 55 30	₹		15 50 36 113	₹	
		<u>→</u>	9% 23% 18%			16% 26% 20% →		
		← Ped.	0.75 0.74 0.95		← Ped.	0.75 0.91 0.82		
	PM Peak 16:00	0.84	0.78 0.86	Δ.	Total Count 7 hours*	Ped. ← 40		
		14%	← 16% 20%			← 18% 21% 18%		
		28	126 13 59			744 77 522 260		
	<u>Ped.</u> 2	171	558 68 236	Trucks Trucks % PHF	30 Ped.	2971 347 1924 1213	Trucks % PHF	
	→ 0.87 16%	159 1019 ← 41 214 →	← ← ← 47 ← 673	12 20% 0.82 102 13% 0.96	+ 1206 6893 18% 253 1159		16% 14%	
	0.95 14%	139 869 .		15 12% 0.84	14% 806 4771 16% 250 1287	1 1	14%	
		s % Trucks Cars	117 - 297 - 175		cs % Trucks	577 1523 1102 3974	16 Ped.	
		122	19 73 29	÷		78 437 214 901	<u>→</u>	
		<u>→</u>	14% 20% 14%			12% 22% 16%		
		← Ped.	0.87 0.88 0.91		← Ped.			







¥ Ø6 (R)





Splits and Phases:	831: RR 57 (BOWMANVILLE AVE) & HARTWELL AVENUE		
₩ ø2 (R)		₩ _{Ø4}	
57.6 s		32.49	

Weekend Peak 09-00-18:30 * Phase Number 2 4 NBSB EBWB Movement Lead/Lag Lead-Lag Optimize Recall Mode C-Max None Maximum Split (s) Maximum Split (%) 60.3 29.7 67.0% 33.0% Minimum Split (%)
Minimum Split (s)
Yellow Time (s)
All-Red Time (s)
Minimum Initial (s)
Vehicle Extension (s) 1.8 Minimum Gap (s)
Time Before Reduce (s)
Time To Reduce (s) Walk Time (s) Flash Dont Walk (s) Intersection Summary Cycle Length Control Type Natural Cycle 60
Offset: 41.4 (46%), Referenced to phase 2:NBSB, Start of Green



Background Traffic Information



Reginal Rd 57

110 3					
Year	AADT	ху	x^2	Growth by	Annual
	(vehicles)			Linear	Growth
				Regression	Rate
2017	18875	38070875	4068289	19565	
2018	19295	38937310	4072324	17915	
2019	15575	31445925	4076361	16265	-8.43%
6054	53745	108454110	12216974		

events 3 m -1650 b 3347615

Source: AADT provided by the Region of Durham, 2017-2019

Hwy 2

11VV y Z					
Year	AADT	ху	x^2	Growth by	Annual
	(vehicles)			Linear	Growth
				Regression	Rate
2017	29310	59118270	4068289	29732	
2018	28960	58441280	4072324	28117	
2019	26080	52655520	4076361	26502	-5.43%
6054	84350	170215070	12216974		

events 3 m -1615 b 3287186.667

Source: AADT provided by the Region of Durham, 2017-2019

Fw: 10 Aspen Springs Drive, Residential Development - Bowmanville GO Extension

Chris Toews < Chris. Toews@trans-plan.com>

Thu 11/11/2021 12:08 PM

To: Jing Min < Jing.Min@trans-plan.com>

Hey Jing,

See below Metrolinx's response to our inquiry.

Best regards,

Chris Toews Traffic Analyst | TRANS-PLAN Transportation Engineering

Toll Free: +1 (877) 668-8784 (TPTI) Office/Fax: +1 (647) 931-7383 Cell: +1 (647) 993-2663

Email: chris.toews@trans-plan.com

W: www.trans-plan.com

Company portfolio: Trans-Plan Portfolio Company stats: Trans-Plan Statistics

Head office: 785 Dundas Street West, Toronto, Ontario, M6J 1V2



From: Derek Davies < Derek. Davies @ metrolinx.com > Sent: Thursday, November 11, 2021 11:59 AM

To: Chris Toews < Chris. Toews@trans-plan.com>

Cc: Alexandra Goldstein Alexandra.Goldstein@metrolinx.com; Reiner Kravis Reiner.Kravis@metrolinx.com; Joseph Milos < Joseph. Milos@metrolinx.com>; Jennifer Wong < Jennifer. Wong@metrolinx.com>; Jocelyn Stenner <Jocelyn.Stenner@metrolinx.com>; Stephanie Cardenas <Stephanie.Cardenas@metrolinx.com>

Subject: RE: 10 Aspen Springs Drive, Residential Development - Bowmanville GO Extension

[EXTERNAL] Hi Chris,

Thanks for reaching out! Please see below for Metrolinx's response and for some additional information regarding the Bowmanville GO Station that may be helpful.

- At this time, there are no station designs available and site access routes cannot be confirmed as the Bowmanville GO Station is to be delivered through Metrolinx's Transit Oriented Communities (TOC) Program. Please also note that the 2011 concept site plan provided was for the purposes of the 2011 Environmental Assessment which is now considered to be out of date.
- The TOC Program involves the partnership between Metrolinx and a third party to fund, design, and deliver new or improved transit infrastructure wherein third parties will fund the design and construction of infrastructure and Metrolinx will operate it. For more information on the Transit Oriented Communities Program, please <u>click here</u> to visit the Metrolinx TOC website.
- · Additional environmental and limited traffic studies are currently underway to reflect updates since the 2011 EA and the 2020 Initial Business Case (IBC) with the future third party being responsible for completing necessary due diligence.
- Future transit schedules have not been determined at this time, for more information regarding level of service and ridership, please click here for the IBC and Metrolinx Board report.

 Metrolinx is currently in active discussions with landowners and developers to deliver the four GO stations proposed for Thornton's Corners East, Ritson Road, Courtice and Bowmanville through the TOC Program along the proposed Bowmanville Extension.

Should you have any additional questions, please feel free to reach out to Alex Goldstein who is a member of our Third Party Projects Review team or Reiner Kravis in Stations Planning, both CC'd

Thanks,

Derek Davies (He, Him)

Senior Advisor, Development, Heavy Rail (New Stations) Metrolinx | 20 Bay Street, Suite 600 | Toronto, ON | M5J 2W3 C: 416-275-1473

From: Chris Toews < Chris. Toews@trans-plan.com> Sent: Monday, November 08, 2021 1:45 PM To: Derek Davies < Derek. Davies @ metrolinx.com >

Subject: 10 Aspen Springs Drive, Residential Development - Bowmanville GO Extension

EXTERNAL SENDER: Do not click any links or open any attachments unless you trust the sender and know the content is safe.

EXPÉDITEUR EXTERNE: Ne cliquez sur aucun lien et n'ouvrez aucune pièce jointe à moins qu'ils ne proviennent d'un expéditeur fiable, ou que vous ayez l'assurance que le contenu provient d'une source sûre.

Good afternoon Derek,

My name is Chris Toews and I work for a traffic consultant named Trans-Plan. We have been retained to complete a Traffic Impact Study for the proposed residential development at 10 Aspen Springs Drive, Bowmanville (site plan attached for your reference). The development is to be located adjacent to the Metrolinx lands designated for the future Bowmanville GO Expansion. Upon submission of our Terms of Reference to Durham Region we were provided with your contact information to confirm current plans for the project, as it is required to include in our traffic analysis. We were hoping to obtain the following information:

- Access design and locations
- Confirmation of shared laneway configuration at northern border of site
- Previously completed Traffic Impact Studies (if any)
- Site trip generation estimates
- Future train schedules
- Anticipated completion year

If any of the above information can be provided it would be greatly appreciated.

Best regards,

Chris Toews Traffic Analyst | TRANS-PLAN

Transportation Engineering

Toll Free: +1 (877) 668-8784 (TPTI) Office/Fax: +1 (647) 931-7383

Cell: +1 (647) 993-2663

RE: Terms of Reference, Traffic Study_ 10 Aspen Springs Drive, Bowmanville

Greg Pereira < Greg. Pereira @durham.ca>

Mon 1/10/2022 12:27 PM

To: Jing Min < Jing.Min@trans-plan.com>

Cc: Doug Robertson < Doug.Robertson@Durham.ca>

[EXTERNAL]

Hi Jin –

Sorry for the delay in response, this information was in my inbox just before the xmas break.

Region of Durham Transportation Planning staff have completed some in-house analysis to identify the traffic growth rates for the major arterials in the study area. This analysis is based on the DRTPM2014, but uses the land use forecast work from our SGA analysis. The suggested annual growth rates are:

- Before 2024 historic growth rates unless there is significant development during this time period. The consultant should use the traffic data to verify the rates.
- 2024-2029 The RR57 will be widened to 4 lanes between Baseline Rd and Steven Rd and the GO station will be operational. The intensification will be mainly along Hwy 2 corridor. Assuming the linear development growth until 2051 to achieve the SGA forecast, the annual growth rates would be estimated at:
 - RR57, south of Hwy 2 2.0%
 - ∘ RR57, south of Aspen Springs Dr 1.5%
 - ∘ Hwy 2, between Green Rd and RR57 2.5%
 - Hwy 2, west of Green Rd − 2.0%

Please let me know if you have any clarification questions.

Regards

Greg

From: Jing Min <Jing.Min@trans-plan.com>

Sent: January 10, 2022 12:14 PM

To: Greg Pereira < Greg. Pereira@durham.ca>

Subject: Re: Terms of Reference, Traffic Study 10 Aspen Springs Drive, Bowmanville

Hi Greg,

Hope you had a great holiday.

Correct me if I'm wrong, you advised in our call that your team you would provide us with a growth rate for the new Bowmanville GO station to help us generate trips in TIS. I'm just following up and see if you have any update.

Thank you,

Background Developments Information

Proposed Residential Development 10 Aspen Springs Drive, Bowmanville, ON



Development 1 - Green Road and Highway 2 Proposed Multi-Residential Development

Land Use	Units /	AM	Peak Ho	ur	PM	Peak H	our
Land USE	Size (GFA)	In	Out	Total	In	Out	Total
	Р	HASE 1 (2	2024)				
ITE 221 (Multi-Family	137						
High-Rise)	137						
ITE 820 (Shopping	187m²						
Centre)	10/111						
	Trips	14	39	53	36	27	63
	Р	HASE 2 (2	2026)				
ITE 221 (Multi-Family	91						
High-Rise)	J1						
ITE 820 (Shopping	174.4m²						
Centre)	1/4.4111						
	Trips	11	29	40	26	21	47
Total	New Trips	25	68	93	62	48	110

Source: Figures 4-1 and 4-2, Transportation Impact Study, September 2021 by Nextrans Consulting

Development 2 - 215, 219 & 223 King Street West

Proposed Residential Development

Land Use	Units	ΑN	1 Peak Ho	ur	PM	l Peak H	lour
Land OSE	Offics	In	Out	Total	In	Out	Total
Residential ITE Code 230	425						
	Trips	27	129	156	125	62	187

Source: Figure 4-1, Transportation Study Update #2, August 2017 by Nextrans Consulting

Development 3 - 55 Clarington Boulevard

Proposed Residential Development

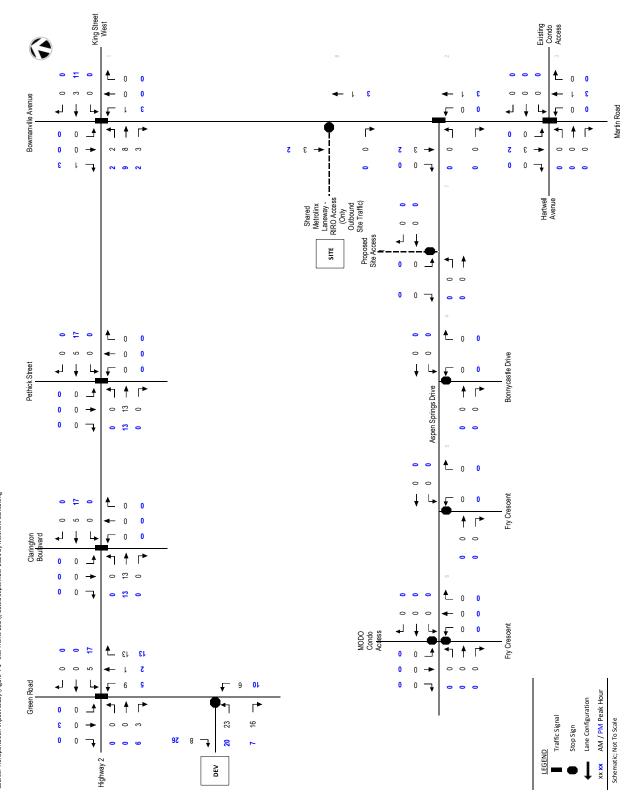
Land Use	Units	AM	Peak Ho	ur	PIV	l Peak H	our
Land OSE	Ullits	In	Out	Total	In	Out	Total
Residential ITE Code 222	134						
	Trips	20	86	106	83	43	127

Source: Exhibit 3.2, Memorandum: Update of 55 Clarington Boulevard TIS, February 2017 by Tranplan Associates

Proposed Residential Multi-Building, Mixed-Use Development 10 Aspen Springs Drive, Bowmanville, ON

DEV 1: Phase 1 (2024) Trip Distribution for Proposed Residential Development at Green Road and Highway 2

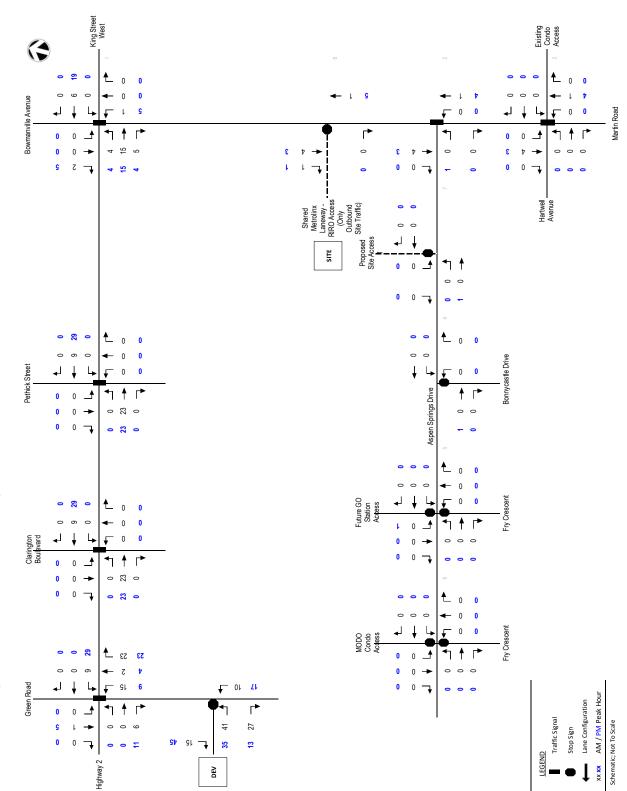
Source: Transportation Impact Study (Figure 4-1 - Site Traffic 2024), dated September 2021 by Nextrans Consulting



Proposed Residential Multi-Building, Mixed-Use Development 10 Aspen Springs Drive, Bowmanville, ON

DEV 1: Phase 2 (2026) Trip Distribution for Proposed Residential Development at Green Road and Highway 2

Source: Transportation Impact Study (Figure 4-2 - Site Traffic 2026), dated September 2021 by Nextrans Consulting



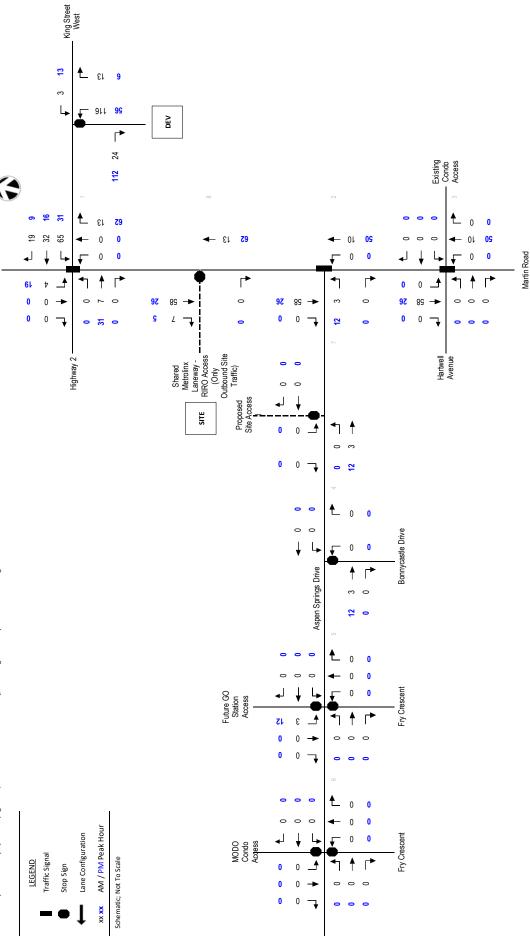


Proposed Residential Multi-Building, Mixed-Use Development 10 Aspen Springs Drive, Bowmanville, ON

DEV 2: Trip Distribution for Proposed Residential Development at 215, 219 & 223 King Street West

Source: Transportation Study Update #2 (Figure 4-1, Site Generated Traffic Volumes), dated August 2017 by Nextrans Consulting

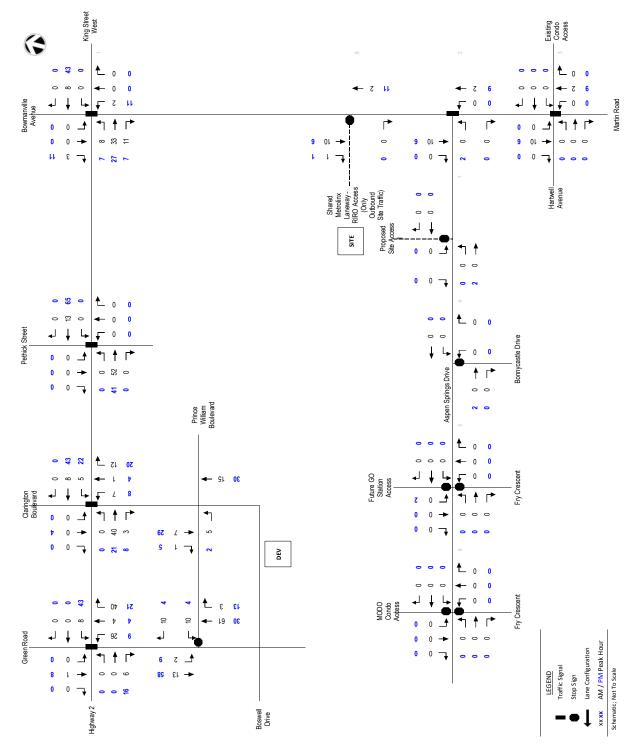
Bowmanville Avenue

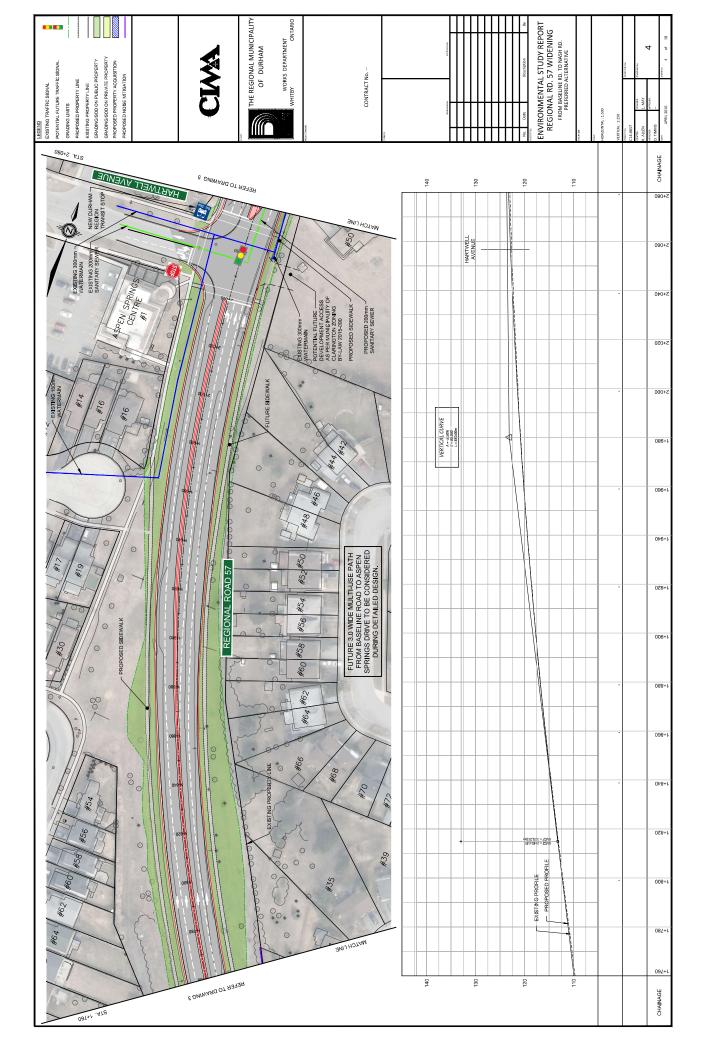


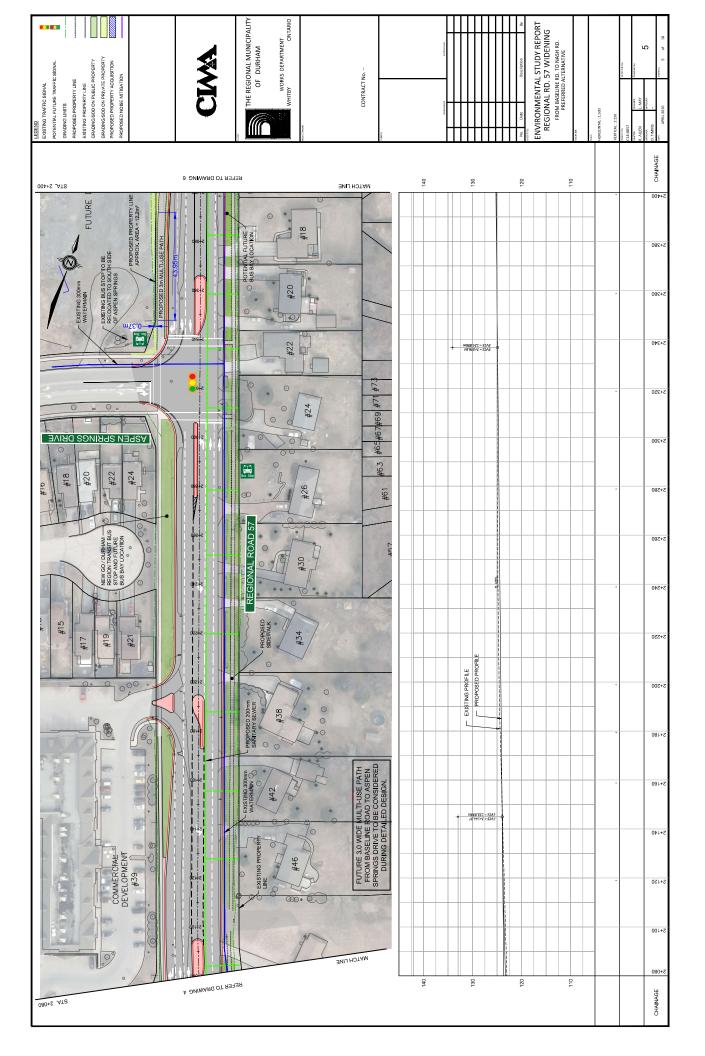
Proposed Residential Multi-Building, Mixed-Use Development 10 Aspen Springs Drive, Bowmanville, ON

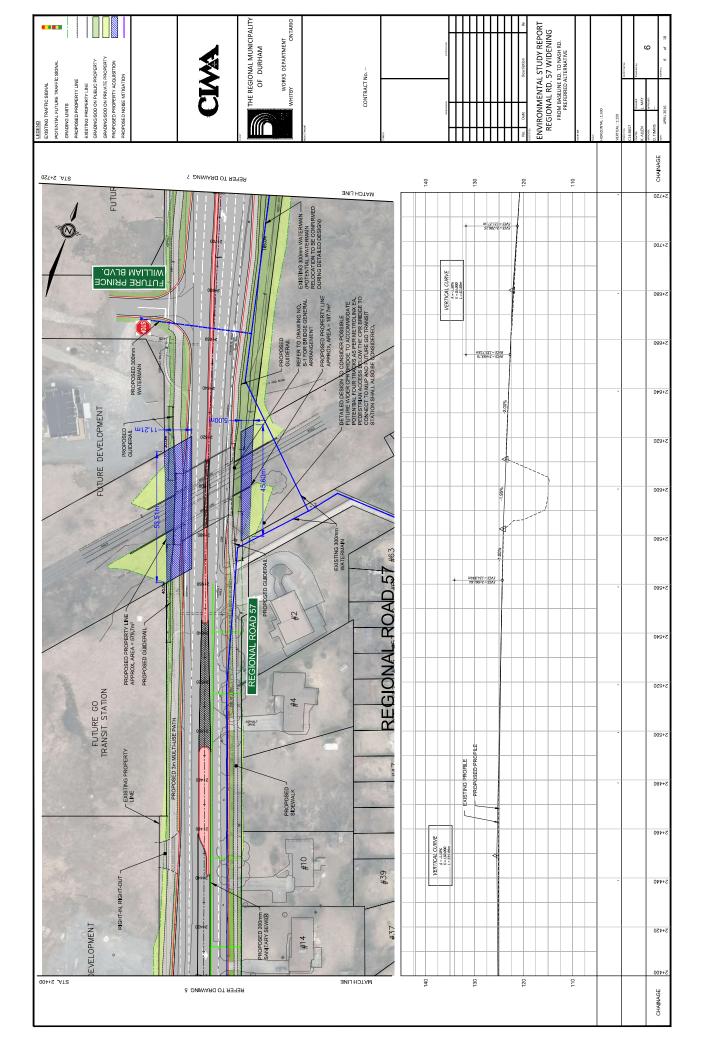
DEV 3: Trip Distribution for Proposed Residential Development at 51-55 Clarington Boulevard

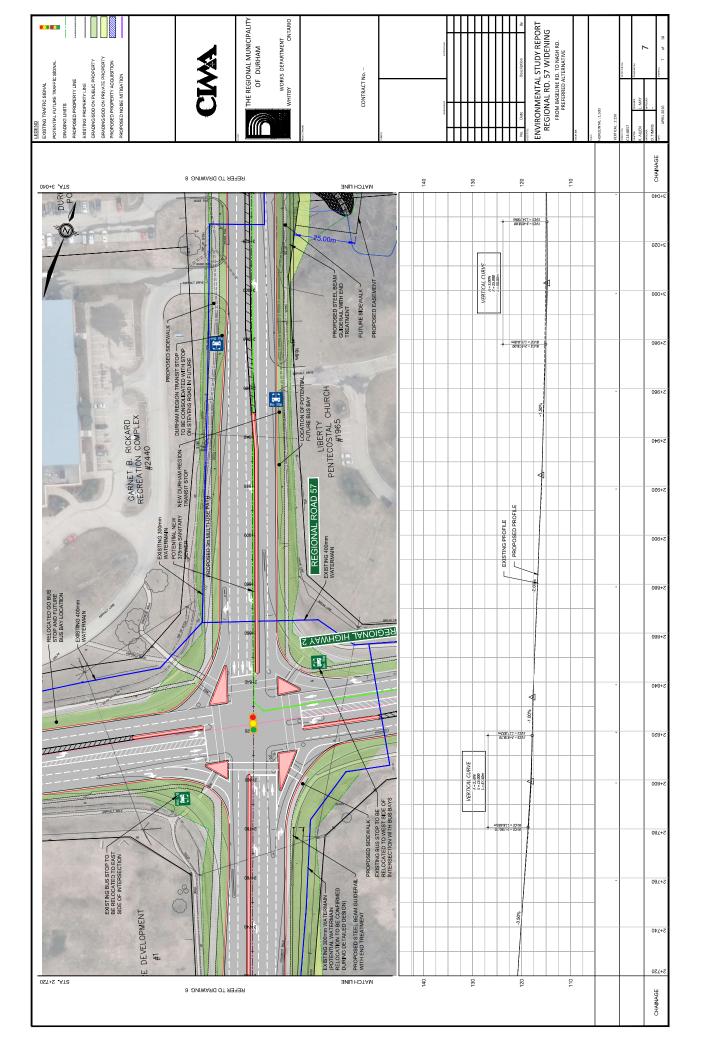
source: Transportation Impact Study (Figure 4-1 - Site Traffic 2024), dated September 2021 by Nextrans Consulting













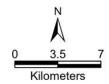
Transportation Tomorrow Survey Data



MUNICIPALITY OF CLARINGTON WARD 2







WARD 2

	WARD Z																		
I							HOU	SEHOL	.D CHA	RACT	ERISTI	CS							
I		D۱	welling Ty	/pe		Но	usehold S	Size		١	Number o	f Availabl	e Vehicle	es		House	ehold Ave	erages	
	Households	əsnoH	Townhouse	Apartment	1	2	æ	4	5+	0	1	2	3	4+	Persons	Workers	Drivers	Vehicles	Trips/Day
	10,700	73%	10%	17%	20%	32%	19%	19%	9%	4%	27%	50%	12%	7%	2.7	1.6	1.9	2.0	5.4

						POP	ULATIC	ON CH	ARACT	ERISTICS						
				Age					<u>_</u>		Emp	ployment T	уре			
Population		5	5	5	4		ian	Daily Trips per erson (age 11+)	Work Trips pe Worker	Population	Full Time	Part Time	At Home	Student	Licensed	Transit Pass
	-10	1-1	6-2	6-4	46-6	5+	Median	Per	Daily			١	Male			
	0	1	1	2	4	9	2		J	14,300	49%	5%	4%	19%	73%	7%
												Fe	emale			
28,500	15%	6%	11%	28%	27%	12%	37.8	2.4	0.74	14,200	38%	10%	3%	21%	72%	7%

				TRIPS I	MADE BY	RESIDE	NTS OF I	MUNICIF	ALITY O	F CLARIN	IGTON -	WARD 2	2			
Times		0/		Trip I	Purpose				Mode o	f Travel			N	/ledian Trip	Length (km	1)
Time Period	Trips	% 24hr	HB-W	HB-S	HB-D	N-HB	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	12,600	21.9%	47%	14%	23%	15%	75%	12%	2%	3%	6%	3%	13.6	2.5	14.6	61.6
24 Hrs	57,600		33%	8%	42%	17%	78%	14%	1%	1%	5%	1%	11.1	7.7	14.6	62.0

		TR	IPS MA	DE TO N	/IUNICIP	ALITY O	F CLARII	NGTON -	WARD:	2 - BY RE	SIDENTS	OF THE	TTS ARE	Α		
Time		% 24		Trip P	urpose				Mode o	of Travel			N	1edian Trip	Length (km)
Period	Trips	% 24 hr	Work	School	Home	Other	Driver	Pass.	Transit	GO Train	Walk & Cycle	Other	Driver	Pass.	Transit	GO Train
6-9 AM	7,800	15.5%	43%	29%	6%	22%	65%	11%	1%	*	11%	12%	6.6	2.1	7.1	*
24 Hrs	50,100		12%	5%	47%	35%	76%	15%	1%	1%	6%	3%	8.0	6.5	17.8	62.0

USER : Trans-Plan Transportation Inc.
DATE : Thursday November 04 2021

DATA : 2016 TTS v1.1

FILTER 1 : Ward number of origin - ward_orig In 73

FILTER 2 :Trip purpose of origin => Home

FILTER 3 : start_time => 600-1000

ROW : pd_dest COLUMN : ward_orig

		North 1%		
West	48%		23%	East
		28%		
		South		

Destination Zone		No. of Trips from Ward 73	Percent of Trips from Ward 73	Location Respect to Site
PD 1 of Toronto		386	4.2%	W
PD 3 of Toronto		56	0.6%	W
PD 4 of Toronto		114	1.2%	W
PD 5 of Toronto		109	1.2%	W
PD 6 of Toronto		32	0.4%	W
PD 8 of Toronto		11	0.1%	W
PD 9 of Toronto		21	0.2%	W
PD 11 of Toronto		15	0.2%	W
PD 12 of Toronto		66	0.7%	W
PD 13 of Toronto		149	1.6%	W
PD 15 of Toronto		17	0.2%	W
PD 16 of Toronto		30	0.3%	W
Brock		10	0.1%	N
Scugog		81	0.9%	N
Pickering		531	5.8%	S
Ajax		448	4.9%	S
Whitby		1112	12.2%	S
Oshawa		2708	29.7%	W
Clarington				
	72	658	7.2%	W
	73	Internal		
	74	1538	16.8%	E
	75	287	3.1%	E
Richmond Hill		42	0.5%	S
Markham		93	1.0%	S
Vaughan		30	0.3%	S
Mississauga		73	0.8%	S
Waterloo		9	0.1%	S
Cambridge		17	0.2%	S
Kawartha Lakes		40	0.4%	E
Peterborough		180	2.0%	Е
Cavan Monaghan		91	1.0%	E
Monaghan		7	0.1%	E
Northumberland		118	1.3%	S
Hastings		54	0.6%	S
External		129	1.4%	
Total		9133	100%	

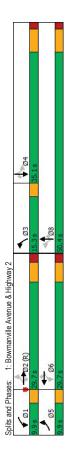


APPENDIX D

Capacity and Queuing Analysis

Timings <Existing> Weekday AM Peak Hour 1: Bowmanville Avenue & Highway 2 122/2021

	1	†	-	1	ţ	4	1	←	*	۶	→	*
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	15	44	W_	je-	44	W_	ji.	*	NC.	je-	+	R_
Traffic Volume (vph)	135	295	203	158	688	46	183	261	83	28	473	240
Future Volume (vph)	135	295	203	158	989	46	183	261	8	78	473	240
Turn Type	pm+pt	A	Perm	pm+pt	Ν	Perm	pm+pt	AN	Perm	Perm	AN	Perm
Protected Phases	2	2		_	9		က	œ			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	2	2	_	9	9	က	∞	∞	4	4	4
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	2.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	9.0	28.2	28.2	9.0	28.2	28.2	0.6	26.0	26.0	30.5	30.5	30.5
Total Split (s)	9.9			6.6	29.7	29.7	15.3				35.1	35.1
Total Split (%)	11.0%		8	11.0%	33.0%	33.0%	17.0%			39.0%	39.0%	39.0%
Yellow Time (s)	3.0			3.0	4.3	4.3	3.0				4.9	4.9
All-Red Time (s)	0:0			0.0	1.9	1.9	0.0				1.6	1.6
Lost Time Adjust (s)	0:0	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			3.0	6.2	6.2	3.0				6.5	6.5
Lead/Lag	Lead			Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	34.1	23.6	23.6	34.1	23.5	23.5	46.9	43.4	43.4	29.6	29.6	29.6
Actuated g/C Ratio	0.38	0.26	0.26	0.38	0.26	0.26	0.52	0.48	0.48	0.33	0.33	0.33
v/c Ratio	0.80	0.74	0.49	0.74	0.91	0.14	0.62	0.47	0.14	0.13	0.95	0.45
Control Delay	48.8	36.8	6.9	38.5	49.2	1.	20.5	15.5	5.6	23.4	29.7	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.8	36.8	6.9	38.5	49.2	[-	20.5	15.5	2.6	23.4	29.7	7.2
ros		□	∀	۵	۵	∢	O	Ф	⋖	ပ	ш	⋖
Approach Delay		31.1			44.4			14.8			40.0	
Approach LOS		ပ			٥			В				
Intersection Summary												
Cyde Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	o phase 2:	EBTL, Sta	art of Gre	en								
Natural Cycle: 80												
Control Type: Actuated-Coordinated	rdinated											
Maximum v/c Ratio: 0.95												
Intersection Signal Delay: 33.9	6.3			드	Intersection LOS: C	LOS: C						
Intersection Capacity Utilization 78.8%	ion 78.8%			2	ICU Level of Service D	f Service	۵					
Analysis Period (min) 15												



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis 1: Bowmanville Avenue & Highway 2

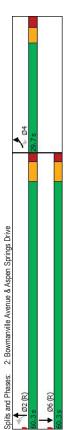
ty Analysis <Existing> Weekday AM Peak Hour 2

	1	1	1	-	ţ	4	•	+	*	۶	→	*
Movement	田田	EBT	EB	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	je.	\$	W.	F	‡	W.	je.	*	¥L_	F	*	R_
Traffic Volume (vph)	135	299	203	158	989	46	183	261	83	28	473	240
Future Volume (vph)	135	299	203	158	889	46	183	261	83	28	473	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1:00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1:00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1:00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1:00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1587	3147	1344	1585	3174	1253	1547	1562	1474	1444	1601	1360
Flt Permitted	0.17	1.00	1.00	0.27	1.00	1.00	0.19	1.00	1.00	0.55	1.00	1.00
Satd. Flow (perm)	283	3147	1344	459	3174	1253	312	1562	1474	836	1601	1360
Peak-hour factor, PHF	0.79	0.92	0.75	0.81	0.91	0.79	0.95	0.74	0.75	0.75	0.95	0.86
Adj. Flow (vph)	171	611	271	195	756	28	193	353	111	37	498	279
RTOR Reduction (vph)	0	0	500	0	0	43	0	0	22	0 (0	167
Lane Group Flow (vph)	171	611	2	382	7.26	15	183	353	72	37	498	112
Confl. Peds. (#/hr)	2		10	10		2	15		က	က		15
Heavy Vehicles (%)	15%	16%	18%	15%	15%	27%	18%	23%	%6	26%	20%	16%
Turn Type	pm+pt	NA	Perm	pm+pt	₹	Perm	pm+pt	¥	Perm	Perm	Ν	Perm
Protected Phases	2	7		~	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Actuated Green, G (s)	31.0	23.6	23.6	30.8	23.5	23.5	43.4	43.4	43.4	29.6	29.6	29.6
Effective Green, g (s)	31.0	23.6	23.6	30.8	23.5	23.5	43.4	43.4	43.4	29.6	29.6	29.6
Actuated g/C Ratio	0.34	0.26	0.26	0.34	0.26	0.26	0.48	0.48	0.48	0.33	0.33	0.33
Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	504	825	352	248	828	327	298	753	710	274	526	447
v/s Ratio Prot	c0.07	0.19		90:0	c0.24		c0.08	0.23			c0.31	
v/s Ratio Perm	0.22		0.02	0.21		0.01	0.23		0.04	0.04		0.08
v/c Ratio	0.84	0.74	0.20	0.79	0.91	0.05	0.65	0.47	0.08	0.14	0.95	0.25
Uniform Delay, d1	22.9	30.4	25.9	23.7	32.3	24.9	16.6	15.6	12.5	21.2	29.4	22.1
Progression Factor	9.	0.1	9.	9.	9.	9.	0.1	0.85	0.81	9.	9.	1.00
Incremental Delay, d2	24.8	5.9	ر ن	12.1	14.3	0.1	4.5	0.4	0.0	0.2	26.3	0.3
Delay (s)	47.8	36.3	27.2	38.7	46.6	24.9	21.2	13.7	10.2	21.4	22.7	22.4
Level of Service			ပ			ပ	ပ	മ	മ	ပ	ш	O
Approach Delay (s)		32.8			43.8			15.3			42.7	
Approach LOS								ш			Ω	
Intersection Summary												
HCM 2000 Control Delay			35.9	Ĭ	HCM 2000 Level of Service	Level of	Service		۵			
HCM 2000 Volume to Capacity ratio	city ratio		0.88									
Actuated Cycle Length (s)			0.06	S	Sum of lost time (s)	time (s)			18.7			
Intersection Capacity Utilization	tion		78.8%	೦	ICU Level of Service	f Service	•		Ω			
Analysis Period (min)			15									
c Critical Lane Group												

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

<Existing> Weekday AM Peak Hour 12/22/2021 Timings 2: Bowmanville Avenue & Aspen Springs Drive

																																					7: B	vice E
→	SBT	4	730	730	Y Y	9		9		20.0	27.0	60.3	%0.79	4.2	2.1	0.0	6.3			C-Max	63.8	0.71	0.82	12.7	0:0	12.7	В	12.7	В				uee.				Intersection LOS: B	CIII evel of Service F
←	NBT	*	404	404	ΑN	2		2		20.0	27.0	60.3	%0.79	4.2	2.1	0.0	6.3			C-Max	63.8	0.71	0.41	5.6	0.0	9.6	∢	6.1	∢				tart of Gr				ī	_
•	NBL	F	8	\$	Perm		2	2		20.0	27.0	60.3	%0.79	4.2	2.1	0.0	6.3			C-Max	63.8	0.71	0.37	9.8	0.0	9.8	∢						6:SBT, S					
-	EBR	k_	8	6	Perm		4	4		8.0	24.0	29.7			5.6	0.0	5.9			None	14.0	0.16	0.39	9.5	0.0	9.5	∢						BTL and					
4	EBL	r	123	123	Prot	4		4		8.0	24.0	29.7			5.6	0:0	5.9			None	14.0	0.16	0.62	45.3	0.0	45.3	۵	28.9	O				shase 2:N		nated			n 83 7%
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future Volume (vph)	Turn Type	Protected Phases	Permitted Phases	Detector Phase	Switch Phase	Minimum Initial (s)	Minimum Split (s)	Total Split (s)		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: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	Natural Cycle: 80	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 0.82	Intersection Signal Delay: 13.4	Intersection Canacity I Hilization 83.7%



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis 2: Bowmanville Avenue & Aspen Springs Drive

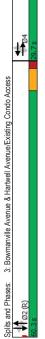
<Existing> Weekday AM Peak Hour 12/22/2021

Movement Eat EBR NBL NBT SBT SBR Lane Configurations T		1	1	•	←	→	•	
123 90 84 404 730 103 123 90 84 404 730 103 123 90 84 404 730 103 120 1900 1900 1900 1900 1900 5 9 5 9 6 3 6 3 6 3 6 3 6 3 1 0 100 100 100 100 100 1 0 100 100 100 100 100 1 0 100 100 100 100 1 0 100 100 100 100 1 0 100 100 100 100 1 0 100 100 100 100 1 0 100 100 100 100 1 0 100 100 100 1 0 100 100 100 1 0 100 100 100 1 0 100 100 100 1 0 100 100 100 1 0 100 100 100 1 0 100 100 100 1 0 100 100 100 1 0 17	Movement	EBL	EBR	NBL	NBT	SBT	SBR	
123 90 84 404 730 103 123 90 84 404 730 103 1900 1900 1900 1900 1900 1900 5.9 5.9 6.3 6.3 6.3 6.3 100 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Lane Configurations	je.	R.	r	*	2		
123 90 84 404 730 103 1900 1900 1900 1900 1900 1900 1900 1900	Traffic Volume (vph)	123	6	\$	404	730	103	
1900 1900	Future Volume (vph)	123	6	8	404	730	103	
5.9 5.9 6.3 6.3 6.3 1.00	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
100 100 100 100 100 100 100 100 100 100	Total Lost time (s)	5.9	5.9	6.3	6.3	6.3		
100 100 100 0.99 1100 100 100 0.99 1100 0.85 100 100 0.98 1100 0.85 100 100 0.98 1100 0.85 100 100 100 1172 1512 1824 1862 1864 1095 100 0.22 100 100 1172 1512 382 1562 1564 1172 1512 382 1562 1564 1172 1512 382 1562 1564 117 0 0 5 00 117 0 0 5 00 117 0 0 5 00 118 0.87 117 137 119 140 140 6.38 6.38 6.38 110 140 140 6.38 6.38 6.38 110 140 140 6.38 6.38 6.38 110 0.16 0.71 0.71 0.71 110 140 0.30 0.30 0.01 110 0.01 0.26 0.28 110 0.01 0.26 0.28 110 0.05 0.37 0.41 0.82 110 0.07 0.75 0.69 110 0.07 0.75 0.69 110 0.07 0.75 0.69 110 0.07 0.75 0.69 110 0.07 0.77 0.71 0.71 110 0.07 0.77 0.71 110 0.07 0.77 0.71 110 0.07 0.77 0.79 110 0.07 0.77 0.99 110 0.07 0.78 0.99 110 0.07 0.78 0.90 110 0.08 0.37 0.10 0.80 110 0.08 0.37 0.09 110 0.08 0.37 0.00 0.30 0.00 0.00 0.00 0.00 0.00	Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		
100 100	Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99		
100 0.85 1.00 1.00 0.98 1.00 1.00 0.95 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 1.00 0.95 1.00 0.22 1.00 1.00 1.00 0.95 1.00 1.00 0.95 0.95 0.95 0.00 0.00 0.00 0.00 0	Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		
10.95 100 0.95 100 100 17.2 1512 1624 1562 1564 17.2 1512 1624 1562 1564 17.2 1512 182 1562 1564 17.2 1512 182 1562 1564 17.2 1512 182 1562 1564 17.2 1512 182 1562 1564 17.	Ft	1.00	0.85	1.00	1.00	0.98		
1722 1512 1644 1562 1564 1722 1512 1644 1562 1564 1722 1512 382 1562 1564 166 138 101 459 777 137 166 138 101 459 909 0 6% 6% 6% 13% 13% 13% 166 21 101 459 909 0 6% 6% 14% 23% 13% 23% 140 Prof Perm Perm NA NA 4	Fit Protected	0.95	1.00	0.95	1.00	1.00		
1,095 1,00 0,22 1,00	Satd. Flow (prot)	1722	1512	1644	1562	1564		
1722 1512 382 1564 1724 0.65 0.83 0.88 0.94 0.75 166 21 101 459 909 0 166 21 101 459 909 0 166 21 101 459 909 0 168 8% 11% 2.3% 19% 2.3% 140 140 6.38 6.38 6.38 140 140 6.38 6.38 6.38 140 140 6.38 6.38 6.38 140 140 6.38 6.38 6.38 140 140 6.38 6.3 6.3 140 140 6.38 6.3 6.3 140 140 0.26 0.29 0.058 140 0.26 0.29 0.058 140 0.26 0.29 0.058 140 0.26 0.37 0.41 0.82 140 0.26 0.37 0.41 0.82 140 0.26 0.37 0.41 0.82 140 0.26 0.37 0.41 0.82 140 0.26 0.37 0.41 0.82 150 0.26 0.37 0.41 0.82 160 0.26 0.37 0.41 0.82 170 0.26 0.37 0.41 0.58 180 0.37 0.41 0.58 180 0.37 0.41 0.58 190 0.37 0.41 0.58 190 0.37 0.41 0.58 190 0.37 0.41 0.58 190 0.37 0.41 0.58 190 0.37 0.41 0.58 190 0.37 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.38 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.58 190 0.41 0.41 0.41 0.41 190 0.41 0.41 0.41 0.41 0.41 190 0.41 0.41 0.41 0.41 0.41 0.41 190 0.41 0.41 0.41 0.41 0.41 0.41 190 0.41 0.41 0.41 0.41 0.41 0.41 0.41 190 0.41 0.4	Flt Permitted	0.95	1.00	0.22	1.00	1.00		
F	Satd. Flow (perm)	1722	1512	382	1562	1564		
166 138 101 459 777 137 137 166 138 101 459 90 9 9 9 9 9 9 9 9	Peak-hour factor, PHF	0.74	0.65	0.83	0.88	0.94	0.75	
hh) 166 21 101 459 909 0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Adj. Flow (vph)	166	138	101	429	777	137	
hy) 166 21 101 459 909 0 6% 8% 11% 23% 19% 23% Frot Perm Perm NA NA 4 2 2 6 14.0 14.0 63.8 63.8 63.8 14.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	RTOR Reduction (vph)	0	117	0	0	2	0	
6% 8% 11% 23% 19% 23% Prot Perm Perm NA NA A A A A B B B 638 638 638 638 638 638 638 638 638 638	Lane Group Flow (vph)	166	51	101	429	606	0	
6% 8% 11% 23% 19% 23% Prot Perm Perm NA NA 4	Confl. Peds. (#/hr)			6			6	
Prot Perm Perm NA NA 4	Heavy Vehicles (%)	%9	%8	11%	23%	19%	23%	
4	Turn Type	Prot	Perm	Perm	¥	¥		
s) 140 638 638 638 0 140 140 638 638 638 0 016 0.16 0.71 0.71 0.71 0 016 0.16 0.71 0.71 0.71 0 016 0.10 0.71 0.71 0.71 0 010 0.29 0.30 0 010 0.29 0.38 0 029 0.37 0.41 0.82 0 020 0.37 0.41 0.82 0 030 0.37 0.69 0 030 0.37 0.69	Protected Phases	4			2	9		
140	Permitted Phases		4	2				
140	Actuated Green, G (s)	14.0	14.0	63.8	63.8	63.8		
0.16 0.16 0.71 0.71 0.71 5.9 5.9 6.3 6.3 6.3 6.3 0.2 267 235 2.70 1107 1108 0.01 0.26 0.29 0.58 0.62 0.09 0.37 0.41 0.82 2. 4.4 0.2 3.6 1.1 4.3 2. 4.4 0.2 3.6 1.1 4.3 2. 4.4 0.2 3.6 1.1 4.3 2. A.4 0.2 3.6 1.1 4.3 2. A.4 0.2 3.6 1.1 6.5 2. A.4 0.2 3.6 1.1 6.5 2. A.4 0.2 3.6 1.1 6.5 3.5 3.2 6.5 5.4 9.1 4.0 0.67 0.73 0.69 2. A.4 0.2 3.6 1.1 6.5 2. A.4 0.2 3.6 1.1 6.5 3.6 7 7.1 5.0 10.5 4.0 0.7 7.1 5.0 10.5 A.8 B. 3.6 7 A.8 B. 3.7 A.8 B. 3.8 A.8 B. 3.9 A.8 B. 3.1	Effective Green, g (s)	14.0	14.0	63.8	63.8	63.8		
5 9 5 9 6 3 6 3 6 3 6 3 6 3 6 3 6 3 6 3 6 3 6	Actuated g/C Ratio	0.16	0.16	0.71	0.71	0.71		
30 30 30 30 30 30 3	Clearance Time (s)	5.9	5.9	6.3	6.3	6.3		
267 235 270 1107 1108 c0.10 0.29 c0.58 0.62 0.09 0.37 0.41 0.82 35.5 32.6 5.2 5.4 9.1 1.00 0.67 0.73 0.69 2 4.4 0.2 3.6 1.1 4.3 4.00 32.7 7.1 5.0 10.5 D C A A B B y y y y volapacity ratio 0.78 Ocapacity ratio 0.78 Outlitzation 15 Outline (s)	Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		
c0.10 0.29 c0.58 0.62 0.09 0.37 0.41 0.82 3.55 32.6 5.2 5.4 9.1 1.00 1.00 0.67 0.73 0.69 2 4.4 0.2 3.6 1.1 4.3 4.00 3.7 7.1 5.0 10.5 D C A A B 3.67 7.1 5.0 10.5 D A B 3.67 7.1 5.0 10.5 A B 3.67 7.1 5.0 10.5 D A B 4.00 3.7 7.1 5.0 10.5 A B 4.00 0.78 A B 4	Lane Grp Cap (vph)	267	235	270	1107	1108		
0.62 0.09 0.37 0.41 0.82 3.55 3.26 5.2 5.4 9.1 1.00 1.00 0.67 0.73 0.69 2 4.4 0.2 3.6 1.1 4.3 4.00 32.7 7.1 5.0 10.5 D C A A B B 36.7 5.4 10.5 A B B y y y y Capacity ratio 0.78 Capac	v/s Ratio Prot	c0.10			0.29	c0.58		
0.62 0.09 0.37 0.41 0.82 3.55 3.26 5.2 5.4 9.1 1.00 1.00 0.67 0.73 0.69 4.4 0.2 3.6 1.1 4.3 40.0 32.7 7.1 5.0 10.5 D C A A B 36.7 6.4 10.5 D C A A B 36.7 6.4 10.5 A B 40.9 32.7 7.1 5.0 10.5 A B 40.0 32.7 7.1 5.0 10.5 B A B 40.0 32.7 7.1 5.0 10.5 C-capacity ratio 0.78 C-capacity ratio 0	v/s Ratio Perm		0.01	0.26				
35.5 32.6 5.2 5.4 9.1 1.00 1.00 0.67 0.73 0.69 2 40.0 32.7 7.1 5.0 10.5 D C A A B 36.7 A A B 36.7 A A B 37.4 HCM 2000 Level of Service 13.4 HCM 2000 Level of Service 13.4 HCM 2000 Level of Service 13.4 HCM 2000 Level of Service 13.5 Service 13.5 Service 13.6 Service 13.7 HCM 2000 Level of Service 14.6 Service 15.0 Library 13.7 HCM 2000 Level of Service 16.0 Service	v/c Ratio	0.62	0.0	0.37	0.41	0.82		
1.00 1.00 0.67 0.73 0.69 2 44 0.2 3.6 1.1 4.3 40.0 3.7 7.1 5.0 10.5 D C A A B 3.6 7 A B 5.4 10.5 A B 3.7 7.1 5.0 10.5 A B 4.0 0.78 A B	Uniform Delay, d1	35.5	32.6	5.2	5.4	9.1		
2 44 02 36 1.1 43 40 32.7 7.1 50 10.5 D C A A B B 36.7 5.4 10.5 D C A B B y y y y Capacity ratio 0.78 Chilization 83.7% CU Level of Service 15	Progression Factor	1.00	1.00	0.67	0.73	69.0		
400 32.7 7.1 5.0 10.5 D C A A B 36.7 5.4 10.5 D A B 4 B 4 B 5 4 10.5 A B 7 A B 6 B 7 A B 6 B 7 A B 7 A B 7 B 7 A B 7 A B 7 B 7 B 7 B 7 B 7 B 7 B 7 B 7 B 7 B 7	Incremental Delay, d2	4.4	0.2	3.6	7:	4.3		
D C A B B	Delay (s)	40.0	32.7	7.1	2.0	10.5		
36.7 5.4 10.5 Y Y Y Capacity ratio 0.78 Utilization 83.7% 13.4 HCM 2000 Level of Service 90.0 Sum of lost time (s) 13.4 HCM 2000 Level of Service 90.0 Sum of lost time (s) 15. ICU Level of Service 10.0 Level of S	Level of Service	_	ပ	⋖	⋖	ш		
y y y 13.4 HCM 2000 Level of Service ccapacity ratio 0.78 Sum of lost time (s) th (s) Utilization 83.7% ICU Level of Service 15	Approach Delay (s)	36.7			5.4	10.5		
13.4 HCM 2000 Level of Service 0.78 90.0 Sum of lost time (s) 83.7% ICU Level of Service 15	Approach LOS	Ω			V	В		
13.4 HCM 2000 Level of Service 0.78 90.0 Sum of lost time (s) 83.7% ICU Level of Service 15	Intersection Summary							
0.78 90.0 Sum of lost time (s) 83.7% ICU Level of Service 15	HCM 2000 Control Delay			13.4	\	:M 2000 L	evel of Service	В
90.0 Sum of lost time (s) 83.7% ICU Level of Service 15	HCM 2000 Volume to Capaci	ty ratio		0.78				
83.7% ICU Level of Service 15	Actuated Cycle Length (s)			0.06	Su	m of lost i	ime (s)	12.2
15	Intersection Capacity Utilizati	on		83.7%	⊴	J Level of	Service	Ш
c Critical I ane Group	Analysis Period (min)			15				
	c Critical Lane Group							

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Timings CEXISTING">CEXISTING Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 12/22/2021

 Bowrnallylle Avenue & Hartwell Avenue/Existing Condo Access 	o anu	I I I I	AVE	ine/E	ristilig		DOC C	ŝ		1202/22/21
	1	†	1	-	ţ	•	←	۶	→	
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations		4	W.		4	K.	¢T.	je-	÷	
Traffic Volume (vph)	20	0	怒	~	~	78	466	4	791	
Future Volume (vph)	20	0	怒	←	~	28	466	4	791	
Turn Type	Perm	ΑN	Perm	Perm	ΑN	Perm	ΑN	Perm	NA	
Protected Phases		4			4		2		2	
Permitted Phases	4		4	4		2		2		
Detector Phase	4	4	4	4	4	2	2	2	2	
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	24.3	24.3	24.3	24.3	24.3	27.0	27.0	27.0	27.0	
Total Split (s)	29.7	29.7	29.7	29.7	29.7		60.3	60.3	60.3	
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%	%0.79	%0.79	%0.79	%0.79	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.8	4.8	4.8	
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	1.8	1.8	4.0	1.8	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)		6.3	6.3		6.3	9.9	9.9	9.9	9.9	
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)		8.4	8.4		8.4	72.8	72.8	72.8	72.8	
Actuated g/C Ratio		0.0	0.0		0.09	0.81	0.81	0.81	0.81	
v/c Ratio		0.21	0.24		0.03	0.10	0.44	0.01	0.67	
Control Delay		41.5	15.2		30.7	3.6	4.9	3.8	6.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		41.5	15.2		30.7	3.6	4.9	3.8	6.2	
SOT		Ω	Ω		O	∢	∢	∢	A	
Approach Delay		25.5			30.7		4.8		6.1	
Approach LOS		ပ			O		∢		A	
Intersection Summary										
Cyde Length: 90										
Actuated Cycle Length: 90										
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	phase 2:1	NBSBan	d 6:, Start	of Green	_					
Natural Cyde: 80										
Control Type: Actuated-Coordinated	dinated									
Maximum v/c Ratio: 0.67										
Intersection Signal Delay: 6.6				드	tersection	Intersection LOS: A				
Intersection Capacity Utilization 72.5%	on 72.5%			2	:U Level	ICU Level of Service C	ပ			
Analysis Period (min) 15										



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Signalized Intersection Capacity Analysis <Existing> Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 12/22/2021

Movement EBI EBI WBI WBI WBI WBI WBI WBI WBI WBI BI P	Movement Lane Configurations Traffic Volume (vinh)	EBF		0					F	OON	a	SBT	
20	Lane Configurations		EBT	EBK	WBL	WBT	WBR	NBL	NBI	NDN	ODL	5	SBR
20 0 34 1 1 2 28 466 0 4 731 20 0 0 34 1 1 1 2 28 466 0 4 731 190 1900 1900 1900 1900 1900 1900 1900	Traffic Volume (vnh)		4	R_		4		F	£\$		F	43	
1900 934 1 1 2 2 28 466 0 0 4 791 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 0.85 0.93 0.93 1.00 1.00 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1.00 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1900 1900 0.99 0.95 1.00 0.99 1900 1900 1.00 1.00 1.00 1900 1900 1.00 1.00 1.00 1900 1900 1.00 1.00 1.00 1900 1900 1.00 1.00 1.00 1900 1900 1.00 1.00 1.00 1900 1900 1.00 1.00 1.00 1900 1900 1.00 1.00 1.00 1900 1900 1900 1.00 1900 1900 1900 1900 1900 1900 1900	india organia	20	0	怒	-	-	2	28	466	0	4	791	25
1900 1900	Future Volume (vph)	20	0	怒	-	-	2	28	466	0	4	791	25
1.00 1.00	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
100 100	Total Lost time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	
100 100	Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
100 100	Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
100 0.85	Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		0.99	1.00	
1825 150 0.99 0.95 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055 1.00 0.055	Frt		1.00	0.85		0.93		1.00	1.00		1.00	0.99	
1825 1541 1769 1644 1575 1811 1615 1825 1541 1769 1644 1575 1811 1615 1451 1451 1622 486 1575 843 1615 1451 1451 1622 486 1575 843 1615 29	Fit Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
145 154 162 162 1616	Satd. Flow (prot)		1825	1541		1769		1644	1575		1811	1615	
1451 1541 1622 486 1575 843 1615 29	Flt Permitted		92.0	1.00		0.91		0.28	1.00		0.44	1.00	
1068 0.92 0.75 0.82 0.82 0.68 0.84 0.92 0.95 0.95 29	Satd. Flow (perm)		1451	1541		1622		486	1575		843	1615	
29 0 45 1 1 2 41 555 0 4 833 9 0 29 3 2 0 0 2 0 0 0 0 0 1 0 29 42 0 2 0 0 0 0 0 0 1 0 29 82 0 2 0 41 555 0 4 873 0 2 9 0 2 0 41 555 0 4 874 1 4 4 4 5 6 0 8 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	Peak-hour factor, PHF	99.0	0.92	0.75	0.82	0.82	0.82	0.68	0.84	0.92	0.92	0.95	0.60
0 0 0 42 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0	Adj. Flow (vph)	53	0	42	~	-	2	41	555	0	4	833	42
0	RTOR Reduction (vph)	0	0	45	0	2	0	0	0	0	0	-	0
0% 0% 6% 0% 11% 22% 0% 9% 18% Perm NA N	Lane Group Flow (vph)	0	53	က	0	2	0	41	555	0	4	874	0
Perm NA	Confl. Peds. (#/hr) Heavy Vehicles (%)	%0	%0	%9	%0	%0	%0	11 %	22%	0%	2 %0	18%	17%
4		Perm	Y Y	Perm	Perm	¥		Perm	¥		Perm	AN	
4			4			4			2			2	
6.8 6.8 6.8 70.3 70.3 70.3 70.3 70.3 0.8 6.8 6.8 70.3 70.3 70.3 70.3 0.8 0.8 70.8 70.8 70.8 70.8 70.8 0.8 0.8 70.8 7	Permitted Phases	4		4	4			2			2		
(s) 68 68 68 70.3 70.3 70.3 70.3 70.3 70.3 70.3 70.3	Actuated Green, G (s)		8.9	6.8		8.9		70.3	70.3		70.3	70.3	
0.08	Effective Green, g (s)		8.9	8.9		8.9		20.3	70.3		70.3	70.3	
S	Actuated g/C Ratio		0.08	0.08		0.08		0.78	0.78		0.78	0.78	
S S S S S S S S S S	Clearance Time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	
109 116 122 379 1230 658 650	Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Color Colo	Lane Grp Cap (vph)		109	116		122		379	1230		658	1261	
Color Colo	v/s Ratio Prot								0.35			00.54	
100 100	v/s Ratio Perm		c0.02	0.00		0.00		0.08			0.00		
1392 385 385 24 33 22 130	v/c Ratio		0.27	0.03		0.02		0.11	0.45		0.01	69.0	
d2 1.00 1.00 1.00 1.37 40.6 38.6 38.6 2.9 4.5 0.0 D D D A A A A A A A A A A A A A A A A A	Uniform Delay, d1		39.2	38.5		38.5		2.4	3.3		2.2	4.7	
d2 13 0.1 0.6 1.2 0.0 40.6 38.6 2.9 4.5 3.0 D D D A A A N 39.4 38.6 4.4 A A N 39.4 38.6 4.4 A A N 0 D D A A A A N 6.9 HCM 2000 Level of Service A<	Progression Factor		1.00	1.00		1.00		1.00	1.00		1.37	0.78	
40.6 38.6 38.6 2.9 4.5 3.0 D D D D A A A A A D D D D A A A A A A A A A	Incremental Delay, d2		7.3	0.1		0.1		9.0	1.2		0.0	2.1	
any any b D D D A A A A A A A A 38.6 D A 4.4 5.44	Delay (s)		40.6	38.6		38.6		2.9	4.5		3.0	2.7	
39.4 38.6 4.4 5 Day Delay Delay Disay D	Level of Service		□			□		V	∢		Þ	∢	
6.9 HCM 2000 Level of Service 0.65 90.0 Sum of lost time (s) 72.5% ICU Level of Service 15	Approach Delay (s)		39.4			38.6			4.4			5.7	
6.9 HCM 2000 Level of Service 0.65 90.0 Sum of lost time (s) 72.5% ICU Level of Service 15	Approach LOS					۵			4			4	
6.9 HCM 2000 Level of Service 0.65 Sum of lost time (s) 72.5% ICU Level of Service 15	Intersection Summary												
0.65 90.0 Sum of lost time (s) 72.5% ICU Level of Service 15	HCM 2000 Control Delay			6.9	H	3M 2000 I	Level of S	Service		V			
90.0 Sum of lost time (s) 72.5% ICU Level of Service 15	HCM 2000 Volume to Capacity I	ratio		0.65									
72.5% ICU Level of Service 15	Actuated Cycle Length (s)			0.06	Su	m of lost	time (s)			12.9			
Analysis Period (min) 15	Intersection Capacity Utilization			72.5%	ಠ	U Level o	f Service			ပ			
	Analysis Period (min)			15									

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis 4: Bonnycastle Drive & Aspen Springs Drive

<Existing> Weekday AM Peak Hour 12/22/2021

12/22/2021 5: Fry Cres

HER WW 187 21 21 21 20 20 20 20 20 20 20 20 20 20 20 20 20		†	-	-	Ļ	•	•	
ordigurations (verlih) 187 21 12 175 38 26 Volume (verlih) 187 21 12 175 38 26 Volume (verlih) 187 21 12 175 38 26 Volume (verlih) 67% 21 12 175 38 26 Volume (verlih) 67% 69 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.9	ement	EBT	EBR	WBL	WBT	NBL	NBR	
Volume (verlh) 187 21 175 38 26 Volume (verlh) 187 21 12 175 38 26 Avolume (verlh) 187 21 12 175 38 26 Avolume (verlh) 187 21 12 175 38 26 Our Factor 0,93 0,93 0,93 0,93 0,93 0,93 our Factor 0,93 0,93 0,93 0,93 0,93 0,93 intered (ms) 1 1 2 2 2 2 intered (ms) 1 1 1 2 3 3 3 3 3 3 3 3 3 3 3 3	Configurations	23			4	>		
Volume (Vehr)h 187 21 12 38 26 Anitrol Free Free Stop 20 20 20 20 20 30 0.93	c Volume (veh/h)	187	21	12	175	8	56	
our Factor Free Stop our Factor 0.93 0.93 0.93 0.93 flow rate (vph) 201 23 13 186 41 28 dians diversite (vph) 201 23 13 188 41 28 dians (vph) 201 23 13 18 41 28 dispeed (mis) None 27 23 17 28 th Blockage nr flare (veh) None 42 214 th Blockage None 428 214 storage veh) None 428 214 storage veh None 428 214 blockage veh 4.1 64 6.2 age 1 conf vol 226 428 214 blocked vol 3.5 3.5 3.3 age (s) 224 201 69 3.5 3.5 age (s) 1.1 4.1 4.1 4.1 4.1 4.1	re Volume (Veh/h)	187	21	12	175	88	56	
our Factor 0% 0% 0% four factor 033 033 033 033 four factor 201 23 13 18 41 28 finds 37 11 28 27 37 special (ms) None 3.7 1.1 28 in flate (ver) None 1.1 1.1 28 in flate (ver) None 1.1 1.1 1.1 trype 1.1 1.1 1.1 1.1 1.1 trype 1.1	Control	Free			Free	Stop		
0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93	Ф	%0			%0	%0		
201 23 13 188 41 28 2	Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
None None 165 141 14	y flow rate (vph)	201	23	13	188	41	78	
None None 111	strians					2		
None None 14.1 1.1 1.26 428 214 2.2 3.5 3.3 9.9 93 97 135.2 580 829 EB 1 WB 1 NB 1 2.3 0 28 1700 135.2 661 0.0 0.6 11.1 B 0.0 0.6 11.1 B 0.0 0.6 11.1 B 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	Width (m)					3.7		
None None 165 165 226 428 214 4.1 6.4 62 22 35 33 99 93 97 1352 580 829 EB 1 WB 1 NB 1 23 0.01 0.10 0.0 0.2 2.6 0.0 0.0 11 0.0 0.0 11 0.0 0.0 11 0.0 0.0 11 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1 1.8 0.0 0.0 0.0 11.1	ing Speed (m/s)					1.1		
None 165 165 226 428 214 4.1 6.4 6.2 22 3.5 3.3 99 97 1352 580 829 1362 580 829 13700 1382 661 0.0 0.2 26 0.0 0.2 26 0.0 0.6 11.1 B 1.8 10.0 Level of Service	ent Blockage					0		
None None 165 165 165 165 165 165 165 165 165 164 62 164 62 164 62 164 62 165	turn flare (veh)							
165 226 428 214 4.1 6.4 6.2 2.2 3.5 3.3 99 93 97 1352 580 829 1352 580 829 1352 580 829 1352 580 829 1352 580 829 1352 61 1352 61 1352 61 130 141 18 18 18 18 18 18 18 18		None			None			
165 226 428 214 226 428 214 4.1 6.4 6.2 22 3.5 3.3 99 97 1352 580 829 724 201 69 0 13 41 23 0.01 0.10 0.00 2.2 66 0.0 0.0 2.2 6 0.0 0.0 1.1 B 0.0 0.0 1.1 B 0.0 0.0 1.1 B 0.0 0.0 34,	de veh)							
226 428 214 226 428 214 4.1 6.4 6.2 22 3.5 3.3 99 93 97 1352 580 829 EB1 WB 1 NB 1 23 20 28 1700 1352 661 0.13 0.01 0.10 0.0 0.2 26 0.0 0.2 26 0.0 0.6 11.1 A B 0.0 0.6 11.1 B 0.0 0.6 11.1 1.8 1.8 1.8 1.8 1.8 1.8 1.8	eam signal (m)				165			
226 428 214 226 428 214 4.1 6.4 6.2 2.2 3.5 3.3 99 93 97 1352 580 829 EB 1 WB 1 NB 1 23 0 28 1700 1352 661 0.0 0.0 6 11.1 0.0 0.6 11.1 B 0.0 0.6 11.1 1.8 10.0 CULevel of Service	latoon unblocked							
226 428 214 4.1 6.4 6.2 4.1 6.4 6.2 2.2 3.5 3.3 99 93 97 1352 580 829 1352 580 829 1352 0.0 829 1700 1352 661 0.0 0.2 2.6 0.0 0.6 11.1 B	onflicting volume			226		428	214	
226 428 214 4.1 6.4 6.2 2.2 3.5 3.3 99 93 97 1352 580 829 135 3.3 97 97 1352 580 829 135 3.3 97 97 1352 681 13 0.01 0.10 0.0 0.2 26 0.0 0.2 2.6 0.0 0.2 2.6 0.0 0.2 2.6 0.0 0.2 1.1 1.8 0.0 0.6 11.1 1.8 0.0 0.6 11.1 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8	stage 1 conf vol							
226 428 214 4.1 6.4 6.2 2.2 3.5 3.3 99 93 97 1352 580 829 13 141 224 201 69 0 13 41 23 0 28 1700 1352 661 0.0 0.6 11.1 A B 0.0 0.6 11.1	stage 2 conf vol							
#11 6.4 6.2 2.2 3.5 3.3 9.9 93 97 1352 580 829 EB1 WB1 NB1 224 201 69 23 0 28 1700 1352 661 0.0 0.2 2.6 0.0 0.6 11.1 B 0.0 0.6 11.1 B 1.8 Itization 29.4% ICU Level of Service	unblocked vol			226		428	214	
22 3.5 3.3 99 93 97 1352 580 829 724 201 69 0 13 41 23 20 28 1700 1352 661 0.1 0.0 2.2 6 0.0 0.2 2.6 0.0 0.6 11.1 B 0.0 0.6 11.1 1.8 1CU Level of Service	ngle (s)			4.1		6.4	6.2	
22 35 33 99 93 97 1352 580 829 EB1 WB1 NB1 224 201 69 0 13 41 23 001 0.10 0.0 0.2 26 0.0 0.2 2.6 0.0 0.6 11.1 B 0.0 0.6 11.1 B 0.0 0.6 11.1 B 0.0 0.6 11.1	stage (s)							
1352 580 829 EB1 WB1 NB 1 224 201 69 0 13 41 23 0 28 1700 1352 661 0.0 0.6 11.1 A B 0.0 0.6 11.1 B 0.0 0.6 11.1 A B 0.0 0.6 11.1 B 0.0 0.6 11.1 A B 0.0 0.6 11.1 B 0.0 0.6 11.1 A B 0.0 0.6 11.1 B 0.0 0.6 11.1 B 0.0 0.6 11.1 B				2.2		3.5	3.3	
HB 1 WB 1 NB 1 224 201 69 23 0 28 1700 135 661 0.0 0.2 2.6 0.0 0.6 11.1 B 0.0 0.6 11.1 B 1.8 Ilization 29.4% ICU Level of Service	ene free %			66		83	26	
EB1 WB1 NB1 224 201 69 0 13 41 23 0 28 1700 1352 661 0.0 0.2 2.6 0.0 0.6 11.1 B 0.0 0.6 11.1 B 1.8 Itization 29.4% ICU Level of Service	apacity (veh/h)			1352		280	829	
224 201 69 0 13 41 23 28 1700 1362 661 0.0 0.2 26 0.0 0.2 11 0.0 6 11.1 B 0.0 0.6 11.1 1.8 1.8 Ilization 29.4% ICU Level of Service	tion, Lane #	8	WB 1	NB 1				
0 13 41 23 0 28 1700 28 1700 0.0 0.10 0.0 0.2 2.6 0.0 0.6 11.1 A B 0.0 0.6 11.1 B ICU Level of Service	ne Total	224	201	69				
23 0 28 1700 1352 661 0.03 0.01 0.10 0.0 0.6 11.1 A B 0.0 0.6 11.1 1.1 1.1 1.8 ICU Level of Service	ne Left	0	13	41				
1700 1352 661 0.13 0.01 0.10 0.0 0.2 2.6 0.0 0.6 11.1 A B B 0.0 0.6 11.1 B Ilization 29.4% ICU Level of Service	ne Right	23	0	28				
0.13 0.01 0.10 0.0 0.2 2.6 0.0 0.6 11.1 0.0 0.6 11.1 B 0.0 0.6 11.1 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8		1700	1352	199				
0.0 0.2 2.6 0.0 0.6 11.1 A B B 0.0 0.6 11.1 B B Ilization 29.4% ICU Level of Service	ne to Capacity	0.13	0.01	0.10				
(s) 0.0 0.6 11.1 A B A B Institution C9.4% ICU Level of Service	ie Length 95th (m)	0.0	0.2	5.6				
(s) 0.0 0.6 11.1 B many 1.8 ICU Level of Service	ol Delay (s)	0.0	9.0	11.1				
(s) 0.0 0.6 11.1 B nmary 1.8 ICU Level of Service	SOT		∢	В				
mmary 1.8 ICU Level of Service	bach Delay (s)	0.0	9.0	11.1				
nmary 1.8 1.0 Level of Service 29.4% ICU Level of Service	oach LOS			മ				
1.8 1.29.4% ICU Level of Service	section Summary							
pacity Utilization 29.4% ICU Level of Service	age Delav			1.8				
	ection Capacity Utilization			29 4%	<u></u>	l evel of	Service	A.
	Analysis Pariod (min)			4				

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HCM Unsignalized Intersection Capacity Analysis 5: Fry Crescent (East) & Aspen Springs Drive

<Existing> Weekday AM Peak Hour 12/22/2021

₹ ₹ 1	BT NBL NBR	\$- **	209 11 7	209 11 7	0,		0.92 0.9		2 4	3.7 3.7	1.1			None		250		458 226			458 226					560 814														
*	R WBL WBT		4	3 4 2	Fr		0.92	3 4 2		(*)				N		2		225			225	4.1		2.2	100	1350	1 NB1	11 20	4 12		00 640		0.1 0.7			0.2 10.8	В		0.5	
†	EBT EBR	÷2	201	201	Free		0.92 0.92	218						None													EB1 WB1	221 231	0		1700 1350	_	0.0			0.0				
	Movement	Lane Configurations	Traffic Volume (veh/h)	Future 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)	fF (s)	p0 queue free %	cM capacity (veh/h)	Direction, Lane #	Volume Total	Volume Left	Volume Right	SH	Volume to Capacity	Queue Length 95th (m)	Control Delay (s)	Lane LOS	Approach Delay (s)	Approach LOS	Intersection Summary	Average Delay	, , , ,

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

12/22/2021 <Existing> Weekday AM Peak Hour HCM Unsignalized Intersection Capacity Analysis <Existing> \ 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

Movement EBI EBT EBR Lane Configurations 44 177 1 177 1 177 1 177 1 1		WBT WBR 44 206 9 206 9 0.91 0.91 0.91 0.91 0.91 0.91 0.93 328	NBL 4 4 4 4 4 4 4 4 4 4 4 4 4 4 8 4 4 8 4 4 8 4 4 8 4 4 7.1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 9 9 9 9 9	21 21 476 476 476	Stop 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20 20 20 22 22 239 6.2 39
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Volume (veh/h) 11 177 Volume (veh/h) 11 177 Volume (veh/h) 12 195 Indow rate (vph) 12 195 ians 12 195 inth (m) 12 195 inth (wh) None 244 intring (wh) 244 4.1 age 1 conf vol 244 4.1 age 2 conf vol 244 4.1 age (s) 2.2 4.1 age (s) 2.2 4.1 age (s) 4.1 4.1 age (s) 2.2 4.1 age (s) 2.2 4.1 age (s) 2.2 4.1 age (s) 2.2 4.1 age (s)		60 60 7	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Stop 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	8 8 8 10.0 9 1 198	19 19 21 21 476	Stop 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20 20 20 22 23 239 6.2 239
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our Factor 0.91 0% frow rate (vph) 12 195 fians fridth (m) 13 195 fians (veh)		Ö	0.91 4 484 484 7.1	0.91 0 0 3 3.7 1.1 0 0 474 6.5	198	21 21 476	0.91 0 0 8 8 3.7 1.1 1.1	22 22 23 239 6.2
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None None 244 4.1 4.1 4.1 1324 881 1000 0.2 0.1 1381 0.01 1381 0.05 0.2 0.1 0.5 0.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	4 66 67 6		4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	3 3.7 1.1 0 0 0 474 474	198	21 476	0 8 8 1.1 1.1 1.1 470	23 239 239
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244 244 4.1 2.2 99 1324 1324 1208 208 240 12 4 12 4 1381 0.01 0.02 0.1 0.5 0.2 0.5 0.2 0.5 0.2 0.5 0.2	99 61 7.4	328	484 484 7.1	3.7 1.1 0 0 474 474 6.5	198	476	1.1 1.1 470	239
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None 244 4.1 2.2 2.2 99 1324 68 1 4.1 7.2 1.2 208 240 1.2 208 240 1.2 208 240 0.3 0.3 0.5 0.2 0.1 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	66 1.4. 6	328	484 7.1	474 474 6.5	198	476	470	239
244 244 4.1 2.2 99 1324 EB1 WB1 1208 240 12 4 11 10 1324 1381 0.01 0.02 0.01 0.5 0.2 A A A A A A A A	66 1.4. 6	328	484 484 7.1	474 474 6.5	198	476	470	239
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244 4.1 22 99 1324 EB1 WB1 1 208 240 1324 1324 1381 001 000 0.2 0.5 0.5 0.5	199	328	484 484 7.1	474 474 6.5	198	476	470	239
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244 244 4.1 4.1 1324 1324 1881 0.01 0.2 0.2 0.2 0.3 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	199 199 199		484 7.1	474 474 6.5	198	476	470	239
244 4.1 4.1 2.2 99 1324 1324 124 124 1381 0.01 0.00 0.2 0.1 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	199	Ш	484 7.1	474	198	476	470	239
244 4.1 2.2 99 1324 1324 128 240 12 128 240 12 1381 001 002 003 005 005 005 005 005 005 005 005 005	4.1		484	6.5	198	476	470	239
244 4.1 2.2 99 1324 EB1 WB1 1 208 240 12 4 12 4 1381 001 002 012 0.1 05 0.2 A A A A A A A A A A A A A A A A A A A	4.1		7.1	6.5	198	476	470	239
2.2 99 1324 EB1 WB1 208 240 12 4 1 1 10 1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 A A A A	4.1		7.1	6.5			>	6.2
2.2 99 1324 EB 1 WB 1 208 240 12 4 12 4 12 4 10 00 0.01 0.00 0.2 0.1 0.5 0.2 0.5 0.2	c				6.2	7.1	6.5	;
22 99 1324 EB1 WB1 1 208 240 12 4 11 10 1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 A A A								
1324 EB1 WB1 1 208 240 12 4 10 1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 A A A A A A	7.7		3.5	4.0	3.3	3.5	4.0	3.3
1324 EB1 WB1 1208 240 12 4 4 11 10 1324 1381 0.00 0.	100		66	100	66	96	100	97
208 240 208 240 12 4 1 10 1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 0.5 0.2 0.5 0.2	1381		473	481	845	485	483	799
208 240 12 4 1 10 1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 A A A	SB 1							
12 4 1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 A A A A A								
1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 0.5 0.2	. 54							
1324 1381 0.01 0.00 0.2 0.1 0.5 0.2 A A A 0.5 0.2								
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A A 0.5	=							
0.5 0.2	В							
!	11.4							
pproach LOS B	В							
ntersection Summary								
pacity Utilization 25.5		ICU Level of Service			A			
Analysis Period (min)								

<Existing> Weekday PM Peak Hour 03-14-2022 Timings 1: Bowmanville Avenue & Highway 2

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	‡	*	r	‡		×	*	*	<i>y-</i>	*	-
Traffic Volume (vph)	265	1049	289	130	908	61	241	439	162	84	326	207
Future Volume (vph)	265	1049	289	130	908		241	439	162	84	326	20
Turn Type	pm+pt	Ϋ́	Perm	pm+pt	₹	ď	pm+pt	₹	Perm	Perm	ΑΝ	Perm
Protected Phases	2	2		Ψ	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		
Detector Phase	2	2	7	τ-	9	9	က	∞	∞	4	4	
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	2.0	12.0	12.0	12.0	12.0	12
Minimum Split (s)	0.6	28.0	28.0	9.0	28.0	28.0	9.0	26.0	26.0	26.0	26.0	26
Total Split (s)	10.8	38.7	38.7	6.6	37.8	37.8	13.5	41.4	41.4	27.9	27.9	27.
Total Split (%)	12.0%	43.0%	43.0%	11.0%	45.0%	45.0%	15.0%	46.0%	46.0%	31.0%	31.0%	31.0
Yellow Time (s)	3.0	4.3	4.3	3.0	4.3	4.3	3.0	4.9	4.9	4.9	4.9	4
All-Red Time (s)	0.0	1.9	1.9	0.0	1.9	1.9	0.0	1.6	1.6	1.6	1.6	-
Lost Time Adjust (s)	0.0	0.0	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	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Ľ
Lead-Lag Optimize?	Yes			Yes	Yes	٣						
Recall Mode	None	C-Max	C-Max	None	None	Ş						
Act Effct Green (s)	43.5	32.5	32.5	41.7	31.6	31.6	38.4	34.9	34.9	21.4	21.4	21
Actuated g/C Ratio	0.48	0.36	0.36	0.46	0.35	0.35	0.43	0.39	0.39	0.24	0.24	0.2
v/c Ratio	96.0	96.0	0.49	0.74	0.74	0.14	06:0	0.80	0.28	1.00	1.00	0.5
Control Delay	2.09	46.8	7.7	37.1	30.4	2.0	44.5	30.7	3.4	125.8	82.0	6
Queue Delay	0:0	0.0	0.0	0.0	0.0	0:0	0:0	0.0	0.0	0.0	0.0	O
Total Delay	2.09	46.8	7.7	37.1	30.4	2.0	44.5	30.7	3.4	125.8	82.0	o i
FOS	ш	0	⋖	_	O	⋖	_	O	⋖	ш	ш	
Approach Delay		45.0			29.4			29.2			64.3	
Approach LOS		Ω			O			ပ			ш	

Intersection LOS: DICU Level of Service E Cycle Length: 90 Actuated Cycle Length: 90 Offset: 0 (0%), Asferenced to phase 2:EBTL, Start of Green Natural Cycle: 90 Control Type: Actuated-Coordinated Intersection Signal Delay: 39.9 Intersection Capacity Utilization 89.4% Analysis Period (min) 15 Maximum v/c Ratio: 1.00

Splits and Phases: 1: Bowmanville Avenue & Highway 2



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis <Existing> Weekday PM Peak Hour 1: Bowmanville Avenue & Highway 2 03-14-2022

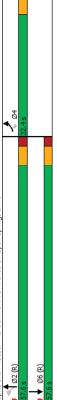
	1	1	<i>></i>	>	ţ	4	•	←	4	۶	→	*
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	‡	*	r	‡	*-	F	*	*	r	*	¥.
Traffic Volume (vph)	265	1049	289	130	806	61	241	439	162	84	326	207
Future Volume (vph)	265	1049	289	130	806	61	241	439	162	84	326	207
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1:00	0.95	1:00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1:00	1.00	0.97	1.00	1.00	0.98	1:00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1:00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1:00	9.0	0.85	1:00	9.	0.85	1.00	1.00	0.85	1:00	1.00	0.85
Fit Protected	0.95	1.00	1:00	0.95	1.00	1:00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2200	3202	1356	1630	3230	1326	1599	1601	1409	1570	1601	1384
FIt Permitted	0.19	1.00	1:00	0.13	1.00	1:00	0.21	1.00	1.00	0.46	1.00	1.00
Satd. Flow (perm)	321	3202	1356	217	3230	1326	356	1601	1409	455	1601	1384
Peak-hour factor, PHF	0.87	0.95	0.30	0.84	96:0	0.82	0.91	0.88	0.87	0.78	98.0	0.84
Adj. Flow (vph)	305	1104	321	155	840	74	265	499	186	108	379	246
RTOR Reduction (vph)	0	0	167	0	0	48	0	0	113	0	0	165
Lane Group Flow (vph)	305	1194	72	155	840	26	265	499	73	108	379	8
Confl. Peds. (#/hr)	2		9	9		2	15		က	က		15
Heavy Vehicles (%)	16%	14%	17%	12%	13%	20%	14%	20%	14%	16%	20%	14%
Turn Type	pm+pt	ΑN	Perm	pm+pt	ΝA	Perm	pm+pt	Ν	Perm	Perm	¥	Perm
Protected Phases	2	2		_	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Actuated Green, G (s)	40.3	32.5	32.5	38.5	31.6	31.6	34.9	34.9	34.9	21.4	21.4	21.4
Effective Green, g (s)	40.3	32.5	32.5	38.5	31.6	31.6	34.9	34.9	34.9	21.4	21.4	21.4
Actuated g/C Ratio	0.45	0.36	0.36	0.43	0.35	0.35	0.39	0.39	0.39	0.24	0.24	0.24
Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	306	1156	489	201	134	465	283	620	246	108	380	329
v/s Ratio Prot	60.00	0.34		90:0	0.26		c0.11	0.31			0.24	
v/s Ratio Perm	00.36		0.11	0.27		0.02	c0.25		0.05	0.24		0.06
v/c Ratio	1.00	96.0	0.31	0.77	0.74	90:0	0.94	0.80	0.13	1.00	1.00	0.24
Uniform Delay, d1	18.7	28.0	20.7	19.4	25.6	19.3	22.5	24.5	17.8	34.3	34.3	27.8
Progression Factor	1:00	1.00	1.00	1.00	1:00	1:00	0.84	0.87	0.82	1.00	1.00	1.00
Incremental Delay, d2	50.2	17.7	1.7	16.6	5.6	0.1	30.1	2.2	0.1	9.98	45.1	0.4
Delay (s)	68.9	45.7	22.4	35.9	28.3	19.4	49.0	27.0	14.7	120.9	79.4	28.2
Level of Service	ш	Ω	ပ	Ω	ပ	മ	Ω	ပ	В	ш	ш	O
Approach Delay (s)		45.5			28.8			30.7			68.3	
Approach LOS		۵			O			O			ш	
Intersection Summary												
HCM 2000 Control Delay			42.1	土	CM 2000	HCM 2000 Level of Service	Service		۵			
HCM 2000 Volume to Capacity ratio	ity ratio		1.02									
Actuated Cyde Length (s)			90.0	ઝ	Sum of lost time (s)	time (s)			18.7			
Intersection Capacity Utilization	lon		89.4%	2	U Level o	CU Level of Service			ш			
Analysis Period (min)			15									
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Critical Lane Group

Timings <Existing> Weekday PM Peak Hour 2: Bowmanville Avenue & Aspen Springs Drive 03-14-2022

and draw	• •	/ ► 8	√ §	← IN	→ B	
Lane Group	EBL	בפע	NBL	NBI	251	
Lane Configurations	<i>y</i> -	*	F	*	£	
Traffic Volume (vph)	<u>1</u> 2	98	66	889	619	
Future Volume (vph)	1 2	98	66	889	619	
Turn Type	Prot	Perm	Perm	Ϋ́	₹	
Protected Phases	4			2	9	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	9	
Switch Phase						
Minimum Initial (s)	8.0	8.0	20.0	20.0	20.0	
Minimum Split (s)	24.0	24.0	27.0	27.0	27.0	
Total Split (s)	32.4	32.4	97.6	57.6	9.73	
Total Split (%)	36.0%	36.0%	64.0%	64.0%	64.0%	
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	
All-Red Time (s)	2.6	5.6	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	6.3	6.3	6.3	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	
Act Effct Green (s)	16.1	16.1	61.7	61.7	61.7	
Actuated g/C Ratio	0.18	0.18	0.69	0.69	69.0	
v/c Ratio	0.68	0.35	0.40	0.73	0.78	
Control Delay	44.9		9.5	1.	10.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	44.9	8.1	9.5	1.1	10.3	
TOS	Ω	∢	∢	മ	В	
Approach Delay	30.6			10.9	10.3	
Approach LOS	O			В	ш	
Intersection Summary						
Cycle Length: 90						
Actuated Cycle Length: 90						
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	to phase 2:1	NBTL and	16:SBT,	Start of G	reen	
Natural Cycle: 70						
Control Type: Actuated-Coordinated	rdinated					
Maximum v/c Ratio: 0.78						
Intersection Signal Delay: 13.9	3.9			드	Intersection LOS: B	LOS: B
Intersection Capacity Utilization 81.0%	tion 81.0%			⊇	:U Level o	ICU Level of Service D
Analysis Period (min) 15						

Splits and Phases: 2: Bowmanville Avenue & Aspen Springs Drive



Proposed Residential Development, 10 Aspen Springs Drive, Bowmarville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 2

<Existing> Weekday PM Peak Hour 03-14-2022 HCM Signalized Intersection Capacity Analysis 2: Bowmanville Avenue & Aspen Springs Drive

According to the control of the co		1	<i>></i>	•	←	→	•	
figurations 1	Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lyme (vph) 154 86 96 619 126 Lyme (vph) 154 86 99 688 619 128 (vphp) 190 1900 1900 1900 1900 1900 Lime (s) 5.9 5.9 6.3 6.3 6.3 6.3 6.3 Lime (s) 5.9 5.9 6.3 6.3 6.3 6.3 6.3 Alkes 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Itimes 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Itimes 1.00 1	Lane Configurations	*	*	r	*	2		
lume (vph) 154 86 99 688 619 128 v(wpta) 300 1900 1900 1900 1900 1900 v(wpta) 5.9 5.9 6.3 6.3 6.3 6.3 6.3 Factor 1.00 1.00 1.00 1.00 1.00 1.00 likes 1.00 1.00 1.00 1.00 1.00 1.00 bibles 1.00 0.95 1.00 1.00 1.00 1.00 v (poru) 1722 15.12 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00<	Traffic Volume (vph)	154	98	66	889	619	126	
Factor 1900 1900 1900 1900 1900 1900 1900 1900 1900	Future Volume (vph)	<u>12</u>	88	8	989	619	126	
Time (s) 5.9 5.9 6.3 6.3 6.3 Fundaments) 5.9 6.3 6.3 6.3 Fundaments) 5.9 6.3 6.3 6.3 6.3 Fundaments) 5.9 6.3 6.3 6.3 6.3 Fundaments) 6.9 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Thready (bikes 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	l otal Lost time (s)	y. 5	5. 5	5.0	5.0	5.0		
tibikes 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	Fmb. ped/bikes	8.6	8.6	8.0	8.0	0.99		
ted (vpt) (v	Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		
ted 0.95 1.00 0.95 1.00 1.00 w (port) 1722 1512 1644 1562 1546 w (port) 1722 1512 1644 1562 1546 rfactor, PHF 0.74 0.65 0.83 0.88 0.94 0.75 duction (vph) 0 0.8 10 0 0.8 10 0 bridges (%) 6% 8% 11% 23% 19% 23% bridges (%) 6% 8% 11% 61.7 61.7 61.7 Green, g (s) 16.1 16.1 61.7 61.7 61.7 bridges (%) 0.08 0.09 0.09 0.00 cap (vph) 3.08 2.00 0.09 0.00 cap (vph) 3.08 6.1 8.9 9.5 benice 0.09 0.00 0.73 0.77 belay, d 1 34.5 30.8 6.1 8.9 9.5 benice 0.00 0.00 0.77 0.89 0.52 benice 0.00 0.00 0.77 0.89 0.52 con Factor 1.00 0.77 0.89 0.52 benice 0.00 0.00 0.77 0.89 0.52 benice 0.00 0.00 0.77 0.89 0.52 control Delay, d 1.29 3.3 3.5 control Delay, d 1.29 3.3 3.5 control Delay atio 0.75 0.75 control Delay atio 0.75 control Delay indication 1.00 0.75 Cycle Length (s) 0.00 0.00 cycle Length (s) 0.00 cycle	T.	1:00	0.85	1.00	1.00	0.97		
v (prot) 1722 1512 1644 1562 1546 ted 3059 1.00 0.25 1.00 0.25 1.00 ted 0.35 1.00 0.25 1.00 1.00 v(pm) 1722 1512 437 1562 1546 1.00 v(pm) 208 1.22 1.9 782 659 168 0.75 dup Flow (vph) 0 0 0 0 8 0 0 0 8 0 dup Flow (vph) 208 1.32 1.19 782 659 168 0 9 0 0 8 0 dup Flow (vph) 208 1.18 238 1.18 238 1.08 0	Fit Protected	0.95	1.00	0.95	1.00	1.00		
ried (1967) 100 (1972 1512) 1512 1512 1512 1516 156 (1968) (1968) (1968) (1969)	Satd. Flow (prot)	1722	1512	1644	1562	1546		
riactor, PHF 0.74 0.65 0.83 0.88 0.94 0.75 riactor, PHF 0.74 0.65 0.83 0.88 0.94 0.75 duction (vph) 2.08 24 119 782 659 168 9 bp Flow (vph) 2.08 24 119 782 819 0 9 Bs. (#hr) 9 8 782 819 0 9 Bs. (#hr) 9 8 11% 23% 19% 23% 9 Bs. (#hr) 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Fit Permitted	0.95	1.00	0.25	1.00	1.00		
rector, PHF 0.74 0.65 0.83 0.88 0.94 0.75 duction (vph) 208 122 119 782 6.99 168 bit (#In/type) 208 24 119 782 6.99 168 bit (#In/type) 208 24 119 782 6.99 168 bit (#In/type) 6% 8% 11% 23% 19% 23% bit (#In/type) 6% 8% 11% 61.7 61.7 61.7 61.7 61.7 61.7 61.7 61.7	Satd. Flow (perm)	1722	1512	437	1562	1546		
(vph) 208 132 119 782 659 168 up Elow (vph) 208 132 119 782 659 168 dup Elow (vph) 208 24 19 782 659 168 dup Elow (vph) 208 24 19 782 819 0 des. (#In) 6% 8% 11% 23% 19% 23% phases 4 2 6 8 11% 23% 19% 23% Phases 4 2 6 6 6 8 11% 23% Phases 4 2 6 6 6 6 6 6 Green, G (s) 16.1 16.1 6.1 6.1 6.1 6.3 <td>Peak-hour factor, PHF</td> <td>0.74</td> <td>0.65</td> <td>0.83</td> <td>0.88</td> <td>0.94</td> <td>0.75</td> <td></td>	Peak-hour factor, PHF	0.74	0.65	0.83	0.88	0.94	0.75	
duction (vph) 208 24 119 782 819 0 ab (#hr) 208 24 119 782 819 0 ab (#hr) 208 24 119 782 819 0 ab (#hr) 6% 8% 11% 23% 19% 23% bhicles (%) 6% 6% 6% 14 2 bhases 4 2 6 bhases 4 2 6 bhases 4 2 6 bhases 6 16.1 16.1 6.1 6.1 7 61.7 can (ph) 308 270 299 1070 1059 broth 0.12 0.02 0.27 0.03 10.0 bhases 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Adj. Flow (vph)	208	132	119	782	629	168	
up Flow (vph) 208 24 119 782 819 0 8s. (#Inf) 6% 8% 11% 23% 19% 23% Phases A 1 23% 19% 23% 9 Phases Pord Perm Perm NA A 2 6 Phases A 2 6 6 6 6 6 Phases A 4 2 6 6 6 6 Green, G (s) 16.1 16.1 61.7 61.7 61.7 61.7 Green, G (s) 16.1 16.1 61.7 61.7 61.7 61.7 Green, G (s) 16.1 16.1 61.7 61.7 61.7 61.7 Green, G (s) 16.1 16.1 61.7 61.7 61.7 61.7 GC Rain (ph) 30 20 63 63 63 63 63 A A A A A	RTOR Reduction (vph)	0	108	0	0	∞	0	
19	Lane Group Flow (vph)	208	24	119	782	819	0	
hicles (%) 6% 8% 11% 23% 19% 23% Prof Perm Perm NA NA PA Phases 4 2 6 Phases 6 Phase	Confl. Peds. (#/hr)			6			တ	
Photaese 4 2 6 6 Phasese 4 2 6 Phasese 6 16.1 f6.1 61.7 f6.1.7 f6.1.7 Green, g(s) 16.1 16.1 61.7 f6.1.7 f6.1.7 Green, g(s) 16.1 16.1 f6.1 61.7 f6.1.7 Salting 1.8 1.8 1.8 1.8 1.8 Delay, d1 31.0 7.6 93 8.5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.9 9.5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.9 9.5 Delay (s) 36.7 8.9 9.5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.9 9.5 Delay (s) 36.7 8.9 9.5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.8 5 Delay (s) 36.7 8.9 9.5 Delay (s) 36.7 8.5 Delay (s) 36.7 8.9 9.5 Delay (s) 36.8 8.9 9.5 Delay (s) 36.8 8.9 9.5 Delay (s) 36.8 8.9 9.5 Dela	Heavy Vehicles (%)	%9	%8	11%	23%	19%	23%	
Phases 4 2 6 Phases 4 2 6 Phases 6 Green, G(s) 16.1 16.1 61.7 61.7 Green, G(s) 16.1 16.1 16.1 16.1 Green, G(s) 16.1 16.1 16.1 16.1 Green, G(s) 16.1 16.1 16.1 16.1 16.1 Green, G(s) 16.1 16.1 16.1 16.1 16.1 16.1 16.1 16.	Turn Type	Prot	Perm	Perm	NA	A		
Phases 4 2 Phases (s) 16.1 16.1 61.7 61.7 61.7 Green, (s) 16.1 16.1 16.1 61.7 Green, (s) 2.1 2.9 6.3 6.3 Atension (s) 3.0 3.0 3.0 3.0 Atension (s) 3.0 2.0 27 Prof. 0.12 0.2 0.27 Prof. 0.01 0.2 0.27 Prof. 0.02 0.27 Prof. 0.02 0.27 Prof. 0.03 0.07 Prof. 0.03 0.07 Prof. 0.04 0.73 0.77 Perm 0.68 0.09 0.07 0.77 Perm 0.68 0.09 0.73 0.77 Perm 0.68 0.09 0.73 0.77 Perm 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.70 Perm 0.70 0.70 0.70 0.70 0.70 0.70 0.70 0.7	Protected Phases	4			7	9		
Green, G (s) 16.1 16.1 61.7 61.7 61.7 Green, G (s) 16.1 16.1 61.7 61.7 Green, g (s) 16.1 16.1 61.7 61.7 Green, g (s) 16.1 16.1 16.1 61.7 61.7 Green, g (s) 16.1 61.7 61.7 61.7 61.7 61.7 61.7 61.7	Permitted Phases		4	2				
Green, g(s) 16.1 16.1 61.7 61.7 61.7 Green, g(s) 16.9 6.9 6.6 6.6 6.6 Full (Red) 5.9 5.9 6.3 6.3 6.3 Attension (s) 3.0 3.0 3.0 3.0 3.0 Cap (vph) 308 270 299 1070 1059 Prof 40.1 2.9 1070 1059 107 Prof 40.2 0.2 0.2 0.2 107 108 107 108 107 108 107 108 107 108 107 108 107 108 107 108 107 108	Actuated Green, G (s)	16.1	16.1	61.7	61.7	61.7		
g/C Ratio 0.18 0.18 0.69 0.69 0.69 a Time (s) 5.9 5.9 6.3 6.3 6.3 Cap (vph) 308 270 299 1070 1059 Prot 0.012 0.50 0.27 Perm 0.68 0.09 0.40 0.73 0.77 Islay, d1 34.5 30.8 6.1 8.9 9.5 Isla Delay, d2 38.7 0.8 6.2 Islay and 38.7 0.8 8.5 Islay and 38.7 0.9 3.3 3.5 Islay and 38.7 0.7 0.8 0.22 Islay and 38.7 0.7 0.8 0.22 Islay and 38.7 0.7 0.8 0.22 Islay and 31.0 7.6 9.3 8.5 Islay and 31.0 7.7 8.6 8.5 Islay and 31.0 7.7 8.7 8.5 Islay and 31.0 7.7 8.8 Islay and 31.0	Effective Green, g (s)	16.1	16.1	61.7	61.7	61.7		
Time (s) 5.9 5.9 6.3 6.3 Attension (s) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Actuated g/C Ratio	0.18	0.18	0.69	0.69	0.69		
xtension (s) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 4.0 <t< td=""><td>Clearance Time (s)</td><td>5.9</td><td>5.9</td><td>6.3</td><td>6.3</td><td>6.3</td><td></td><td></td></t<>	Clearance Time (s)	5.9	5.9	6.3	6.3	6.3		
Cap (vph) 308 270 299 1070 1059 Prof -0.12 0.50 c.0.33 Prof 0.68 0.68 0.68 0.68 0.68 0.77 Prof 0.72 Prof 0.77 Prof 0.72 <	Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		
Prof. doi:10.00.00.00.00.00.00.00.00.00.00.00.00.0	Lane Grp Cap (vph)	308	270	299	1070	1059		
Perm 0.68 0.02 0.27 0.77 0.68 0.09 0.40 0.73 0.77 0.68 0.09 0.40 0.73 0.77 0.68 0.62 0.52 0.77 0.68 0.52 0.77 0.69 0.40 0.77 0.69 0.52 0.77 0.69 0.52 0.77 0.69 0.52 0.77 0.69 0.52 0.77 0.69 0.77 0.69 0.52 0.77 0.69 0.52 0.77 0.75 0.78 0.52 0.77 0.75 0.78 0.78 0.77 0.77 0.78 0.78 0.77 0.77	v/s Ratio Prot	o 0.12			0.50	c0.53		
0.68	v/s Ratio Perm		0.05	0.27				
blay, d1 34.5 30.8 6.1 8.9 9.5 on Factor 1.00 0.77 0.8 0.52 lian Delay, d2 3.10 7.6 9.3 8.5 lenvice D C A A A A Dost Summary 13.4 HCM 2000 Level of Service O'Colume to Capacity ratio 0.75 O'Clae Length (s) 9.0 Sum of lost time (s) 9.0 O'Clack Length (s) 9.0 Sum of lost time (s) 9.0 Sum of lost t	v/c Ratio	0.68	0.09	0.40	0.73	0.77		
on Fador 1.00 1.00 0.77 0.88 0.52 tal Delay, d2 5.8 0.1 2.9 3.3 3.5 tervice D C A A A A A A A A A A A A A A A A A A	Uniform Delay, d1	34.5	30.8	6.1	8.9	9.5		
Idel Delay, d2 58 0.1 2.9 3.3 3.5 Service D 7.6 9.3 8.5 Pervice D 7.6 9.1 8.5 Pervice D 7.6 Perv	Progression Factor	1:00	9.	0.77	0.68	0.52		
40.3 31.0 76 9.3 8.5	Incremental Delay, d2	2.8	0.1	5.9	3.3	3.5		
7 A A A A A A A A A A A A A A A A A A A	Delay (s)	40.3	31.0	9.7	9.3	8.5		
9.1 8.5 A A 13.4 HCM 2000 Level of Service 0.75 Sum of lost time (s) 81.0% ICU Level of Service 15	Level of Service	_	ပ	⋖	¥	∢		
A A A 13.4 HCM 2000 Level of Service 0.75 Sum of lost time (s) 81.0% ICU Level of Service 15	Approach Delay (s)	36.7			9.1	8.5		
13.4 HCM 2000 Level of Service 0.75 Sum of lost time (s) 81.0% ICU Level of Service 15	Approach LOS	Ω			A	V		
13.4 HCM 2000 Level of Service 0.75 Sum of lost time (s) 81.0% ICU Level of Service 15	Intersection Summary							
0.75 90.0 Sum of lost time (s) 81.0% (CU Level of Service 15	HCM 2000 Control Delay			13.4	H	M 2000	aval of Sarvice	В
90.0 Sum of lost time (s) 81.0% ICU Level of Service 15	HCM 2000 Volume to Capac	city ratio		0.75	-	7007		
81.0% ICU Level of Service	Actuated Cycle Length (s)			90.0	S.	m of lost	time (s)	12.2
	Intersection Capacity Utilizat	tion		81.0%	⊴	J Level o	Service	۵
	Analysis Period (min)			15				

Critical Lane Group

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 4

Timings EXisting> Weekday PM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-202">03-14-202

→	SBT	ţ	929	929	NA	2		2		20.0	27.0	97.6	64.0%	4.8	9.1	0.0	9.9			C-Max	72.0	0.80	09:0	6.1	0:0	6.1	V	6.1	A										
۶	SBL	K-	4	4	Perm		2	2		20.0	27.0	57.6	64.0%	4.8	1.8	0.0	9.9			C-Max	72.0	0.80	0.01	4.5	0.0	4.5	∢												
←	NBT	÷	747	747	₹	2		7		20.0	27.0	9.75	64.0%	4.8	1.8	0.0	9.9			C-Max	72.0	0.80	0.71	10.3	0.0	10.3	В	9.7	∢									۵	
•	NBL	je-	72	72	Perm		2	2		20.0	27.0	9.75	64.0%	4.8	1.8	0.0	9.9			C-Max	72.0	0.80	0.23	2.0	0.0	2.0	∢										LOS: A	CU Level of Service D	
Ļ	WBT	4	5	2	¥	4		4		8.0	23.0	32.4	36.0%	3.3	3.0	0.0	6.3			None	9.3	0.10	0.08	56.6	0.0	56.6	ပ	56.6	O				_				Intersection LOS: A	U Level o	
/	WBL		က	က	Perm		4	4		8.0	23.0	32.4	36.0%	3.3	3.0					None													of Greer				Ξ.	ಲ	
<u>/</u>	EBR	¥	29	29	Perm		4	4		8.0	23.0	32.4	36.0%	3.3	3.0	0.0	6.3			None	9.3	0.10	0.34	13.3	0.0	13.3	В						16:, Start						
†	EBT	÷	0	0	ΑN	4		4		8.0	23.0	32.4	36.0%	3.3	3.0	0.0	6.3			None	9.3	0.10	0.33	43.2	0.0	43.2	٥	24.8	O				VBSB and						
1	EBL		33	33	Perm		4	4		8.0	23.0	32.4	36.0%	3.3	3.0					None													to phase 2:N		ordinated		9.4	ation 77.3%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	Natural Cycle: 80	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 0.71	Intersection Signal Delay: 9.4	Intersection Capacity Utilization 77.3%	Analysis Period (min) 15



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis <Existing> Weekday PM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-2022

Movement	EBT 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	EBR 59 59 59 59 63 6.3 1.00 1.00 0.85 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.75 72	WBL 3 3 1900 0.82 4 4	WBT 2 2 2 2 2 1.000 11.0	√ WBR	₩ NBL 22 2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2	₩ INBI	NBR N	<u>→</u> ਲ	→ SBT	SBR
1900 1 19	6.3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	EBR 59 59 59 59 59 59 59 59 59 59 59 59 59	WBL 3 3 1900 0.82 4 4	400 11:00 0:93 0:98	WBR 6 6 1900	NBL 72 7	NBT 🚓	NBR	SBL	SBT 4	SBR
1900 1900 10.68 149 0 0	6.3 0 0 0 0 1900 6.3 6.3 1.00 1.00 0.95 825 0.95 1439 0.92 0 0	59 59 59 1900 6.3 1.00 1.00 1.00 1.541 1.541 1.541 1.541 1.75 79	3 3 1900 4 4	2 2 2 2 2 2 1900 1.00 1.00 1.00 0.93 0.98	6 1900	72 72	4		J	4	45
0.68 0.68 0.00	0 0 0 0 6.3 6.3 11.00 11.00 0.95 0.95 0.95 0.92 0.92	59 59 6.3 6.3 1.00 1.00 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.75 7	1900	2 2 2 2 1100 1100 1100 0.93 0.93	900	22 22	747		_	656	45
1900 1900 0.68 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 6.3 1.00 1.00 1.00 0.95 1439 0.75 0.75 0.75 0.75	59 6.3 6.3 1.00 1.00 1.00 0.85 1.00 1.541 1.00 1.541 7.7	1900	2 1900 6.3 1.00 1.00 0.93 0.93	1900	22	141	က	+	3	2
0.0 0 0 0 0 0 0	6.3 1.00 1.00 1.00 0.95 0.95 0.92 0.92 0.92	6.3 1.00 1.00 0.85 1.00 1.00 1.54 7.7 7.7	0.82	6.3 1.00 1.00 1.00 0.93 0.98		1900	1900	1900	1900	1900	1900
0.0 0 0 0 0 0 0	1.00 1.00 1.00 0.95 0.75 0.75 0.92 0.92 0.92	1.00 1.00 1.00 0.85 1.00 1.00 1.54 1.00 7.75 7.75 7.75 7.75	0.82	1.00 1.00 1.00 0.93 0.98		9.9	9.9		9.9	9.9	
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00 1.00 0.95 0.75 0.92 0.92 0 0 49	1.00 1.00 0.85 1.00 1.00 1.00 1.00 7.7 7.7	0.82	1.00 1.00 0.93 0.98		1:00	1.00		1.00	1.00	
0.68 49 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00 0.95 0.95 0.75 0.92 0 0 0	1.00 0.85 1.00 1.00 1.541 0.75 79 79	0.82	1.00 0.93 0.98		1.00	1.00		1.00	1.00	
0.00 00 00 00 00 00	1.00 0.95 1825 0.75 0.92 0 0 49	0.85 1.00 1.00 1.00 1.541 0.75 79 72	0.82	0.93		1.00	1.00		1.00	1.00	
0.68 49 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.95 1825 0.75 0.92 0 0 49	1.00 1.00 1.00 1.00 7.7 7.2 7.2	0.82	0.98		1.00	1.00		1.00	0.99	
0.68 49 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.75 0.75 0.92 0 0 0 49	1541 1.00 1.00 0.75 79 72 7	0.82	1751		0.95	1.00		0.95	1.00	
0.68 0 49 0 0	0.75 0.92 0 0 49	1.00 1541 0.75 79 72	0.82	<u>₹</u>		1643	1575		1825	1602	
0.68 C 49 C 0 0 0 0	0.92 0 0 0 49	0.75 79 72 7	0.82	0.88		0.33	1.00		0.27	1.00	
0.68 C 49 0 0 0	0.92 0 0 49	0.75 79 7	0.82	1565		268	1575		515	1602	
0 0 0	0 0 6	72 7	4 0	0.82	0.82	0.68	0.84	0.92	0.92	0.95	0.60
0 %0	0 64	72	<	2	7	106	883	က	4	691	75
0 (yd.	49	7	0	9	0	0	0	0	0	2	0
%0			0	7	0	106	892	0	4	764	0
%0						-		2	2		_
	%0	- 1	%0	%0	%0	11%	22%	%0	%0	18%	17%
Perm	ΑĀ	Perm	Perm	NA		Perm	Ν		Perm	₹	
	4			4			5			5	
4		4	4			2			2		
()	7.7	7.7		7.7		69.4	69.4		69.4	69.4	
s)	7.7	7.7		7.7		69.4	69.4		69.4	69.4	
	60.0	0.09		0.09		0.77	0.77		0.77	0.77	
	6.3	6.3		6.3		9.9	9.9		9.9	9.9	
(S	3.0	3.0		3.0		3.0	3.0		3.0	3.0	
(vbh)	123	131		133		437	1214		397	1235	
							c0.57			0.48	
v/s Ratio Perm c0	c0.03	0.00		0.00		0.19			0.01		
	0.40	0.02		0.05		0.24	0.73		0.01	0.62	
	39.0	37.8		37.8		5.9	5.4		2.4	4.5	
	1.00	1.00		1.00		1.00	1:00		1.35	0.87	
tal Delay, d2	2.1	0.2		0.2		1.3	4.0		0.0	1.7	
	41.1	38.0		37.9		4.2	9.4		3.2	2.6	
	۵	۵		٥		∢	4		∢	∢	
	39.2			37.9			8.9			9.6	
Approach LOS	٥						∢			⋖	
Intersection Summary											
HCM 2000 Control Delay		8.6	HC	√ 2000 L	HCM 2000 Level of Service	ervice		Α			
HCM 2000 Volume to Capacity ratio		0.70									
Actuated Cycle Length (s)		0.06	Sun	Sum of lost time (s)	me (s)			12.9			
Intersection Capacity Utilization	_	77.3%	<u> </u>	ICU Level of Service	Service			Ω			
Analysis Period (min)		15									

<existing> Weekday PM Peak Hour</existing>	03-14-2022
HCM Unsignalized Intersection Capacity Analysis	4: Bonnycastle Drive & Aspen Springs Drive

	ì	•	•		_		
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	2			₩	>		
Traffic Volume (veh/h)	216	42	28	197	42	24	
Future Volume (Veh/h)	216	42	28	197	42	24	
Sign Control	Free			Free	Stop		
Grade	%0			%0	%0		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Hourly flow rate (vph)	232	45	30	212	45	26	
Pedestrians					2		
Lane Width (m)					3.7		
Walking Speed (m/s)							
Percent Blockage					0		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)				165			
pX, platoon unblocked							
vC, conflicting volume			279		528	256	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			279		528	256	
tC, single (s)			4.1		6.4	6.2	
tC, 2 stage (s)							
作(s)			2.2		3.5	3.3	
p0 queue free %			86		91	26	
cM capacity (veh/h)			1293		201	785	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	277	242	71				
Volume Left	0	30	45				
Volume Right	42	0	26				
SSH	1700	1293	218				
Volume to Capacity	0.16	0.02	0.12				
Queue Length 95th (m)	0:0	0.5	3.2				
Control Delay (s)	0.0	1.2	12.1				
Lane LOS		∢	В				
Approach Delay (s)	0.0	1.2	12.1				
Approach LOS			В				

Proposed Residential Development, 10 Aspen Springs Drive, Bowmarville, ON Trans-Plan

ICU Level of Service

1.9 39.7% 15

Intersection Summary
Average Delay
Intersection Capacity Utilization
Analysis Period (min)

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Unsignalized Intersection Capacity Analysis <Existing> Weekday PM Peak Hour 5: Fry Crescent (East) & Aspen Springs Drive

HCM Unsignalized Intersection Capacity Analysis <Existing> Weekday PM Peak Hour 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive 03-14-2022

1

14 11 228 7 7 14 11 228 7 7 14 11 228 7 7 14 11 228 7 7 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 24 8 8 15 12 25 12 12 11 11 11 11 11 11 11 11 11 11 11	, ,	†	<u>م</u> [\	↓	√ §	◆	
14 11 228 7 8 Free Stop 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92	۱۳		EBR	WBL	WBT	NBL	NBR	
14 11 228 7 8 Free Stop 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92	-				₩	>		
14 11 228 7 8	24	0	4	=	228	7	∞	
Free Stop 0.82 0.92 0.92 0.92 15 12 248 8 9 2 4 9 3 7 37 1.1 1.1 0 0 0 None 250 290 554 284 4.1 64 6.2 280 1278 490 755 WB 1 NB 1 0 9 1278 490 755 0.01 0.03 0.2 0.7 0.4 112 A B 0.4 112 0.5 0.5 15	246	_	4	Ξ	228	7	∞	
0.92 0.92 0.92 0.92 1.5 1.2 248 9 9 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	<u>8</u>				Free	Stop		
0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92	ô	. 0			%0	%0		
15 12 248 8 9 2 4 3.7 3.7 1.1 1.1 0 0 0 None 250 290 554 284 4.1 6.4 6.2 280 12.8 99 12.8 99 12.8 99 12.8 99 12.8 602 0.01 0.03 0.2 0.7 A B 0.4 11.2 A B 0.4 11.2 A B 0.5 10.5 8 0.5 0.1 0.03 0.2 0.7 A B 0.4 11.2 B B 0.4 11.2 A B 0.5 10.5 8 0.5 0.6 0.7 A B 0.6 0.7 B B 0.7 11.2 A B 0.8 0.5 0.9 0.7 B B 0.9 0.7 B B 0.0 0.7 B B 0.0 0.7 B B 0.1 11.2 B B 0.2 0.7 B B 0.3 11.5 B B 0.4 11.2 B B 0.4 11.2 B B 0.5 10.5 8 0.5	93	01	0.92	0.92	0.92	0.92	0.92	
250 290 554 284 1.1 1.1 0 0 0 None 250 290 554 284 4.1 6.4 6.2 22 3.5 3.3 99 98 99 98 99 98 99 98 99 98 99 1278 490 755 WB1 NB1 128 0.2 0.7 0.4 11.2 A B 0.4 11.2 B 0.5 0.1 0.5 0.5 0.5 0.6 0.7 0.7 0.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	27.	_	15	12	248	∞	6	
3.7 3.7 3.7 3.7 None 250 None 250 554 284 250 554 284 4.1 6.4 6.2 28 35 3.3 99 99 99 1278 490 755 WB1 NB1 260 17 260 9 1278 602 0.01 0.03 0.2 0.7 0.4 11.2 A B B 0.5 ICU Level of Service 15 MB1 16 MB1 17 MB1 18 MB1 18 MB1 18 MB1 19 MB1 10 MB1 10 MB1 10 MB1 11 MB1 12 MB1 12 MB1 13 MB1 14 MB1 15 MB1 16 MB1 17 MB1 18 MB1 18 MB1 18 MB1 18 MB1 19 MB1 10 MB1 10 MB1 11					2	4		
1.1 1.1 None 250 S54 284 290 554 284 4.1 6.4 6.2 22 3.5 3.3 99 99 99 99 99 1278 490 755 WB 1 NB 1 260 17 602 0.01 0.03 0.2 0.7 0.4 11.2 A B 0.4 11.2 A B 0.5 ICU Level of Service 15 In the service of t					3.7	3.7		
None 250 290 554 284 4.1 6.4 6.2 29 1278 8 99 1278 0.0 17 12 8 0.2 0.1 0.3 0.2 0.4 11.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.7 0.4 11.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5								
250 250 250 250 250 250 254 284 4.1 6.4 6.2 28 3.5 3.3 99 98 99 1278 490 755 WB 1 NB 1 260 0.01 0.03 0.2 0.1 0.4 11.2 A B 0.4 11.2 A B 0.4 11.2 A B 0.4 11.2 A B 0.5 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0					0	0		
None 250 554 284 4.1 6.4 6.2 22 35 35 33 99 98 99 98 99 178 60 17 12 8 0.0 17 12 8 0.2 0.7 0.4 11.2 0.4 11.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5								
250 250 250 254 284 4.1 6.4 6.2 22 3.5 3.3 99 98 99 1278 490 755 WB 1 128 602 0.01 128 602 0.01 0.03 0.2 0.7 A B 0.4 11.2 B 0.4 11.2 B 0.5 11.8 B 0.6 0.7 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.0 0.3 0.3	ouc				None			
250 290 554 284 4.1 290 554 284 4.1 6.4 6.2 22 3.5 3.3 99 98 98 99 1278 490 755 WB 1 28 0 17 28 0 0 17 28 0 0 17 28 0 0 17 28 0 0 17 28 0 0 17 28 0 0 17 28 0 0 17 28 0 0 17 28 0 0 17 28 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0								
290 554 284 290 554 284 4.1 6.4 6.2 2.2 3.5 3.3 99 98 99 98 99 98 99 1278 490 755 WB1 NB1 260 17 12 8 0.0 17 12 8 0.2 0.7 0.4 11.2 A B 0.4 11.2 A B 0.5 ICU Level of Service 15 8 16%					250			
290 554 284 4.1 6.4 6.2 2.2 3.5 3.3 99 98 99 12.78 490 755 NB.1 17 8 8 9 602 0.03 0.7 11.2 B 11.2 B 11.2 B 31.6% ICU Level of Service								
290 554 284 4.1 6.4 6.2 2.2 3.5 3.3 99 98 99 1278 490 755 NB1 77 8 8 9 602 0.03 0.7 11.2 B 11.2 B 11.2 B 11.2 B 11.2 B 11.2 1.3 1.6% ICU Level of Service				290		554	284	
290 554 284 4.1 64 62 22 3.5 3.3 99 98 99 1278 490 755 WB 1 NB 1 260 17 12 8 602 0.01 0.03 0.2 0.7 0.4 11.2 A B B 0.4 11.2 A B B 0.4 11.2 A B B 0.5 0.7 0.6 0.5 0.7 0.7 0.8 0.7 0.8 0.7 0.9 0.7 0.1 0.03 0.2 0.7 0.8 0.7 0.9 0.7 0								
290 554 284 4.1 6.4 6.2 2.2 3.5 3.3 99 99 99 1278 490 755 WB1 NB1 260 17 20 17 20 17 20 9 1278 602 0.01 0.03 0.2 0.7 0.4 11.2 A B 0.4 11.2 A B 0.5 (CU Level of Service 15 (CU Level of Service)								
4.1 6.4 6.2 2.2 3.5 3.3 99 99 99 1278 490 755 NB1 17 17 18 8 9 602 0.03 0.7 11.2 B 1.2 B 1.				290		554	284	
2.2 3.5 3.3 99 98 99 12.78 490 755 WB 1 NB 1 260 17 12 8 602 0.01 0.03 0.2 0.7 0.4 11.2 A B B 0.4 11.2 A B B C C U Level of Service				4.1		6.4	6.2	
22 3.5 3.3 1278 490 755 WB1 NB1 260 17 12 8 602 0.01 0.03 0.2 0.7 0.4 11.2 A B B 0.4 11.2 A B B 0.4 11.2 A B B 0.6 11.2 A B B 0.7 0.5 0.8 0.5 0.9 0.7 0.1 0.03 0.0 0.7 0.1 0.03 0.1 0.03 0.2 0.7 0.3 0.5 0.4 11.2 A B B 0.4 11.2 A B B 0.5 0.5 0.7 0.6 0.5 0.7 0.7 0.7 0.7 0.8 0.5 0.7 0.8 0.5 0.7 0.9 0.5 0.7 0.9 0.5 0.7 0.9 0.5 0.7 0.9 0.5 0.7 0.9 0.5 0.7 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9								
99 98 99 99 98 1278 490 755 99 755 99 99 99 99 99 99 99 99 99 99 99 99 9				2.2		3.5	3.3	
1278 490 755 NB1 17 17 8 9 602 0.03 0.7 11.2 B 11.2 B 11.2 B 11.2 12.3 16.% 15.9 16.7 17.1 18.9 19.9 10.9				66		88	66	
WB1 NB1 260 17 12 8 10 9 1278 662 0.01 0.03 0.2 0.7 0.4 11.2 A B 0.4 11.2 B 0.5 1CU Level of Service 15 15 15 15 15 15 15 15 15 15 15 15 15 1				1278		490	755	
260 17 12 8 0 9 1278 602 0.01 0.03 0.2 0.7 0.4 11.2 A B B 0.4 11.2 A B B 0.5 (CU Level of Service	EB 1		WB1	NB 1				
12 8 0 9 1278 602 0.01 0.03 0.4 11.2 A B B 0.4 11.2 B B 0.4 11.2 B B 0.4 11.2 B 11.8 B	286		260	17				
1278 602 0.01 0.03 0.2 0.7 0.4 11.2 A B B 0.4 11.2 0.5 31.6% ICU Level of Service	0		12	œ				
1278 602 0.01 0.03 0.2 0.7 0.4 11.2 A B 0.4 11.2 B 1.6% ICU Level of Service	7		0	တ				
0.01 0.03 0.2 0.7 0.4 11.2 A B 0.4 11.2 0.5 ICU Level of Service 15	20		1278	602				
0.2 0.7 0.4 11.2 A B B 0.4 11.2 B B CU Level of Service 15.6% ICU Level of Service	Ε.		0.01	0.03				
0.4 11.2 A B B 0.4 11.2 B B 0.5 31.6% ICU Level of Service 15	0.		0.2	0.7				
A B 0.4 11.2 B 0.5 31.6% ICU Level of Service 15	0.	_	0.4	11.2				
0.4 11.2 B 0.5 31.6% ICU Level of Service 15			⋖	ш				
ICU Level of Service	0.0		0.4	11.2				
ICU Level of Service				В				
ICU Level of Service								
ICU Level of Service				0.5				
15			.,	31.6%	⊴	U Level of	Service	
				15				

3.3

4.0 100 416

3.5 96 420

3.3 100 759

4.0 100 412

3.5 98 418

2.2 99 1279

2.2 99 1308

4.1

27 27 18 9 9 9 499 0.05 1.3 12.6 B 12.6 B

258 8 34 1279 0.01 0.1 0.3 A

304 16 16 18 308 308 0.01 0.3 0.5 0.5

Direction, Lane #
Volume Total
Volume Left
Volume Right
cSH
Volume to Capacity
Queue Length 55th (m)
Control Delay (s)
Lane LOS

2 452 0.03 0.6 13.2 B 13.2 B

241 6.2

580 6.5

282

588

572 7.1

241

580

570

282

288

572

291

258

Pedesirians
Lane Width (m)
Walking Stocked (mis)
Percent Blockede (mis)
Percent Blockede (mis)
Median type
Median storage veh
Dy, palabou unblocked
VC, conflicting volume
VC1, stage 1 cont vol
Co, stage 2 cont vol
Co, stage 2 cont vol
Co, stage 6)
F(S)
F(S)
G(S

Stop 0% 0.91

9 9

3 3

16

5 5

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

197 197 197 0% 0.91 216

246 246 246 0% 0.91 270

18

0.91

0.91

34

0.91

18

0.91

Grade Peak Hour Factor Hourly flow rate (vph) 0

None 328

None

Stop 0% 0.91

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Synchro 10 Report Page 9

ICU Level of Service

1.2 30.6% 15

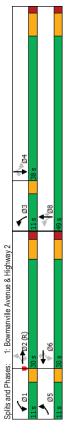
Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach Delay (s) Approach LOS

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Timings https://weekdayhtt

	1	†	1	>	ţ	4	•	—	*	۶	→	*
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	*	*	F	*	¥.	jr.	*	¥C.	F	*	¥c.
Traffic Volume (vph)	72	638	229	167	741	49	197	277	88	30	502	259
Future Volume (vph)	154	638	229	167	741	49	197	277	88	30	502	259
Turn Type	pm+pt	Α	Perm	pm+pt	ΑN	Perm	pm+pt	Ϋ́	Perm	Perm	₹	Perm
Protected Phases	2	2		Ψ-	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	7	7	Ψ.	9	9	က	∞	∞	4	4	4
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	2.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	9.0	28.2	28.2	0.6	28.2	28.2	0.6	26.0	26.0	30.5	30.5	30.5
Total Split (s)	11.0	30.0		11.0		30.0	11.0	49.0		38.0	38.0	38.0
Total Split (%)	12.2%	33.3%		12.2%		33.3%	12.2%	24.4%	54	42.2%	42.2%	42.2%
Yellow Time (s)	3.0	4.3		3.0		4.3	3.0	4.9		4.9	4.9	4.9
All-Red Time (s)	0.0	1.9	9:1	0.0		1.9	0.0	1.6		1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	3.0	6.2		3.0	6.2	6.2	3.0	6.5		6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead		Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	C-Max	Ó	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	35.4	23.8	23.8	35.4	23.8	23.8	45.6	42.1	42.1	31.1	31.1	31.1
Actuated g/C Ratio	0.39	0.26	0.26	0.39	0.26	0.26	0.51	0.47	0.47	0.35	0.35	0.35
v/c Ratio	0.84	0.83	0.53	0.81	0.97	0.15	0.80	0.51	0.16	0.14	0.95	0.47
Control Delay	51.3	41.6	7.0	45.1	28.7	1.6	36.2	16.5	2.3	21.7	59.0	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	41.6	7.0	45.1	28.7	1.6	36.2	16.5	2.3	21.7	29.0	8.9
TOS	0	_	∢	_	ш	⋖	۵	ш	⋖	O	ш	⋖
Approach Delay		34.3			52.8			20.0			39.2	
Approach LOS		ပ			٥			В			٥	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	o phase 2:	EBTL, St	art of Gre	eu								
Natural Cycle: 90												
Control Type: Actuated-Coordinated	rdinated											
Maximum v/c Ratio: 0.97												
Intersection Signal Delay: 38.0	3.0			드	Intersection LOS: D	LOS: D						
Intersection Capacity Utilization 83.6%	ion 83.6%			2	CU Level of Service E	of Service	ш					
Analysis Period (min) 15												



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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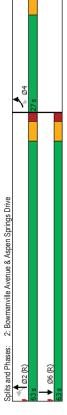
HCM Signalized Intersection Capacity Analysis <Background> 2024 Weekday AM Peak Hour 1: Bowmanville Avenue & Highway 2

	4	†	1	-	Ļ	4	•	←	•	۶	→	•
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	‡	*-	*	‡	*-	r	*	*	*	*	*
Traffic Volume (vph)	154	638	229	167	741	49	197	27.7	88	30	205	259
Future Volume (vph)	154	638	229	167	741	49	197	277	88	30	205	259
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1:00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1:00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1:00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1587	3147	1344	1586	3174	1253	1547	1562	1474	1445	1601	1360
Flt Permitted	0.17	1.00	1.00	0.21	1.00	1.00	0.18	1.00	1.00	0.54	1.00	1.00
Satd. Flow (perm)	281	3147	1344	329	3174	1253	294	1562	1474	820	1601	1360
Peak-hour factor, PHF	0.79	0.92	0.75	0.81	0.91	0.79	0.95	0.74	0.75	0.75	0.95	0.86
Adj. Flow (vph)	195	693	302	206	814	62	207	374	117	40	528	301
RTOR Reduction (vph)	0	0	224	0	0	46	0	0	62	0	0	174
Lane Group Flow (vph)	195	693	8	206	814	16	207	374	22	40	528	127
Confl. Peds. (#/hr)	2		10	10		2	15		က	က		15
Heavy Vehides (%)	15%	16%	18%	15%	15%	27%	18%	23%	%6	76%	20%	16%
	pm+pt	ΑA	Perm	pm+pt	₹	Perm	pm+pt	₹	Perm	Perm	Ν	Perm
	2	2		-	9		က	∞			4	
	2		2	9		9	∞		∞	4		4
Actuated Green, G (s)	32.2	23.8	23.8	32.2	23.8	23.8	42.1	42.1	42.1	31.1	31.1	31.1
Effective Green, g (s)	32.2	23.8	23.8	32.2	23.8	23.8	42.1	42.1	42.1	31.1	31.1	31.1
Actuated g/C Ratio	0.36	0.26	0.26	0.36	0.26	0.26	0.47	0.47	0.47	0.35	0.35	0.35
Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Venicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	222	832	355	242	839	331	248	730	689	283	553	469
v/s Ratio Perm	0.23	77.0	0.00	0.22	00.50	0.01	0.32	14	0.04	0.05	3	0.09
v/c Ratio	0.88	0.83	0.23	0.85	0.97	0.05	0.83	0.51	0.08	0.14	0.95	0.27
Uniform Delay, d1	22.8	31.2	25.9	22.5	32.7	24.7	18.1	16.8	13.2	20.3	28.8	21.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.82	0.68	1.00	1.00	1.00
Incremental Delay, d2	30.0	9.6	1.5	23.8	23.9	0.1	19.8	9.0	0.0	0.2	27.1	0.3
Delay (s)	52.7	40.8	27.4	46.4	9.99	24.7	37.3	14.3	9.1	20.5	55.9	21.6
Level of Service	Ω	□	O	□	ш	O	□	ш	⋖	ပ	ш	O
Approach Delay (s)		39.3			52.9			20.2			42.4	
Approach LOS		Ω			Ω			O			Ω	
Intersection Summary												
HCM 2000 Control Delay			40.4	ヹ	HCM 2000 Level of Service	Level of	Service		۵			
HCM 2000 Volume to Capacity ratio	y ratio		0.94									
Actuated Cycle Length (s)	4		0.06	ઝ ઽ	Sum of lost time (s)	time (s)			18.7			
Analysis Period (min)	=		03.070	2	n revel	oervice			ш			
c Critical Lane Group			2									

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Timings /weekday Aspen Springs Drive
o href="https://weekday">o href="https://weekday Aspen Springs Drive
o href="https://weekday Aspen Springs Drive

	1	1	•	—	→	
Lane Group	EBL	EBR	NBL	NBT	SBT	
Lane Configurations	r	*-	r	*	£	
Traffic Volume (vph)	131	95	88	431	789	
Future Volume (vph)	131	92	88	431	789	
Turn Type	Prot	Perm	Perm	Ϋ́	NA	
Protected Phases	4			2	9	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	9	
Switch Phase						
Minimum Initial (s)	8.0	8.0	20.0	20.0	20.0	
Minimum Split (s)	24.0	24.0	27.0	27.0	27.0	
Total Split (s)	27.0	27.0	63.0	63.0	63.0	
Total Split (%)	30.0%	30.0%	%0.07	%0.07	%0.02	
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	
All-Red Time (s)	5.6	5.6	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	6.3	6.3	6.3	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	С-Мах	C-Max	
Act Effct Green (s)	14.5	14.5	63.3	63.3	63.3	
Actuated g/C Ratio	0.16	0.16	0.70	0.70	0.70	
v/c Ratio	0.64	0.40	0.49	0.45	0.89	
Control Delay	45.5	8.9	13.2	9.6	19.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.5	8.9	13.2	5.6	19.7	
ros	۵	∢	В	∢	В	
Approach Delay	28.9			7.0	19.7	
Approach LOS	O			∢	В	
Intersection Summary						
Cycle Lenath: 90						
Actuated Cycle Length: 90						
Offset 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	phase 2:	NBTL an	d 6:SBT,	Start of G	ue	
Natural Cycle: 90						
Control Type: Actuated-Coordinated	Jinated					
Maximum v/c Ratio: 0.89						
Intersection Signal Delay: 17.3	က			드	Intersection LOS: B	
Intersection Capacity Utilization 87.6%	on 87.6%			2	ICU Level of Service E	
Analysis Period (min) 15						



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Propos

Synchro 10 Report Page 3

HCM Signalized Intersection Capacity Analysis <Background> 2024 Weekday AM Peak Hour 2: Bowmanville Avenue & Aspen Springs Drive

Movement							
	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	*	*	r	*	£		
Traffic Volume (vph)	131	95	88	431	789	109	
Future Volume (vph)	131	92	88	431	789	109	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.9	5.9	6.3	6.3	6.3		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		
Frpb, ped/bikes	1:00	1.00	1.00	1:00	0.99		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		
Fr	1:00	0.85	1.00	1.00	0.98		
Fit Protected	0.95	1.00	0.95	1.00	1.00		
Satd. Flow (prot)	1722	1512	1644	1562	1564		
Flt Permitted	0.95	1.00	0.18	1.00	1.00		
Satd. Flow (perm)	1722	1512	313	79CL	1564		
Peak-hour factor, PHF	0.74	0.65	0.83	0.88	0.94	0.75	
Adj. Flow (vph)	177	146	107	490	836	145	
RTOR Reduction (vph)	0 [122	107	0 00/	9 820	0	
Confl. Peds. (#/hr)		F-7	စ်	2	5	റ ത	
Heavy Vehicles (%)	%9	%8	11%	23%	19%	23%	
Turn Type	Prot	Perm	Perm	NA	¥		
Protected Phases	4			2	9		
Permitted Phases		4	2				
Actuated Green, G (s)	14.5	14.5	63.3	63.3	63.3		
Effective Green, g (s)	14.5	14.5	63.3	63.3	63.3		
Actuated g/C Ratio	0.16	0.16	0.70	0.70	0.70		
Clearance Time (s)	5.9	5.9	6.3	6.3	6.3		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	277	243	220	1098	1100		
v/s Ratio Prot	c0.10			0.31	c0.63		
v/s Ratio Perm		0.02	0.34				
v/c Ratio	0.64	0.10	0.49	0.45	0.89		
Uniform Delay, d1	35.3	32.2	0.9	2.8	10.6		
Progression Factor	0.1	00.1	0.68	0.66	0.95		
Incremental Delay, 02	0.4	20.00	9.0		0.0		
Delay (s)	- 04	S.2C	5 5 6	0.0			
Annmach Delay (s)	38.6	2	۵	£ 4	16 a		
Approach Delay (3)	9			- <	2 0		
Approach LOS	2			₹	٥		
Illel section summaly							
HCM 2000 Control Delay	citor die		16.8	오	SM 2000	HCM 2000 Level of Service	æ
HCM 2000 Volume to Capacity ratio	city ratio		0.04	•			
Actuated Cycle Length (s)			90.0		Im of lost	Sum of lost time (s)	12.2
Intersection Capacity Utilization	rtion		%9.78	2	U Level o	f Service	ш
Analysis Period (min)							

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Timings <a href="center

HCM Signalized Intersection Capacity Analysis <Background> 2024 Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-202

 Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 	enue &	напже	all Ave	nue/Ex	ıstıng	Condo) Acce	SS		03-14-2022
	1	†	<i>></i>	>	ţ	•	+	۶	→	
Lane Group	EBL	EBI	EBR	WBL	WBT	R	NBT	SBL	SBT	
Lane Configurations		₹	*		4	*	÷z	*	2	
Traffic Volume (vph)	21	0	38	~	~	8	498	4	853	
Future Volume (vph)	21	0	36	-	~	30	498	4	853	
Turn Type	Perm	Ϋ́	Perm	Perm	N A	Perm	Ϋ́	Perm	Ν	
Protected Phases		4			4		2		2	
Permitted Phases	4		4	4		7		2		
Detector Phase	4	4	4	4	4	2	2	2	2	
Switch Phase										
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	27.0	27.0	27.0	27.0	
Total Split (s)	29.7	29.7	29.7		29.7	60.3	60.3	60.3	60.3	
Total Split (%)	33.0%	33.0%	33.0%	33	33.0%	%0'.29	%0.79	%0.79	%0.79	
Yellow Time (s)	3.3	3.3	3.3		3.3	4.8	4.8	4.8	4.8	
All-Red Time (s)	3.0	3.0	3.0		3.0	<u></u>	— —	1.8	1.8	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3	6.3		6.3	9.9	9.9	9.9	9.9	
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)		8.5	8.5		8.5	72.8	72.8	72.8	72.8	
Actuated g/C Ratio		0.0	0.0		0.09	0.81	0.81	0.81	0.81	
v/c Ratio		0.23	0.26		0.03	0.13	0.47	0.01	0.72	
Control Delay		41.7	15.0		30.3	4.0	5.2	4.2	8.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		41.7	15.0		30.3	4.0	5.2	4.2	8.0	
SOT		Ω	ш		O	∢	V	⋖	V	
Approach Delay		25.5			30.3		5.1		7.9	
Approach LOS		O			O		∢		A	
Intersection Summary										
Cycle Length: 90										
Actuated Cycle Length: 90										
Offset 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	to phase 2:	NBSB an	d 6:, Star	t of Greer	_					
Natural Cycle: 80										
Control Type: Actuated-Coordinated	ordinated									
Maximum v/c Ratio: 0.72										
Intersection Signal Delay: 7	7.7			드	tersectio	Intersection LOS: A				
Intersection Capacity Utilization 75.8%	ation 75.8%			0	U Level	ICU Level of Service D	۵			
Analysis Period (min) 15										

***** Splits and Phases: 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access \(\psi \frac{A}{2} \) (R)

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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	1	†	*	>	Ļ	4	•	←	•	۶	→	•
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4	¥.		4		r	£,		r	2	
Traffic Volume (vph)	21	0	36	-	—	2	30	498	0	4	853	26
Future Volume (vph)	21	0	36	-	-	2	30	498	0	4	853	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		0.99	1.00	
±4		1.00	0.85		0.93		1.00	1.00		1:00	0.99	
Fit Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1825	154		1769		1644	1575		1812	1616	
Flt Permitted		92.0	1.00		0.91		0.25	1.00		0.42	1.00	
Satd. Flow (perm)		1451	1541		1622		433	1575		803	1616	
Peak-hour factor, PHF	0.68	0.92	0.75	0.82	0.82	0.82	89.0	0.84	0.92	0.92	0.95	09.0
Adj. Flow (vph)	31	0	48	-	-	2	44	593	0	4	868	43
RTOR Reduction (vph)	0	0	44	0	7	0	0	0	0	0	_	0
Lane Group Flow (vph)	0	31	4	0	2	0	44	593	0	4	940	0
Confl. Peds. (#/hr)							_		2	2		_
Heavy Vehides (%)	%0	%0	%9	%0	%0	%0	11%	22%	%0	%0	18%	17%
Turn Type	Perm	Ν	Perm	Perm	≨		Perm	₹		Perm	Ϋ́	
Protected Phases		4			4			5			5	
Permitted Phases	4		4	4			2			2		
Actuated Green, G (s)		6.9	6.9		6.9		70.2	70.2		70.2	70.2	
Effective Green, g (s)		6.9	6.9		6.9		70.2	70.2		70.2	70.2	
Actuated g/C Ratio		0.08	0.08		0.08		0.78	0.78		0.78	0.78	
Clearance Time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		111	118		124		337	1228		626	1260	
v/s Ratio Prot								0.38			00.58	
v/s Ratio Perm		c0.02	0.00		0.00		0.10			0.00		
v/c Ratio		0.28	0.03		0.02		0.13	0.48		0.01	0.75	
Uniform Delay, d1		39.2	38.5		38.4		2.4	3.5		2.2	5.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.49	9.5 25.5	
Incremental Delay, d2		4.6	0.1		0.1		8.0	4.		0.0	2.3	
Delay (s)		40.6 G	85.0 0.0		38.5		3.2	y. 2.		y.,	7.7	
Level of Service		<u>-</u>	a		ם נ		⋖	∢ !		⋖	∢ (
Approach Delay (s)		39.4			38.5			4.7			7.2	
Approach LOS		٥			Ω			∢			∢	
Intersection Summary												
HCM 2000 Control Delay			7.9	H	HCM 2000 Level of Service	evel of S	ervice		V			
HCM 2000 Volume to Capacity ratio	ity ratio		0.70									
Actuated Cycle Length (s)			0.06	Su	Sum of lost time (s)	ime (s)			12.9			
Intersection Capacity Utilization	io		75.8%	⊇	ICU Level of Service	Service			□			
Analysis Period (min)			12									
The leading												

c Critical Lane Group

Proposed Residential Development, 10 Aspen Springs Drive, Bowmarville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis-Background> 2024 Weekday AM Peak Hour 4: Bonnycastle Drive & Aspen Springs Drive

HCM Unsignalized Intersection Capacity Analysis<Background> 2024 Weekday AM Peak Hour 5: Fry Crescent (East) & Aspen Springs Drive

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph)

Stop 0.92 11 4 4

222 222 222 0% 0.92 241

213 213 213 0.92 232

Sign Control

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

240

486

239

Pedesirians
Lane Width (m)
Walking Stocked (mis)
Percent Blockede (mis)
Percent Blockede (mis)
Median type
Median storage veh
Dy, palabou unblocked
VC, conflicting volume
VC1, stage 1 cont vol
Co, stage 2 cont vol
Co, stage 2 cont vol
Co, stage 6)
F(S)
F(S)
G(S

None 245

None

3.3

3.5 98 540

2.2 100 1334

240

486

4	NBR		28	28			0.93	30										228			228	6.2		3.3	96	815														
√	WBT NBL		185 41		0)		0.93 0.93		2	3.7	- -	0		None		160		457			457	6.4		3.5	92	228														
*	WBL WI			14	Ľ.			15 1						9		_		240			240	4.1		2.2	8	1336	NB 1	74	4	30	640	0.12	3.0	11.4	Ф	11.4	В		1.9	
<u> </u>	EBR		22	22			0.93	54																			WB1	214	15	0	1336	0.01	0.3	9.0	⋖	9.0				
†	EBT	2	199	199	Free	%0	0.93	214						None													EB 1	238	0	24	1700	0.14	0.0	0.0		0.0				
	Movement	Lane Configurations	Traffic Volume (veh/h)	Future Volume (Veh/h)	Sign Control	Grade	Peak Hour Factor	Hourly flow rate (vph)	Pedestrians	Lane Width (m)	Walking Speed (m/s)	Percent Blockage	Right tum 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	

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Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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ICU Level of Service

0.5 25.5% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

627 0.03 0.8 10.9 B 10.9 B

0.0

Approach Delay (s) Approach LOS

0.00 0.00 0.1 0.2 A

3 3 3 700 0.14 0.0

Direction, Lane #
Volume Total
Volume Left
Solume Right
SSH
Volume to Capacity
Queue Length Sth (m)
Control Delay (s)
Lane LOS

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis-Background> 2024 Weekday AM Peak Hour 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

HCM Unsignalized Intersection Capacity Analysis-Background> 2024 Weekday AM Peak Hour 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

1

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph)

Stop 0% 0.92 0

199 199 0% 0.92 216

226 226 226 0.92 0.92

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

216

462

216

Walking Speed (m/s)
Malking Speed (m/s)
Percent Blookage
Percent Blookage
Right turn flare (veh)
Median type
Median type
Median storage veh)
Upstream signal (m)
Dx, plathon unblooked
vC, conflicting volume
vC1, stage 2 conf vol
vC2, stage 2 conf vol
vC2, stage 8 (s)
f(s)
C, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 4 stage (s)
f(s)
G, 4 stage (s)
G, 5 stage (s)
G, 5 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 7 stage (s)
G, 8 stag

79

None

None

216

462

3.3 100 824

3.5 100 558

2.2 100 1354

Monomenent		\	Ť	>	-	,	/		_	L	•	+	•
12 18	Novement	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
h) 12 188 1 4 219 10 4 0 9 20 0 Free CSO 211 0.91 0.91 0.91 0.91 0.91 0.91 0.91 0.	Configurations		4			4			4			4	
12 188	: Volume (veh/h)	12	188	_	4	219	10	4	0	တ	20	0	21
Free Free Stop O% O% O% O% O% O% O% O	Volume (Veh/h)	12	188	-	4	219	10	4	0	တ	20	0	21
0.91 0.94 0.95 0.96 0.97 0.91 0.91 0.91 0.91 0.91 0.91 0.91 0.91	Control		Free			Free			Stop			Stop	
0.91			%0			%0			%0			%0	
13 207	Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
None None None S14 S04 S10 S10 S10 S10 S11 S11 S14 S04 S10 S	flow rate (vph)	13	207	-	4	241	#	4	0	10	22	0	23
None None None 1.1 1	trians								က			∞	
None None None 323 e 260 211 3514 504 210 506 500 1 22 22 22 3.5 4.0 3.3 3.5 4.0 1 306 1368 670 585 1 1 11 10 23 1 11 10 23 1 100 0.02 0.08 1 0.01 0.05 1.9 1 0.5 0.1 10.5 11.7 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 10 23 1 1 1 1 1 10 23 1 1 1 1 1 10 23 1 1 1 1 1 10 23 1 1 1 1 1 10 23 1 1 1 1 1 10 23 1 1 1 1 1 1 10 23 1 1 1 1 1 10 23 1 1 1 1 1 10 23 1 1 1 1 1 1 10 23 1 1 1 1 1 1 10 23 1 1 1 1 1 1 10 23 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Vidth (m)								3.7			3.7	
None None None 323 e 260 211 514 504 210 506 500 l 22 22 22 22 3.5 4.0 3.3 3.5 4.0 1306 1306 1308 670 586 1306 1308 670 586 0.01 0.00 0.02 0.08 m) 0.2 0.1 10.5 11.7 A A B B B B B B B W Villization 27.26 None None None None None None None None	ig Speed (m/s)								-:			7:	
None None 323 ad 260 211 323 ad 260 211 514 504 210 506 500 1 260 211 4.1 7.1 6.5 6.2 7.1 6.5 99 100 99 100 99 95 100 1306 1368 670 585 m) 0.2 1 0.5 11 7 A A B B B B B Nullization 27.26 A 1.5	nt Blockage								0			-	
None None None 323 e 260 211 514 504 210 506 500 1 260 211 514 504 210 506 500 2 2 2 2 2 3.5 4.0 3.3 3.5 4.0 1 306 1308 14 45 1 1 10 23 1 10 23 1 10 23 1 10 5 11 7 1 1 10 5 11 1 1 1 0 23 1 1 1 1 0 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 23 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	um flare (veh)												
## 260 211 514 504 210 506 500 1	n type		None			None							
Secondary State	n storage veh)												
8d 260 211 514 504 210 506 500 1 1 2 60 211 514 504 210 506 500 1 2 2 2 2 2 3.5 4.0 3.3 3.5 4.0 3.9 95 100 99 95 90 99 95 100 99 95 90 99 95 100 99 95 90 99 95 90 99 90 99 90 99 90 99 90 99 90 99 90 99 90 99 90 99 90 99 90 99 90 99 90 90	am signal (m)					323							
e 260 211 514 504 210 506 500 211 260 211 514 504 210 506 500 211 260 211 514 504 210 506 500 200 200 200 200 200 200 200 200 200	atoon unblocked												
1	nflicting volume	260			211			514	204	210	206	200	254
1	tage 1 conf vol												
260 211 514 504 210 506 500 21 4.1 7.1 6.5 6.2 7.1 6.5 7.1	tage 2 conf vol												
22 2.2 3.5 4.0 3.3 3.5 4.0 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 6.2 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.2 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.5 7.1 6.5 7.1 7.1 7.1 7.1 7.1 7.1 7.1 7.1 7.1 7.1	nblocked vol	260			211			514	204	210	206	200	254
2.2 2.2 3.5 4.0 3.3 3.5 4.0 3.9 99 1306 1306 1308 1308 1308 1308 1308 1308 1308 1308	gle (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
22 22 3.5 4.0 3.3 3.5 4.0 1306 1306 1306 451 462 832 462 465 1306 1306 451 462 832 462 465 1306 1368 670 585 670 685 670 585 670 670 670 670 670 670 670 670 670 670	tage (s)												
1306 100 99 100 99 100 99 100 99 1100		2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
1306 1368 451 462 832 465 46	ue free %	66			100			66	100	66	92	100	97
EB1 WB1 NB1 SB1 221 266 14 45 13 4 4 4 22 1 1 10 23 1306 1368 670 585 0.01 0.00 0.02 0.08 m) 0.2 0.1 0.5 1.9 0.5 0.1 10.5 11.7 A A B B B B B B B A A B B B A B B B A A B B B A A B B B B	oacity (veh/h)	1306			1368			451	462	832	462	465	783
221 256 14 45 13 14 22 1 1 10 23 1306 1368 670 585 m) 0.01 0.00 0.02 0.08 m) 0.5 0.1 0.5 1.9 0.5 0.1 10.5 11.7 A A B B B 0.5 0.1 10.5 11.7 B B B y 1.5 ICU Level of Service	on, Lane #	EB 1	WB 1	NB 1	SB 1								
13 4 2 2 11 11 10 23 1306 1368 670 585 0.01 0.00 0.02 0.08 m) 0.2 0.1 0.5 1.9 0.5 0.1 10.5 11.7 A A B B B 0.5 0.1 10.5 11.7 A A B B B 0.5 1.1 10.5 11.7 A A B B B 1.5 1.7 1.5 1.7	e Total	221	256	14	45								
1 11 10 23 1306 1368 670 585 0.01 0.02 0.02 0.08 m) 0.2 0.1 0.5 1.9 A A B B B A A B B B O.5 0.1 10.5 11.7 B B B Y 1.5 Utilization 27.2% ICU Level of Service	e Left	13	4	4	22								
1306 1388 670 588 0.01 0.00 0.02 0.08 m) 0.2 0.1 0.5 1.9 0.5 0.1 10.5 11.7 A A B B B 0.5 0.1 10.5 11.7 Y 1.5 I.5 ICU Level of Service	e Right	-	=	10	23								
m) 0.01 0.00 0.02 0.08 0.2 0.1 0.5 1.9 0.5 0.1 10.5 11.7 A A B B B 0.5 0.1 10.5 11.7 B B B 7 1.5 1.5 (CU Level of Service		1306	1368	029	585								
m) 0.2 0.1 0.5 1.9 0.5 0.1 10.5 11.7 A A B B B 0.5 0.1 10.5 11.7 B B B Y 1.5 Vibilization 27.2% ICU Level of Service	e to Capacity	0.01	0.00	0.02	0.08								
0.5 0.1 10.5 11.7 A A B B B 0.5 0.1 10.5 11.7 B B B 7 1.5 Utilization 27.2% ICU Level of Service	Length 95th (m)	0.2	0.1	0.5	1.9								
A A B B 0.5 0.1 10.5 11.7 B B B y 1.5 1.5 I Utilization 27.2% ICU Level of Service	ol Delay (s)	0.5	0.1	10.5	11.7								
9.5 0.1 10.5 11.7 B B B 7 1.5 1.0 Level of Service	SO	∢	⋖	ш	ш								
y 1.5 1.0 Level of Service	ach Delay (s)	0.5	0.1	10.5	11.7								
1.5 27.2% CU Level of Service	ach LOS			В	В								
1.5 27.2% ICU Level of Service	ection Summary												
27.2% ICU Level of Service	yeleC er			ر ب									
15 E 16 E	oction Canacity I Hilization			27 2%	<u>C</u>	ava	Spryice			⊲			
	in Praised (min)			0/7:17	2	ם דפגפו	201/100			ζ			

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

ICU Level of Service

0.0 15.2% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

0.00 0.00 0.0 A 0.0 A

0.0

0.0

Approach Delay (s) Approach LOS

0.13

oSH Volume to Capacity Queue Length 95th (m) Control Delay (s) Lane LOS

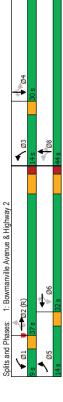
246 0 0 0.00 0.00 0.00

Direction, Lane #
Volume Total
Volume Left
Volume Right

HCM Unsignalized Intersection Capacity Analysis-Background> 2024 Weekday AM Peak Hour 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

																																							<	Œ.	
•	SBR		0	0			0.92	0																															Consider	acivice of Seivice	
→	NBT SBT	↓	563 899		_		0.92 0.92	312 977						None None		117 379																							ا ۱۲۱	I CO Level	
✓	NBL N		0		ш	Ì		0						ž			0.73	277			982	4.1		2.2	100	610	SB 1	22.6	0	0	1700	0.57	0:0	0.0		0.0			0.0	15	
/	EBR	*-	0	0		0	0.92	0									0.73	212			786	6.2		3.3	100	287	NB 1	612	0	0	1700	0.36	0.0	0.0		0.0					
^	EBL		0	0	Stop	%0	0.92	0									0.79	1589			1287	6.4		3.5	100	143	EB 1	0	0	0	1700	0.00	0.0	0.0	∢ 0	0.0	∢		9	<u></u>	
	Movement	Lane Configurations	Traffic Volume (veh/h)	Future 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	Analysis Period (min)	

	4	†	<u> </u>	-	Ļ	4	•	—	•	۶	→	*
Lane Group	EBF	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	‡	*-	*	‡	*-	۴	*	*	r	*	*-
Traffic Volume (vph)	291	1149	317	138	910	65	270	466	171	88	346	234
Future Volume (vph)	291	1149	317	138	910	65	270	466	171	88	346	234
Turn Type	pm+pt	N A	Perm	pm+pt	₹	Perm	pm+pt	≨	Perm	Perm	Ϋ́	Perm
Protected Phases	2	2		_	9		က	00			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	2	2	-	9	9	က	∞	∞	4	4	4
Switch Phase												
Minimum Initial (s)	4.5	20.0	20.0	4.0	20.0	20.0	4.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	0.6	28.2	28.2	7.0	28.2	28.2	7.0	30.5	30.5	25.0	25.0	25.0
Total Split (s)	14.0	37.0	37.0	9.0	32.0	32.0	14.0	44.0	44.0	30.0	30.0	30.0
Total Split (%)	15.6%	41.1%	41.1%	10.0%	35.6%	35.6%	15.6%	48.9%	48.9%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.3	4.3	3.0	4.3	4.3	3.0	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	0.0	1.9	1.9	0.0	1.9	1.9	0.0	1.6	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0.0	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	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	43.0	30.8	30.8	35.0	25.8	25.8	41.0	37.5	37.5	23.5	23.5	23.5
Actuated g/C Ratio	0.48	0.34	0.34	0.39	0.29	0.29	0.46	0.42	0.42	0.26	0.26	0.26
v/c Ratio	0.95	1.10	0.56	0.85	1.02	0.16	0.85	0.79	0.28	09.0	96.0	0.51
Control Delay	62.9	90.2	10.7	54.0	69.2	0.7	34.7	27.1	5.6	44.7	70.3	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	90.2	10.7	54.0	69.2	0.7	34.7	27.1	5.6	44.7	70.3	9.5
SOT	ш	ш	В	Ω	ш	∢	ပ	ပ	∢	Ω	ш	⋖
Approach Delay		9.07			62.5			24.3			45.2	
Approach LOS		ш			ш			O				
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	to phase 2:	EBTL, St	art of Gre	en								
Natural Cycle: 90												
Control Type: Actuated-Coordinated	rdinated											
Maximum v/c Ratio: 1.10												
Intersection Signal Delay: 55.1	5.1			=	Intersection LOS: E	LOS: E						
Intersection Capacity Utilization 95.1%	tion 95.1%			೦	U Level o	ICU Level of Service F	ш					
Analysis Period (min) 15												



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis <Background> 2024 Weekday PM Peak Hour 1: Bowmanville Avenue & Highway 2

Movement Lane Configurations Traffic Volume (vph) Future Volume (vph) Ideal Flow (vphpl)	EBL	EBT	GGG	2	F 0.44				-	2	F	כ
Lane Configurations Traffic Volume (vph) Future Volume (vph) Ideal Flow (vphpl)	ŀ		למן	WBL	WBT	WBR	M M	NBT	NBR	SBL	SBI	SBR
Traffic Volume (vph) Future Volume (vph) Ideal Flow (vphpl)	je-	\$	*-	<u>, </u>	‡	*-	*	*	¥	r	*	*-
Future Volume (vph) Ideal Flow (vphpl)	291	1149	317	138	910	92	270	466	171	88	346	234
Ideal Flow (vphpl)	291	1149	317	138	910	92	270	466	171	88	346	234
	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1:00	1:00	0.97	1.00	1.00	0.97	1.00	1:00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr	1:00	1:00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2200	3202	1356	1630	3230	1326	1599	1601	1409	1570	1601	1384
Flt Permitted	0.14	1.00	1.00	0.16	1.00	1.00	0.22	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)	230	3202	1356	266	3230	1326	363	1601	1409	726	1601	1384
Peak-hour factor, PHF	0.87	0.95	06:0	0.84	96.0	0.82	1.00	0.88	0.87	0.78	98.0	0.84
Adj. Flow (vph)	334	1209	352	164	948	79	270	530	197	114	402	279
RTOR Reduction (vph)	0	0	168	0	0	26	0	0	113	0	0	182
Lane Group Flow (vph)	334	1209	78	164	948	23	270	230	84	114	402	97
Confl. Peds. (#/hr)	2		9	9		2	15		က	က		15
Heavy Vehicles (%)	16%	14%	17%	12%	13%	20%	14%	20%	14%	16%	20%	14%
Turn Type	pm+pt	ΑĀ	Perm	pm+pt	Ϋ́	Perm	bm+pt	Ν Α	Perm	Perm	₹	Perm
Protected Phases	2	7		-	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Actuated Green, G (s)	39.8	30.8	30.8	31.8	25.8	25.8	37.5	37.5	37.5	23.5	23.5	23.5
Effective Green, g (s)	39.8	30.8	30.8	31.8	25.8	25.8	37.5	37.5	37.5	23.5	23.5	23.5
Actuated g/C Ratio	0.4	0.34	0.34	0.35	0.29	0.29	0.45	0.42	0.42	0.26	0.26	0.26
Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	342	1095	464	<u>\$</u>	922	380	302	299	287	189	418	361
//s Ratio Prot	00.12	c0.38		90.0	0.29		c0.11	0.33			0.25	
//s Ratio Perm	0.31		0.14	0.25		0.02	c0.26		90.0	0.16		0.07
//c Ratio	0.98	1.10	0.40	0.89	1.02	90.0	0.89	0.79	0.14	09.0	96.0	0.27
Uniform Delay, d1	26.3	29.6	22.5	24.9	32.1	23.3	20.4	22.9	16.3	29.5	32.8	26.4
Progression Factor	1:00	1.00	1.00	1.00	1.00	1.00	0.83	0.85	0.67	1.00	1.00	1.00
Incremental Delay, d2	45.0	60.4	2.5	37.4	36.1	0.1	19.7	4.5	0.1	5.3	34.0	0.4
Delay (s)	68.2	90.0	25.1	62.4	68.2	23.4	36.7	23.8	10.9	34.5	8.99	26.8
Level of Service	ш	ш	ပ	ш	ш	ပ	Ω	ပ	Ф	ပ	ш	O
Approach Delay (s)		74.1			64.4			24.8			48.2	
Approach LOS		ш			ш			O			۵	
Intersection Summary												
HCM 2000 Control Delay			57.4		HCM 2000 Level of Service	Level of	Service		ш			
HCM 2000 Volume to Capacity ratio	ty ratio		1.05									
Actuated Cycle Length (s)			90.0	ઝ	Sum of lost time (s)	time (s)			18.7			
Intersection Capacity Utilization	uc		95.1%	೦	ICU Level of Service	of Service	an.		ш			
Analysis Period (min)			15									

Timings CBackground> 2024 Weekday PM Peak Hour Springs Drive 03-14-202

→	SBT	÷z.	299	299	¥ N	9		9		20.0	27.0	57.0	63.3%	4.2	2.1	0.0	6.3	Lag	Yes	C-Max	53.3	0.59	1.01	42.9	0.0	42.9	۵	42.9	٥				_				Intersection LOS: C	CU Level of Service C	
—	NBT	*	744	744	Ν	2		2			27.0		73.3% 63	4.2	2.1	0.0	6.3								0.0			12.1	മ				tart of Gree				Inters	ICOI	
•	NBL	je-	105	105	pm+pt	2	2	2		2.0	8.0	9.0	10.0%	3.0	0.0	0.0	3.0	Lead	Yes		99.1	0.73	0.57	22.9	0.0	22.9	ပ						d 6:SBT, S						
<u> </u>	EBR	*	92	95	Perm		4	4		8.0	24.0	24.0	26.7%	3.3	5.6	0.0	5.9			None	15.0	0.17	0.38	9.0	0.0	9.0	∢						NBTL an						
1	EBL	je.	163	163	Prot	4		4		8.0	24.0	24.0	26.7%	3.3	2.6	0.0	5.9			None	15.0	0.17	0.71	50.2	0.0	50.2	Ω	33.1	ပ				to phase 2:	-	ordinated		18.2	ation 71.6%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	Natural Cycle: 90	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 1.01	Intersection Signal Delay: 28.2	Intersection Capacity Utilization 71.6% Analysis Period (min) 15	Alialysis Ferroa (min) to

Splits and Phases: 2: Bowmanville Avenue & Aspen Springs Drive



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Signalized Intersection Capacity Analysis <Background> 2024 Weekday PM Peak Hour 2: Bowmanville Avenue & Aspen Springs Drive

	1	<i>></i>	•	←	→	•	
Novement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	*	æ	×	*	£3		
raffic Volume (vph)	163	92	105	744	299	134	
uture Volume (vph)	163	92	105	744	299	134	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
otal Lost time (s)	5.9	5.9	3.0	6.3	6.3		
ane Util. Factor	1.00	1.00	1.00	1.00	1.00		
rpb, ped/bikes	1.00	1:00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		
ĮĮ.	1.00	0.85	1.00	1.00	0.98		
It Protected	0.95	1.00	0.95	1.00	1.00		
Satd. Flow (prot)	1601	1471	1644	1642	1641		
It Permitted	0.95	1.00	0.08	1.00	1.00		
Satd. Flow (perm)	1601	1471	143	1642	1641		
Peak-hour factor, PHF	0.86	0.68	0.87	0.85	0.80	0.89	
Adj. Flow (vph)	190	135	121	875	834	151	
RTOR Reduction (vph)	0	113	0	0	7	0	
ane Group Flow (vph)	190	23	121	875	878	0	
confl. Peds. (#/hr)	က		_			_	
Heavy Vehicles (%)	14%	11%	11%	17%	15%	10%	
urn Type	Prot	Perm	pm+pt	AA	Ν		
Protected Phases	4		2	2	9		
Permitted Phases		4	2				
Actuated Green, G (s)	15.0	15.0	62.8	62.8	53.3		
Effective Green, g (s)	12.0	15.0	62.8	62.8	53.3		
Actuated g/C Ratio	0.17	0.17	0.70	0.70	0.59		
Clearance Time (s)	5.9	5.9	3.0	6.3	6.3		
/ehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		
ane Grp Cap (vph)	266	245	208	1145	971		
//s Ratio Prot	00.12		0.04	c0.53	09:00		
/s Ratio Perm		0.02	0.36				
//c Ratio	0.71	0.09	0.58	0.76	1.0		
Iniform Delay, d1	35.5	31.7	16.6	8.8	18.4		
Progression Factor	1.00	1.00	1.79	0.67	0.71		
ncremental Delay, d2	8.8	0.2	2.8	3.3	26.1		
Delay (s)	44.2	31.9	32.4	9.2	39.2		
evel of Service	□	O	ပ	∢	□		
Approach Delay (s)	39.1			12.0	39.2		
pproach LOS	Ω			Ф	Ω		
ntersection Summary							
HCM 2000 Control Delay			27.4	E	M 2000 I	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	ity ratio		0.93	2			
Actuated Cycle Length (s)			90.0	S	Sum of lost time (s)	ime (s)	15.2
ntersection Capacity Utilization	ion		71.6%	⊇	CU Level of Service	Service	O
nalysis Period (min)			15				
Care legiting							

c Critical Lane Group

Timings CBackground 2024 Weekday PM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-2022

→	SBT	£\$	707	707	ΑN	2		2		2.0	27.0	9.75	64.0%	4.8	1.8	0.0	9.9			C-Max	72.1	0.80	0.64	8.3	0.0	8.3	⋖	8.2	⋖										
۶	SBL	*	4	4	Perm		2	2		2.0	27.0	57.6	64.0%	4.8	1.8	0.0	9.9			C-Max	72.1	0.80	0.01	5.2	0.0	5.2	∢												
←	NBT	\$	807	807	≨	2		2		2.0	27.0	57.6	64.0%	4.8	1.8	0.0	9.9			C-Max	72.1	0.80	0.76	12.6	0.0	12.6	ш	11.8	В								Ç	د	
•	NBL	r	92	9/	Perm		2	2		2.0	27.0	97.6	64.0%	4.8	1.8	0.0	9.9			C-Max	72.1	0.80	0.27	5.6	0.0	9.9	⋖										LOS: B	O Level of Service C	
ļ	WBT	4	5	2	₹	4		4		2.0	23.0	32.4	36.0%	3.3	3.0	0.0	6.3			None	8.7	0.10	0.09	25.2	0.0	25.2	ပ	25.2	O								Intersection LOS: B	n revel	
>	WBL		က	က	Perm		4	4		2.0	23.0	32.4	36.0%	3.3	3.0					None													of Greer				<u>=</u> ⊆	2	
<u> </u>	EBR	¥L.	63	63	Perm		4	4		2.0	23.0	32.4	36.0%	3.3	3.0	0.0	6.3			None	8.7	0.10	0.38	13.6	0.0	13.6	ш						d 6:, Start						
†	EBT	÷	0	0	ΑA	4		4		2.0	23.0	32.4	36.0%	3.3	3.0	0.0	6.3			None	8.7	0.10	0.37	44.8	0.0	44.8	_	25.4	O				VBSB and						
1	BB		32	32	Perm		4	4		2.0	23.0	32.4	36.0%	3.3	3.0					None													to phase 2:h		ordinated		1.4	4110H 09.2%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	Natural Cycle: 90	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 0.76	Intersection Signal Delay: 11.4	Intersection Capacity Utilization 69.2%	Analysis Period (min) 15



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis <Background> 2024 Weekday PM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access

HCM Unsignalized Intersection Capacity Analysis<Background> 2024 Weekday PM Peak Hour 4: Bonnycastle Drive & Aspen Springs Drive

0.93

31

0.93

Grade Peak Hour Factor Hourly flow rate (vph)

NBL 45 45 45 00% 0.93 8.7 3.7 1.1

> 209 209 209 0% 0.93 225

> 230 230 230 0.93 247

> > Sign Control

25 25

29

4 4 4 4

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL		4	1	1	\	ļ	4	•	•	•	۶	→	•
1900 1900	Movement	EBF	EBI	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
35 0 63 3 2 7 76 807 3 4 36 100 1900 1900 1900 1900 1900 1900 1900	Lane Configurations		÷	¥.		€\$		*	£		r	£	
35 0 63 3 2 7 76 807 3 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Traffic Volume (vph)	32	0	83	က	5	7	9/	807	က	4	707	47
1900 1900 1900 1900 1900 1900 1900 1900	Future Volume (vph)	32	0	83	က	2	7	9/	807	က	4	707	47
100 100	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
1.00	l otal Lost time (s)		6.3	6.3		5.0		9.9	9.6		9.9	9.6	
1.00	Lane Util. Factor		9.5	1.00		9.1		9.1	1.00		1.00	1.00	
1.00	Frpb, ped/bikes		0.1	00.5		0.1		0.1	1.00		1.00	1.00	
1.00	Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
1825 144			00.5	0.82		0.92		1.00	1.00		1.00	0.99	
1825 1541 1742 1643 1575 1825 1482 1482 1484 1482 1484 1482 1484 1482 1484 1482	Fit Protected		0.95	1.00		0.39		0.95	1.00		0.95	1.00	
HF 0.68 134 1575 0.82 0.82 0.82 1575 157 157 0.82 0.82 0.82 0.82 157 157 0.82 0.82 0.82 0.82 0.82 157 0.82 0.82 0.82 0.88 0.84 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92	Satd. Flow (prot)		1825	1541		1742		1643	1575		1825	1603	
HF 0.68 0.92 0.75 0.82 0.82 0.89 0.84 0.92 0.92 0.92 0.80 0.89 0.89 0.89 0.89 0.89 0.89 0.89	Flt Permitted		0.75	1.00		0.89		0.30	1.00		0.24	1.00	
HF 068 092 075 082 082 068 084 092 092 092 091 091 0 0 77 0 17 0 10 0 0 0 0 0 0 0 0 0 0 0	Satd. Flow (perm)		1436	1541		1575		522	1575		452	1603	
ph) 0 0 77 0 8 112 961 3 4 4 1 2 9 112 961 3 4 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Peak-hour factor, PHF	89.0	0.92	0.75	0.82	0.82	0.82	0.68	0.84	0.92	0.92	0.95	09.0
ph) 0 0 51 7 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Adj. Flow (vph)	21	0	\$	4	7	တ	112	961	က	4	744	78
ph) 0 51 7 0 7 0 112 964 0 4 0	RTOR Reduction (vph)	0	0	11	0	∞	0	0	0	0	0	2	0
0% 6% 0% 0% 11% 22% 0% 0% 1% 1 1	Lane Group Flow (vph)	0	21	7	0	7	0	112	964	0	4	820	0
1,000, 0,000,	Confl. Peds. (#/hr)							_		2	2		_
Perm NA NA NA Perm NA	Heavy Vehicles (%)	%0	%0	%9	%0	%0	%0	11%	22%	%0	%0	18%	17%
(s) 7.6 7.6 69.5 69.5 69.5 69.5 (s) 7.6 7.6 69.5 69.5 69.5 69.5 (s) 7.6 7.6 7.6 69.5 69.5 69.5 69.5 69.5 69.5 69.5 69	Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	¥	
(s) 7.6 7.6 7.6 69.5 69.5 69.5 69.5 (9.5 6.9.5 6.9.5 6.9.5 6.9.5 (9.5 6.	Protected Phases		4			4			2			2	
(s) 7.6 7.6 69.5 69.5 69.5 69.5 (s) 69.5 (s) 7.6 7.6 69.5 69.5 69.5 69.5 (s) 7.6 7.6 69.5 69.5 69.5 69.5 69.5 69.5 69.5 69	Permitted Phases	4		4	4			2			2		
s) 7.6 7.6 7.6 69.5 69.5 69.5 69.5 69.5 69.5 69.5 69	Actuated Green, G (s)		9.7	9.7		7.6		69.5	69.5		69.5	69.5	
0.08 0.08 0.07 0.77 0.77 0.77 0.78 0.78	Effective Green, g (s)		9.7	9.7		9.7		69.5	69.5		69.5	69.5	
S	Actuated g/C Ratio		0.08	0.08		0.08		0.77	0.77		0.77	0.77	
S	Clearance Time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	
121 130 133 403 1216 349 349 340 3	Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Court Cour	Lane Grp Cap (vph)		121	130		133		403	1216		349	1237	
Control of the cont	v/s Ratio Prot								c0.61			0.51	
0.42	v/s Ratio Perm		c0.04	0.00		0.00		0.21			0.01		
391 37.9 37.9 3.0 6.0 2.4 1.00 1.00 1.00 1.00 1.05 1.2 24 0.2 0.2 1.7 5.4 0.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	v/c Ratio		0.42	0.02		0.02		0.28	0.79		0.01	99.0	
1,00	Uniform Delay, d1		39.1	37.9		37.9		3.0	0.9		2.4	4.8	
d2 2.4 0.2 0.2 1.7 5.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	Progression Factor		1.00	1.00		9.		9.	1.00		1.63	1.26	
11.5 38.1 38.0 4.7 11.4 3.9 2	Incremental Delay, d2		2.4	0.5		0.2		1.7	5.4		0.0		
39.4 38.0 A B A 7 7 7 3 8.0 B A 7 7 7 8.0 B B A 7 7 7 8.0 B B A 7 8.0 B B A 7 8.0 B B A 7 8.0 B B B A 7 8.0 B B B A 7 8.0 B B B B A 7 8.0 B B B B B A 7 8.0 B B B B B B B B B B B B B B B B B B B	Delay (s)		41.5	38.1		38.0		4.7	11.4		3.9	7.1	
39.4 38.0 10.7 D Delay 11.3 HCM 2000 Level of Service B COL Level of Service COL Service COL	Level of Service		Ω	Ω		۵		∢	Ф		<	∢	
11.3 HCM 2000 Level of Service 0.76 80.0 Sum of lost time (s) 69.2% ICU Level of Service 1.5	Approach Delay (s)		39.4			38.0			10.7			7.1	
11.3 HCM 2000 Level of Service 0.76 Sum of lost time (s) 69.2% ICU Level of Service	Approach LOS		٥						В			4	
11.3 HCM 2000 Level of Service 0.76 Sum of lost time (s) 69.2% ICU Level of Service 1.5	Intersection Summary												
0.76 90.0 Sum of last time (s) 69.2% ICU Level of Service 15	HCM 2000 Control Delay			11.3	 	3M 2000	Level of S	Service		B			
90.0 Sum of lost time (s) 69.2% ICU Level of Service	HCM 2000 Volume to Capacit	ty ratio		0.76									
69.2% ICU Level of Service	Actuated Cycle Length (s)	,		0.06	ร	im of lost	time (s)			12.9			
7	Intersection Capacity Utilizatic	r.		69.2%	೦	U Level o	of Service			O			
	Analysis Period (min)			15									

3.3 96 770

3.5 90 480

2.2 98 1274 75 75 48 27 27 555 0.14 3.5 12.5 B

294 0 0 0.17 0.00 0.00

Direction, Lane #
Volume Total
Volume Left
Solume Right
SSH
Volume to Capacity
Queue Length Sth (m)
Control Delay (s)
Lane LOS

560

272

260

296

Pedesirians
Lane Width (m)
Walking Stocked (mis)
Percent Blockede (mis)
Percent Blockede (mis)
Median type
Median storage veh
Dy, palabou unblocked
VC, conflicting volume
VC1, stage 1 cont vol
Co, stage 2 cont vol
Co, stage 2 cont vol
Co, stage 6)
F(S)
F(S)
G(S

None 160

None

ICU Level of Service

2.0

Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach Delay (s) Approach LOS

Residential Development, 10 Aspen Springs Drive, Bowmanville, ON	
Proposed	Trans-Pla

Critical Lane Group

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Unsignalized Intersection Capacity Analysis-Background> 2024 Weekday PM Peak Hour 5: Fry Crescent (East) & Aspen Springs Drive

HCM Unsignalized Intersection Capacity Analysis<Background> 2024 Weekday PM Peak Hour 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

1

																																								⋖	
																																								eo	
•	NBR		6				0.92											300			300	6.2			66	739														ICU Level of Service	
€	图图	>	∞	∞	Stop	%0	0.92	6	4	3.7	- -	0						288			588	6.4		3.5	86	468														CU Level	
Ļ	WBT	₩	242	242	Free	%0	0.92	263	2	3.7	- -	0		None		245																								_	
\	WBL		12	12			0.92	13										306			306	4.1		2.2	66	1261	NB 1	19	တ	10	280	0.03	8.0	11.4	В	11.4	മ		90	33.2%	Ļ
<u> </u>	EBR		14	4			0.92	15																			WB1	276	13	0	1261	0.01	0.2	0.5	⋖	0.5					
†	EBT	æ	264	564	Free	%0	0.92	287						None													EB 1	302	0	15	1700	0.18	0.0	0.0		0.0				_	
	Movement	Lane Configurations	Traffic Volume (veh/h)	Future Volume (Veh/h)	Sign Control	Grade	Peak Hour Factor	Hourly flow rate (vph)	Pedestrians	Lane Width (m)	Walking Speed (m/s)	Percent Blockage	Right tum 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	(

256

615

605

300

624

809

309

274

Walking Speed (m/s)
Malking Speed (m/s)
Percent Blookage
Percent Blookage
Right turn flare (veh)
Median type
Median type
Median storage veh)
Upstream signal (m)
Dx, plathon unblooked
vC, conflicting volume
vC1, stage 2 conf vol
vC2, stage 2 conf vol
vC2, stage 8 (s)
f(s)
C, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 4 stage (s)
f(s)
G, 4 stage (s)
G, 5 stage (s)
G, 5 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 7 stage (s)
G, 8 stag

Stop 0.91

19

0.91

0.91

0.91

0.91

19

0.91

Grade Peak Hour Factor Hourly flow rate (vph) 0

None 323

None

Stop 0% 0.91

33

17

र र

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

261 261 261 0.91 287 256 6.2

615

300

624

7.1

4.1

274

3.3

4.0 100 397

3.5 95 398

3.3 100 743

4.0 100 393

3.5 97 395

2.2 99 1259

2.2 99 1291 29 29 10 10 10 1.5 13.0 13.0 13.0

> 13 2 2 2 0.03 0.03 0.7 13.7 13.7 B

275 9 36 1259 0.01 0.2 0.3 A

322 322 16 19 0.01 0.3 0.5 A

Direction, Lane #
Volume Total
Volume Left
Solume Right
SM
Volume Right
SM
Caueu Length Sth (m)
Control Delay (s)
Lane LOS

ille, ON	
, Bowmanville	
Drive	
prings [
Aspen S	
9	
tial Development,	
ideni	
Res	_
Proposed	rans-Pla
	_

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ICU Level of Service

1.3 31.3% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach Delay (s) Approach LOS

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis-Background> 2024 Weekday PM Peak Hour 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

HCM Unsignalized Intersection Capacity Analysis<Background> 2024 Weekday PM Peak Hour 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph) Lane Width (m)
Walking Speed (m/s)
Percent Blockage
Right turn flare (veh)
Median type

Stop 0% 0.92

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

None 379

None

117

0.82

0.82

0.74

2.2 100 715

3.3

3.5

870 0

731

731

1431

Median storage veh)
Upstream signal (m)
Dx, Pattorn unblocked
Cx, conflicting volume
vC1, stage 1 conf vol
vC2, stage 2 conf vol
vC3, unblocked vol
Cx, unblocked vol
Cx, single (s)
Cx, single (s)
Cx, single (s)
Cx, stage (d)
C

800 800 800 0% 0.92 870

> 907 907 908 0.92 986

EBL EBT W 4 1 255 2 0 255 2 0% 0 0% 0 0 277 2 100 1306	•							
1	Į.	EB	EBT	WBT	WBR	SBL	SBR	
h) 0 255 238 0 0 0 h) 0 255 238 0 0 0 Free Free Stop 0.92 0.92 0.92 0.92 0.92) 0 277 259 0 0 0 h) 0 277 259 0 0 0 h) 0 277 259 259 e 259 536 259 e 259 536 259 f 4.1 6.4 6.2 2.2 3.5 3.3 f 100 100 100 h 306 770 700 h 0 0 0 0 h 0 0 0 0 h 0 0 0 0 0 h 0 0 0 0	figurations		₩.	42		>-		
None None Sas 259 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	lume (veh/h)	0	255	238	0 0	0 0	0 0	
0	nume (ven/n)	>	Z22 Free	Z30 Free	>	Stop	>	
0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92			%0	%0		%0		
) 0 277 259 0 0 0 None None None 79 259 536 259 4.1 6.4 6.2 2.2 35 33 100 100 100 1306 1700 0.0 0.0 0 0 0 0 1306 1700 0.0 0.0 0 0 0 0 0 1306 0.0 0.0 0.0 0 0 0 0 0 1306 0.0 0.0 0.0 0 0 0 0 0 1306 0.0 0.0 0.0 0 0 0 0 0 0 1306 0.0 0.0 0.0 0 0 0 0 0 0 1306 0.0 0.0 0.0 0 0 0 0 0 0.0 0.0 146.8% ICU Level of Service 168% 168% 168% 168%		3.92	0.92	0.92	0.92	0.92	0.92	
None None 79 79 6 259 79 79 79 79 79 79 79 79 79	w rate (vph)	0	277	259	0	0	0	
None None 79 79 79 79 79 79 79 79 79 79 79 79 79 7	SL							
None None None 79 536 259 e 259 536 259 e 259 536 259 100 100 100 100 100 100 100 100 100 100	h (m)							
None None 79 79 6	(s/m) peed							
None None None 79 79 79 79 79 79 79 79 79 79	lockage							
Mone None 79 79 79 79 79 79 79 79 79 79 79 79 79 7	flare (veh)							
F39 5.36 2.59 1 259 5.36 2.59 4.1 6.4 6.2 2.2 3.5 3.3 100 100 100 1306 1700 1700 0.00 0.00 0.0 0.00 0.00 0.0 0.00 0.00 0.0 0.00 0.00 0.0 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 158	ed		None	None				
Fig. 259 79 536 259 Fig. 259 536 259 Fig. 259 536 259 Fig. 259 536 259 Fig. 259 536 259 Fig. 250 54 62 Fig. 250 55 780 Fig. 277 259 0	orage veh)							
e 259 536 259 e 229 536 259 4.1 6.4 6.2 2.2 3.5 3.3 100 100 100 1306 1700 7700 1306 1700 1700 1306 1700 1700 1306 1700 1700 1306 1700 1700 1306 1700 1700 1306 1700 1700 1306 1700 1700 1306 1700 1700 1306 1700 1700 1307 1708 1708 1308 1808 1808 1808 1408 1808 1808 1808 1508 1808 1808 1808 1608 1808 1808 1808 1608 1808 1808 1608 1808 1808 1608 1808 1808 1608 1808 1808 1608 1808 1808 1608 1808 1808 1608 1808 1808 1608 1808	signal (m)			79				
e 259 536 259 1 259 536 259 4.1 6.4 6.2 2.2 3.5 3.3 100 100 100 1306 1700 1700 0 0 0 0 1306 1700 0.0 0 0 0 0.0 0 0 0 0.0 0 0 0 0.0 1306 1700 0.0 0 0 0 0.0 1306 1700 0.0 0 0 0 0.0 1306 1700 0.0 0 0 0 0.0 1306 1700 0.0 0 0 0 0.0 0 0 0 0.0 1306 1700 0.0 0 0 0 0.0 0 0 0 0.0 146.8% ICU Level of Service	on unblocked							
259 536 259 4.1 6.4 6.2 2.2 3.5 3.3 100 1306 1306 1306 1306 1306 1306 0		259				536	259	
259 536 259 4.1 6.4 6.2 2.2 3.5 3.3 100 1306 1306 1306 1307 277 259 0 0 0 0 1306 1700 0.00 0.15 0.00 0.00 0.15 0.00 0.00 0.0 0.0 0.00 0.0 0.0 0.00 0.0 0.	e 1 conf vol							
259 558 259 4.1 6.4 6.2 2.2 3.5 3.3 2.2 3.5 3.3 100 100 100 1306 1700 7700 0.00 0								
4.1 6.4 6.2 2.2 3.5 3.3 100 1306 1306 EB1 WB1 SB1 EB1 WB1 SB1 0		259				236	526	
2.2 3.5 3.3 100 100 100 100 100 100 100 100 100 100		4.1				6.4	6.2	
22 35 33 100 100 100 1306 505 780 EBJ WBJ SBJ 505 780 0 0 0 0 0 1306 1700 1700 0.00 0.15 0.00 m) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0								
1306 100 100 100 1306 1306 1306 1306 130		2.2				3.5	3.3	
1306 505 780 EB1 WB1 SB1 505 780 277 259 0 0 0 0 0 0 0 0 1306 1700 1700 0.00 0.0 0.0 0.00 0.0 0.0 0.0 0.0 0.0		9				100	100	
EB1 WB1 SB1 277 259 0 0 0 0 0 0 0 1306 1700 1700 0.00 0.15 0.00 0.0 0.0 0.0 0.0 0.0 0.0 A 0.0 0.0 0.0 A 0.0 0.0 0.0 A 0.0 0.0 0.0 A 16.8% ICU Level of Service		306				202	780	
277 259 0 0 0 0 1306 1700 1700 0.00 0.15 0.00 0.0 0.0 0.0 A 0.0 0.0 0.0 A 0.0 0.0 0.0 A 0.0 0.0 0.0 A 0.0 0.0 0.0 A 0.0 0.0 0.0 A 0.0 0.0 0.0 A 16.8% ICU Level of Service		B 1	WB 1	SB 1				
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		277	259	0				
1306 1700 1700 1700 1700 1700 1700 1700 17	eft	0	0	0				
1306 1700 1700 m) 0.00 0.15 0.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.		0	0	0				
m) 0.00 0.15 0.00 0.0 0.0 0.0 0.0 0.0 0.0 A A 0.0 0.0 A A 0.0 0.0 A A 1.00 0.0 16.8% (CU Level of Service 15.8%)		306	1700	1700				
m) 0.0 0.0 0.0 0.0 0.0 0.0 A 0.0 0.0 A 0.0 0.0 A 0.0 0.0 A 16.8% ICU Level of Service		0.00	0.15	0.00				
0.0 0.0 0.0 A 0.0 0.0 0.0 A A Y 0.0 0.0 16.8% ICU Level of Service 15.8% ISSU Level of Service		0.0	0:0	0.0				
0.0 0.0 0.0 A Verification 16.8% ICU Level of Service 15.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0		0:0	0:0	0.0				
9 0.0 0.0 A y 0.0 0.0 CU Level of Service 15.8% ICU Level of Service 15.8%				⋖				
y 0.0 0.0 Utilization 16.8% ICU Level of Service 15.9% 15.00	Delay (s)	0.0	0:0	0.0				
y 0.0 0.0 Initiation 16.8% ICU Level of Service 15.9% 15.00 Level of Service 15.00 Level of	SOT			∢				
0.0 Utilization 16.8% ICU Level of Service 15	on Summary							
Utilization 16.8% ICU Level of Service	Jelay			0.0				
	on Capacity Utilization			16.8%	D D	Level of	Service	A
	Analysis Period (min)			15				

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 10

Aspen Springs Drive, Bow	en Springs Drive,	en Springs Drive,
en Sprin	en Sprin	en Sprin
	elopment, 10	Residential Development, 10 า

ICU Level of Service

0.0 51.1%

Average Delay Intersection Capacity Utilization Analysis Period (min)

0.51 0.0 0.0

0.00 0.00 A O.00 A

Direction, Lane #
Volume Total
Volume Left
Volume Right
SSH
Volume to Capacity
Volume to Capacity
Conrol Delay (s)
Lane LOS

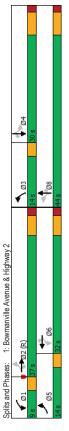
0.0

0.0

Approach Delay (s) Approach LOS

<Total> 2024 Weekday PM Peak Hour 03-14-2022 Timings 1: Bowmanville Avenue & Highway 2

i. Downland Michael	5	8	۵y کـ									
	1	†	<i>></i>	•	ţ	4	•	—	•	۶	→	*
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	-	₩	×.	*	₩	X	je.	*	×	F	+	*E_
Traffic Volume (vph)	291	1149	344	156	910	92	287	495	178	88	381	234
Future Volume (vph)	291	1149	344	156	910	92	287	495	178	88	381	234
Turn Type	pm+pt	ΑN	Perm	pm+pt	ΑΝ	Perm	pm+pt	ΑN	Perm	Perm	¥	Perm
Protected Phases	2	2		~	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	2	2	Ψ	9	9	က	∞	∞	4	4	4
Switch Phase												
Minimum Initial (s)	4.5	20.0	20.0	4.0	20.0	20.0	4.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	9.0	28.2	28.2	7.0	28.2	28.2	7.0	30.5	30.5	25.0	25.0	25.0
Total Split (s)	14.0	37.0	37.0	9.0	32.0	32.0	14.0	44.0	0.44	30.0	30.0	30.0
Total Split (%)	15.6%	41.1%	41.1%	10.0%	35.6%	35.6%	15.6%	48.9%	48.9%	33.3%	33.3%	33.3%
Yellow Time (s)	3.0	4.3	4.3	3.0	4.3	4.3	3.0	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	0.0	1.9	1.9	0.0	1.9	0:	0.0	1.6	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	0:0	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	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	43.0	30.8	30.8	32.0	25.8	25.8	41.0	37.5	37.5	23.5	23.5	23.5
Actuated g/C Ratio	0.48	0.34	0.34	0.39	0.29	0.29	0.46	0.42	0.42	0.26	0.26	0.26
v/c Ratio	0.95	1.10	0.59	96.0	1.02	0.16	1.01	0.84	0.29	0.68	1.06	0.52
Control Delay	62.9	90.2	11.2	76.7	69.2	0.7	68.5	29.8	3.7	53.0	95.1	10.2
Queue Delay	0.0	0:0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.9	90.2	11.2	76.7	69.2	0.7	68.5	29.8	3.7	53.0	95.1	10.2
SOT	ш	ш	Ω	ш	ш	⋖	ш	O	⋖	۵	ш	Ф
Approach Delay		8.69			62.9			35.2			61.0	
Approach LOS		ш			ш			٥			ш	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset 0 (0%), Referenced to phase 2:EBTL, Start of Green	o phase 2	EBTL, St	art of Gre	en								
Natural Cycle: 110												
Control Type: Actuated-Coordinated	rdinated											
Maximum v/c Ratio: 1.10												
Intersection Signal Delay: 60.1	Ξ.			≘	Intersection LOS: E	LOS: E						
Intersection Capacity Utilization 96.7%	ion 96.7%			2	:U Level	ICU Level of Service F	ш					
Analysis Period (min) 15												



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis 1: Bowmanville Avenue & Highway 2

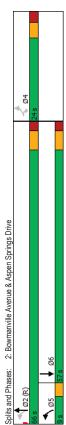
<Total> 2024 Weekday PM Peak Hour 03-14-202

	1	†	1	-	ļ	4	•	—	*	۶	→	*
Movement	EBF	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	\$	*	r	\$	*	F	*	*	r	*	*
Traffic Volume (vph)	291	1149	344	156	910	65	287	495	178	88	381	234
Future Volume (vph)	291	1149	344	156	910	65	287	495	178	83	381	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1:00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1:00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2200	3202	1356	1630	3230	1326	1601	1601	1409	1570	1601	1384
Flt Permitted	0.14	1.00	1.00	0.16	1.00	1.00	0.16	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)	230	3202	1356	266	3230	1326	267	1601	1409	641	1601	1384
Peak-hour factor, PHF	0.87	0.95	06:0	0.84	96.0	0.82	1.00	0.88	0.87	0.78	98.0	0.84
Adj. Flow (vph)	334	1209	382	186	948	79	287	295	202	114	443	279
RTOR Reduction (vph)	0	0	182	0	0	26	0	0	110	0	0	172
Lane Group Flow (vph)	334	1209	200	186	848	23	287	263	92	114	443	107
Confl. Peds. (#/hr)	2		10	10		2	15		က	က		15
Heavy Vehides (%)	16%	14%	17%	12%	13%	20%	14%	20%	14%	46%	20%	14%
Turn Type	pm+pt	¥	Perm	pm+pt	₹	Perm	pm+pt	₹	Perm	Perm	ΑN	Perm
Protected Phases	2	2		-	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Actuated Green, G (s)	39.8	30.8 30.8	30.8	31.8	25.8	25.8	37.5	37.5	37.5	23.5	23.5	23.5
Effective Green, g (s)	39.8	30.8	30.8	31.8	25.8	25.8	37.5	37.5	37.5	23.5	23.5	23.5
Actuated g/C Ratio	0.44	0.34	0.34	0.35	0.29	0.29	0.42	0.42	0.42	0.26	0.26	0.26
Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	342	1095	464	184	925	380	274	299	287	167	418	361
v/s Ratio Prot	c0.12	c0.38		0.07	0.29		c0.13	0.35			0.28	
v/s Ratio Perm	0.31		0.15	0.29		0.02	c0.31		0.07	0.18		0.08
v/c Ratio	0.98	1.10	0.43	1.01	1.02	90.0	1.05	0.84	0.16	0.68	1.06	0.30
Uniform Delay, d1	26.3	29.6	22.8	27.0	32.1	23.3	21.7	23.6	16.4	29.9	33.2	26.6
Progression Factor	9.	1.00	1:00	1.00	1.00	1:00		98.0	0.87	1.00	9.	9
Incremental Delay, d2	45.0	60.4	2.9	69.2	36.1	0.1	55.2	0.9	0.1	10.9	2.09	0.5
Delay (s)	68.2	0.06	25.7	96.2	68.2	23.4	79.2	26.4	14.4	40.8	94.0	27.1
Level of Service	ш	ш	O	ட	ш	ပ	ш	ပ	œ		ш	O
Approach Delay (s)		73.5			9.69			38.4			64.4	
Approach LOS		ш			ш						ш	
Intersection Summary												
HCM 2000 Control Delay			63.7	Ĭ	HCM 2000 Level of Service	Level of	Service		ш			
HCM 2000 Volume to Capacity ratio	ity ratio		1.13									
Actuated Cycle Length (s)			0.06	ઝ	Sum of lost time (s)	time (s)			18.7			
Intersection Capacity Utilization	ion		%2.96	೨	ICU Level of Service	f Service			ш			
Analysis Period (min)			15									
c Critical Lane Group												

Proposed Residential Development, 10 Aspen Springs Diive, Bowmanville, ON Trans-Plan

Timings < Total 2024 Weekday PM Peak Hour 2: Bowmanville Avenue & Aspen Springs Drive 03-14-2022 03-14-2022

	1	1	•	←	→
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	*	¥.	*	*	43
Traffic Volume (vph)	216	110	169	744	676
Future Volume (vph)	216	110	169	744	929
Turn Type	Perm	Perm	pm+pt	Ϋ́	NA
Protected Phases			2	2	9
Permitted Phases	4	4	2		
Detector Phase	4	4	2	2	9
Switch Phase					
Minimum Initial (s)	8.0	8.0	2.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0
Total Split (s)	24.0	24.0	9.0	0.99	57.0
Total Split (%)	26.7%	26.7%	10.0%	73.3%	63.3%
Yellow Time (s)	3.3	3.3	3.0	4.2	4.2
All-Red Time (s)	5.6	5.6	0.0	2.1	2.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.9	5.9	3.0	6.3	6.3
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	Max
Act Effct Green (s)	16.9	16.9	64.2	6.09	50.7
Actuated g/C Ratio	0.19	0.19	0.71	0.68	0.56
v/c Ratio	0.84	0.40	0.92	0.79	1.17
Control Delay	60.2	8.4	0.09	10.1	104.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	60.2	8.4	0.09	10.1	104.1
ros	ш	∢	ш	മ	ш
Approach Delay	39.9			19.2	104.1
Approach LOS	۵			Ф	Ш
Intersection Summary					
Cvcle Lenath: 90					
Actuated Cycle Length: 90					
Offset 0 (0%), Referenced to phase 2:NBTL, Start of Green	phase 2:	NBTL, St	art of Gre	en	
Natural Cycle: 140					
Control Type: Actuated-Coordinated	linated				
Maximum v/c Ratio: 1.17					
Intersection Signal Delay: 58.4	4			ī	Intersection LOS: E
Intersection Capacity Utilization 83.5%	n 83.5%			Ö	CU Level of Service E
Analysis Period (min) 15					



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis 2: Bowmanville Avenue & Aspen Springs Drive

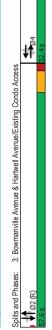
<Total> 2024 Weekday PM Peak Hour 03-14-2022

Movement EBL EBR NBL NB SBT SBR Movement EBL EBR NBL NBL NBL NBT SBT SBR Movement EBL EBR NBL NBL NBT SBT SBR Movement (pub) 216 110 169 744 676 214 676 214 110 169 744 676 214 676 214 110 169 744 676 214 676 214 110 169 744 676 214 676 2	SBI SBR 676 214 676 214 676 214 673 100 6.3 100 1.00
216 110 169 744 216 110 169 744 216 1100 1900 1900 1900 59 59 30 63 100 100 100 100 100 0.98 100 100 100 0.98 100 0.97 100 0.98 100 0.97 100 0.98 100 0.97 100 0.98 100 0.07 100 0.98 100 0.07 100 0.98 100 0.07 100 0.98 100 0.07 100 0.98 100 0.07 100 0.98 100 0.07 100 0.98 100 0.07 0.08 0.98 100 0.07 0.08 0.99 100 0.09 0.90 100 0.09 100 0.90 100 0.00 100	676 214 676 214 676 214 1900 1900 6.3 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.
216 110 169 744 1900 1900 1900 1900 1900 1900 1900 1900	676 214 676 214 1900 1900 6.3 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.
216 110 169 744 1900 1900 1900 1900 5.9 5.9 3.0 6.3 1.00 1.00 1.00 1.00 0.99 1.00 1.00 1.00 0.99 1.00 1.00 1.00 0.95 1.00 1.00 1.00 1.00 0.85 1.00 1.00 1.00 0.85 1.00 1.00 1.00 0.85 1.00 1.00 1.00 0.85 1.00 1.00 1.00 0.95 1.00 1.00 1.00 0.95 1.00 1.00 1.00 0.95 1.00 1.00 1.00 0.95 1.00 1.00 1.00 0.95 1.00 1.00 1.00 0.86 0.86 0.89 1.00 0.90 0.9 60.9 60.9 1.00 0.90 0.90 1.00 0.90	676 214 1900 1900 6.3 1.00
1900 1900 1900 1900 1900 1900 1900 1900	1900 1900 16.3 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.
59 59 30 63 100 100 100 100 100 100 100 100 100 100	6.3 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.
100 1,00 1,00 1,00 1,00 1,00 0,99 1,00 1,00	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 0.37 1.00 1.00 1.00 1.02 0.80 0.80 0.80 0.80 0.7 0.7 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
1,00 0.89 1,00 1,00 1,00 1,00 0.85 1,00 1,00 0.95 1,00 0.95 1,00 0.95 1,00 0.95 1,00 0.95 1,00 0.07 1,00 0.95 1,00 0.07 1,00 0.95 1,00 0.07 1,00 0.95 1,00 0.07 1,00 0.95 1,00 0.07 0.95 1,00 0.95 1	100 1628 1628 1630 1630 1645 140 174 1074 1074 1076 1076 1076 1076 1070 1070 1070 1070
100 0.85 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	0.97 100 1628 1.00 1628 245 240 1074 0 1074 0 1074 0 1074 0 1074 0 1074 0 1074 0 1076 0 1070 0 1000 0 1000 0 1000 0 1000 0 1000 0 1000 0 1000 0 1000 0 100 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000
10.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 0.09 0.09 0.09 0.09 0.09 0.09 0	100 1628 100 1628 0.80 0.89 845 240 1074 0 1074 0 1074 0 1076 6 6.3 3.0 50.7 50.7 50.7 50.7 50.7 50.7 50.7 6 6 6 8.3 3.0 11.17 11.17 11.20 F F F F F F F F F F F F F F F F F F F
1588 1471 1644 1642 0.95 1.00 0.07 1.00 1588 0.86 0.88 0.87 0.88 0.86 0.68 0.87 0.88 0.81 14% 11% 11% 17% 14% 11% 11% 17% 14% 11% 11% 17% 169 16.9 60.9 60.9 0.19 0.19 0.88 0.88 0.19 0.19 0.88 0.88 0.19 0.10 0.10 0.10 0.84 0.11 0.93 0.79 0.84 0.11 0.93 0.79 0.84 0.11 0.93 0.79 0.84 0.11 0.93 0.79 0.84 0.10 0.10 1.00 0.84 0.11 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.11 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.10 0.93 0.79 0.84 0.11 0.93 0.79 0.85 0.88 0.88 0.88 0.85 0.85 0.85 0.88 0.85 0.85 0.85 0.88 0.85	1628 1000 1628 0.80 0.89 845 240 11 0 1074 0 1074 1 108 6 6 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.3 6.
0.95 1.00 0.07 1.00 0.86 0.68 0.68 0.68 0.68 0.87 0.68 0.69 0.69 0.51 30 194 875 0.51 30 194 875 0.10 1.00 1.00 1.65 0.04 0.11 0.93 0.79 0.04 0.11 0.93 0.79 0.05 0.05 0.05 0.04 0.10 1.03 0.05 0.05 0.05 0.05 0.04 0.10 1.03 0.05 0.05 0.05 0.05 0.04 0.10 1.03 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05	100 1628 0.80 0.80 0.45 240 174 0 1074 0 1074 0 1076 6 6.3 10.7 10.6 11.17 10.6 0.89 102.0 F
1588 1471 129 1642 1682 1642 1686 1687 1	1628 080 089 845 240 1074 0 1074 0 1076 1 15% 10% NA 6 50.7 50.7 50.7 50.7 50.7 50.7 6.3 3.0 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 917 c0.66 6.3 6.3 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5
0.86 0.68 0.87 0.85 0.87 0.85 0.87 0.85 0.87 0.85 0.87 0.85 0.87 0.85 0.87 0.85 0.87 0.85 0.87 0.87 0.87 0.87 0.87 0.87 0.87 0.87	0.80 0.89 0.845 2.40 1.074 0 1.074 0 1.074 0 1.074 0 0.056 6.3 3.0 0.056 6.3 3.0 0.056 0.056 0.056 0.056 0.056 0.056 0.056 0.056 0.059 0.056 0.059 0.056 0.059 0.056 0.059 0.056 0.059 0.056 0.056 0.059 0.056 0.0
251 162 194 875 251 30 194 875 3 14 875 14% 11% 11% 17% Perm Perm pm+pt NA 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 25.9 5.9 3.0 6.3 20.0 30.0 30.0 30.0 20.1 0.0 0.6 0.6 20.1 0.0 0.5 0.6 20.1 0.0 0.5 0.6 20.2 0.5 0.9 0.1 20.3 0.7 0.3 0.7 20.4 0.1 0.9 0.5 20.5 0.7 0.3 0.5 20.6 0.7 0.3 0.5 20.7 0.3 0.5 20.8 0.7 0.3 0.5 20.9 0.1 0.3 0.5 20.9 0.2 0.5 20.9 0.1 0.3 0.5 20.9 0.2 0.5 20.9 0.2 0.5 20.9 0.2 0.5 20.9 0.2 0.5 20.9 0.2 0.5 20.9 0.2 0.5 20.9 0.3 0.5 20.9 0.3 0.5 20.9 0.1 0.5	845 240 11 0 1074 0 1078 10% NA 6 50.7 50.7 50.7 50.7 6.3 6.3 8.0 917 60.66 6.3 1.17 11.7 11.7 11.7 11.7 11.7 11.7 11
251 30 194 875 3 1 14% 17% 14% 11% 11% 17% Perm Perm pm+pt 17% 4 4 2 2 4 4 4 2 2 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 289 276 208 1111 288 276 208 1111 288 276 208 1111 200 0.10 0.68 6.3 0.63 6.0 1 0.9 0.56 7.0 1 0.9 0.56 8.4 0.1 0.9 0.56 1.0 1.0 1.0 1.6 3 0.56 18.9 0.2 31.2 3.4 44.9 Chanchitration 177	1074 0 1074 0 15% 10% NA 6 6 50.7 50.7 0.56 6.3 3.0 917 c0.66 1.17 19.6 0.89 84.5 102.0 F
) 251 30 194 815 3 1 1 17% 14% 11% 11% 11% 17% 4 4 2 2 4 4 2 2 60.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 10.0 16.9 0.8 10.0 10.0 0.8 10.0 0.2 0.5 10.0 0.4 0.1 0.9 10.0 0.2 0.5 10.0 0.4 0.1 0.9 10.0 0.2 0.5 10.0 0.4 0.1 0.9 10.0 0.2 0.5 10.0 0.4 0.1 0.9 10.0 0.2 0.5 10.0 0.2 0.5 10.0 0.3 0.7 10.0 0.3 0.7 10.0 0.3 0.7 10.0 0.5 0.5 10.0 0.3 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.0 0.7 10.	1074 0 15% 10% NA 6 50.7 50.7 50.7 50.7 50.8 3.0 3.0 917 c0.66 6.3 3.0 1.17 1.17 1.17 1.17 1.17 1.17 1.17 1.
Ham Perm pm+pt NA Perm Perm Perm Perm Perm Perm Perm Perm	
14% 11% 17% 17% 17% 17% 17% 17% 17% 17% 17	
Perm Perm pm+pt NA 5 2 4 4 2 2 60.9 16.9 60.9 60.9 16.9 60.9 60.9 16.9 60.9 60.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16	
16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 60.9 60.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16	
16.9 16.9 60.9 60.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16	
16.9 16.9 60.9 60.9 16.9 16.9 16.9 16.9 16.9 16.9 16.9 16	
s) 16.9 16.9 60.9 60.9 60.9 60.9 60.9 60.9 60.9 6	
(a) 200 (b) 0.68 0.68 0.69 0.69 0.69 0.69 0.69 0.69 0.69 0.69	
s) 59 5.9 3.0 6.3 s) 3.0 3.0 3.0 3.0 c) 288 276 288 1111 c0.16 0.02 0.66 0.84 0.11 0.93 0.79 35.3 30.3 27.4 10.1 1.00 1.00 1.63 0.56 6.4 2 30.5 75.9 9.1 4.4 9 C E A A 44.9 C E A A 44.9 C E A A 44.9 C E A A 6.0 C C C C C C C C C C C C C C C C C C C	
s) 30 30 30 30 30 30 110 28 276 208 1111 28 20 276 208 1111 28 20 20 20 20 20 20 20 20 20 20 20 20 20	
288 276 208 1111 298 276 208 1111 2016 002 0.56 084 0.11 0.93 0.79 383 30.3 274 10.1 383 30.3 274 10.1 1.00 1.00 1.63 0.56 24.2 30.5 75.9 9.1 D C E A 44.9 C E A D C C D C C D C C C C C D C C C C C C C	
c0.16 0.02 0.65 0.84 0.11 0.93 0.79 0.84 0.11 0.93 0.79 1.00 1.00 1.63 0.79 1.00 1.00 1.63 0.56 42 18.9 0.2 31.2 3.4 0.2 31.2 3.4 0.2 31.2 3.4 0.4 4.9 0.5 0.6 E A A 44.9 C E A A 44.9 C E A A 10.7 1.00 1.00 1.00 1.00 1.00 1.00 1.00	
do 2 0.56 0.02 0.56 0.79 0.79 0.79 0.79 0.79 0.79 0.79 0.79	
0.84 0.11 0.93 0.79 35.3 30.3 27.4 10.10 42 18.9 0.2 31.2 3.4 54.2 30.5 75.9 9.1 D C E A 44.9 D C E A 44.9 D C DBelay 10 DBelay 11 17 17 17	
35.3 30.3 27.4 10.1 42 10.0 1.00 1.63 0.56 42 54.2 30.5 75.9 9.1 44.9 C E A 44.9 21.2 Delay 59.2 10.7 10.7 10.7 10.7	
d2 18.9 0.2 31.2 3.4 1.00 1.00 1.63 0.56 1.0 1.00 1.00 1.00 1.0 1.0 1.0 1.0 1.0	
d2 18.9 0.2 31.2 3.4 54.2 30.5 75.9 9.1 D C E A 44.9 D C E A 21.2 D C D C E A 54.9	
54.2 30.5 75.9 9.1 D C E A 44.9 21.2 D C C C A 71.0 Any 59.2 In Connectivity of 10.7	Ш
D C E A 44.9 21.2 21.2 D C C C C C C C C C C C C C C C C C C	
44.9 21.2 Day May Bolday 10, 20, 20, 20, 20, 20, 20, 20, 20, 20, 2	
D C C mmary 59.2 trol Delay 107	
59.2	
59.2	
107	1CM 2000 Level of Service E
Actuated Cycle Length (s) 90.0 Sum of lost time (s)	Sum of lost time (s) 15.2
Utilization 83.5%	CU Level of Service
Analysis Period (min)	

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Timings Traings Superville Avenue & Hartwell Avenue/Existing Condo Access 03-14-2022 03-14-2022

5. DOWITIATIVITIE AVEITURE A HAITWELL AVEITURE/EXISTITING COLLING ACCESS	MG &	laik	ב כ	INC/LY	91113			200		03-14-2022
	1	†	<u> </u>	-	ţ	•	←	۶	→	
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations		₩	¥C		4	-	æ	-	÷	
Traffic Volume (vph)	32	0	83	က	5	9/	871	4	733	
Future Volume (vph)	32	0	63	က	2	9/	871	4	733	
Turn Type	Perm	ΑΝ	Perm	Perm	Ϋ́	Perm	ΑN	Perm	ΑĀ	
Protected Phases		4			4		2		7	
Permitted Phases	4		4	4		2		2		
Detector Phase	4	4	4	4	4	2	2	2	2	
Switch Phase										
Minimum Initial (s)	2.0	2.0	2.0	2.0	5.0	2.0	5.0	2.0	5.0	
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	27.0	27.0	27.0	27.0	
Total Split (s)	32.4	32.4	32.4	32.4	32.4	9.75	57.6	97.9	9.73	
Total Split (%)	36.0%	36.0%	36.0%	36.0%	36.0%	Ø	64.0%	64.0%	64.0%	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.8	4.8	4.8	
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	- - - - -	1.8	 8.	1.8	
Lost Time Adjust (s)		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)		6.3	6.3		6.3	9.9	9.9	9.9	9.9	
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)		8.7	8.7		8.7	72.1	72.1	72.1	72.1	
Actuated g/C Ratio		0.10	0.10		0.10	0.80	0.80	0.80	0.80	
v/c Ratio		0.37	0.38		0.09	0.28	0.82	0.01	99.0	
Control Delay		44.8	13.6		25.2	5.9	15.7	2.8	10.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		44.8	13.6		25.2	5.9	15.7	2.8	10.8	
SOT		۵	Ω		O	∢	Ω	∢	മ	
Approach Delay		25.4			25.2		14.7		10.7	
Approach LOS		ပ			O		Ω		В	
Intersection Summary										
Cycle Length: 90										
Actuated Cycle Length: 90										
Offset 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	phase 2:	NBSB an	d 6:, Star	t of Greer	_					
Natural Cycle: 90										
Control Type: Actuated-Coordinated	dinated									
Maximum v/c Ratio: 0.82										
Intersection Signal Delay: 13.9	O;			드	tersectio	Intersection LOS: B				
Intersection Capacity Utilization 72.6%	ion 72.6%			2	U Level	ICU Level of Service C	O O			
Analysis Period (min) 15										



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Signalized Intersection Capacity Analysis <Total> 2024 Weekday PM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-202

Movement EBI EBN WBI		4	†	>	>	↓	4	•	←	*	۶	→	*
1,000 1,00	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1,00 35 63 3 2 7 76 871 3 4 733 1,00 1,900	Lane Configurations		4	¥.		4		r	£		r	£3	
1900 1900	Traffic Volume (vph)	32	0	63	က	5	7	92	87.1	က	4	733	47
1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 100	Future Volume (vph)	35	0	63	က	2	7	9/	871	က	4	733	47
1, 10, 10, 10, 10, 10, 10, 10, 10, 10,	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
100 100	Total Lost time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	
100 100	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		1.00	1.00		1.00	1.00	
1,00 0,85 0,99 0,99 0,99 0,99 0,99 0,99 0,99 0,9	Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
1955 100 0.99 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.95 1.00 0.75 1.00 0.82 0.82 0.82 0.84 0.92 0.92 0.95 0	Frt		1.00	0.85		0.92		1.00	1.00		1.00	0.99	
1825 1541 1742 1643 1575 1825 1603 1705 100 10	Flt Protected		0.95	1.00		66.0		0.95	1.00		0.95	1.00	
1,10	Satd. Flow (prot)		1825	154		1742		1643	1575		1825	1603	
1436 1541 1575 498 1575 385 1603 1436 192 0.75 0.82 0.82 0.85 0.95 0.95 51	Flt Permitted		0.75	1.00		0.89		0.29	1.00		0.20	1.00	
tractor, PHF	Satd. Flow (perm)		1436	1541		1575		498	1575		385	1603	
(vph) 51 0 84 4 2 9 112 1037 3 4 772 up Flow (vph) 0 0 0 0 0 0 0 2 up Flow (vph) 0 51 7 0 8 0 10 0 0 2 sis (#In) 0% 6% 0% 0% 0% 11% 22% 0% 18% phases Perm NA Perm NA Perm NA Perm NA Phases Perm NA Perm	Peak-hour factor, PHF	0.68	0.92	0.75	0.82	0.82	0.82	89.0	0.84	0.92	0.92	0.95	09.0
Oduction (vph) 0 0 0 0 0 0 0 2 Asta (Hr) 0 51 7 0 112 1040 0 4 848 Asta (Hr) 0 0 7 0 7 0 1 5 5 4 848	Adj. Flow (vph)	52	0	84	4	2	တ	112	1037	က	4	772	78
the control Delay (rpth) 0 51 7 0 7 0 112 1040 0 4 848 and sets of the control Delay (rpth) 0 51 7 0 7 0 112 1040 0 4 848 and sets of the control Delay (rpth) 0 51 7 0 0 7 0 112 1040 0 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	RTOR Reduction (vph)	0	0	11	0	∞	0	0	0	0	0	2	0
thirdes (%) 6% 6% 6% 6% 14% 22% 6% 6% 18% 18% 19% 19% 19% 19% 19% 19% 19% 19% 19% 19	Lane Group Flow (vph)	0	21	7	0	7	0	112	1040	0	4	848	0
hildes (%) 0% 0% 6% 0% 0% 11% 22% 0% 0% 18% Perm NA Pe	Confl. Peds. (#/hr)							_		2	2		_
Phases	Heavy Vehicles (%)	%0	%0	%9	%0	%0	%0	11%	22%	%0	%0	18%	17%
Phases	Turn Type	Perm	ΑN	Perm	Perm	≱		Perm	¥		Perm	ΑN	
Phases	Protected Phases		4			4			2			2	
Geen, G(s) 7.6 7.6 7.6 69.5	Permitted Phases	4		4	4			7			2		
Green (s) 7.6 7.6 69.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 66.5 67.7 77.7	Actuated Green, G (s)		9.7	7.6		9.7		69.5	69.5		69.5	69.5	
gC Ratio 0.08 0.08 0.77 0.77 0.77 0.77 0.77 0.77	Effective Green, g (s)		9.7	9.7		9.7		69.5	69.5		69.5	69.5	
Second Control Delay 6.3 6.3 6.3 6.6 6.6 6.6 6.6 6.6 6.6 6.6	Actuated g/C Ratio		0.08	0.08		0.08		0.77	0.77		0.77	0.77	
Xension (s) 3.0 <th< td=""><td>Clearance Time (s)</td><td></td><td>6.3</td><td>6.3</td><td></td><td>6.3</td><td></td><td>9.9</td><td>9.9</td><td></td><td>9.9</td><td>9.9</td><td></td></th<>	Clearance Time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	
Cap (vph) 121 130 133 384 1216 297 17 Proft C004 0.00 0.00 0.02 0.06 0.01 0.06 0.01 0.0	Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Perm c0.04 0.00 0.00 0.22 0.01 Perm c0.04 0.00 0.00 0.22 0.00 Perm control Delay, d2 0.05 0.05 0.29 0.86 0.01 0.01 Perm sabbra control Delay, d2 0.02 0.02 0.01 0.01 Perm sabbra control Delay, d2 0.02 1.9 7.8 0.00 Perm sabbra control Delay (a) 0.0 1.00 1.00 1.00 1.00 Perm sabbra control Delay (b) 0.0 0.0 0.0 0.0 0.0 0.0 Perm sabbra control Delay (c) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Lane Grp Cap (vph)		121	130		133		384	1216		297	1237	
belay, d1 39.1 37.9 0.05 0.29 0.86 0.001 of the control Delay of the con	v/s Ratio Perm		c0.04	00:00		0.00		0.22			0.01		
belay, d1 391 37.9 37.9 30 6.9 2.4 on Factor 1.00 1.00 1.00 1.00 1.71 tal Delay, d2 2.4 0.2 0.2 1.9 7.8 service D D D 1.47 4.0 service D D A B A Delay (s) 39.4 38.0 4.9 14.7 4.0 Delay (s) 39.4 38.0 A B A A Do Summary D B B A B A A O Control Delay 13.6 HCM 2000 Level of Service B B C C Oycle Length (s) 90.0 Sum of lost time (s) C	v/c Ratio		0.42	0.05		0.05		0.29	98.0		0.01	69.0	
on Factor 1.00 1.00 1.00 1.00 1.71 Isla Delay, d2 2.4 0.2 0.2 1.9 7.8 0.0 1.00 1.00 1.00 1.71 Isla Delay, d2 2.4 0.2 0.2 1.9 7.8 0.0 1.00 1.00 1.00 1.00 1.00 1.00 1.0	Uniform Delay, d1		39.1	37.9		37.9		3.0	6.9		2.4	2.0	
tal Delay, d2 2.4 0.2 0.2 1.9 7.8 0.0 service D D D A B A Delay(s) 39.4 38.0 4.7 4.0 LOS D D A B A LOS D D B A ILOS D D B A ILOS D D B A O Control Delay 13.6 HCM 2000 Level of Service B O Volumenta 0.01 Sum of lost time (s) D D Oxformation Capacity Tailization 72.6% ICU Level of Service C Period (min) 15 ICU Level of Service C	Progression Factor		1.00	1.00		1.00		1.00	1.00		1.71	1.73	
41.5 38.1 38.0 4.9 14.7 4.0	Incremental Delay, d2		5.4	0.2		0.2		1.9	7.8		0.0	0.3	
D D D A B A A B A A 38.0	Delay (s)		41.5	38.1		38.0		4.9	14.7		4.0	8.9	
39.4 38.0 13.7 D D B B 13.6 HCM 2000 Level of Service B 72.6% ICU Level of Service C 15.6 ICU Level of Service C	Level of Service		□	□		0		∢	В		⋖	⋖	
Table D D B B B 13.6 HCM 2000 Level of Service 0.81 Sum of lost time (s) 72.6% ICU Level of Service 15	Approach Delay (s)		39.4			38.0			13.7			8.8	
13.6 HCM 2000 Level of Service 13.1 and 2000 Level of Service 20.0 Sum of lost time (s) 72.6% ICU Level of Service 15	Approach LOS		۵			۵			ω			∢	
13.6 HCM 2000 Level of Service ratio 0.81 Sum of lost time (s) 72.6% ICU Level of Service 15	Intersection Summary												
ratio 0.81 90.0 Sum of lost time (s) 72.6% ICU Level of Service 15	HCM 2000 Control Delay			13.6	Ĭ	CM 2000 I	evel of S	ervice		В			
90.0 Sum of lost time (s) 72.6% ICU Level of Service 15	HCM 2000 Volume to Capacit	y ratio		0.81									
72.6% ICU Level of Service 15	Actuated Cycle Length (s)			0.06	S	ım of lost	time (s)			12.9			
Analysis Period (min) 15	Intersection Capacity Utilizatio	E		72.6%	೨	U Level o	Service			O			
	Analysis Period (min)			2									

Proposed Residential Development, 10 Aspen Springs Drive, Bowmarville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis <Total > 2024 Weekday PM Peak Hour 4: Bonnycastle Drive & Aspen Springs Drive

45 25 45 55 45 55 50 0% 0% 0.93 0.93 48 27 3.7 1.1 0 0 646 310 646 310 64 6.2 3.5 3.3 89 96 428 734 128 734 128 734 128 1734 128 1734 128 128 128 128 128 128 128 128 128 128
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HCM Unsignalized Intersection Capacity Analysis <To 5: Fry Crescent (East) & Aspen Springs Drive

sis <Total> 2024 Weekday PM Peak Hour 03:14:202

Movement	† =	> #	WBL	↓ MBT	√ NB	NBR	
Lane Configurations	43			€	>		
raffic Volume (veh/h)	298	14	12	289	. ∞	တ	
-uture Volume (Veh/h)	298	14	12	289	∞	6	
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)	324	15	13	314	6	10	
Pedestrians				2	4		
-ane Width (m)				3.7	3.7		
Nalking Speed (m/s)				- -	1.		
Percent Blockage				0	0		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Jostream signal (m)				245			
oX. platoon unblocked							
vC. conflicting volume			343		929	338	
C1. stage 1 conf vol							
AC2. stage 2 confivol							
vCu, unblocked vol			343		929	338	
C, single (s)			4.1		6.4	6.2	
C, 2 stage (s)							
F(s)			2.2		3.5	3.3	
on diene free %			66		86	66	
cM capacity (veh/h)			1222		416	705	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	339	327	19				
/olume Left	0	13	0				
/olume Right	15	0	10				
	1700	1222	531				
/olume to Capacity	0.20	0.01	0.04				
Queue Length 95th (m)	0.0	0.2	8.0				
Control Delay (s)	0.0	0.4	12.0				
Lane LOS		∢	ω				
ach Delay (s)	0.0	0.4	12.0				
Approach LOS			В				
ntersection Summary							
Average Delay			0.5				
ntersection Capacity Utilization	ioi		35.6%	0	U Level o	ICU Level of Service	ď
Analysis Period (min)			15	!		8	
, , , , , , , , , , , , , , , , , , , ,							

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis <Total> 2024 Weekday PM Peak Hour 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive 03-14-2022

<Total> 2024 Weekday PM Peak Hour ss 03-14-2022

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph) 338

689

417

Pedestrians
Lane Width (m)
Walking Speed (m/s)
Percent Blockage
Right tun flare (veh)
Median type
Median type
Median storage veh)
Dy patroam signal (m)
Dy patroam signal (m)
Dy stage 1 cont vol
CC, conficting volume
vC1, stage 2 cont vol
CC, stage 2 cont vol
CC, stage 6 cont vol
CC, stage 8 (s)
F(s)
F(c)
Di queue free %
dM capacity (veh/h)

79

None

None

689

417

3.3 93 704

3.5

2.2 97 1142

47

145

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

SBL 64 64 64 64 64 69% 0.92 70

238 238 0% 0% 259

255 255 255 0% 0.92 277

HCM Unsignalized Intersection Capacity Analysis <7: Aspen Springs Drive & 10 Aspen Springs Drive Access

1

Movement EBI, and Configurations 15 Fraffic Volume (veh/h) 15 Future Volume (Veh/h) 15 Sign Control Grade Hour Factor 0.91 Pedsk Hour Factor 0.91 ane Width (m)	7	EBT	EBR	MBI	FC						Fac	
Ö		•		1	WBI	WBR	NBL	NBT	NBR	SBL	SDI	SBR
O O		÷			4			4			4	
0.	15	295	17	∞	255	83	တ	-	2	17	0	တ
0		295	17	œ	255	33	6	-	2	17	0	0
0		Free			Free			Stop			Stop	
O		%0			%0			%0			%0	
		0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
	16	324	19	တ	280	38	10	-	2	19	0	10
								က			_∞	
								3.7			3.7	
Valking Speed (m/s)								- -			7.	
Percent Blockage								0			-	
Right tum flare (veh)												
	Ĺ	None			None							
Aedian storage veh)												
Jpstream signal (m)					323							
X, platoon unblocked												
	324			346			694	710	336	692	702	306
vC2, stage 2 conf vol												
	324			346			694	710	336	692	702	306
	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
	66			66			97	100	100	92	100	66
cM capacity (veh/h) 1237	37			1221			345	320	708	348	354	733
Direction, Lane # EB 1		WB 1	NB 1	SB 1								
36	359	325	13	59								
	16	တ	9	19								
		36	2	9								
1237		1221	375	425								
/olume to Capacity 0.0		0.01	0.03	0.07								
Queue Length 95th (m) 0.	က	0.2	8.0	1.7								
Control Delay (s) 0.	0.5	0.3	14.9	14.1								
	⋖	∢	ш	ω								
(s) /	0.5	0.3	14.9	14.1								
pproach LOS			В	В								
ntersection Summary												
Average Delay			1.2									
ntersection Capacity Utilization		e	33.5%	2	ICU Level of Service	f Service			⋖			
Analysis Period (min)			15									

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed F

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ential Development, 10 Aspen Springs Drive, Bowmanville, ON

ICU Level of Service

2.6 53.1% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

121 70 51 487 0.25 7.4 14.8 B B

0.0

Approach Delay (s) Approach LOS

0 158 1700 0.25 0.0

374 374 374 0.03 0.03 1.3 1.3

Direction, Lane #
Volume Total
Volume Left
Solume Right
SSH
Volume to Capacity
Queue Length Sth (m)
Control Delay (s)
Lane LOS

<Total> 2024 Weekday PM Peak Hour rav 03-14-2022 HCM Unsignalized Intersection Capacity Analysis <7 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

Movement EBI EBR NBI SBT SBR		4	>	•	←	-	*	
onfigurations of 6 0 960 881 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Movement	EBL	EBR	NBL	NBT	SBT	SBR	
e Volume (vehth) 0 6 0 960 881 0 0 6 0 960 Control (Vehth) 200 6 0 960 881 0 0 6 0 960 Control 200	Lane Configurations		¥		*	2		
Volume (Vehith) 0 6 0 960 881 0 Annical Stop Free Free Free Free Our Factor 0.92 0.92 0.92 0.92 0.92 Identical 0.92 0.92 0.92 0.92 0.92 Identical 0.93 0.92 0.92 0.92 0.92 Speed (m/s) 1.04 0.7 0.73 0.73 0.73 Blockage mm. flanter (veh) None None None None storage with min flanter (veh) 1.77 379 0.73 Mistanter (veh) 0.60 0.79 0.79 0.79 Appead (m/s) 1.64 6.2 4.1 379 Appead (m/s) 1.64 6.2 4.1 379 Appead (m/s) 1.64 6.2 4.1 379 Appead (m/s) 1.73 2.99 6.4 4.1 4.1 Appead (s) 1.64 6.2 4.1	Traffic Volume (veh/h)	0	9	0	096	881	0	
Only (a) Free Free Free Our Factor 0.92 0.92 0.92 0.92 Iow rate (vph) 0 7 0 1043 958 0 Indication (value) 0 7 0 1043 958 0 Indication (value) 0 7 0 1043 958 0 Indicated (val) 8 8 0 0 0 0 Indicated (val) 8 0 0 0 0 0 0 Indicated (val) 6 0 <	Future Volume (Veh/h)	0	9	0	096	881	0	
our Factor 0 % 0 % 0 % 0 % 0 % 0 % 0 % 0 % 0 % 0	Sign Control	Stop			Free	Free		
Hour Factor 0.92	Grade	%0			%0	%0		
ly flow rate (vph) 0 7 0 1043 958 0 with time (vph) 0 7 0 1043 958 0 with time (vph) 0 7 0 1043 958 0 with time (veb) 0 1042 0 1043 958 0 with time (veb) 0 1043 0 1045 0	Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
wild filt (m) World filt (m) and Stockage and Stockage and Stockage and Stockage with Jam (lam) (with mid than (with)) None None None and type and stockage with than flaten wild order of with all stock wild wild stock wild wild wild wild wild wild wild wild	Hourly flow rate (vph)	0	7	0	1043	928	0	
Width (m) Midth (ms) Ing Speed (ms) None None an storage with an storage of confroid with a storage with a storag	Pedestrians							
ing Speed (in/s) an type an storage wh) alton unblocked an storage wh) alton unblocked an storage wh) as a 20 and indicing volume an storage wh) as a 20 as a 20 an indicing volume and	Lane Width (m)							
an storage earl Blockage Itum flare (veh) None None an storage veh) an storage veh) International (m)	Walking Speed (m/s)							
turn flare (veh) Iturn flare (m) Iturn flare	Percent Blockage							
an type an strategy exh) ream signal (m) an strategy exh) ream signal (m) an strategy exh) ream signal (m) an strategy exh) roundicting volume 2001 958 958	Right tum flare (veh)							
an storage veh) are storage veh) are an signal (m) alternation (m) bright (m) conflicting volume 2001 958 958 358 958 358 958 358 958 358 958 359 841 359 844 350 98 100 350	Median type				None	None		
ream signal (m) ream signal (m) validation unblocked 0.60 0.79 0.70	Median storage veh)							
latoon unblocked 0.60 0.79 0.79 nordificiting volume 2001 958 958 stage 2 conf vol 1564 818 818 unblocked vol 1564 818 818 unblocked vol 6.4 6.2 4.1 stage (s) 3.5 3.3 2.2 unblocked vol 70 98 100 apacity (vehrln) 73 299 644 apacity (vehrln) 73 299 644 apacity (vehrln) 73 299 644 apacity (vehrln) 73 0.0 0 ne Right 7 104 958 ne Left 0 0 0 ne Right 299 1700 1700 ne to Cach Delay (s) 17.3 0.0 0.0 cod Delay (s) 17.3 0.0 0.0 cod Delay (s) 17.3 0.0 0.0 cod Delay (s) 17.3 0.0 0.0 apaciton Summary 0.17 0.0 apaciton Cach Delay (s) 17.3 0.0 0.0 apaciton Summary 0.17 0.0 apaciton Cach Delay (s) 17.3 0.0 0.0 apaciton Summary 0.17 0.0 apacitor Section Cach Olive (s) 17.3 0.0 0.0 apacitor Cach Delay (s) 17.3 0.0 0.0	Upstream signal (m)				117	379		
onflicting volume 2001 958 958 stage 1 conf vol stage 2 conf vol unblocked onf vol stage (s) 6.4 6.2 4.1 stage (s) 7 299 6.4 thorn Lane # EB 1 NB 1 SB 1 thorn Lane # EB 1 NB 1 SB 1 thorn Lane # Capacity (velvh) 7 3 299 6.4 thorn Lane # B 1 NB 1 SB 1 thorn Lane # B 1 NB 1 SB 1 thorn Lane # B 299 1700 0 0 ne Right 7 0 0 ne Right 7 0 0 no Delay (s) 0.02 0.61 0.56 thorn Los C 0 0.0 cach LOS C 0	pX, platoon unblocked	09.0	0.79	0.79				
stage 1 conf vol stage 2 conf vol inclored vol stage (s) stage	vC, conflicting volume	2001	928	928				
stage 2 conf vol 1564 818 818 unblocked vol 6.4 6.2 4.1 ingle (s) 6.4 6.2 4.1 stage (s) 3.5 3.3 2.2 busines # Feb (s) 7.0 98 6.44 papacity (veh/n) 7.3 9.6 6.44 papacity (veh/n) 7.3 9.6 6.44 papacity (veh/n) 7.3 0.0 0.4 me lotal 7 1043 958 me lotal 7 1043 958 me lotal 7 7 0 me lotal 7 7 0 me lotal 7 7 0 me lotal 0.0 0.0 0 not Delay (s) 17.3 0.0 0 codh Delay (s) 17.3 0.0 0 codh Lolay 6 0 0 codh Delay (s) 17.3 0.0 codh Delay (s) 17.3 0 <td>vC1, stage 1 conf vol</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	vC1, stage 1 conf vol							
unblocked vol 1564 818 818 stage (s) 6.4 6.2 4.1 stage (s) 3.5 3.3 2.2 unble free % 100 98 100 apacity (vehrln) 73 299 644 apacity (vehrln) 7 1043 958 nne Left 0 0 0 nne Right 7 0 0 0 nne Right 299 1700 1700 nne Length 95th (m) 0.02 0.61 0.56 no Lo Capacity 0.02 0.61 0.56 no Cach Delay (s) 17.3 0.0 0.0 cach Delay (s) 17.3 0.0 0.0 adah LOS C 0 0 0 adah LOS C 0 0 0 0 adah LOS C 0 0 0 0 0 0 adah LOS C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	vC2, stage 2 conf vol							
stage (s) 6.4 6.2 4.1 stage (s) 5.4 6.2 4.1 stage (s) 3.5 3.3 2.2 stage (s) 7.3 2.2 stage (s) 7.3 2.9 6.4 stage (s) 7.3 2.9 6.4 stage (s) 7.4 2.9 6.4 stage (s) 7.0 0.0 0.0 0.0 stage (s) 7.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	vCu, unblocked vol	1564	818	818				
stage (s) 3.5 3.2 Jeue free % 100 98 100 98 100 98 100 98 100 644 299 644 101 73 299 644 102 644 103 644 1043 958 1043 105 100 100 100 100 100 100 10	IC, single (s)	6.4	6.2	4.1				
3.5 3.3 2.2	tC, 2 stage (s)							
apacity (vehrIn) 73 299 644 apacity (vehrIn) 73 299 644 martical 7 1043 958 me Left 0 0 0 me Right 29 1700 1700 me Legth 95th (m) 0.02 0.61 0.56 me Legth 95th (m) 0.05 0.0 0.0 clo Delay (s) 17.3 0.0 0.0 adab Delay (s) 17.3 0.0 0.0 adab Delay (s) 17.3 0.0 0.0 adab Delay (s) 65 0.0 adab Delay (s) 66 0.0 adab Delay (s) 17.3 0.0 0.0 adab Delay (s) 67 0.0 adab Delay (s) 17.3 0.0 0.0	F (s)	3.5	3.3	2.2				
apacity (veh/h) 73 299 644 stron Lane # EB 1 NB 1 SB 1 me Total 7 1043 958 me Total 7 1043 958 me Total 7 0 0 0 me Right 7 0 0 0 0 me Lospacity (2) 0.02 0.61 0.56 me Lospacity (3) 17.3 0.0 0.0 cold Delay (s) C 0 0 0 0 code Delay (s) C 0 0 0 0 0 code Delay (s) C 0 0 0 0 0 0 code Delay (s) C 0 0 0 0 0 0 0 code Delay (s) C 0 0 0 0 0 0 0 0 code Delay (s) C 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	on due ue free %	100	86	19				
stion, Lane # EB 1 NB 1 SB 1 ne Total 7 1043 958 ne Left 0 0 0 ne Right 7 0 0 ne to Capacity 0.02 0.61 0.56 ne Length 95ih (m) 0.5 0.0 0.0 no LoS 0 0.0 0.0 n-LoS 0 0.0 0.0 acach Delay (s) 17.3 0.0 0.0 acach LoS C 0 0 acach LoS C 0 0 acach LoS C 0 0 section Capacity Wilization 56.4% ICU Level of Service	cM capacity (veh/h)	73	299	644				
ne Total 7 1043 958 ne Left 0 0 0 ne Right 7 0 0 ne Right 299 1700 1700 ne to Capacity 0.02 0.61 0.56 Le Length 95th (m) 0.5 0.0 0.0 coach Delay (s) 17.3 0.0 0.0 coach Delay (s) 17.3 0.0 0.0 section Summary 0.1 section Summary 0.1 section Summary 0.1 section Capacity Witization 56.4% ICU Level of Service	Direction, Lane #	EB 1	NB 1	SB 1				
ne Left 0 0 0 ne Right 7 0 0 ne Right 299 1700 1700 ne to Capacity 0.02 0.61 0.56 ne Length 95th (m) 0.5 0.0 0.0 cod Delay (s) 17.3 0.0 0.0 cod Delay (s) 17.3 0.0 0.0 section Summary 0.0 section Summary 0.0 section Summary 0.0 15.4% ICU Level of Service	Volume Total	7	1043	928				
ne Right 7 0 0 ne bright 299 1700 1700 ne to Capacity 0.02 0.61 0.56 or Length 95th (m) 0.5 0.0 0.0 or Delay (s) 17.3 0.0 0.0 orach Delay (s) 17.3 0.0 0.0 and Delay (s) 2 0.61 0.66 and Delay (s) 17.3 0.0 0.0 and LOS C 0 section Summary 0.0 section Summary 0.0 fight Delay 0.00 15.5 0.00 16.6 0.00 17.8 0.00 18.5 elevice fight filtration 6.00 18.5 0.00 18.5 elevice filtration 7.5 6.4% 19.5 0.00 19.5	Volume Left	0	0	0				
299 1700 1700 The b Capacity 0.02 0.61 0.56 Los abelay (s) 17.3 0.0 0.0 The section Summary 0.17 Section Capacity Utilization 56.4% (CU Level of Service Service) 1.50 The section Capacity Utilization 1.56.4% (CU Level of Service Service) 1.50 The section Capacity Utilization 1.56.4% (CU Level of Service Service) 1.50 The section Capacity Utilization 1.50 The	Volume Right	7	0	0				
Japacity 0.02 0.61 0.56 Jan Sin (m) 0.5 0.0 0.0 ay (s) 7.3 0.0 0.0 C C C C Summary Apart Wilization 56.4% ICU Level of Service midd (min) 15.00 15.00 0.0 0.0 15.00 0.0 0.0 15.00 0.0 0.0 15.00 0.0 0.0 15.00 0.0 0.0 15.00 0.0 0.0 15.00 0.0 0.0 15.00 0.0 0.0 15.00 0.0 0.0 0.0 15.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	SSH	536	1700	1700				
gth 95th (m) 05 00 0.0 ey (s) 17:3 0.0 0.0 C C C C C Summary 0.1 Capacity Utilization 56.4% ICU Level of Service nidd (min) 15	Volume to Capacity	0.02	0.61	0.56				
eley (s) 17.3 0.0 0.0 C C C C C C C C C C C C C C C C C C C	Queue Length 95th (m)	0.5	0.0	0.0				
C C C C C C C C C C	Control Delay (s)	17.3	0.0	0.0				
belay (s) 17.3 0.0 0.0 OS C Summary App Capacity Utilization 56.4% ICU Level of Service 16.0	-ane LOS	ပ						
C 0.1 0.1 Icavel of Service 156.4% ICU Level of Service 15 15 15 15 15 15 15 15 15 15 15 15 15	Approach Delay (s)	17.3	0.0	0.0				
0.1 56.4% ICU Level of Service 15	Approach LOS	O						
0.1 56.4% ICU Level of Service 15	Intersection Summary							
56.4% ICU Level of Service 15	Average Delay			0.1				
	Intersection Capacity Utilizatio	u		56.4%	ਹ	J Level of		
	Analysis Period (min)			15				

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<Total> 2024 Weekday AM Peak Hour Timings 1: Bowmanville Avenue & Highway 2

	1	†	<u>/</u>	-	Ļ	1	•	←	•	۶	→	*
Lane Group	EBF	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	\$	*	*	‡	*	r	l	*	*	*	*-
Traffic Volume (vph)	157	638	236	172	741	49	215	311	66	30	519	259
Future Volume (vph)	<u>15</u>	638	236	172	741	49	215		66	30	519	259
Turn Type	pm+pt	AN	Perm	pm+pt	₹	Perm	pm+pt	¥	Perm	Perm	Ν	Perm
Protected Phases	2	2		_	9		က	00			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	2	2	-	9	9	က	∞	80	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	2.0	20.0	20.0	2.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	0.6	28.2	28.2	9.0	28.2	28.2	9.0	26.0	26.0	30.5	30.5	30.5
Total Split (s)	11.0	30.0		11.0	30.0	30.0	11.0	49.0	49.0	38.0	38.0	38.0
Total Split (%)	12.2%	33.3%		12.2%	33.3%	33.3%	12.2%	24.4%	24.4%	42.2%	42.2%	42.2%
Yellow Time (s)	3.0	4.3		3.0	4.3	4.3	3.0	4.9	4.9	4.9	4.9	4.9
All-Red Time (s)	0.0	1.9		0.0	1.9	1.9	0.0	1.6	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	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	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	35.0	23.8	23.8	35.0	23.8	23.8	46.0	42.5	42.5	31.5	31.5	31.5
Actuated g/C Ratio	0.39	0.26	0.26	0.39	0.26	0.26	0.51	0.47	0.47	0.35	0.35	0.35
v/c Ratio	0.87	0.83	0.55	0.85	0.97	0.15	06.0	0.57	0.17	0.15	0.97	0.47
Control Delay	55.4	41.6	8.3	51.6	58.7	1.6	51.0	17.6	2.5	21.9	63.2	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.4	41.6	8.3	51.6	58.7	1.6	51.0	17.6	2.5	21.9	63.2	7.2
SOT	ш	Ω	∢	Ω	ш	∢	Ω	В	∢	O	ш	⋖
Approach Delay		35.1			54.1			24.7			42.3	
Approach LOS		٥			٥			O			۵	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	to phase 2:	EBTL, St	art of Gre	en								
Natural Cycle: 90												
Control Type: Actuated-Coordinated	ordinated											
Maximum v/c Ratio: 0.97												
Intersection Signal Delay: 39.9	6.6			드	ntersection LOS: D	LOS: D						
Intersection Capacity Utilization 85.5%	tion 85.5%			≗	CU Level of Service	of Service	ш					
Analysis Period (min) 15												





Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

<Total> 2024 Weekday AM Peak Hour 03-14-2022 HCM Signalized Intersection Capacity Analysis 1: Bowmanville Avenue & Highway 2

EBT	EBR 236 1900 6.2 36 1900 0.97 1900 0.97 1900 0.97 1900 1344 1.00 1344 0.75 218 97 1900 1800 1900 1900 1900 1900 1900 1900		WBT WBR WBR WBT WBR 741 49 49 49 49 49 49 49 49 49 49 49 49 49	2 2 2 2 2 1.1.1 1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.1 1.1.	311 311 1900 1.00 1.00 1.00 1.00 1.00 1.00 1.	NBR 99 99 99 99 1900 1.00 0.85 1.00 1474 1.00 1474 1.00 1474 1.00 1474 1.00 132 3 3 3 3 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	SBL 30 30 30 30 6.5 6.5 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	SBT 519 519 519 519 519 519 6.5 519 6.	SBR 259 259 259 1900 6.5 1.00 1.00 1.36 301 134 167 167 168 178 178 178 178 178 178 178 178 178 17
154 638 154 638 154 638 1900 1900 1900 1,00 0.95 1,00 1,00 1,00 1,00 1,00 1,00 1,00 1,00 0,95 1,00 0,17 1,				[311 311 311 1900 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	6.5 6.5 1.00 0.98 1.00 0.88 1.00 1.474 1.00 1.474 1.00 1.474 1.00 0.75 1.32 3.3 3.3 9%	30 30 30 30 30 6.5 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	519 1900 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	259 259 259 1900 6.5 6.5 6.5 1.00 1.00 0.85 301 1360 1360 137 147 147 147 147 147 147 147 147 147 14
154 638 154 638 1900 1900 3.0 6.2 1.00 0.95 1.00 1.00 1.00 1.00				£ , , , , , , , , , , , , , , , , , , ,	311 1900 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	99 99 1900 6.5 1.00 0.98 1.00 1474 1.00 1474 1.00 1.75 0.75 9% 9%	30 1900 6.5 1.00 1.00 1.00 0.95 1445 0.52 786 0.75 40 40 40 26%	519 1900 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 546 546 20%	259 259 1900 6.5 6.5 6.5 7 1.00 0.85 301 1.00 1.00 1.00 1.00 1.00 1.00 1.00
154 638 1900 1900 3.0 6.2 1.00 0.95 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.02 1.00 0.02 1.00 0.02 1.00 0.02 1.00 0.02 1.00 0.02 1.00 0.02 1.00 0.03 1.00 0.03					1900 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	99 1900 6.5 1.00 0.98 1.00 1474 1.00 1474 1.00 1474 1.00 6.2 6.2 8 3 3 9%	30 6.5 1.00 1.00 1.00 1.00 0.95 1445 0.52 786 0.75 40 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	519 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 546 546 546	259 1900 6.5 1.00 0.97 1.00 0.85 1.00 1.36 1.36 1.36 1.37 1.37 1.37 1.37 1.37 1.37 1.37 1.37
1900 1900 1900 1900 1900 1900 1900 1900					6.5 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	1900 6.5 1.00 0.85 1.00 1.474 1.474 1.474 1.474 1.77 1.00 1.75 1.32 1.32 1.32 1.32 1.32 1.33 1.33 1.33	1900 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	1900 6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5 6.5
30 6.2 1.00 0.95 1.00 1.00 1.00 1.00 0.95 1.00 0.97 0.92 1.95 693 2 1.95 693 2 1.57 1.00 0.77 0.92 1.95 693 2 1.95 693 2 1.95 693 2 1.95 693 2 1.95 693 2 1.95 693 3 1.8 2.38 3.18 2.38 3.18 2.38				[E	6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	6.5 1.00 0.98 1.00 0.85 1.00 1474 1.474 1.474 1.32 7.0 6.2 6.2 8 9%	6.5 1.00 1.00 1.00 0.95 1445 0.52 0.52 40 0 40 40 3 26%	6.5 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.	6.5 1.00 0.97 1.00 0.85 301 1.36 0.86 301 15 16 17 15 16 17 17 18 18 18 19 19 19 10 10 10 10 10 10 10 10 10 10 10 10 10
1.00 0.95 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.01 1.00 2.81 3147 0.77 0.92 1.95 693 2.2 1.95 693 2.2 2 2.2 2 3.18 2.38 3.18 2.38 3.18 2.38 3.18 2.38 3.18 2.38					1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	1.00 0.98 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	1.00 1.00 1.00 0.95 1445 0.52 786 0.75 40 40 40 40 40 26%	1.00 1.00 1.00 1.00 1.00 1.00 1.00 546 0.95 546 546	1.00 0.97 1.00 0.85 1.00 1.00 1.360 0.86 301 157 157 157 158 158 158 158 158 158 158 158 158 158
1.00 1.00 1.00 1.00 1.00 1.00 0.95 1.00 0.187 3147 0.17 0.02 0.79 0.92 0.79 0.92 1.95 693 0 0 1.95 693 1.95 693 1.95 813 1.96 83 1.96 83 1.97 1.00 1.98 83 1.98 83 1.9				, , , , , , , , , , , , , , , , , , ,	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	0.98 1.00 0.85 1.00 1474 1474 0.75 70 62 3 3 9%	1.00 1.00 1.00 0.95 1445 0.52 786 0.75 40 0 40 40 40 3 3 26%	1.00 1.00 1.00 1.00 1.00 1.00 1.00 546 0.95 546 0.95 546	0.97 1.00 0.85 1.00 1.360 0.86 301 134 157 167 167 178 188 189 189 189 189 189 189 189 189 18
1,00 1,00 1,00 1,00 0,95 1,00 1,00 0,95 1,00 1,00 0,97 1				, , , , ,	1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.74 420 0 420 0 420 NA NA N	1.00 0.85 1.00 1474 1.00 1474 0.75 70 62 3 3 9%	1.00 1.00 0.95 1445 0.52 786 0.75 40 0 40 40 3 26%	1.00 1.00 1.00 1.00 1.00 0.95 546 0.95 546 20%	1.00 0.85 1.00 1.360 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.
1.00 1.00 0.95 1.00 1.587 3147 0.17 1.00 2.81 3147 0.79 0.92 195 693 0 0 0 0 195 693 2 15% pm-pt NA 5 2 2 3.1.8 2.3.8 3.1.8 2.3.8 3.1.8 2.3.8				, le	1.00 1.562 1.00 1.00 1.00 1.00 0.74 420 0 420 23% NA	0.85 1.00 1474 1.00 1474 0.75 132 70 62 83 3 9%	1.00 0.95 1445 0.52 786 0.75 40 0 40 40 3 26%	1.00 1.00 1.00 1.00 1.00 0.95 546 0 546 20%	0.85 1.00 1.00 1.00 1.00 0.86 301 167 167 168 168 168 168 168
0.95 1.00 0.17 1.00 2.81 3147 0.77 0.02 1.95 693 0 0 0 1.96 693 2 2 15% 16% pm-pt NA pm-pt NA 5 2 2 2 2 3.18 2.38 3.18 2.38 3.18 2.38				o t o o o o	1.00 1562 1.00 1.00 0.74 420 0 420 23% NA	1.00 1474 1.00 1474 0.75 132 70 62 3 9%	0.95 1445 0.52 786 0.75 40 0 40 40 3 26%	1.00 1.00 1.00 1.00 0.95 546 0 546 20%	1.00 1.00 1.00 1.00 0.86 301 167 158 167 168
1587 3147 0.17 1.00 281 1347 0.78 0.92 195 693 0 0 195 693 2 15% 16% pm+pt NA 5 2 2 2 15% 16% 31.8 238 31.8 238 31.8 238 31.8 238		6 6 6 6			1562 1.00 1.00 1.562 0.74 420 0 420 420 8	1474 1.00 1474 0.75 132 70 62 62 3 9%	1445 0.52 786 0.75 40 40 40 3 3 26%	1601 1.00 1601 0.95 546 0 546 20%	1360 1.00 1.00 0.86 301 167 167 168 Perm
0.17 1.00 281 3147 0.78 0.92 195 693 2 195 693 2 2 15% 16% pm+pt NA 5 2 2 3 1.8 2.38 3.18 2.38 3.18 2.38 3.16 2.36				_ _ _ _ _ _	1.00 1.562 0.74 420 0 420 420 23% NA	1.00 1474 0.75 132 70 62 62 3 9%	0.52 786 0.75 40 40 40 3 3 26%	1.00 1601 0.95 546 0 546 20%	1.00 1.360 0.86 301 134 157 167 167 167
281 3147 0.79 0.92 195 693 0 0 0 195 693 2 15% 16% pm+pt NA 5 2 2 2 2 2 31.8 23.8 31.8 23.8 31.8 23.8				, la	1562 0.74 420 0 420 420 23% NA 8	1474 0.75 132 70 62 3 9% Perm	786 0.75 40 0 40 40 3 26%	1601 0.95 546 0 546 546	1360 0.86 301 167 15 16% Perm
0.79 0.92 195 693 0 0 0 0 195 693 2 15% 16% 15% 16% 31.8 23.8 31.8 23.8 31.8 23.8 31.8 23.8				, lq	0.74 420 0 420 420 23% NA 8	0.75 132 70 62 3 9% Perm	0.75 40 0 40 40 3 26%	0.95 546 0 546 546	0.86 301 167 134 15% Perm
196 693 0 0 0 196 693 2 15% 16% pm+pt NA 5 2 2 2 2 2 3 31.8 23.8 31.8 23.8 31.8 23.8 31.8 23.8				, lg	420 0 420 23% NA NA 8	132 70 62 3 9% Perm	40 0 40 3 26%	546 0 546 546	301 167 134 15 16% Perm
195 693 2 15% 16% pm+pt NA 5 2 2 2 2 2 318 238 318 318 318 318 318 318 318 318 318 3				, lg	23% NA 8	70 62 3 9% Perm	0 40 3 26%	0 546 20%	167 134 15% Perm
195 693 2 15% 16% 16% 16% 2 2 2 2 318 238 318 238 318 238 318 238 31 6 35 0.26		-		, lg	420 23% NA 8	62 3 9% Perm	40 3 26%	546	134 15 16% Perm
2 15% 16% pm+pt NA 5 2 2 2 2 2 31.8 23.8 31.8 23.8 31.8 23.8 31.6 2.0.26					23% NA 8	9% Perm	3 26% Derm	20%	15 16% Perm
15% 16% 16% 16% 16% 16% 16% 16% 16% 16% 16					23% NA 8	9% Perm	26% Perm	50%	16% Perm
pm+pt NA 5 2 2 2 2 2 3.18 23.8 31.8 23.8 0.26 0.35 6.26					NA 8	Perm	Darm		Perm 4
5 2 2 2 31.8 23.8 31.8 23.8 0.35 0.26	2 5	(∞		= D	¥	4
31.8 31.8 0.35	2 5							4	4
31.8 31.8 0.35	0000					∞	4		
31.8 0.35 3.0	23.0				42.5	42.5	31.5	31.5	31.5
0.35	23.8		3.8 23.8		45.5	45.5	31.5	31.5	31.5
30	0.26			3 0.47	0.47	0.47	0.35	0.35	0.35
ò	6.2	3.0	6.2 6.2	3.0	6.5	6.5	6.5	6.5	6.5
/ehicle Extension (s) 3.0 3.0	3.0				3.0	3.0	3.0	3.0	3.0
ane Grp Cap (vph) 215 832	355		839 331	1 241	737	969	275	260	476
80:00		0	c0.26	c0.08	0.27			0.34	
	0.07	0.24		_		0.04	0.05		0.10
0.91	0.27				0.57	0.09	0.15	0.97	0.28
	26.2		•		17.1	13.1	20.0	28.9	21.1
1.00	1:00		`		0.83	0.77	1.00	1.00	1.00
ncremental Delay, d2 36.6 9.6	1.9		23.9 0.1		6.0	0.1	0.2	31.4	0.3
	28.1	57.5 56	3.6 24.7	7 57.5	12.1	10.1	20.3	60.3	21.4
ш	ပ		Ш	ш	മ	മ	ပ	ш	O
Approach Delay (s) 40.6		ŭ	55.0		56.6			45.3	
pproach LOS D					O			۵	
ntersection Summary									
HCM 2000 Control Delay	42.8	HCM 2	HCM 2000 Level of Service	of Service		٥			
HCM 2000 Volume to Capacity ratio	0.98								
Actuated Cycle Length (s)	0.06	Sumo	Sum of lost time (s)	S)		18.7			
ration	85.5%	ICU Le	ICU Level of Service	<u>.e</u>		ш			
Analysis Period (min)	15								

<Total> 2024 Weekday AM Peak Hour 03-14-2022 Timings 2: Bowmanville Avenue & Aspen Springs Drive

																																					LOS: C	ICU Level of Service F	
→	SBT	æ	800	800	₹	9		9		20.0	27.0	63.0	%0.07	4.2	2.1	0.0	6.3			C-Max	0.09	0.67	0.99	36.5	0.0	36.5		36.5	۵				reen				Intersection LOS: C	:U Level c	
←	NBT	*	431	431	Ν	2		2		20.0	27.0	63.0	%0.07	4.2	2.1	0.0	6.3			C-Max	0.09	0.67	0.47	6.7	0.0	6.7	⋖	18.0	В				Start of G				=	2	
•	NBL	je-	104	104	Perm		2	2		20.0	27.0	63.0	%0.07	4.2	2.1	0.0	6.3			C-Max	0.09	0.67	0.87	62.2	0.0	62.2	ш						1 6:SBT,						
<u> </u>	EBR	¥C	118	118	Perm		4	4		8.0	24.0	27.0	30.0%	3.3	5.6	0.0	5.9			None	17.8	0.20	0.41	7.9	0.0	7.9	V						NBTL and						
1	EBL	*	193	193	Prot	4		4		8.0	24.0	27.0	30.0%	3.3	5.6	0.0	5.9			None	17.8	0.20	0.77	49.1	0.0	49.1	٥	32.2	O				to phase 2:		ordinated		30.1	ation 93.4%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	Natural Cycle: 90	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 0.99	Intersection Signal Delay: 30.1	Intersection Capacity Utilization 93.4%	Analysis Period (min) 15

Splits and Phases: 2: Bowmanville Avenue & Aspen Springs Drive



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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<Total> 2024 Weekday AM Peak Hour 03-14-2022 HCM Signalized Intersection Capacity Analysis 2: Bowmanville Avenue & Aspen Springs Drive

																																								C	,	12.2	ш		
*	SBR		138	138	1900										0.75	787	0 0	ത	23%																					vel of Service		ne (s)	ervice		
· →	SBT	43	800			6.3	1.00	0.99	1.00	0.98	1.00	1554	0.1			821	4027	1701	19%				0.09	0.09	0.67	6.3	3.0	1036	99.00		0.99	14.8	0.97	79.3	33.6		33.6	ပ		HCM 2000 Level of Service		Sum of lost tin	ICU Level of Service		
←	NBL NBT				1900 1900		1.00 1.00		1.00 1.00		0.95 1.00			`	_	125 490	125 /190		11% 23%	Perm NA	2	2				6.3 6.3		144 1041	0.31	0.58		11.9 7.3			٥	D	15.4	В		29.3				15	
>	EBR	¥C_	118	19	1900	5.9	1.00	1.00	1.00	0.85	1.00	1512	0.1	1512	0.65	182	<u>4</u> %	3	8%			4	17.8	17.8	0.20	5.9	3.0	299		0.03	0.13	29.7	1.00	7.00	29.9	ပ							හි		
1	EB		193	193	1900	5.9	1:00	1:00	1:00	1:00	0.95	1722	0.95	1722	0.74	767	261	104	%9	Prot	4		17.8	17.8	0.20	5.9	3.0	340	00.15		0.77	34.1	1:00	10.0	44.1		38.3				acity ratio		zation		
	Movement	Lane Configurations	Traffic Volume (vph)	Future Volume (vph)	Ideal Flow (vphpl)	Total Lost time (s)	Lane Util. Factor	Frpb, ped/bikes	Flpb, ped/bikes	Fr	Fit Protected	Satd. Flow (prot)	Fit Permitted	Satd. Flow (perm)	Peak-hour factor, PHF	Adj. Flow (vph)	RTOR Reduction (vph)	Confl. Peds. (#/hr)	Heavy Vehicles (%)	Turn Type	Protected Phases	Permitted Phases	Actuated Green, G (s)	Effective Green, g (s)	Actuated g/C Ratio	Clearance Time (s)	Vehicle Extension (s)	Lane Grp Cap (vph)	v/s Ratio Prot	v/s Ratio Perm	v/c Ratio	Uniform Delay, d1	Progression Factor	Incremental Delay, d2	Delay (s)	Level of Service	Approach Delay (s)	Approach LOS	Intersection Summary	HCM 2000 Control Delay	HCM 2000 Volume to Capacity ratio	Actuated Cycle Length (s)	Intersection Capacity Utilization	Analysis Period (min)	 Critical Lane Group

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Timings <Total> 2024 Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-202

→	SBT	£\$	872	872	ΝΑ	2		2		20.0	27.0	60.3	%0'.29	4.8	1:8	0.0	9.9			C-Max	72.8	0.81	0.74	8.9	0:0	8.9	¥	8.9	¥										
۶	SBL	F	4	4	Perm		2	2		20.0	27.0	60.3	%0'.29	4.8	1.8	0.0	9.9			C-Max	72.8	0.81	0.01	4.2	0.0	4.2	∢												
•	NBT	£\$	512	512	₹	2		2		20.0	27.0	60.3	%0'.29	4.8	1.8	0.0	9.9			C-Max	72.8	0.81	0.48	5.3	0.0	5.3	∢	5.3	∢									۵	
•	NBL	F	30	30	Perm		2	2		20.0	27.0	60.3	%0'.29	4.8	1.8	0.0	9.9			C-Max	72.8	0.81	0.13	4.1	0.0	4.1	∢										LOS: A	ICU Level of Service D	
ļ	WBT	4	τ-	τ-	₹	4		4		8.0	23.0	29.7	33.0%	3.3	3.0	0.0	6.3			None	8.5	0.09	0.03	30.3	0.0	30.3	O	30.3	O				_				Intersection LOS: A	U Level o	
-	WBL		τ-	τ-	Perm		4	4		8.0	23.0	29.7	33.0%	3.3	3.0					None													t of Greer				≟	0	
<u>/</u>	EBR	*	36	36	Perm		4	4		8.0	23.0	29.7	33.0%	3.3	3.0	0.0	6.3			None	8.5	0.09	0.26	15.0	0.0	15.0	ш						d 6:, Start						
†	EBT	4	0	0	ΑN	4		4		8.0	23.0	29.7	33.0%	3.3	3.0	0.0	6.3			None	8.5	0.09	0.23	41.7	0.0	41.7	Ω	25.5	O				NBSB an						
1	EBL		21	21	Perm		4	4		8.0	23.0	29.7	33.0%	3.3	3.0					None													to phase 2:1		ordinated		3.3	ation 76.8%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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	SOT	Approach Delay	Approach LOS	Intersection Summary	Cycle Length: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	Natural Cycle: 80	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 0.74	Intersection Signal Delay: 8.3	Intersection Capacity Utilization 76.8%	Analysis Period (min) 15



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis <Total > 2024 Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-2022

Lane Configurations	EBR 36 36 36 6.3 6.3 1.00 1.00 1.00 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.04 1.04 1.04 1.04 1.04 1.04 1.0	MBL 1900	WBT WBR 1 2 1 2 1900 1900 6.3 11.00	2 30 20 30 20 30 30 30 30 30 30 30 30 30 30 30 30 30		NBR 0	SBL 4	SBT 4	SBR
ph) 21 (ph) 21 (ph) 21 (ph) 1900 (ph) 1900 (ph) 0 (cyth)	36 36 36 36 6.3 1.00 1.00 1.00 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	1900					} ⊏ →	₹	6
ph) 21 ph) 21) 1900 ')) PHF 0.68 31 ((vph) 0 ('vph) 0 (38 36 1900 6.3 1.00	- t - 00 - t - 00		ì			4	87.0	0
(vph) 21 (vph) 1900 (vph) 1900 (vph) 0	36 1900 6.3 1.00 1.00 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.54 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	- 00 - 00		ì				710	07
(vph) 1900 (vph) 0 0 (vph) 0	6.3 1.00 1.00 1.00 1.00 1.00 1.541 1.00 1.541 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4	000		•			4	872	56
(vph) 0 (vph) 0 0 (v	6.3 1.00 1.00 1.00 1.00 1.54 1.00 1.54 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.4		6.3		~	1900	1900	1900	1900
((vph) 0.68 31 31 0.69 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00 1.00 1.00 0.85 1.00 1541 1.00 48 48 48 48 48 48 48		9 0 :	9.9			9.9	9.9	
), PHF 0.68 31 ((vph) 0 ('vph) 0 ('ph) 0% ('ph) 0%	1.00 0.85 1.00 1.54 1.00 1.54 4.8 4.8 4.4 4.4 4.4 4.4 4.4 4.4 4.4 4.		1.00	1:00	00.1		1.00	1.00	
(vph) 0 (vph) 0 0	1.00 1.00 1.541 1.00 1.541 0.75 4 4 4 4 4 4 4 4			1.00			1.00	1:00	
PHF 0.68 31 (vph) 0 (vph) 0 0 (vph) 0 0 % (vph) 0 0 % (vph) 0 0 (vph)	0.85 1.00 1.541 1.00 1.541 0.75 48 44 44 44 44		1.00	1:00	0 1.00		0.99	1.00	
(vph) 0.68 (vph) 0 0 0.69 (vph) 0 0 0 0.69 (vph) 0 0 0 0.69 (vph) 0 0.69 (vph) 0 0 0 0.69 (vph) 0 0 0 0.69 (vph) 0 0 0 0 0.69 (vph) 0 0 0 0 0 0.69 (vph) 0 0 0 0 0 0.69 (vph) 0 0 0 0 0 0 0.69 (vph) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00 1.541 1.00 1.541 0.75 48 44 44 44		0.93	1.0			1.00	0.99	
), PHF 0.68 31 31 (vph) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.00 1.00 1.541 0.75 48 44 44 44		0.99	0.95			0.95	1.00	
m) 1.1 or, PHF 0.68 (1.1 or, Cych) 0 ow (vph) 0 v(vph) 0 very perm	1.00 1541 0.75 48 44 4 4 6%		1769	164	_		1813	1616	
m) 1- 2r, PHF 0.68 (0 31 30 (vph) 0 w (vph) 0 hr) 0 Perm	0.75 0.75 48 44 44 6%		0.91	0.24			0.41	1.00	
ar, PHF 0.68 (31 31 31 00 (vph) 0 00 (vph) 0 01 (vph) 0 01 (vph) 0 01 (vph) 0 02 (vph) 0	0.75 48 44 4 4 6%		1622	417	7 1575		786	1616	
31 31 00 00 00 00 00 00 00 00 00 00 00 00 00	44 44 6%	0.82	0.82 0.	0.82 0.68	3 0.84	0.92	0.92	0.95	09.0
0 0 0 Pem	6% 44 Perm	-	-		4 610		4	918	43
0 0% Perm	6% Perm	0	2	0 0		0	0	τ-	0
0% Perm	%9 Berm	0	2	0 44	4 610		4	096	0
0% Perm	6% Perm	ò				ပ ခွ	က ခွဲ	700	710
Perm	Perm	%n		%LL %0		%n	%ĥ	0,0	%/1
	5	Perm	¥.	Perm	u NA		Perm	₹	
			4		7			2	
4	4	4					2	i	
	6.9		6.9	70.2			70.2	70.2	
s)	6.9		6.9	70.2			70.2	70.2	
	0.08		0.08	0.78			0.78	0.78	
Clearance Time (s) 6.3	6.3		6.3	9.9			9.9	9.9	
Vehicle Extension (s) 3.0	3.0		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph) 111	118		124	325	5 1228		613	1260	
v/s Ratio Prot								c0.59	
Perm	0.00		0.00	0.11			0.01		
	0.03		0.02	0.14	_		0.01	0.76	
	38.5		38.4	2.4			2.2	5.4	
Progression Factor 1.00	1.00		1.00	1.00	`		1.48	1.09	
ıtal Delay, d2	0.1		0.1	6.0	9 1.4		0.0	2.0	
Delay (s) 40.6	38.6		38.5	3.5			3.3	7.8	
	۵		۵	1	۷ ۷		⋖	∢	
Approach Delay (s) 39.4			38.5		4.9			7.8	
Approach LOS D			О		A			∢	
Intersection Summary									
HCM 2000 Control Delay	8.2	HCS	HCM 2000 Level of Service	of Service		∢			
HCM 2000 Volume to Capacity ratio	0.72								
Actuated Cycle Length (s)	0.06	Sum	Sum of lost time (s)	(s)		12.9			
Intersection Capacity Utilization	%8.9/	OOI	ICU Level of Service	vice		Ω			
Analysis Period (min)	15								

<total> 2024 Weekday AM Peak Hour</total>	03-14-2022
HCM Unsignalized Intersection Capacity Analysis	4: Bonnycastle Drive & Aspen Springs Drive

																																								A	
•	NBR		28	28			0.93	30										238			238	6.2		3.3	96	804														Service	
√	WBT NBL	≱	222 41		0,		0.93 0.93		2	3.7	[0		None		160		205			205	6.4		3.5	92	522														ICU Level of Service	
` \ _	EBR WBL M		22 14	14	ш			15						Ž				250			250	4.1		2.2	66	1325	WB 1 NB 1	254 74					0.3 3.1			0.6 11.7	В		1.8	33.8%	15
†	EBT	æ	208	208	Free		0.93							None													EB 1 W		0		•	_	0.0			0.0				ization	
	Movement	Lane Configurations	Traffic Volume (veh/h)	Future 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)	b0 dueue 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)

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 6

Total HCM Uni 5: Fry Cr

HCM Unsignalized Intersection Capacity Analysis <Total> 2024 Weekday AM Peak Hour 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive 03-14-2022

†

0.91

0.91

10.91

Stop 0% 0.91

Stop 0% 0.91

0.91

11

0.91

0.91

13

Grade Peak Hour Factor Hourly flow rate (vph)

20

တ တ

9 9

255 255 255 0% 0.91 280

197 197 197 0% 0.91 216

2 2

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

40

3.3 97 745

4.0 100 436

3.5 95 429

3.3 99 823

4.0 434

3.5 99 418

2.2 100 357

2.2 99 1264

p0 queue free % cM capacity (veh/h)

22 23 23 548 0.08 0.08 12.2 B 12.2 B

295 4 4 11 1357 0.00 0.1 0.1 0.1

Direction, Lane #
Volume Total
Volume Left
Solume Right
SM
Volume Right
SM
Caueu Length Sth (m)
Control Delay (s)
Lane LOS

230 13

14 4 10 645 0.02 0.5 10.7 10.7 B

264 0.01 0.2 0.5 A A

294

548

220 6.2

552 6.5

562 7.1

294

548

554

220

552

562

220

299

Pedesirians
Lane Width (m)
Walking Speed (mis)
Walking Speed (mis)
Walking Speed (mis)
Waldian type
Madian type
Walting a storage veh)
Destream signal (m)
De, plation unblocked
vC, conflicting volume
vC1, stage 1 conf vol

None 323

None

HCM Unsignalized Intersection Capacity Analysis 5: Fry Crescent (East) & Aspen Springs Drive	tersect) & As	tion C spen S	apacity prings	/ Anal) Drive	/sis	<total> 2024 Weekday AM Peak Hour 03-14-2022</total>	Hour 2022
	†	~	>	ţ	•	*	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	2			€	>		
Traffic Volume (veh/h)	223	က	4	259	Ξ	80	
Future Volume (Veh/h)	223	က	4	259	Ξ	8	
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)	242	က	4	282	12	6	
Pedestrians				2	4		
Lane Width (m)				3.7	3.7		
Walking Speed (m/s)				[[:		
Percent Blockage				0	0		
Right tum flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)				245			
pX, platoon unblocked							
vC, conflicting volume			249		538	250	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			249		538	250	
tC, single (s)			4.1		6.4	6.2	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			100		88	66	
cM capacity (veh/h)			1323		204	789	
Direction, Lane #	EB 1	WB1	NB 1				
Volume Total	245	286	21				
Volume Left	0	4	12				
Volume Right	က	0	တ				
cSH	1700	1323	265				
Volume to Capacity	0.14	0.00	0.04				
Queue Length 95th (m)	0.0	0.1	0.8				
Control Delay (s)	0.0	0.1	11.3				
Lane LOS		V	В				
Approach Delay (s)	0.0	0.1	11.3				
Approach LOS			Ω				
Intersection Summary							
Average Delay			0.5				
Intersection Capacity Utilization	_		27.5%	Ö	ICU Level of Service	f Service A	
Analysis Period (min)			15				

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Synchro 10 Report Page 9

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

ICU Level of Service

1.5 27.9% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach Delay (s) Approach LOS

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

<Total> 2024 Weekday AM Peak Hour ss HCM Unsignalized Intersection Capacity Analysis <7. 7: Aspen Springs Drive Access

<Total> 2024 Weekday AM Peak Hour ay 03-14-2022

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph)

Pedestrians
Lane Width (m)
Walking Speed (m/s)
Percent Blockage
Right turn flare (veh)
Median type

Stop 0% 0.92 0

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

927 927 927 0% 0.92

624 624 Free 0% 0.92 678

None 379

None 117

0.72

0.72

0.78

2.2 100 583

3.3 88 271

3.5 100 127

813

1366

Median storage veh)
Upstream signal (m)
Dx, Pattorn unblocked
Cx, conflicting volume
vC1, stage 1 conf vol
vC2, stage 2 conf vol
vC3, unblocked vol
Cx, unblocked vol
Cx, single (s)
Cx, single (s)
Cx, single (s)
Cx, stage (d)
C

SB 1

Direction, Lane #
Volume Total
Volume Left
Volume Right

HCM Unsignalized Intersection Capacity Analysis <-8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

199 43 81 37 Pree Stop 02% 00% 0% 02% 00% 00% 216 47 88 40 None 73 508 240 6.4 6.2 518 35 33 83 95 521 799 588 40 524 524 525 521 799 588 40 524 524 525 521 799 588 588 524 789 588 588 588 588 588 588 588 588 588 5	
092 092 47 88 40 508 240 64 62 3.5 3.3 83 95 521 799	10 226 10 226 Free
508 240 508 240 64 62 3.5 3.3 83 95 521 799	0.92 0.92
508 240 508 240 6.4 6.2 3.5 3.3 83 95 521 799	
508 240 508 240 6.4 6.2 3.5 3.3 83 95 521 799	
508 240 508 240 6.4 6.2 3.5 3.3 83 95 521 739	None
508 240 508 240 6.4 6.2 3.5 3.3 83 95 521 799 ICU Level of Service	
508 240 508 240 64 62 83 95 521 799 ICU Level of Service	
508 240 6.4 6.2 3.5 3.3 83 95 521 799 ICU Level of Service	263
508 240 6.4 6.2 3.5 3.3 83 95 521 799 ICU Level of Service	
3.5 3.3 83 95 521 799 ICU Level of Service	263 4.1
521 799 521 799 1CU Level of Service	C
521 799 ICU Level of Service	5.7 99
ICU Level of Service	1301
ICU Level of Service	EB 1 WB 1 S
ICU Level of Service	257 263
ICU Level of Service	
ICU Level of Service	
ICU Level of Service	
ICU Level of Service	0.2 0.0
ICU Level of Service	
ICU Level of Service	
ICU Level of Service	0.4 0.0
ICU Level of Service	
ICU Level of Service	
ICU Level of Service	
	e e

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Synchro 10 Report Page 11

ш

ICU Level of Service

0.4 58.8% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

0.59 0.0 0.0

678 0 0 0 1700 0.40 0.0

32 32 32 271 0.12 3.0 50.1 C

osh Volume to Capacity Queue Length 95th (m) Control Delay (s) Lane LOS

0.0

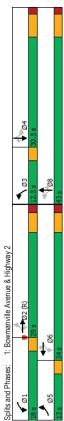
0.0

Approach Delay (s) Approach LOS

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Timings https://weekday<a href="h

	1	†	*	>	ţ	4	•	←	•	۶	→	*
ane Group	EBF	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations	*	‡	¥C	<i>y</i> -	‡	*	F	‡	*	*	‡	¥C.
raffic Volume (vph)	176	740	263	250	882	73	227	306	11	37	554	298
uture Volume (vph)	176	740	263	250	882	73	227	306	11	37	554	298
urn Type	pm+pt	Ϋ́	Perm	pm+pt	Ϋ́	Perm	pm+pt	Ϋ́	Perm	Perm	₹	Perm
Protected Phases	2	2		~	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	2	2	-	9	9	က	∞	∞	4	4	4
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	2.0	12.0	12.0	12.0	12.0	12.0
linimum Split (s)	9.0	28.2	28.2	0.6	28.2	28.2	0.6	26.0	26.0	30.5	30.5	30.5
otal Split (s)	13.0	29.0	29.0		34.0	34.0		43.0	43.0	30.5	30.5	30.5
otal Split (%)	14.4%	32.2%	32.2%		37.8%	37.8%		47.8%	47.8%	33.9%	33.9%	33.9%
ellow Time (s)	3.0	4.3	4.3		4.3	4.3		4.9	4.9		4.9	4.9
II-Red Time (s)	0.0	1.9	0:1		1.9	1.9		1.6	1.6	1.6	1.6	1.6
ost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
otal Lost Time (s)	3.0	6.2	6.2	3.0	6.2	6.2		6.5	6.5	6.5	6.5	6.5
ead/Lag	Lead	Lag	Lag		Lag	Lag	_				Lag	Lag
ead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes				Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	_	None	None	_	None	None	None	None	None
ct Effct Green (s)	38.1	24.5	24.5	45.6	29.1	29.1		34.9	34.9	22.4	22.4	22.4
Actuated g/C Ratio	0.42	0.27	0.27	0.51	0.32	0.32	0.43	0.39	0.39	0.25	0.25	0.25
/c Ratio	0.84	0.94	09:0	0.90	0.95	0.19		0.36	0.22	0.26	0.77	0.61
ontrol Delay	47.5	53.0	10.9	50.5	49.8	4.0		16.5	5.6	30.2	38.9	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
otal Delay	47.5	53.0	10.9	50.5	49.8	4.0	37.7	16.5	2.6	30.2	38.9	10.6
S			ш	۵	۵	∢	_	Ω	∢	O	_	В
pproach Delay		41.4			46.9			20.3			28.4	
pproach LOS		Ω						ပ			ပ	
ntersection Summary												
vole Lenath: 90												
ctuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	phase 2	:EBTL, St	art of Gre	eu								
Natural Cycle: 90												
ontrol Type: Actuated-Coordinated	dinated											
Maximum v/c Ratio: 0.95												
ntersection Signal Delay: 36.5	75.			Ξ	Intersection LOS: D	LOS: D						
ntersection Capacity Utilization 79.4%	ion 79.4%			೦	U Level o	CU Level of Service D	۵					
Analysis Period (min) 15												



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 1

HCM Signalized Intersection Capacity Analysis <Background> 2029 Weekday AM Peak Hour 1: Bowmanville Avenue & Highway 2

	1	†	<i>></i>	-	↓	4	•	←	•	۶	→	*
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	‡	*-	*	ŧ	¥L.	r	‡	*	r	‡	*
Traffic Volume (vph)	176	740	263	250	882	73	227	306	11	37	554	298
Future Volume (vph)	176	740	263	250	882	73	227	306	111	37	554	298
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1:00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1:00	1:00	0.85	1:00	1:00	0.85	1:00	1.00	0.85	1:00	9.1	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1587	3147	1344	1587	3174	1266	1544	2968	1474	1445	3042	1360
Fit Permitted	0.16	1.00	1.00	0.15	1.00	1.00	0.26	1.00	1.00	0.51	1.00	1.00
Satd. Flow (perm)	273	3147	1344	243	3174	1266	415	2968	1474	775	3042	1360
Peak-hour factor, PHF	0.79	0.92	0.75	0.81	0.91	0.79	0.95	0.74	0.75	0.75	0.95	0.86
Adj. Flow (vph)	223	804	321	309	973	92	239	414	148	49	583	347
RTOR Reduction (vph)	0	0	217	0	0	62	0	0	91	0	0	227
Lane Group Flow (vph)	223	804	134	309	973	30	239	414	22	49	583	120
Confl. Peds. (#/hr)	2 5	30	Q 3	9	i i	2	15	300	က	e 500	200	15
Heavy Vehicles (%)	15%	16%	18%	15%	15%	27%	18%	23%	% 6	%92	50%	9L
Turn Type	pm+pt	¥ °	Perm	pm+pt	≸ °	Perm	pm+pt	ĕ°	Perm	Perm	A A	Perm
Profected Prinses	n c	7	c	- 0	D	c	o c	0	c	,	4	
Permitted Phases	7 8 78	24.5	24 5	9 7 7	20.1	20.1	37.0	340	34 o	700	20.4	4 00
Actuated Green, 9 (s)	5 2	24.5	24.5	47.7	20.1	20.1	24.0	24.0	24.0	22.4	700	22.4
Actuated o/C Ratio	0.39	0.27	0.27	0.47	0.32	0.32	0.39	0.39	0.39	0.25	0.25	0.25
Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	255	856	365	336	1026	409	280	1150	571	192	757	338
v/s Ratio Prot	0.10	0.26	9	c0.15	c0.31		60.00	0.14		0	0.19	0
V/s Ratio Perm	0.24	000	0.10	0.28	900	0.02	CU.24	90.0	0.04	0.00	72	90.0
We hallo	20.0	32.0	26.5	20.0 20.5 20.5	20.00	21.0	21.4	10.00	17.6	27.1	31.7	00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.81	0.58	1.00	1.00	1.00
Incremental Delay, d2	26.5	19.1	2.8	29.1	16.9	0.1	21.0	0.2	0.1	0.7	4.9	9.0
Delay (s)	47.8	51.2	29.3	51.6	46.6	21.2	38.9	16.0	10.2	27.8	36.3	28.5
Level of Service	□	□	O	□	Ω	ပ	□	Ф	В	ပ	□	O
Approach Delay (s)		45.0			46.0			21.8			33.1	
Approach LOS		Ω			Ω			ပ			O	
Intersection Summary												
HCM 2000 Control Delay			38.6	Ĭ	HCM 2000 Level of Service	Level of	Service		۵			
HCM 2000 Volume to Capacity ratio	ty ratio		96.0									
Actuated Cycle Length (s)	5		90.0	ಪ ⊆	Sum of lost time (s)	time (s)			18.7			
Analysis Period (min)	5		15	2					2			
c Critical Lane Group												

Proposed Residential Development, 10 Aspen Springs Diive, Bowmanville, ON Trans-Plan

Timings /weekday Aspen Springs Drive
03-14-2022
03

	1	~	•	—	→	*	
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	r	*	F	‡	‡	¥C	
Traffic Volume (vph)	148	105	8	495	927	121	
Future Volume (vph)	148	105	66	495	927	121	
Turn Type	Prot	Perm	Perm	N A	A	Perm	
Protected Phases	4			2	9		
Permitted Phases		4	2			9	
Detector Phase	4	4	2	2	9	9	
Switch Phase							
Minimum Initial (s)	8.0	8.0	20.0	20.0	20.0	20:0	
Minimum Split (s)	24.0	24.0	27.0	27.0	27.0	27.0	
Total Split (s)	29.7	29.7	60.3	60.3	60.3	60.3	
Total Split (%)	33.0%	33.0%	%0'.29	%0'.29	%0'.29	%0'.29	
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2	
All-Red Time (s)	5.6	5.6	2.1	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0:0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	6.3	6.3	6.3	6.3	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	С-Мах	C-Max	С-Мах	С-Мах	
Act Effct Green (s)	15.7	15.7	62.1	62.1	62.1	62.1	
Actuated g/C Ratio	0.17	0.17	0.69	0.69	0.69	0.69	
v/c Ratio	0.67	0.45	0.38	0.27	0.47	0.17	
Control Delay	45.2	14.2	9.2	5.0	4.8	0.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	45.2	14.2	9.2	2.0	4.8	0.7	
ros	۵	В	V	∢	∢	∢	
Approach Delay	31.3			2.7	4.2		
Approach LOS	O			∢	∢		
Intersection Summary							
Cycle Lenath: 90							
Actuated Cycle Length: 90							
Offset 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	phase 2:	NBTL an	d 6:SBT,	Start of G	reen		
Natural Cycle: 60							
Control Type: Actuated-Coordinated	Jinated						
Maximum v/c Ratio: 0.67							
Intersection Signal Delay: 9.2				드	Intersection LOS: A	LOS: A	
Intersection Capacity Utilization 65.9%	on 65.9%			0	ICU Level of Service C	of Servic	0.0
Analysis Period (min) 15							



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Splits and Phases: 2: Bowmanville Avenue & Aspen Springs Drive

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 3

HCM Signalized Intersection Capacity Analysis <Background> 2029 Weekday AM Peak Hour 2: Bowmanville Avenue & Aspen Springs Drive

	1	/	•	←	→	•	
Movement	EBF	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	F	¥.	r	ŧ	ŧ	k.	
Traffic Volume (vph)	148	105	66	495	927	121	
Future Volume (vph)	148	105	66	495	927	121	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.9	5.9	6.3	6.3	6.3	6.3	
Lane Util. Factor	1:00	1.00	1.00	0.95	0.95	1.00	
Frpb, ped/bikes	1:00	1.00	1.00	1.00	1.00	96.0	
Flpb, ped/bikes	1:00	1.00	0.99	1.00	1.00	1.00	
Ft	1.00	0.85	1.00	1.00	1.00	0.85	
Fit Protected	0.95	1.00	0.95	1.00	1.00	1.00	
Satd. Flow (prot)	1722	1512	1636	2968	3067	1270	
Flt Permitted	0.95	1.00	0.27	1.00	1.00	1.00	
Satd. Flow (perm)	1722	1512	460	2968	3067	1270	
Peak-hour factor, PHF	0.74	0.65	0.83	0.88	0.94	0.75	
Adj. Flow (vph)	200	162	119	295	986	161	
RTOR Reduction (vph)	0	86	0	0	0	20	
Lane Group Flow (vph)	200	64	119	563	986	111	
Confl. Peds. (#/hr)			6			6	
Heavy Vehicles (%)	%9	%	11%	23%	19%	23%	
Turn Type	Prot	Perm	Perm	Ϋ́	¥	Perm	
Protected Phases	4			2	9		
Permitted Phases		4	2			9	
Actuated Green, G (s)	15.7	15.7	62.1	62.1	62.1	62.1	
Effective Green, g (s)	15.7	15.7	62.1	62.1	62.1	62.1	
Actuated g/C Ratio	0.17	0.17	69.0	69.0	69.0	69.0	
Clearance Time (s)	5.9	5.9	6.3	6.3	6.3	6.3	
Vehide Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	300	263	317	2047	2116	876	
v/s Ratio Prot	c0.12			0.19	c0.32		
v/s Ratio Perm		0.04	0.26			60.0	
v/c Ratio	0.67	0.24	0.38	0.28	0.47	0.13	
Uniform Delay, d1	34.7	32.0	2.8	5.3	6.4	4.7	
Progression Factor	1:00	1.00	0.75	0.78	0.61	0.37	
Incremental Delay, d2	5.5	0.5	3.3	0.3	0.5	0.2	
Delay (s)	40.2	32.5	9.7	4.5	4.4	1.9	
Level of Service	_	O	⋖	∢	∢	A	
Approach Delay (s)	36.8			2.0	4.0		
Approach LOS	۵			∢	∢		
Intersection Summary							
HCM 2000 Control Delay			86	ĭ	M 2000	HCM 2000 Level of Service	А
HCM 2000 Volume to Capacity ratio	ity ratio		0.51				
Actuated Cycle Length (s)			0.06	S	Sum of lost time (s)	time (s)	12.2
Intersection Capacity Utilization	ion		65.9%	0	ICU Level of Service	f Service	O
Analysis Period (min)			15				
c Critical Lane Group							

Proposed Residential Development, 10 Aspen Springs Diive, Bowmanville, ON Trans-Plan

5. Bowillariville Averige & narwell Averige/Existing Corido Access	a a a	Iditwo	2	Ide/Ly	13(11)	5		00			03-14-2022
	1	†	<i>></i>	-	ţ	•	←	۶	→	•	
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR	
Lane Configurations		4	X		4	<u></u>	44	<i>y</i> -	₩	¥C	
Traffic Volume (vph)	23	0	9	τ-	~	83	269	5	1008	59	
Future Volume (vph)	23	0	9	τ-	~	83	269	2	1008	58	
Turn Type	Perm	ΑΝ	Perm	Perm	Ϋ́	Perm	ΑN	Perm	ΑN	Perm	
Protected Phases		4			4		2		2		
Permitted Phases	4		4	4		2		2		2	
Detector Phase	4	4	4	4	4	2	7	2	7	5	
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	24.3	24.3	24.3	24.3	24.3	27.0	27.0	27.0	27.0	27.0	
Total Split (s)	29.7	29.7	29.7	29.7	29.7		60.3	60.3	60.3	60.3	
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%	67	%0.79	%0.79	%0'.29	%0'.29	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3		4.8	4.8	4.8	4.8	
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	1.8	1.8	1.8	— —	1.8	
Lost Time Adjust (s)		0:0	0:0		0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3	6.3		6.3	9.9	9.9	9.9	9.9	9.9	
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)		9.8	9.8		9.8	72.7	72.7	72.7	72.7	72.7	
Actuated g/C Ratio		0.10	0.10		0.10	0.81	0.81	0.81	0.81	0.81	
v/c Ratio		0.25	0.27		0.03	0.13	0.28	0.01	0.42	0.04	
Control Delay		41.9	14.7		30.3	4.1	3.3	2.2	2.4	0.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		41.9	14.7		30.3	4.1	3.3	2.2	2.4	0.5	
SOT		Ω	ш		O	∢	∢	∢	∢	∢	
Approach Delay		25.3			30.3		3.4		2.4		
Approach LOS		O			O		⋖		A		
Intersection Summary											
Cycle Length: 90											
Actuated Cycle Length: 90											
Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	phase 2:	NBSB an	d 6:, Star	t of Greer	_						
Natural Cycle: 55											
Control Type: Actuated-Coordinated	dinated										
Maximum v/c Ratio: 0.42											
Intersection Signal Delay: 3.8	ω.			드	tersectio	Intersection LOS: A					
Intersection Capacity Utilization 57.2%	ion 57.2%			0	U Level	ICU Level of Service B	B				
Analysis Period (min) 15											



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Signalized Intersection Capacity Analysis <Background> 2029 Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access

	1	†	<i>></i>	•	ļ	4	•	←	*	۶	→	•
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4	*		4		F	₩		r	‡	*-
Traffic Volume (vph)	23	0	40	_	Ψ.	2	33	269	0	5	1008	23
Future Volume (vph)	23	0	40	~	τ-	2	33	269	0	2	1008	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	9.9
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		0.99	1.00	1.00
Fr		1.00	0.85		0.93		1.00	1.00		1.00	1.00	0.85
Fit Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1825	1541		1769		1643	2992		1812	3093	1363
Flt Permitted		92.0	1.00		0.91		0.26	1.00		0.39	1.00	1.00
Satd. Flow (perm)		1451	1541		1622		451	2992		752	3093	1363
Peak-hour factor, PHF	0.68	0.92	0.75	0.82	0.82	0.82	89.0	0.84	0.92	0.92	0.95	09.0
Adj. Flow (vph)	怒	0	53	~	-	2	49	229	0	2	1061	48
RTOR Reduction (vph)	0	0	49	0	2	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	34	4	0	2	0	49	229	0	2	1061	37
Confl. Peds. (#/hr)	ě					ě	-		2	2		_
Heavy Vehicles (%)	%0	%0	%9	%0	%0	%0	11%	%77.	%0	%0	18%	11%
Turn Type	Perm	¥.	Perm	Perm	≨		Perm	≨		Perm	¥	Perm
Protected Phases		4			4			7			2	
Permitted Phases	4		4	4	i		2			2		7
Actuated Green, G (s)		7.0	7.0		7.0		70.1	70.1		70.1	70.1	70.1
Effective Green, g (s)		7.0	7.0		7.0		70.1	70.1		70.1	70.1	70.1
Actuated g/C Katio		0.08	0.08		0:08		0.78	0.78		0.78	0.78	0.78
Clearance Time (s)		6.3	6.3		6.3		9.0	9.0		9.9	9.0	9.9
Vellide Exterision (s)		0.0	0.0		0.0		0.0	0.0		0.0	0.0	10.0
Lane Grp Cap (vpn)		711	2		071		- S	7330		200	2409	1001
v/s Ratio Perm		c0 05	000		000		0.11	24.0		0.01	5.3	0.03
v/c Ratio		0.30	0.03		0.02		0.14	0.29		0.01	0.44	0.0
Uniform Delay, d1		39.2	38.4		38.3		2.5	2.8		2.2	3.3	2.3
Progression Factor		1.00	1.00		1.00		1.00	1.00		0.73	0.54	0.49
Incremental Delay, d2		1.5	0.1		0.1		0.8	0.3		0.0	0.5	0.1
Delay (s)		40.7	38.5		38.4		3.3	3.2		1.6	2.4	1.2
Level of Service		Ω	۵		□		∢	∢		∢	∢	⋖
Approach Delay (s)		39.4			38.4			3.2			2.3	
Approach LOS		Ω			۵			∢			∢	
Intersection Summary												
HCM 2000 Control Delay			4.4	Ĭ	HCM 2000 Level of Service	Level of S	service		A			
HCM 2000 Volume to Capacity ratio	ity ratio		0.43									
Actuated Cycle Length (s)			90.0	ઝ	Sum of lost time (s)	time (s)			12.9			
Intersection Capacity Utilization	Б		57.2%	೨	ICU Level of Service	f Service			m			
Analysis Period (min)			15									
 c Critical Lane Group 												

c Critical Lane Group

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis<Background> 2029 Weekday AM Peak Hour 4: Bonnycastle Drive & Aspen Springs Drive

HCM Unsignalized Intersection Capacity Analysis<Background> 2029 Weekday AM Peak Hour 5: Fry Crescent (East) & Aspen Springs Drive

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph)

NBL 12 12 0.92 0.92 13 4 4 3.7 1.1

> 245 245 245 0.92 0.92

> 235 235 235 0.92 0.92

> > Sign Control

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

	†	<u> </u>	>	Ļ	•	•	
Novement	EBT	EBR	WBL	WBT	NBL BL	NBR	
Lane Configurations	æ			₩	×		
raffic Volume (veh/h)	223	24	15	205	45	90	
Future Volume (Veh/h)	223	24	15	202	42	8	
Sign Control	Free			Free	Stop		
Grade Peak Hour Factor	%0	0 03	0 03	%0	%0	0 03	
Hourly flow rate (vph)	240	28	16	220	48	32	
Pedestrians					7		
-ane Width (m)					3.7		
Valking Speed (m/s)					-		
Percent Blockage					0		
Right tum flare (veh)							
	None			None			
Median storage veh)							
Jpstream signal (m)				160			
X, platoon unblocked							
C, conflicting volume			268		202	255	
C1, stage 1 conf vol							
vC2, stage 2 conf vol							
/Cu, unblocked vol			268		202	255	
C, single (s)			4.1		6.4	6.2	
C, 2 stage (s)							
F (s)			2.2		3.5	3.3	
on due ue free %			66		9	96	
cM capacity (veh/h)			1305		521	787	
Direction, Lane #	EB 1	WB1	NB 1				
/olume Total	266	236	80				
/olume Left	0	16	48				
/olume Right	26	0	32				
cSH	1700	1305	603				
/olume to Capacity	0.16	0.01	0.13				
Queue Length 95th (m)	0.0	0.3	3.5				
Control Delay (s)	0.0	9.0	11.9				
ane LOS		⋖	ш				
proach Delay (s)	0.0	9.0	11.9				
Approach LOS			Ω				
ntersection Summary							
Average Delay			1.9				
ntersection Capacity Utilization	_		34.1%	೦	ICU Level of Service	Service	A
Analysis Period (min)			15				

3.3 99 776

3.5 97 504

2.2 100 1308 23 23 13 10 10 10 10 11 11 11 13 11 13 11

> 4 0.15 0.0 0.0

Direction, Lane #
Volume Total
Volume Left
Volume Right
cSH
Volume to Capacity
Course Length Stift (m)
Course Length Stift (m)
Lane LOS

259 0

0.00 0.00 0.2 A 0.2

0.0

Approach Delay (s) Approach LOS

263

537

263

537

263

Pedesirians
Lane Width (m)
Walking Stocked (mis)
Percent Blockede (mis)
Percent Blockede (mis)
Median type
Median storage veh
Dy, palabou unblocked
VC, conflicting volume
VC1, stage 1 cont vol
Co, stage 2 cont vol
Co, stage 2 cont vol
Co, stage 6)
F(S)
F(S)
G(S)
F(S)
G(S

None 245

None

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

ICU Level of Service

0.6 27.5% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

HCM Unsignalized Intersection Capacity Analysis

6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

03-14-2022

HCM Unsignalized Intersection Capacity Analysis-Background> 2029 Weekday AM Peak Hour 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

1

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph)

Stop 0% 0.92

219 219 219 0.92 238

253 253 253 0% 0.92 275

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

238

513

238

Walking Speed (m/s)
Malking Speed (m/s)
Percent Blookage
Percent Blookage
Right turn flare (veh)
Median type
Median type
Median storage veh)
Upstream signal (m)
Dx, plathon unblooked
vC, conflicting volume
vC1, stage 2 conf vol
vC2, stage 2 conf vol
vC2, stage 8 (s)
f(s)
C, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 4 stage (s)
f(s)
G, 4 stage (s)
G, 5 stage (s)
G, 5 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 7 stage (s)
G, 8 stag

79 None

None

3.3

3.5 100 521

2.2

6.4

BB
0.91 0.91
-
231
4.1
100 1345
625 550 0.03 0.09 0.6 2.2 10.9 12.2 B
12
1.6 28.6% ICU Level of Service 15

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

10	
Development,	
Residential	_
Proposed	Trans-Pla

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Aspen Springs Drive, Bowmanville, ON

ICU Level of Service

0.0 16.6% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

0.00 0.00 0.0 A A A

0.0 0.0

0.0

Approach Delay (s) Approach LOS

0.14

Direction, Lane #
Volume Total
Volume Left
Solume Right
SM
Volume Right
SM
Caueu Length Sth (m)
Control Delay (s)
Lane LOS

275 0 0 0 329 0.00 0.00 0.00

HCM Unsignalized Intersection Capacity Analysis

8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

03-14-2022

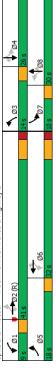
	4	<i>></i>	✓	←	→	*	
	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations		*-		‡	4₽		
raffic Volume (veh/h)	0	0	0	643	1059	∞	
Future Volume (Veh/h)	0	0	0	643	1059	8	
	Stop			Free	Free		
	%0			%0	%0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	0	0	669	1151	6	
-ane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right tum flare (veh)							
				None	None		
Median storage veh)							
Jpstream signal (m)				117	379		
X, platoon unblocked	0.92	06:0	06:0				
C, conflicting volume	1505	280	1160				
rC1, stage 1 conf vol							
vC2, stage 2 conf vol							
'Cu, unblocked vol	1185	323	964				
	8.9	6.9	4.1				
C, 2 stage (s)							
	3.5	3.3	2.2				
on due ue free %	100	100	100				
cM capacity (veh/h)	168	809	641				
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB2		
	0	350	350	167	393		
	0	0	0	0	0		
/olume Right	0	0	0	0	6		
	1700	1700	1700	1700	1700		
Volume to Capacity	0.00	0.21	0.21	0.45	0.23		
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.0		
Control Delay (s)	0:0	0:0	0.0	0.0	0.0		
	∢						
Approach Delay (s)	0:0	0:0		0.0			
S	∢						
ntersection Summary							
Average Delay			00				
ntersection Capacity Utilization			32.9%	ō	ICU Level of Service	Service	
Analysis Period (min)			15				

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<Background> 2029 Weekday PM Peak Hour Timings 1: Bowmanville Avenue & Highway 2

	1	†	~	-	Ļ	4	•	←	•	۶	→	*
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	F	‡	*	F	‡	*	F	*	*	r	*	*
Traffic Volume (vph)	335	1353	365	183	1062	8	311	514	251	118	382	269
Future Volume (vph)	332	1353	365	183	1062	81	311	514	251	118	382	269
Turn Type	pm+pt	N A	Perm	pm+pt	₹	Perm	pm+pt	₹	Perm	pm+pt	Ν	Perm
Protected Phases	2	2		_	9		က	00		7	4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	2	2	-	9	9	က	∞	∞	7	4	4
Switch Phase												
Minimum Initial (s)	4.5	20.0	20.0	4.5	20.0	20.0	4.5	12.0	12.0	2.0	12.0	12.0
Minimum Split (s)	0.6	28.2	28.2	9.0	28.2	28.2	9.0	27.0	27.0	9.0	24.5	24.5
Total Split (s)	18.0		41.0	9.0	32.0	32.0	14.0	30.0	30.0	10.0	26.0	26.0
Total Split (%)	20.0%	45	45.6%	10.0%	35.6%	35.6%	15.6%	33.3%	33.3%	11.1%	28.9%	28.9%
Yellow Time (s)	3.0		4.3	3.0	4.3	4.3	3.0	4.9	4.9	3.0	4.9	4.9
All-Red Time (s)	0.0		1.9	0.0	1.9	1.9	0.0	1.6	1.6	0.0	1.6	1.6
Lost Time Adjust (s)	0.0		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	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	3.0	6.5	6.5
Lead/Lag	Lead		Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	Ó	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	47.9	34.8	34.8	38.5	27.8	27.8	35.5	22.0	22.0	28.5	18.0	18.0
Actuated g/C Ratio	0.53	0.39		0.43	0.31	0.31	0.39	0.24	0.24	0.32	0.20	0.20
v/c Ratio	0.89	1.15		0.99	1.1	0.18	1.00	0.79	0.59	99.0	0.73	0.61
Control Delay	47.1		11.2	82.6	95.4	0.7	63.8	27.3	10.3	34.0	41.2	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.1	105.3	11.2	82.6	95.4	0.7	63.8	27.3	10.3	34.0	41.2	9.2
ros	Ω	ш	ш	ш	ш	⋖	ш	O	ω	O	_	∢
Approach Delay		77.9			89.8			33.5			28.9	
Approach LOS		ш			ш			O			O	
Intersection Summary												
Cycle Length: 90												
Actuated Cycle Length: 90												
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	phase 2:	EBTL, St	art of Gre	eu								
Natural Cycle: 100												
Control Type: Actuated-Coordinated	dinated											
Maximum v/c Ratio: 1.15												
Intersection Signal Delay: 63.0	0:			≟	Intersection LOS: E	LOS: E						
Intersection Capacity Utilization 94.7%	ion 94.7%			2	CU Level of Service F	f Service	ш					
Analysis Period (min) 15												

Splits and Phases: 1: Bowmanville Avenue & Highway 2



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis <Background> 2029 Weekday PM Peak Hour 1: Bowmanville Avenue & Highway 2

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	k	*	¥.	r	*	æ	je.	*	¥.	K	‡	W.
Traffic Volume (vph)	335	1353	365	183	1062	<u>~</u>	311	514	251	118	382	269
Future Volume (vph)	332	1353	365	183	1062	8	311	514	251	118	382	269
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	3.0	6.5	6.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1:00	1:00	1.00	1.00	1:00	1.00	1.00	1.00	1.00	1.00
Fr	1.00	1.00	0.85	1:00	1.00	0.85	1:00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1:00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	2200	3202	1356	1630	3230	1340	1596	3042	1409	1572	3042	1384
Flt Permitted	0.13	1.00	1:00	0.14	1.00	1.00	0.32	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	215	3202	1356	247	3230	1340	545	3042	1409	455	3042	1384
Peak-hour factor, PHF	0.87	0.95	06:0	0.84	96:0	0.82	0.91	0.88	0.87	0.78	98.0	0.84
Adj. Flow (vph)	382	1424	406	218	1106	66	342	584	289	151	444	320
RTOR Reduction (vph)	0	0	164	0	0	89	0	0	149	0	0	250
Lane Group Flow (vph)	382	1424	242	218	1106	31	342	284	140	151	444	70
Confl. Peds. (#/hr)	2		9	9		2	15		က	က		15
Heavy Vehicles (%)	16%	14%	17%	12%	13%	20%	14%	20%	14%	16%	20%	14%
Turn Type	pm+pt	AN	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	¥	Perm
Protected Phases	2	2		Ψ-	9		က	∞		7	4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Actuated Green, G (s)	45.3	34.8	34.8	35.3	27.8	27.8	32.0	22.0	22.0	25.0	18.0	18.0
Effective Green, g (s)	45.3	34.8	34.8	35.3	27.8	27.8	32.0	22.0	22.0	25.0	18.0	18.0
Actuated g/C Ratio	0.50	0.39	0.39	0.39	0.31	0.31	0.36	0.24	0.24	0.28	0.20	0.20
Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	3.0	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	428	1238	524	212	266	413	322	743	344	213	809	276
v/s Ratio Prot	00.14	c0.44		c0.09	0.34		c0.13	0.19		90.0	0.15	
v/s Ratio Perm	0.31		0.18	0.32		0.02	c0.25		0.10	0.14		0.05
v/c Ratio	0.30	1.15	0.46	1.03	1.7	0.07	1.06	0.79	0.41	0.71	0.73	0.25
Uniform Delay, d1	26.7	27.6	20.6	24.1	31.1	22.0	26.2	31.8	28.5	26.1	33.7	30.3
Progression Factor	1:00	1.00	1:00	1.00	1.00	1.00	0.60	0.63	0.58	1.00	1.00	1.00
Incremental Delay, d2	21.1	77.3	5.9	69.4	63.4	0.1	64.4	4.9	0.7	10.3	4.5	0.5
Delay (s)	47.9	104.9	23.5	93.4	94.5	22.1	80.2	24.8	17.4	36.4	38.2	30.8
Level of Service	□	ш	O	ш	ш	O	ш	ပ	В	۵	□	O
Approach Delay (s)		80.1			89.3			38.7			35.3	
Approach LOS		ш			ш			٥				
Intersection Summary												
HCM 2000 Control Delay			66.5	Ĭ	HCM 2000 Level of Service	Level of	Service		ш			
HCM 2000 Volume to Capacity ratio	ity ratio		1.15						1			
Actuated Cycle Length (s)			90.0	S	Sum of lost time (s)	time (s)			18.7			
Intersection Capacity Utilization	noi		94.7%	2	CU Level of Service	of Service			ш			
Analysis Period (min)			15									
, , , , , , , , , , , , , , , , , , , ,												

Intersection Capacity Utilization
Analysis Period (min)
c Critical Lane Group

<Background> 2029 Weekday PM Peak Hour 03-14-202 Timings 2: Bowmanville Avenue & Aspen Springs Drive

*	SBR	R.	147	147	Perm		9	9		20.0	27.0	92.6	64.0%	4.2	2.1	0:0	6.3			C-Max	58.8	0.65	0.22	0.7	0:0	0.7	۷										LOS: B	CU Level of Service B	
→	SBT	‡	761	761	₹	9		9		20.0	27.0	9.73	64.0%	4.2	2.1	0.0	6.3			C-Max	28.8	0.65	0.40	5.1	0.0	5.1	∢	4.2	⋖				reen				Intersection LOS: B	U Level o	
—	NBT	‡	880	880	ΑN	2		2		20.0	27.0	9.73	64.0%	4.2	2.1	0.0	6.3			C-Max	28.8	0.65	0.52	9.5	0.0	9.5	⋖	9.3	∢				Start of Gi				ī	೦	
€	NBL	r	116	116	Perm		2	2		20.0	27.0	9.73	64.0%	4.2	2.1	0.0	6.3			C-Max	28.8	0.65	0.38	10.1	0.0	10.1	В						6:SBT, §						
*	EBR	¥C	101	101	Perm		4	4		8.0	24.0	32.4	36.0%	3.3	5.6	0.0	5.9			None	19.0	0.21	0.35	8.9	0.0	8.9	⋖						VBTL and						
4	EBL	F	196	196	Prot	4		4		8.0	24.0	32.4	36.0%	3.3	5.6	0.0	5.9			None	19.0	0.21	0.73	44.4	0.0	44.4	_	30.6	O				bhase 2:1		dinated		8:	ion 64.0%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	Natural Cycle: 60	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 0.73	Intersection Signal Delay: 10.8	Intersection Capacity Utilization 64.0%	Analysis Period (min) 15

Splits and Phases: 2: Bowmanville Avenue & Aspen Springs Drive



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 2

HCM Signalized Intersection Capacity Analysis <Background> 2029 Weekday PM Peak Hour 2: Bowmanville Avenue & Aspen Springs Drive

	4	/	•	←	→	•	
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	je.	*	F	*	*	¥c.	
Traffic Volume (vph)	196	101	116	880	761	147	
Future Volume (vph)	196	101	116	880	761	147	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.9	5.9	6.3	6.3	6.3	6.3	
Lane Util. Factor	1.00	1:00	1:00	0.95	0.95	1.00	
Frpb, ped/bikes	1.00	1:00	1.00	1.00	1.00	96.0	
Flpb, ped/bikes	1.00	1.00	0.39	1.00	1.00	1.00	
Ŧ	1.00	0.85	1.00	1.00	1.00	0.85	
Fit Protected	0.95	1:00	0.95	1.00	1.00	1.00	
Satd. Flow (prot)	1722	1512	1633	2968	3067	1270	
Fit Permitted	0.95	1:00	0.33	1.00	1.00	1.00	
Satd. Flow (perm)	1722	1512	260	2968	3067	1270	
Peak-hour factor, PHF	0.74	0.65	0.83	0.88	0.94	0.75	
Adj. Flow (vph)	265	155	140	1000	810	196	
RTOR Reduction (vph)	0	122	0	0	0	89	
Lane Group Flow (vph)	265	33	140	1000	810	128	
Confl. Peds. (#/hr)			6			6	
Heavy Vehicles (%)	%9	8%	11%	23%	19%	23%	
Turn Type	Prot	Perm	Perm	NA	NA	Perm	
Protected Phases	4			7	9		
Permitted Phases		4	2			9	
Actuated Green, G (s)	19.0	19.0	58.8	58.8	58.8	58.8	
Effective Green, g (s)	19.0	19.0	28.8	28.8	28.8	58.8	
Actuated g/C Ratio	0.21	0.21	0.65	0.65	0.65	0.65	
Clearance Time (s)	5.9	5.9	6.3	6.3	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	363	319	365	1939	2003	829	
v/s Ratio Prot	00.15			00.34	0.26		
v/s Ratio Perm		0.02	0.25			0.10	
v/c Ratio	0.73	0.10	0.38	0.52	0.40	0.15	
Uniform Delay, d1	33.1	28.6	7.2	8.2	7.3	0.9	
Progression Factor	1.00	1.00	0.94	96.0	0.57	0.25	
Incremental Delay, d2	7.4	0.1	1.3	0.4	0.4	0.3	
Delay (s)	40.5	28.8	8.0	8.3	4.6	1.8	
Level of Service	Ω	O	⋖	4	∢	A	
Approach Delay (s)	36.1			8.2	4.0		
Approach LOS	Ω			∢	∢		
Intersection Summary							
HCM 2000 Control Delay			11.2	Ĭ	CM 2000	HCM 2000 Level of Service	В
HCM 2000 Volume to Capacity ratio	city ratio		0.57				
Actuated Cycle Length (s)			90.0	S	Sum of lost time (s)	time (s)	12.2
Intersection Capacity Utilization	ion		64.0%	೦	CU Level of Service	f Service	В
Analysis Period (min)			15				
C Critical Lane Group							

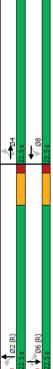
Critical Lane Group

Timings

:Background> 2029 Weekday PM Peak Hour	03-14-2022	
lay PM		١.
Week		-
> 2029	ess	-
ground	do Acc	ľ
<backç< td=""><td>/ell Avenue/Existing Condo /</td><td></td></backç<>	/ell Avenue/Existing Condo /	
Timings	3: Bowmanville Avenue & Hartwell Avenue	•

*	SBR	¥.	25	52	Perm		9	9		2.0	22.5	22.5	%0.03	3.5	1.0	0:0	4.5			Max	18.0	0.40	0.15	6.7	0:0	6.7	V												
→	SBT	‡	819	819	Α	9		9		2.0	22.5	22.5	20.0%	3.5	1:0	0.0	4.5			Max	18.0	0.40	0.70	21.9	0.0	21.9	O	20.5	O										
۶	SBL	je-	2	2	Perm		9	9		2.0	22.5	22.5	20.0%	3.5	1:0	0.0	4.5			Max	18.0	0.40	0.03	12.6	0.0	12.6	മ												
—	NBT	₩.	920	920	₹	2		2		2.0	22.5	22.5	20.0%	3.5	1:0	0.0	4.5			Max	18.0	0.40	0.95	32.4	0.0	32.4	ပ	33.6	O									∢.	
•	NBL	*	84	84	Perm		2	2		2.0	22.5	22.5	20.0%	3.5	1.0	0.0	4.5			Max	18.0	0.40	0.73	43.7	0.0	43.7	۵										LOS: C	CU Level of Service A	
Ļ	WBT	4	2	2	₹	∞		∞		5.0	22.5	22.5	20.0%	3.5	1.0	0.0	4.5			Max	18.0	0.40	0.02	6.4	0.0	6.4	∢	6.4	∢				Green				Intersection LOS: C	:U Level	
-	WBL		4	4	Perm		∞	∞		2.0	22.5	22.5	20.0%	3.5	1.0					Max													, Start of				⊆ :	_	
<u>/</u>	EBR	*	69	69	Perm		4	4		2.0	22.5	22.5	20.0%	3.5	1.0	0.0	4.5			Max	18.0	0.40	0.14	2.0	0.0	2.0	⋖						J 6:SBTL						
†	EBT	₩	0	0	Ϋ́	4		4		2.0	22.5	22.5	20.0%	3.5	1.0	0.0	4.5			Max	18.0	0.40	0.10	9.1	0.0	9.1	∢	9.9	∢				NBTL an						
4	EBL		ස	89	Perm		4	4		5.0	22.5	22.5	20.0%	3.5	1.0					Max													phase 2:				4	on 47.6%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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: 45	Actuated Cycle Length: 45	Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	Natural Cycle: 55	Control Type: Pretimed	Maximum v/c Ratio: 0.95	Intersection Signal Delay: 26.4	Intersection Capacity Utilization 47.6%	Analysis Period (min) 15

Splits and Phases: 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Signalized Intersection Capacity Analysis <Background> 2029 Weekday PM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access

HCM Unsignalized Intersection Capacity Analysis<Background> 2029 Weekday PM Peak Hour 4: Bonnycastle Drive & Aspen Springs Drive

0.93

Grade Peak Hour Factor Hourly flow rate (vph) None

Walking Speed (m/s)
Malking Speed (m/s)
Percent Blookage
Percent Blookage
Right turn flare (veh)
Median type
Median type
Median storage veh)
Upstream signal (m)
Dx, plathon unblooked
vC, conflicting volume
vC1, stage 2 conf vol
vC2, stage 2 conf vol
vC2, stage 8 (s)
f(s)
C, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 4 stage (s)
f(s)
G, 4 stage (s)
G, 5 stage (s)
G, 5 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 7 stage (s)
G, 8 stag

49

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

269 269 0% 0.93

Sign Control

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Movement	EB	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		₹	¥C		4		jr.	₩		y -	‡	*
Traffic Volume (vph)	33	0	69	4	2	7	8	920	4	2	819	52
Future Volume (vph)	99	0	8	4	2	7	æ	920	4	2	819	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor		0.1	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		0.1	9.		9.		9.	1.00		1:00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	0.85
Fit Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1825	1541		1748		1644	2992		1823	3093	1366
Flt Permitted		0.75	1.00		0.95		0.24	1.00		0.22	1.00	1.00
Satd. Flow (perm)		1435	1541		1688		423	2992		426	3093	1366
Peak-hour factor, PHF	89.0	0.92	0.75	0.82	0.82	0.82	0.68	0.84	0.92	0.92	0.95	09.0
Adj. Flow (vph)	22	0	95	2	2	တ	124	1131	4	2	862	87
RTOR Reduction (vph)	0	0	37	0	2	0	0	Ψ.	0	0	0	52
Lane Group Flow (vph)	0	22	22	0	#	0	124	1134	0	2	862	35
Confl. Peds. (#/hr)							_		2	2		_
Heavy Vehicles (%)	%0	%0	%9	%0	%0	%0	11%	22%	%0	%0	18%	17%
Turn Type	Perm	N	Perm	Perm	ΑN		Perm	NA		Perm	¥	Perm
Protected Phases		4			∞			2			9	
Permitted Phases	4		4	∞			2			9		9
Actuated Green, G (s)		18.0	18.0		18.0		18.0	18.0		18.0	18.0	18.0
Effective Green, g (s)		18.0	18.0		18.0		18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio		0.40	0.40		0.40		0.40	0.40		0.40	0.40	0.40
Clearance Time (s)		4.5	4.5		4.5		4.5	4.5		4.5	4.5	4.5
Lane Grp Cap (vph)		574	616		675		169	1196		170	1237	546
v/s Ratio Prot								c0.38			0.28	
v/s Ratio Perm		c0.04	0.04		0.01		0.29			0.01		0.03
v/c Ratio		0.10	0.09		0.05		0.73	0.95		0.03	0.70	0.06
Uniform Delay, d1		8.4	8.4		8.2		11.5	13.1		8.2	11.2	8.3
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.46	1.65	2.97
Incremental Delay, d2		0.3	0.3		0.0		24.4	16.3		0.3	3.1	0.2
Delay (s)		8.8	8.7		8.2		35.9	29.3		12.3	21.6	24.9
Level of Service		∢	⋖		⋖		۵	ပ		Ф	ပ	O
Approach Delay (s)		8.7			8.2			30.0			21.8	
Approach LOS		⋖			∢			O			O	
Intersection Summary												
HCM 2000 Control Delay			25.2	 	3M 2000	HCM 2000 Level of Service	Service		ပ			
HCM 2000 Volume to Capacity ratio	ratio		0.52									
Actuated Cycle Length (s)			45.0	S	Sum of lost time (s)	time (s)			9.0			
Intersection Capacity Utilization	_		47.6%	೦	U Level o	ICU Level of Service			∢			
Analysis Period (min)			15									
c Critical Lane Group												

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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ICU Level of Service 0.93 318 28 318 3.3 96 726 NBL 49 49 49 0% 0.93 53 2 3.7 1.1 3.5 88 433 634 634 230 230 230 0% 0.93 247 None 160 2.1 45.5% 0.93 2.2 97 1224 83 83 30 30 507 0.16 4.4 13.5 B 33 344

> 282 35 0 0 0.03 0.03 0.7 1.2 A

> > Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach Delay (s) Approach LOS

342 0 0.20 0.20 0.0

Direction, Lane #
Volume Total
Volume Left
Volume Right
cSH
Volume to Capacity
Course Length Stift (m)
Course Length Stift (m)
Lane LOS

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis<Background> 2029 Weekday PM Peak Hour 5: Fry Crescent (East) & Aspen Springs Drive

HCM Unsignalized Intersection Capacity Analysis<Background> 2029 Weekday PM Peak Hour 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

1

		-					
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	43			÷	>		
Traffic Volume (veh/h)	291	16	13	267	တ	10	
Future Volume (Veh/h)	291	16	13	267	6	10	
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)	316	17	14	290	10	11	
Pedestrians				2	4		
Lane Width (m)				3.7	3.7		
Walking Speed (m/s)				[1.		
Percent Blockage				0	0		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)				245			
pX, platoon unblocked							
vC, conflicting volume			337		646	330	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			337		949	330	
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		88	86	
cM capacity (veh/h)			1229		432	711	
Direction, Lane #	EB 1	WB1	NB 1				
Volume Total	333	304	21				
Volume Left	0	4	9				
Volume Right	17	0	=				
SSH	1700	1229	244				
Volume to Capacity	0.20	0.01	0.04				
Queue Length 95th (m)	0.0	0.3	6.0				
Control Delay (s)	0.0	0.5	11.9				
Lane LOS		∢	ω				
Approach Delay (s)	0.0	0.5	11.9				
Approach LOS			В				
Intersection Summary							
Average Delay			9.0				
Intersection Capacity Utilization	tion		35.3%	೦	ICU Level of Service	Service	A

3.3

964.0

3.5

3.3 100 715

4.0

3.5 97 357

2.2 99 228

2.2 98 1261

31 31 20 11 443 0.07 1.7 13.7 13.7

14 2 384 0.04 0.9 14.7 14.7 B

304 10 1228 0.01 0.2 0.3 0.3

355 355 19 20 20 20 0.02 0.03 0.6 A

Direction, Lane #
Volume Total
Volume Left
Solume Right
SM
Volume Right
SM
Caueu Length Sth (m)
Control Delay (s)
Lane LOS

282

678

329

689

672

282

8/9

899

329

689

672

339

302

Walking Speed (m/s)
Malking Speed (m/s)
Percent Blookage
Percent Blookage
Right turn flare (veh)
Median type
Median type
Median storage veh)
Upstream signal (m)
Dx, plathon unblooked
vC, conflicting volume
vC1, stage 2 conf vol
vC2, stage 2 conf vol
vC2, stage 8 (s)
f(s)
C, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 2 stage (s)
f(s)
G, 4 stage (s)
f(s)
G, 4 stage (s)
G, 5 stage (s)
G, 5 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 6 stage (s)
G, 7 stage (s)
G, 8 stag

None 323

None

Stop 0% 0.91

∞ ∞

9 9

37

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

230 230 0.91 0% 253

288 288 288 0% 0.91 316

0.91

0.91

11

0.91

10.91

0.91

19

Grade Peak Hour Factor Hourly flow rate (vph)

Stop 0% 0.91

Synchro 10 Report Page 8

Synchro 10 Report Page 9

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

ICU Level of Service

1.3

Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach Delay (s) Approach LOS

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis-Background> 2029 Weekday PM Peak Hour 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

HCM Unsignalized Intersection Capacity Analysis<Background> 2029 Weekday PM Peak Hour 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph) Lane Width (m)
Walking Speed (m/s)
Percent Blockage
Right turn flare (veh)
Median type

Stop 0% 0.92 0

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

SBT 923 923 Pree 0% 0.92 1003

NBT 1076 1076 1076 0.92 1170 None

None

379

117

0.95

0.95

0.87

2.2 100 708

3.3 100 587

3.5

912

381

6.8

Median storage veh)
Upstream signal (m)
Px, platbor unblocked
VC, conflicting volume
VC1, stage 1 conf vol
VC2, stage 2 conf vol
VC3, unblocked vol
CC, unblocked vol
CC, single (s)
F(s)
CC, 2 stage (s)
F(s)
GM capacity (veh/h)

B 2 585

585

Direction, Lane #
Volume Total
Volume Left
Volume Right

	4	†	ţ	4	٠	•	
	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		€	¢Ŷ		>-		
raffic Volume (veh/h)	0	297	263	0	0	0	
Future Volume (Veh/h)	0	297	263	0	0	0	
		Free	Free		Stop		
		%0	%0		%0		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	323	286	0	0	0	
-ane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right tum flare (veh)							
		None	None				
Median storage veh)							
lpstream signal (m)			6/				
X, platoon unblocked							
C, conflicting volume	286				609	286	
/C1, stage 1 conf vol							
vC2, stage 2 conf vol							
/Cu, unblocked vol	286				609	286	
	4.1				6.4	6.2	
C, 2 stage (s)							
	2.2				3.5	3.3	
on gue free %	9				100	100	
cM capacity (veh/h)	1276				458	753	
Direction, Lane #	EB 1	WB1	SB 1				
Volume Total	323	286	0				
	0	0	0				
/olume Right	0	0	0				
	1276	1700	1700				
Volume to Capacity	0.00	0.17	0.00				
Queue Length 95th (m)	0.0	0.0	0.0				
Control Delay (s)	0:0	0.0	0.0				
			⋖				
lay (s)	0.0	0.0	0.0				
Approach LOS			∢				
ntersection Summary							
Average Delay			0.0				
ntersection Capacity Utilization			19.0%	2	ICU Level of Service	Service	A
Analysis Period (min)			15				

Proposed Residential Development, 10 Aspen Springs Drive, Bowmarville, ON Trans-Plan

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Synchro 10 Report Page 10

Synchro 10 Report Page 11

sed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON

ICU Level of Service

0.0 33.1% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

8 0.20 0.20 0.0 0.0

0.39

0.0 0.34 0.0 0.0

0.34

0.00 0.00 A O.00 A

cSH Volume to Capacity Queue Length 95th (m) Control Delay (s) Lane LOS

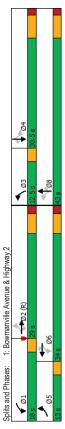
0.0

0.0

Approach Delay (s) Approach LOS

<Total> 2029 Weekday AM Peak Hour 03-14-2022 Timings 1: Bowmanville Avenue & Highway 2

Lane Group							-					
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	‡	*	<i>y-</i>	‡	¥C.	jj.	‡	¥	je-	‡	¥.
Traffic Volume (vph)	176	740	270	255	882	73	245	340	121	37	571	298
Future Volume (vph)	176	740	270	255	882	73	245	340	121	37	571	298
Turn Type	pm+pt	ΑN	Perm	pm+pt	Ϋ́	Perm	pm+pt	ΑN	Perm	Perm	₹	Perm
Protected Phases	2	2		-	9		က	∞			4	
Permitted Phases	2		2	9		9	∞		∞	4		4
Detector Phase	2	2	2	-	9	9	က	œ	∞	4	4	4
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	2.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	9.0	28.2	28.2	0.6	28.2	28.2	0.6	26.0	26.0	30.5	30.5	30.5
Total Split (s)	13.0	29.0	29.0	18.0	34.0	34.0	12.5		43.0	30.5	30.5	30.5
Total Split (%)	14.4%	32.2%	32.2%	20.0%	37.8%	37.8%	13.9%	47	47.8%	33.9%	33.9%	33.9%
Yellow Time (s)	3.0	4.3	4.3	3.0	4.3	4.3	3.0		4.9	4.9	4.9	4.9
All-Red Time (s)	0.0	1.9	1.9	0.0	1.9	1.9	0.0	1.6	1.6	1.6	1.6	1.6
Lost Time Adjust (s)	0.0	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	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes	Yes
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	37.7	24.3	24.3	45.4	29.0	29.0	38.6	35.1	35.1	22.6	22.6	22.6
Actuated g/C Ratio	0.42	0.27	0.27	0.50	0.32	0.32	0.43	0.39	0.39	0.25	0.25	0.25
v/c Ratio	0.84	0.95	0.62	0.91	0.95	0.19	0.89	0.40	0.24	0.26	0.79	0.62
Control Delay	47.9	54.9	12.0	52.4	50.5	4.0	48.0	16.3	2.7	30.6	39.6	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.9	54.9	12.0	52.4	50.5	4.0	48.0	16.3	2.7	30.6	39.6	1.1
ros	٥	٥	മ		۵	∢		Ф	∢	ပ	۵	В
Approach Delay		42.6			47.9			23.2			29.5	
Approach LOS		۵			۵			O			O	
Intersection Summary												
Cvcle Lenath: 90												
Actuated Cycle Length: 90												
Offset 0 (0%), Referenced to phase 2:EBTL, Start of Green	o phase 2:	EBTL, St	art of Gre	en								
Natural Cycle: 90												
Control Type: Actuated-Coordinated	dinated											
Maximum v/c Ratio: 0.95												
Intersection Signal Delay: 37.6	.6			≟ 9	Intersection LOS: D	LOS: D						
Intersection Capacity Utilization 81.2%	ion 81.2%			2	CU Level of Service D	ot Service	_					
Analysis Period (min) 15												



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Synchro 10 Report Page 1

HCM Signalized Intersection Capacity Analysis 1: Bowmanville Avenue & Highway 2

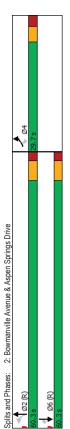
<Total> 2029 Weekday AM Peak Hour 03-14-2022

Movement Eal EB	Movement Lane Configurations Traffic Volume (vph) Future Volume (vph)	EBL	EBT	EBR	IQ/V	WRT	0	-		NBR	2	SBT	ממט
17	Lane Configurations Traffic Volume (vph) Future Volume (vph)				WBL	IOW	WBK	NBL	NBI	-	SBL	5	N P
176 740 270 255 885 73 245 340 121 37 571 1900	Traffic Volume (vph) Future Volume (vph)	F	‡	*	je.	‡	*	je-	*	*	<u>, , , , , , , , , , , , , , , , , , , </u>	‡	•
176 740 270 255 885 73 245 340 121 37 571 180 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 10	Future Volume (vph)	176	740	270	255	882	73	245	340	121	37	571	298
1900 1900 1900 1900 1900 1900 1900 1900		176	740	270	255	882	73	245	340	121	37	571	298
3.0 6.2 6.2 3.0 6.2 6.2 3.0 6.5 6.5 6.5 6.5 6.5 100 100 0.95 100 0	Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
1,00 0.95 1,00 1,00 0.95 1,00 1,00 0.95 1,00	Total Lost time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
100 100 0.97 1.00 1.00 0.98 1.00 1.	Lane Util. Factor	0.0	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.0
100	Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97
1,00	Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1587 3147 1344 1587 3147 1266 1545 2968 1474 1445 3042	Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
1587 3147 1344 1587 3174 1266 1545 2968 1474 1445 3042 276	Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Color Colo	Satd. Flow (prot)	1587	3147	1344	1587	3174	1266	1545	2968	1474	1445	3042	1360
Fig. 12, 12, 13, 13, 13, 13, 12, 13, 13, 13, 13, 13, 13, 13, 13, 13, 13	Flt Permitted	0.17	1.00	1.00	0.15	1.00	1.00	0.24	1.00	1.00	0.49	1.00	7.0
F 0.79 0.92 0.75 0.81 0.91 0.79 0.95 0.74 0.75 0.95 0.95 0.9	Satd. Flow (perm)	276	3147	1344	246	3174	1266	397	2968	1474	742	3042	1360
National Control Con	Peak-hour factor, PHF	0.79	0.92	0.75	0.81	0.91	0.79	0.95	0.74	0.75	0.75	0.95	0.86
15% 15% 10%	Adj. Flow (vph)	223	804	360	315	973	95	258	459	161	49	601	347
hy) 223 804 145 315 973 30 258 459 63 49 601 15	RTOR Reduction (vph)	0	0	212	0	0	62	0	0	98	0	0	221
15% 15% 15% 23% 23% 39 20%	Lane Group Flow (vph)	223	804	145	315	973	30	258	459	63	49	601	126
15% 16% 16% 15% 15% 27% 18% 23% 9% 26% 20% 15% 16% 15% 15% 27% 18% 23% 9% 26% 20%	Confl. Peds. (#/hr)	5		10	10		2	15		က	က		#
pm+pt NA Perm pm+pt NA Perm pm+pt NA Perm Perm NP+pt NA Perm NP+pt NA Perm A A 1 3.45 24.2 24.2 26.2 6.6 8 8 4 4 4 2 2.8 2.89 36.1 35.1 35.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 30 30 30 30 30 30 30 30 30 30 30 <t< td=""><td>Heavy Vehicles (%)</td><td>15%</td><td>16%</td><td>18%</td><td>15%</td><td>15%</td><td>27%</td><td>18%</td><td>23%</td><td>%6</td><td>26%</td><td>20%</td><td>16%</td></t<>	Heavy Vehicles (%)	15%	16%	18%	15%	15%	27%	18%	23%	%6	26%	20%	16%
5 2 1 6 6 8 8 4 4 2 2 2 6 6 8 8 8 9 4 2 4 2 2 2 2 6 8 8 8 8 4 4 2 42 2 2 2 2 8 9 28 9 351 351 351 226 226 3 34.5 24.2 24.2 42.2 28.9 28.9 351 351 351 226 226 0 38 0.27 0.27 0.27 0.27 0.32 0.39 0.39 0.39 0.25 0.25 3 0 30 30 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.		pm+pt	NA	Perm	pm+pt	¥.	Perm	pm+pt	N N	Perm	Perm	NA	Perm
State		2	2		-	9		က	∞			4	
34.5	Permitted Phases	7		2	9		9	∞		∞	4		7
34.5	Actuated Green, G (s)	34.5	24.2	24.2	42.2	28.9	28.9	35.1	35.1	35.1	22.6	22.6	22.6
0.38 0.27 0.27 0.47 0.32 0.39 0.39 0.39 0.25 0.25 0.39 0.39 0.39 0.25 0.25 0.30 0.39 0.39 0.39 0.25 0.25 0.25 0.30 0.30 0.30 0.30 0.30 0.30 0.30 0.3	Effective Green, g (s)	34.5	24.2	24.2	42.2	28.9	28.9	35.1	35.1	35.1	22.6	22.6	22.6
3.0 6.2 6.2 3.0 6.2 6.2 3.0 6.5 6.5 6.5 6.5 6.5 6.5 6.5 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0 8.0	Actuated g/C Ratio	0.38	0.27	0.27	0.47	0.32	0.32	0.39	0.39	0.39	0.25	0.25	0.25
30 30 30 30 30 30 30 30	Clearance Time (s)	3.0	6.2	6.2	3.0	6.2	6.2	3.0	6.5	6.5	6.5	6.5	6.5
255 846 361 338 1019 406 276 1157 574 186 763 1010 0.26 0.015 0.31 0.016 0.15 0.010 0.15 0.00 0.15 0.00 0.15 0.00 0.15 0.00 0.10 0.1	Vehide Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.
0.10 0.26 0.015 c0.31 0.010 0.15 0.020 0.028 0.027 0.037 0.0	Lane Grp Cap (vph)	255	846	361	338	1019	406	276	1157	574	186	763	341
0.23 0.11 0.28 0.02 0.027 0.09 0.07 0.09 0.07 0.09 0.09 0.09 0.0	v/s Ratio Prot	0.10	0.26		c0.15	c0.31		c0.10	0.15			0.20	
0.87 0.95 0.40 0.93 0.95 0.07 0.93 0.40 0.11 0.26 0.79 1.215 32.3 27.0 22.8 29.9 21.2 22.7 198 17.5 27.0 31.5 1.00 1.00 1.00 1.00 1.00 0.82 0.78 0.63 1.00 1.00 1.00 1.00 0.82 0.78 0.63 1.00 1.00 1.00 1.00 0.82 0.78 0.63 1.00 1.00 1.00 1.00 0.82 0.78 0.63 1.00 1.00 0.82 0.78 0.63 1.00 1.00 0.82 0.78 0.63 1.00 1.00 0.82 0.78 0.63 1.00 1.00 0.82 0.78 0.63 1.00 1.00 0.82 0.78 0.63 1.00 0.82 0.78 0.63 0.78 0.63 0.78 0.63 0.78 0.63 0.78 0.63 0.78 0.78 0.63 0.78 0.78 0.78 0.78 0.78 0.78 0.78 0.78	v/s Ratio Perm	0.23		0.11	0.28		0.02	c0.27		0.04	0.07		0.0
215 32.3 27.0 22.8 29.9 21.2 22.7 19.8 17.5 27.0 31.5 1.00	v/c Ratio	0.87	0.95	0.40	0.93	0.95	0.07	0.93	0.40	0.11	0.26	0.79	0.37
1.00 1.00 1.00 1.00 1.00 1.00 0.82 0.78 0.63 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	Uniform Delay, d1	21.5	32.3	27.0	22.8	29.9	21.2	22.7	19.8	17.5	27.0	31.5	27.8
2 265 210 33 318 18.2 0.1 35.7 0.2 0.1 0.8 5.4 48.0 53.3 30.3 54.5 48.1 21.3 54.4 15.6 11.1 27.8 36.9 5.4 46.5 D C D C D B B C D C D A C D C D C D C D C D C D C D C	Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.82	0.78	0.63	1.00	1.00	9.
48.0 53.3 30.3 54.5 48.1 21.3 54.4 15.6 11.1 27.8 36.9 59.9 50.0 50.0 50.0 50.0 50.0 50.0 50		26.5	21.0	3.3	31.8	18.2	0.1	35.7	0.2	0.1	0.8	5.4	0.
D C D C D B B B C	Delay (s)	48.0	53.3	30.3	54.5	48.1	21.3	54.4	15.6	11.1	27.8	36.9	28.5
46.5 47.8 26.2 7 7 9 10	Level of Service		_	O			O		В	В	ပ		O
Y D C Y 40.2 HCM 2000 Level of Service D o Capacity ratio 1.01 D N iff (s) 90.0 Sum of lost time (s) 18.7 Utilization 81.2% ICU Level of Service D 1 15 15	Approach Delay (s)		46.5			47.8			26.2			33.5	
40.2 HCM 2000 Level of Service 1.01 Sum of lost time (s) 18 81.2% ICU Level of Service 15	Approach LOS		Δ			Ω			O			O	
40.2 HCM 2000 Level of Service 1.01 Sum of lost time (s) 18 81.2% ICU Level of Service 15	Intersection Summary												
1.01 90.0 Sum of lost time (s) 18 81.2% ICU Level of Service 15	HCM 2000 Control Delay			40.2	ĭ	2M 2000	Level of	Service		٥			
90.0 Sum of lost time (s) 18 81.2% ICU Level of Service 15	HCM 2000 Volume to Capacity	ratio		1.01									
81.2% ICU Level of Service 15	Actuated Cycle Length (s)			0.06	S	ım of lost	time (s)			18.7			
Analysis Period (min) 15	Intersection Capacity Utilization	_		81.2%	೦	U Level c	of Service						
	Analysis Period (min)			15									

Proposed Residential Development, 10 Aspen Springs Drive, Bowmarville, ON Trans-Plan

Timings Timings Total 2029 Weekday AM Peak Hour 2: Bowmanville Avenue & Aspen Springs Drive">03-14-2022

	1	<i>></i>	•	←	→	*	
Lane Group	田田	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	r	¥C.	<i>y</i> -	‡	‡	¥.	
Traffic Volume (vph)	210	128	114	495	938	149	
Future Volume (vph)	210	128	114	495	938	149	
Turn Type	Prot	Perm	Perm	N A	NA	Perm	
Protected Phases	4			2	9		
Permitted Phases		4	7			9	
Detector Phase	4	4	2	2	9	9	
Switch Phase							
Minimum Initial (s)	8.0	8.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	24.0	24.0	27.0	27.0	27.0	27.0	
	29.7	29.7	60.3	60.3	60.3	60.3	
Total Split (%)	33.0%	33.0%	%0'.29	%0'.29	%0'.29	%0.79	
Yellow Time (s)	3.3	3.3	4.2	4.2	4.2	4.2	
All-Red Time (s)	5.6	5.6	2.1	2.1	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0:0	0.0	
Total Lost Time (s)	5.9	5.9	6.3	6.3	6.3	6.3	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)	19.3	19.3	58.5	58.5	58.5	58.5	
Actuated g/C Ratio	0.21	0.21	0.65	0.65	0.65	0.65	
v/c Ratio	0.77	0.47	0.48	0.29	0.50	0.22	
Control Delay	47.0	16.5	14.0	0.9	7.1	1.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.0	16.5	14.0	0.9	7.1	 6.	
TOS		Ф	В	V	A	A	
Approach Delay	34.5			7.5	6.2		
Approach LOS	O			∢	⋖		
Intersection Summary							
Cycle Length: 90							
Actuated Cycle Length: 90							
Offset 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	ohase 2:1	VBTL and	6:SBT,	Start of G	reen		
Natural Cycle: 60							
Control Type: Actuated-Coordinated	nated						
Maximum v/c Ratio: 0.77							
Intersection Signal Delay: 12.3				드	Intersection LOS: B	LOS: B	
Intersection Capacity Utilization 69.6%	м9:69 и			೦	U Level o	ICU Level of Service C	
Analysis Period (min) 15							



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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HCM Signalized Intersection Capacity Analysis 2: Bowmanville Avenue & Aspen Springs Drive

<Total> 2029 Weekday AM Peak Hour 03-14-2022

		•					
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	<i>y</i>	¥	F	‡	‡	8 C.	
Traffic Volume (vph)	210	128	114	495	938	149	
Future Volume (vph)	210	128	114	495	938	149	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	2.9	5.9	6.3	6.3	6.3	6.3	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	
Frpb, ped/bikes	1:00	1.00	1.00	1.00	1.00	96.0	
Flpb, ped/bikes	1:00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	1.00	0.85	
Fit Protected	0.95	1.00	0.95	1.00	1.00	1.00	
Satd. Flow (prot)	1722	1512	1636	2968	3067	1270	
Fit Permitted	0.95	1.00	0.25	1.00	1.00	1.00	
Satd. Flow (perm)	1722	1512	438	2968	3067	1270	
Peak-hour factor, PHF	0.74	0.65	0.83	0.88	0.94	0.75	
Adj. Flow (vph)	584	197	137	295	866	199	
RTOR Reduction (vph)	0	91	0	0	0	20	
Lane Group Flow (vph)	584	106	137	563	866	129	
Confl. Peds. (#/hr)			6			o	
Heavy Vehicles (%)	%9	%8	11%	23%	19%	23%	
Turn Type	Prot	Perm	Perm	NA	¥	Perm	
Protected Phases	4			2	9		
Permitted Phases		4	2			9	
Actuated Green, G (s)	19.3	19.3	58.5	58.5	58.5	58.5	
Effective Green, g (s)	19.3	19.3	58.5	58.5	58.5	58.5	
Actuated g/C Ratio	0.21	0.21	0.65	0.65	0.65	0.65	
Clearance Time (s)	5.9	5.9	6.3	6.3	6.3	6.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	369	324	284	1929	1993	825	
v/s Ratio Prot	c0.16			0.19	c0.33		
v/s Ratio Perm		0.07	0.31			0.10	
v/c Ratio	0.77	0.33	0.48	0.29	0.50	0.16	
Uniform Delay, d1	33.3	29.9	8.0	8.9	8.2	6.1	
Progression Factor	1:00	1.00	0.77	0.75	0.73	0.76	
Incremental Delay, d2	9.3	9.0	9.6	0.4	9.0	0.3	
Delay (s)	45.6	30.5	11.8	5.4	6.5	5.0	
Level of Service	□	O	ш	⋖	∢	⋖	
Approach Delay (s)	37.6			6.7	6.3		
Approach LOS	Ω			∢	٧		
Intersection Summary							
HCM 2000 Control Delay			12.7	Ĭ	3M 2000	HCM 2000 Level of Service	В
HCM 2000 Volume to Capacity ratio	city ratio		0.57				
Actuated Cycle Length (s)			0.06	S	ım of lost	time (s)	12.2
Intersection Capacity Utilization	tion		%9.69	2	U Level o	ICU Level of Service	O
Analysis Dariod (min)			4				

Proposed Residential Development, 10 Aspen Springs Diive, Bowmanville, ON Trans-Plan

Timings <Total> 2029 Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-2022

HCM Signalized Intersection Capacity Analysis <Total> 2029 Weekday AM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-202

3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access	nue & l	Hartwe	Ave	ne/Ex	isting	Cond	Acce	SS			03-14-2022
	4	†	<i>></i>	-	ţ	•	←	۶	→	*	
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR	
Lane Configurations		₹	*		4	*	₩.	*	‡	¥C.	
Traffic Volume (vph)	23	0	40	~	~	83	583	5	1027	59	
Future Volume (vph)	23	0	40	~	~	33	583	2	1027	59	
Turn Type	Perm	Ν	Perm	Perm	Ϋ́	Perm	NA	Perm	Ϋ́	Perm	
Protected Phases		4			4		2		2		
Permitted Phases	4		4	4		2		2		2	
Detector Phase	4	4	4	4	4	2	2	2	2	2	
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	20.0	20.0	20.0	20.0	20.0	
Minimum Split (s)	24.3	24.3	24.3	24.3	24.3	27.0	27.0	27.0	27.0	27.0	
Total Split (s)	29.7	29.7	29.7	29.7	29.7	60.3	60.3	60.3	60.3	60.3	
Total Split (%)	33.0%	33.0%	33.0%	33.0%	33.0%	%0.79	%0'.29	%0.79	%0.79	%0'.29	
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	4.8	4.8	4.8	4.8	4.8	
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	<u>6</u>	1.8	— —	1.8	7.8	
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.3	6.3		6.3	9.9	9.9	9.9	9.9	9.9	
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	
Act Effct Green (s)		9.6	9.8		9.6	72.7	72.7	72.7	72.7	72.7	
Actuated g/C Ratio		0.10	0.10		0.10	0.81	0.81	0.81	0.81	0.81	
v/c Ratio		0.25	0.27		0.03	0.14	0.29	0.01	0.43	0.04	
Control Delay		41.9	14.7		30.3	4.2	3.4	2.2	2.4	0.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		41.9	14.7		30.3	4.2	3.4		2.4	0.5	
ros		۵	മ		O	∢	⋖	∢	∢	⋖	
Approach Delay		25.3			30.3		3.4		2.4		
Approach LOS		ပ			O		∢		∢		
Intersection Summary											
Cycle Length: 90											
Actuated Cycle Length: 90											
Offset 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	phase 2:	NBSB and	d 6:, Stari	t of Greer							
Natural Cycle: 60											
Control Type: Actuated-Coordinated	Jinated										
Maximum v/c Ratio: 0.43											
Intersection Signal Delay: 3.8				드	tersectio	Intersection LOS: A					
Intersection Capacity Utilization 57.7%	on 57.7%			೦	U Level	ICU Level of Service B	В				
Analysis Period (min) 15											



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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	4	†	-	-	↓	4	•	←	•	۶	→	*
Movement	EBF	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		₩	*		4		F	₩		r	‡	*
Traffic Volume (vph)	23	0	40	-	, -	2	33	583	0	2	1027	53
Future Volume (vph)	23	0	40	-	-	2	33	583	0	2	1027	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	9.9
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		0.99	1.00	1.00
Fr		1:00	0.85		0.93		1:00	1:00		9.	1.00	0.85
Fit Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1825	1541		1769		1643	2992		1812	3093	1363
Cotd Flow (norm)		1451	1541		1622		0.25	00.1		0.39	3003	1.00
Satu. Flow (pellil)	000	2	5	000	770	000	1	7007	000	24.0	2000	202
Adi. Flow (vph)	8 8	0.92	53	10.02	10.07	0.02	49	694	0.92	0.92	1081	48
RTOR Reduction (vph)	0	0	49	0	2	0	0	0	0	0	0	7
Lane Group Flow (vph)	0	34	4	0	2	0	49	694	0	2	1081	37
Confl. Peds. (#/hr)							-		2	2		_
Heavy Vehicles (%)	%0	%0	%9	%0	%0	%0	11%	22%	%0	%0	18%	17%
Turn Type	Perm	NA	Perm	Perm	¥		Perm	¥		Perm	NA	Perm
Protected Phases		4			4			5			5	
Permitted Phases	4		4	4			2			2		2
Actuated Green, G (s)		7.0	7.0		7.0		70.1	70.1		70.1	70.1	70.1
Effective Green, g (s)		7.0	7.0		7.0		70.1	70.1		70.1	70.1	70.1
Actuated g/C Ratio		0.08	0.08		0.08		0.78	0.78		0.78	0.78	0.78
Clearance Time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	9.9
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		112	119		126		342	2330		276	2409	1061
v/s Ratio Prot								0.23			00.35	
v/s Ratio Perm		c0.02	0.00		0.00		0.11			0.01	!	0.03
v/c Ratio		0.30	0.03		0.02		0.14	0.30		0.01	0.45	0.04
Uniform Delay, d1		39.5	4.00		38.3		2.5	2.3		7.7	4.5	2.3
Progression Factor		00.1	00.		00.		00.	00:		4.0	9.0 4.0	0.40
Delay (c)		7.04	38.5		38.4		2.5	3.5		7.0	0.0	. .
l evel of Service							₹ 4	4		<	A	A
Approach Delay (s)		39.4			38.4			3.2			2.3	
Approach LOS					۵			∢			∢	
Intersection Summary												
HCM 2000 Control Delay			4.3	Ĭ	HCM 2000 Level of Service	evel of S	ervice		A			
HCM 2000 Volume to Capacity ratio	ty ratio		0.44						:			
Actuated Cycle Length (s)			0.06	Sn	Sum of lost time (s)	time (s)			12.9			
Intersection Capacity Utilization	LC.		21.7%	೦	U Level o	f Service			ш			
Analysis Period (min)			15									
c Critical Lane Group												

Proposed Residential Development, 10 Aspen Springs Drive, Bowmarville, ON Trans-Plan

HCM Unsignalized Intersection Capacity Analysis <Total> 2029 Weekday AM Peak Hour 4: Bonnycastle Drive & Aspen Springs Drive

																																								Ø	
•	NBR		90	ස			0.93	32										264			264	6.2		3.3	96	778														f Service	
•	NBL	>	45	45	Stop	%0	0.93	48	2	3.7	- -	0						226			226	6.4		3.5	6	488														ICU Level of Service	
ţ	WBT	€	242	242	Free	%0	0.93	260						None		160																								_	
-	WBL		15	ঠ			0.93	16										277			277	4.1		2.2	66	1295	NB1	8	48	35	574	0.14	3.7	12.3	ω	12.3	В		1.8	36.0%	15
>	EBR		24	54			0.93	56																			WB1	276	16	0	1295	0.01	0.3	9.0	⋖	9.0					
†	EBT	æ	232	232	Free	%0	0.93	249						None													EB 1	275	0	56	1700	0.16	0:0	0:0		0:0				uo	
	Movement	Lane Configurations	Traffic Volume (veh/h)	Future Volume (Veh/h)	Sign Control	Grade	Peak Hour Factor	Hourly flow rate (vph)	Pedestrians	Lane Width (m)	Walking Speed (m/s)	Percent Blockage	Right tum 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)

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HCM Unsignalized Intersection Capacity Analysis <Total> 2029 Weekday AM Peak Hour 5: Fry Crescent (East) & Aspen Springs Drive

	†	>	\	Ļ	•	•	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	2			₩	>		
Traffic Volume (veh/h)	242	4	2	282	12	တ	
Future Volume (Veh/h)	242	4	2	282	12	6	
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)	266	4	2	307	13	10	
Pedestrians				7	4		
Lane Width (m)				3.7	3.7		
Walking Speed (m/s)				[-		
Percent Blockage				0	0		
Right turn flare (veh)							
Median type	None			None			
Median storage veh)							
Upstream signal (m)				242			
pX, platoon unblocked							
C, conflicting volume			274		289	274	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			274		289	274	
.C, single (s)			4.1		6.4	6.2	
.C, 2 stage (s)							
FF(s)			2.2		3.5	3.3	
on due one free %			100		26	66	
cM capacity (veh/h)			1296		470	765	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	270	312	23				
Volume Left	0	2	13				
Volume Right	4	0	10				
SSH	1700	1296	265				
Volume to Capacity	0.16	0.00	0.04				
Queue Length 95th (m)	0.0	0.1	1.0				
Control Delay (s)	0.0	0.2	11.6				
Lane LOS		∢	മ				
Approach Delay (s)	0.0	0.2	11.6				
Approach LOS			Ω				
Intersection Summary							
Average Delay			0.5				
Intersection Capacity Utilization	ion		29.5%	⊇	ICU Level of Service	Service	A
Analysis Period (min)			15				

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

<Total> 2029 Weekday AM Peak Hour Springs Drive 03-14-2022 HCM Unsignalized Intersection Capacity Analysis <Total> 2029 \ 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

<Total> 2029 Weekday AM Peak Hour ss 03-14-2022

0.92

0.92

0.92

Grade Peak Hour Factor Hourly flow rate (vph)

262

258

285

Pedesirians
Lane Width (m)
Walking Stocked (mis)
Percent Blockede (mis)
Percent Blockede (mis)
Median type
Median storage veh
Dy, palabou unblocked
VC, conflicting volume
VC1, stage 1 cont vol
Co, stage 2 cont vol
Co, stage 2 cont vol
Co, stage 6)
F(S)
F(S)
G(S)
F(S)
G(S

79

None

None

6.4

3.3 95 777

3.5 82 486

2.2 99 1277

37

43

00

Lane Configurations Traffic Volume (veh/h) Future Volume (Veh/h)

Sign Control

Stop 81 ₹ 80 € 88 88

219 219 0% 0.92 238

253 253 253 0% 0.92 275

HCM Unsignalized Intersection Capacity Analysis <7: Aspen Springs Drive & 10 Aspen Springs Drive Access

1

	1	†	~	\	ļ	1	•	←	•	۶	→	•
Novement	田田	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
raffic Volume (veh/h)	5	217	-	2	278	=	2	0	10	22	0	23
Future Volume (Veh/h)	13	217	-	2	278	=	2	0	10	22	0	23
Sign Control		Free			Free			Stop			Stop	
Grade		%0			%0			%0			%0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	14	238	-	2	302	12	2	0	7	24	0	25
Pedestrians								က			_∞	
ane Width (m)								3.7			3.7	
Valking Speed (m/s)								1.			1.	
Percent Blockage								0			-	
Right tum flare (veh)												
Median type		None			None							
Median storage veh)												
Jpstream signal (m)					323							
X, platoon unblocked												
C, conflicting volume	325			242			616	604	242	909	266	319
C1, stage 1 conf vol												
vC2, stage 2 conf vol												
'Cu, unblocked vol	325			242			919	604	242	909	299	319
C, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
C, 2 stage (s)												
F (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
on gueue free %	66			100			66	100	66	94	100	97
cM capacity (veh/h)	1236			1332			383	404	800	395	407	721
Direction, Lane #	EB 1	WB1	NB 1	SB 1								
/olume Total	253	322	16	49								
/olume Left	4	2	2	54								
/olume Right	-	12	#	52								
SSH	1236	1332	265	513								
/olume to Capacity	0.01	0.00	0.03	0.10								
Queue Length 95th (m)	0.3	0.1	9.0	2.4								
Control Delay (s)	0.5	0.2	11.2	12.8								
ane LOS	∢	∢	Ф	ω								
pproach Delay (s)	0.5	0.2	11.2	12.8								
Approach LOS			ш	ш								
ntersection Summary												
Average Delay			1.5									
ntersection Capacity Utilization	Ĺ		29.4%	⊴	ICU Level of Service	f Service			⋖			
Analysis Period (min)			15									

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

ICU Level of Service

2.6 34.8% 15

Average Delay Intersection Capacity Utilization Analysis Period (min)

Approach Delay (s) Approach LOS

128 88 80 40 551 0.23 6.8 6.8 13.5 13.5 B

47 700 0.17 0.0 0.0

286 111 0 0 0.01 0.02 0.04 0.4 A A O.4

Direction, Lane #
Volume Total
Volume Left
Solume Right
SSH
Volume to Capacity
Queue Length Sth (m)
Control Delay (s)
Lane LOS

<Total> 2029 Weekday AM Peak Hour ay 03-14-2022 HCM Unsignalized Intersection Capacity Analysis <7 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

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Timings /weekday<a href="https://weekday<a href="https://weekday<a href="https://weekday<a href="https://weekday<a href="https://weekday<a href="https://weekday<a href="https://weekday<a

•	SBR	¥c_	25	52	Perm		2	2		20.0	27.0	9.75	%0.49	4.8	1.8	0.0	9.9			C-Max	7.1.7	0.80	0.08	8.0	0:0	8.0	⋖												
→	SBT	‡	845	842	A	2		2		20.0	27.0	97.9	64.0%	4.8	1.8	0.0	9.9			C-Max	7.1.7	0.80	0.36	3.5	0.0	3.5	∢	3.3	∢										
۶	SBL	je-	5	2	Perm		2	2		20.0	27.0	97.6	64.0%	4.8	7.8	0.0	9.9			C-Max	7.1.7	0.80	0.02	3.4	0.0	3.4	⋖												
•	NBT	₩.	1012	1012	₹	2		2		20.0	27.0	97.6	64.0%	4.8	7.8	0.0	9.9			C-Max	7.1.7	0.80	0.51	5.3	0.0	5.3	⋖	5.4	∢									ပ	
•	NBL	×	84	84	Perm		2	2		20.0	27.0	97.6	64.0%	4.8	7.8	0.0	9.9			C-Max	7.1.7	0.80	0.28	5.9	0.0	5.9	⋖										LOS: A	CU Level of Service C	
ļ	WBT	4	5	2	₹	4		4		8.0	24.3	32.4	36.0%	3.3	3.0	0.0	6.3			None	9.6	0.11	0.09	25.0	0.0	25.0	O	25.0	O				_				Intersection LOS: A	U Level	
-	WBL		4	4	Perm		4	4		8.0	24.3	32.4	36.0%	3.3	3.0					None													t of Green				드	2	
/	EBR	¥C	69	69	Perm		4	4		8.0	24.3	32.4	36.0%	3.3	3.0	0.0	6.3			None	9.6	0.11	0.37	12.7	0.0	12.7	ш						d 6:, Star						
†	EBT	€	0	0	ΑN	4		4		8.0	24.3	32.4	36.0%	3.3	3.0	0.0	6.3			None	9.6	0.11	0.37	43.9	0.0	43.9	۵	24.6	O				NBSB an						
1	EBL		33	93	Perm		4	4		8.0	24.3	32.4	36.0%	3.3	3.0					None													phase 2:1		linated			on 67.7%	
	Lane Group	Lane Configurations	Traffic Volume (vph)	Future 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: 90	Actuated Cycle Length: 90	Offset: 0 (0%), Referenced to phase 2:NBSB and 6:, Start of Green	Natural Cycle: 60	Control Type: Actuated-Coordinated	Maximum v/c Ratio: 0.51	Intersection Signal Delay: 5.8	Intersection Capacity Utilization 67.7%	Analysis Period (min) 15



Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

HCM Signalized Intersection Capacity Analysis <Total> 2029 Weekday PM Peak Hour 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access 03-14-2022

Movement EBI EBI MBI	J. DOWINGINIE AVG	3			100	2							
Febr. EBr. Febr. Webl. Webl. Nebr.		1	†	<i>></i>	-	ļ	1	•	←	•	۶	→	•
39 0 6 69 4 2 7 84 1012 4 5 845 39 0 6 69 4 2 7 84 1012 4 5 845 39 0 6 69 4 2 7 84 1012 4 5 845 100 1900 1900 1900 1900 1900 1900 1900 100 100 1.00 1.00 1.00 1.00 1.00 1.00	Movement	EBL	EBI	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
39 0 659 4 2 7 84 1012 4 5 845 39 0 100 100 1900 1900 1900 1900 1900 19	Lane Configurations		₩	*-		4		je.	₩		r	‡	¥C.
39 0 669 4 2 7 84 1012 4 5 845 1900	Traffic Volume (vph)	33	0	69	4	5	7	8	1012	4	2	845	52
100	Future Volume (vph)	ල ද	0	69	4 4	2	2007	\$ 5	1012	4 4	2	842	52
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Ideal Flow (vphpl)	1900	0061	0061	1900	0061	1900	0061	0061	1900	0061	1900	1900
1,00 1,00	I and I Hil Earthor		6.5	0.5		5.0		0.0	0.0		0.0	0.0	100
1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00	Frpb, ped/bikes		8 8:	8.0.		8 8:		8 6.	1.00		1.00	1.00	0.98
100 0.85 0.92 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
1825 150 0.98 100 0.95 100 0.95 100 0.055 100 0.055 100 0.075 100 0.87 1.00 0.022 1.00 0.075 1.00 0.087 1.00 0.022 1.00 0.075 1.00 0.087 0.032 1.00 0.022 1.00 0.05 0.05 0.05 0.05 0.05 0.05 0.05	Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	0.85
1825 1541 1748 1642 2992 1820 3039 1820 10.5 1.00 0.5 1.0	Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
1,75 1,00 0,87 0,32 1,00 0,22 1,00 0,87 0,08 0,92 0,92 0,95	Satd. Flow (prot)		1825	1541		1748		1642	2992		1820	3093	1363
1435 1541 1553 547 2992 414 3093 1068 0.92 0.075 0.08 0.08 0.084 0.092 0.095 0	Flt Permitted		0.75	1:00		0.87		0.32	1.00		0.22	1.00	1.00
0.68 0.92 0.75 0.82 0.82 0.68 0.84 0.92 0.92 0.95 <th< td=""><td>Satd. Flow (perm)</td><td></td><td>1435</td><td>1541</td><td></td><td>1553</td><td></td><td>247</td><td>2992</td><td></td><td>414</td><td>3093</td><td>1363</td></th<>	Satd. Flow (perm)		1435	1541		1553		247	2992		414	3093	1363
57 0 92 5 2 9 124 1205 4 5 889 0 6 8 0 124 1205 6 6 0	Peak-hour factor, PHF	0.68	0.92	0.75	0.82	0.82	0.82	0.68	0.84	0.92	0.92	0.95	0.60
0 0 84 0 8 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Adj. Flow (vph)	24	0	92	2	5	တ	124	1205	4	2	888	87
0% 0% 6% 0% 0% 174 1209 0 5 889 0% 0% 6% 0% 0% 174 1209 0 5 889 Perm NA Perm Perm NA	RTOR Reduction (vph)	0	0	\$	0	∞	0	0	0	0	0	0	20
0% 0% 6% 0% 0% 11% 22% 0% 0% 11% 22% 0% 18% Perm NA NA Perm NA Perm NA	Lane Group Flow (vph)	0	24	∞	0	∞	0	124	1209	0	2	888	29
0% 0% 0% 0% 0% 1% 22% 0% 0% 18% 4 4 4 4 4 4 4 4 18% 4 4 4 4 4 4 4 4 18% 8 8 0 80 69.1 <td< td=""><td>Confl. Peds. (#/hr)</td><td></td><td></td><td>į</td><td></td><td>į</td><td></td><td>_</td><td></td><td>2</td><td>2</td><td></td><td>_</td></td<>	Confl. Peds. (#/hr)			į		į		_		2	2		_
Perm NA Perm C2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 4 3 3	Heavy Vehicles (%)	%0	%0	%9	%0	%0	%0	11%	25%	%0	%0	18%	17%
4 4 4 4 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Turn Type	Perm	AN	Perm	Perm	NA		Perm	N N		Perm	₹	Perm
4	Protected Phases		4			4			2			2	
8.0 8.0 8.0 69.1 69.1 69.1 69.1 69.1 69.1 69.1 60.1 60.0 60.0 60.0 60.1 60.1 60.1 60	Permitted Phases	4		4	4			2			2		2
8.0 8.0 8.0 8.0 8.0 1 89.1 89.1 89.1 89.1 89.1 89.1 89.1 89	Actuated Green, G (s)		8.0	8.0		8.0		69.1	69.1		69.1	69.1	69.1
0.09 0.09 0.09 0.77 0.77 0.77 0.77 0.77	Effective Green, g (s)		8.0	8.0		8.0		69.1	69.1		69.1	69.1	69.1
12	Actuated g/C Ratio		0.09	0.09		0.09		0.77	0.77		0.77	0.77	0.77
30 30 30 30 30 30 30 30	Clearance Time (s)		6.3	6.3		6.3		9.9	9.9		9.9	9.9	9.9
127 136 138 419 2297 317 2374 7 6 6004 0.01 0.01 0.23 0.040 0.05 0.05 0.05 0.05 0.05 0.05 0.0	Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
co.04 0.01 0.023 0.04 0.01 0.45 0.06 0.06 0.30 0.53 0.02 0.07 38.9 37.6 37.5 3.1 4.1 2.5 3.4 2.5 0.0 1.00 1.00 1.00 0.93 0.82 2.5 3.4 4.1 37.7 37.7 4.9 4.9 0.4 3.2 3.1 0.4 3.4 3.4 3.4 3.1 A <t< td=""><td>Lane Grp Cap (vph)</td><td></td><td>127</td><td>136</td><td></td><td>138</td><td></td><td>419</td><td>2297</td><td></td><td>317</td><td>2374</td><td>1046</td></t<>	Lane Grp Cap (vph)		127	136		138		419	2297		317	2374	1046
0.04 0.01 0.01 0.23 0.01 0.45 0.06 0.06 0.30 0.53 0.02 38.9 37.6 37.5 3.1 4.1 2.5 3.4 1.00 1.00 1.00 1.00 1.00 0.93 0.82 2.5 0.2 0.2 1.8 0.9 0.1 0.4 3.7 37.7 4.9 4.9 2.4 3.2 D D D A A A A A A A A 39.1 37.7 4.9 4.9 3.1 D A A A A A A A A A A A A A A A A A A A	v/s Ratio Prot								c0.40			0.29	
0.45 0.06 0.06 0.30 0.53 0.02 0.37 0.02 0.37 0.02 0.37 0.02 0.37 0.02 0.37 0.02 0.37 0.02 0.37 0.02 0.03 0.03	v/s Ratio Perm		c0.04	0.01		0.01		0.23			0.01		0.05
38.9 37.6 37.5 31.1 4.1 2.5 34.1 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1	v/c Ratio		0.45	90:0		90:0		0.30	0.53		0.02	0.37	0.06
100 100 100 100 100 100 100 0.93 0.82 2.5 0.2 0.2 1.8 0.9 0.1 0.4 41.4 37.7 37.7 4.9 4.9 2.4 3.2 D D D A A A A A A A A A A A A A A A A	Uniform Delay, d1		38.9	37.6		37.5		3.1	4.1		2.5	3.4	2.6
2.5 0.2 0.2 1.8 0.9 0.1 0.4 4.14 37.7 37.7 4.9 4.9 2.4 3.2 D D D A A A A A A A A A A A A A A A A	Progression Factor		9.	0.1		9.		9:	0.1		0.93	0.82	0.77
414 37.7 37.7 4.9 4.9 2.4 39.1 37.7 4.9 4.9 2.4 39.1 37.7 4.9 A A A A A A A A A A A A A A A A A A A	Incremental Delay, d2		2.5	0.2		0.2		6.	6.0		0.1	0.4	0.1
39.1 37.7 4.9 A A A A A A B A A A A A B A A A B A A A A B A B A B A B A B A A A B A B A	Delay (s)		41.4	37.7		37.7		6.4	6.4		2.4	3.2	2.1
39.1 37.7 4.9 3 D A D A E.S. HCM 2000 Level of Service A 90.0 Sum of lost time (s) 12.9 6.7.7% ICU Level of Service C	Level of Service			Ω		۵		∢	∢ !		⋖	∢ ,	∀
D A A C	Approach Delay (s)		39.1			37.7			4.9			3.1	
6.5 HCM 2000 Level of Service 0.52 0.00 Sum of lost time (s) 67.7% ICU Level of Service 15	Approach LOS					۵			∢			∢	
6.5 HCM 2000 Level of Service 0.52 0.00 Sum of lost time (s) 67.7% ICU Level of Service 15	Intersection Summary												
ratio 0.52 90.0 Sum of lost time (s) 67.7% ICU Level of Service 15	HCM 2000 Control Delay			6.5	Ĭ	CM 2000 I	Level of S	ervice		V			
90.0 Sum of lost time (s) 67.7% ICU Level of Service 15	HCM 2000 Volume to Capacity	by ratio		0.52									
67.7% ICU Level of Service 15	Actuated Cycle Length (s)			0.06	ง	am of lost	time (s)			12.9			
Analysis Period (min) 15	Intersection Capacity Utilizatio	u		%2'.29	೦	U Level o	f Service			ပ			
	Analysis Period (min)			15									

Critical Lane Group

Queuing and Blocking Report

<Total> 2024 Weekday AM Peak Hour 01/24/2022

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Movement	8	B	B	8	WB	WB	WB	8	R	B17	SB	SB
Directions Served	_	⊢	⊢	~	_	⊢	⊢	_	⊢	⊢	_	-
Maximum Queue (m)	52.7	7.78	9.07	37.1	91.0	129.7	121.7	66.2	81.6	15.4	16.4	197.1
Average Queue (m)	23.6	63.8	58.4	0.0	64.3	75.2	78.3	38.8	44.0	2.2	7.2	131.5
95th Queue (m)	45.7	91.0	74.8	0.0	93.7	6.86	118.6	2'. 19	8.77	1.1	16.5	207.0
Link Distance (m)		365.0	365.0			605.2	605.2		66.3	211.2		375.9
Upstream Blk Time (%)								0	2			
Queuing Penalty (veh)								0	12			
Storage Bay Dist (m)	80.0			20.0	100.0			85.0			55.0	
Storage Blk Time (%)		-	13			വ	59	0	7			46
Queuing Penalty (veh)		2	9			6	14	_	00			137

Intersection: 1: Bowmanville Avenue & Highway 2

SB	œ	100.0	59.4	121.1				20.0		
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: Bowmanville Avenue & Aspen Springs Drive

Movement	8	B	9	9	SB	
Directions Served	_	œ	_	⊢	꼰	
Maximum Queue (m)	43.0	21.5	124.8	255.3	106.2	
Average Queue (m)	33.2	13.0	109.4	174.8	79.3	
95th Queue (m)	40.3	20.3	147.6	328.2	125.2	
Link Distance (m)		57.0		250.0	106.2	
Upstream Blk Time (%)				35	Ψ.	
Queuing Penalty (veh)				173	Ţ.	
Storage Bay Dist (m)	100.0		25.0			
Storage Blk Time (%)			100	7		
Queuing Penalty (veh)			429	7		

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Queuing and Blocking Report

<Total> 2024 Weekday AM Peak Hour 01/24/2022

Intersection: 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access

SB	TR	4.0	0.1	0.6	0.0				15	_
	TR								44	13
	_				2			20.0	0	0
	LTR				7.1			2		
	2				7			10.0	7	-
	ᆸ				116.2			_	33	12
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: 4: Bonnycastle Drive & Aspen Springs Drive

Movement	WB	B NB	
Directions Served	느	T LR	
Maximum Queue (m)	9.5	2 16.5	
Average Queue (m)	1.3	3 7.5	
95th Queue (m)	9.9	6 16.3	
Link Distance (m)	76.0	0 71.8	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Fry Crescent (East) & Aspen Springs Drive

Movement	WB
Directions Served	17
Maximum Queue (m)	9.3
Average Queue (m)	2.6
95th Queue (m)	9.4
Link Distance (m)	74.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

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Queuing and Blocking Report

<Total> 2024 Weekday AM Peak Hour 01/24/2022

Intersection: 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

Movement	EB	NB	SB	
Directions Served	LTR	LTR	LTR	
Maximum Queue (m)	9.8	0.6	9.1	
Average Queue (m)	1.2	2.4	7.5	
95th Queue (m)	6.2	8.8	12.6	
Link Distance (m)	126.5	58.9	56.9	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

Movement EB SB Comparison

Intersection: 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

Network Summary Network wide Queuing Penalty: 868

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Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Queuing and Blocking Report <Total> 2024 Weekday PM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 1: Bowmanville Avenue & Highway 2

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	B17	SB
Directions Served	_	⊢	_	œ	_	_	_	٦	_	œ	⊢	_
Maximum Queue (m)	180.0	377.0	376.3	100.0	45.8	95.9	88.0	66.2	81.7	66.3	136.5	129.7
Average Queue (m)	179.8	344.9	342.5	9.66	32.4	73.6	71.9	58.0	9.77	37.7	42.2	43.5
95th Queue (m)	179.9	400.0	401.3	101.1	50.9	103.0	9.96	73.2	93.9	91.5	7.76	102.7
Link Distance (m)		365.0	365.0			605.2	605.2		66.3		211.2	
Upstream Blk Time (%)		17	19					9	83	_		
Queuing Penalty (veh)		0	0					0	312	0		
Storage Bay Dist (m)	80.0			20.0	100.0			85.0		20.0		55.0
Storage Blk Time (%)	06	28	61	4		0	22	18	43			
Queuing Penalty (veh)	519	170	212	24		0	4	121	200			

Intersection: 1: Bowmanville Avenue & Highway 2

Movement	SB	3 SB
Directions Served	-	
Maximum Queue (m)	266.7	7 100.0
Average Queue (m)	109.3	
95th Queue (m)	230.8	
Link Distance (m)	340.9	0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		50.0
Storage Blk Time (%)	37	
Queuing Penalty (veh)	121	

Intersection: 2: Bowmanville Avenue & Aspen Springs Drive

Movement	æ	EB	BB	NB	SB	
Directions Served	_	œ	_	F	꿈	
Maximum Queue (m)	54.1	57.3	79.2	66.3	108.6	
Average Queue (m)	29.5	27.3	48.7	37.8	75.2	
95th Queue (m)	51.5	53.2	206	75.8	144.8	
Link Distance (m)		57.3		250.0	106.3	
Upstream Blk Time (%)	_	-			က	
Queuing Penalty (veh)	0	4			23	
Storage Bay Dist (m)	100.0		25.0			
Storage Blk Time (%)	-	Ψ	99	œ		
Queuing Penalty (veh)	_	က	488	14		

SimTraffic Report Page 1

Queuing and Blocking Report CTotal> 2024 Weekday PM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access

SB	TR	254.3	216.1	293.2	250.0	က	21		09	2
SB	_	43.8	0.0	0.0				20.0		
BB	TR	663.5	653.3	678.1	647.6	78	0		28	4
BB	_	44.9	24.9	52.6				20.0	18	162
WB	LTR	8.4	3.4	8.6	17.1					
EB	œ	22.4	10.8	22.8				10.0	13	2
EB	디	9.2	3.9	11.3	116.2				4	က
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: 4: Bonnycastle Drive & Aspen Springs Drive

Maximum Queue (m) 9.U 10.3 Average Queue (m) 3.8 10.9 SSR Jouene (m) 11.0 16.0 Link Distance (m) 76.0 71.8 Upstream Bit Imne (%) Storage Bay Dist (m) Storage Bay Dist (m) Storage Bit Time (%)
Quening Penalty (veh)

Intersection: 5: Fry Crescent (East) & Aspen Springs Drive

Movement	8	SB B	
Directions Served	¥	H.	
Maximum Queue (m)	9.1	0.6	
Average Queue (m)	1.3	3.7	
95th Queue (m)	9.9	10.7	
Link Distance (m)	65.2	70.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Queuing and Blocking Report <Total> 2024 Weekday PM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

Movement	EB	NB	SB	
Directions Served	LTR	LTR	LTR	
Maximum Queue (m)	8.7	8.8	9.1	
Average Queue (m)	1.2	6.2	2.6	
95th Queue (m)	6.3	12.7	9.2	
Link Distance (m)	126.5	58.9	56.9	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

Movement	EB	s SB
Directions Served	П	
Maximum Queue (m)	22.5	
Average Queue (m)	8.9	10.1
95th Queue (m)	21.1	18.8
Link Distance (m)	76.0	7.07
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

Movement	æ	EB SB	
Directions Served	œ	R TR	
Maximum Queue (m)	9.0	.0 64.5	
Average Queue (m)	5.6	.6 22.5	
95th Queue (m)	9.5	1.2 66.8	
Link Distance (m)	63.3	.3 63.4	
Upstream Blk Time (%)		0	
Queuing Penalty (veh)		က	
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 2466

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Queuing and Blocking Report CTotal> 2029 Weekday AM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 1: Bowmanville Avenue & Highway 2

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	_	_	⊢	œ	٦	⊢	⊢	_	_	⊢	_	⊢
Maximum Queue (m)	52.7	84.0	81.2	44.2	71.6	89.3	108.4	69.3	53.4	51.2	26.8	83.1
Average Queue (m)	29.8	65.2	9.69	6.3	43.7	9.79	79.4	47.2	27.1	24.2	5.1	49.0
95th Queue (m)	48.9	88.8	9.87	31.8	72.9	92.4	103.3	2.69	51.5	47.1	20.5	9.79
Link Distance (m)		365.0	365.0			601.6	9.109		361.9	361.9		376.1
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			20.0	100.0			85.0			25.0	
Storage Blk Time (%)		-	13	0			28			~		4
Queuing Penalty (veh)		-	98	0			20			-		_

Intersection: 1: Bowmanville Avenue & Highway 2

Movement	SB	SB	
Directions Served	⊢	Ж	
Maximum Queue (m)	73.3	49.8	
Average Queue (m)	47.6	21.9	
95th Queue (m)	68.7	50.8	
Link Distance (m)	376.1		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		50.0	
Storage Blk Time (%)	2	0	
Queuing Penalty (veh)	15	_	

Intersection: 2: Bowmanville Avenue & Aspen Springs Drive

	B SB SB	Т	64.8 42.8	.0 33.3 24.0 13.4	62.1 43.0	.0 108.3 108.3			0.09		
	NB NB			14.1 15.0	27.4 22.	249.0 249.0				2	0
	9	٦	28.8	21.8	27.4				25.0	7	ע
	8	2	53.3	23.7	20.8	53.3	0	0		0	c
i	EB	_	49.3	34.8	46.7		4	0	100.0	4	יכ
	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 (%)	Orienting Penalty (veh)

Queuing and Blocking Report <Total> 2029 Weekday AM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access

SB	œ	13.5	1.9	9.7				0.09		
SB	_	32.9	10.8	30.0	249.0					
SB	⊢	38.9	18.3	45.9	249.0				2	0
NB	TR	39.0	11.6	36.2	647.8					
NB	-	33.8	18.4	38.8	647.8					
NB	_	14.1	4.3	13.1				0.09		
WB	LTR	8.2	9.0	2.9	73.4					
EB	~	12.5	6.7	13.1				10.0	2	0
EB	ᄓ	13.2	5.5	12.7	108.8				4	2
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: 4: Bonnycastle Drive & Aspen Springs Drive

Movement	WB	s NB
Directions Served	L	. LR
Maximum Queue (m)	15.6	5 21.5
Average Queue (m)	0.9	10.7
95th Queue (m)	15.2	18.0
Link Distance (m)	76.0	71.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Fry Crescent (East) & Aspen Springs Drive

Movement	NB
Directions Served	LR
Maximum Queue (m)	8.9
Average Queue (m)	6.2
95th Queue (m)	12.7
Link Distance (m)	70.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

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Queuing and Blocking Report CTotal> 2029 Weekday AM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

Movement	8	8 R	SB	
Directions Served	LTR	LTR	LTR	
Maximum Queue (m)	9.8	8.7	14.9	
Average Queue (m)	1.2	3.0	8.5	
95th Queue (m)	5.9	0.6	12.1	
Link Distance (m)	126.5	58.9	56.9	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

Movement	EB	SB	
Directions Served		R	
Maximum Queue (m)	15.2	12.7	
Average Queue (m)	0.0	8.9	
95th Queue (m)	0.0	10.8	
Link Distance (m)	76.0	75.4	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

Movement	EB	
Directions Served	8	
Aaximum Queue (m)	9.3	
Average Queue (m)	5.2	
35th Queue (m)	12.5	
ink Distance (m)	58.0	
Jpstream Blk Time (%)		
λueuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 89

Proposed Residental Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Queuing and Blocking Report CTotal> 2029 Weekday PM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 1: Bowmanville Avenue & Highway 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	BB	NB	NB	NB
Directions Served	_	⊢	⊢	œ	_	⊢	⊢	œ	_	⊢	⊢	2
Maximum Queue (m)	179.9	384.2	380.8	100.0	164.9	192.1	180.4	115.0	150.0	330.9	284.4	38.0
Average Queue (m)	179.9	380.0	377.1	94.8	127.3	132.3	133.5	65.0	149.9	250.7	181.9	10.3
95th Queue (m)	179.9	385.6	381.3	114.8	175.9	207.7	198.8	157.8	150.0	340.6	343.4	37.4
Link Distance (m)		365.0	365.0			601.6	601.6			361.8	361.8	
Upstream Blk Time (%)		75	22									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (m)	80.0			20.0	100.0			20.0	85.0			50.0
Storage Blk Time (%)	92	88	26	4	88	30	49		100		0	
Queuing Penalty (veh)	640	126	220	53	200	61	40		272		0	

Intersection: 1: Bowmanville Avenue & Highway 2

Movement	SB	SB	SB	SB	
Directions Served	٦	⊢	⊢	R	
Maximum Queue (m)	33.9	70.4	0.77	44.8	
Average Queue (m)	23.1	50.5	45.9	15.7	
95th Queue (m)	33.9	8.97	74.4	35.4	
Link Distance (m)		340.9	340.9		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	22.0			50.0	
Storage Blk Time (%)		2	က	0	
Queuing Penalty (veh)		က	7	0	

Intersection: 2: Bowmanville Avenue & Aspen Springs Drive

Movement	Œ	H	N N	E N	N N	ac.	S.	as:
Directions Served		~	-	⊢	F	F	ļ⊢	2
Maximum Queue (m)	53.1	53.5	71.6	60.1	77.0	48.0	46.4	28.8
Average Queue (m)	33.4	31.4	35.5	33.0	41.6	34.8	16.3	15.3
95th Queue (m)	55.3	63.9	63.0	59.1	79.5	56.1	40.9	27.6
Link Distance (m)		53.5		249.0	249.0	108.4	108.4	
Upstream Blk Time (%)	0	-						
Queuing Penalty (veh)	0	2						
Storage Bay Dist (m)	100.0		25.0					0.09
Storage Blk Time (%)	0	-	54	တ				
Queuing Penalty (veh)	0	4	107	15				

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Queuing and Blocking Report CTotal> 2029 Weekday PM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 3: Bowmanville Avenue & Hartwell Avenue/Existing Condo Access

Movement	EB	EB	WB	BB	BB	NB	SB	SB	SB	SB	
Directions Served	ᆸ	œ	LTR	٦	⊢	TK	_	⊢	_	22	
Maximum Queue (m)	13.8	12.3	7.7	40.1	81.6	106.4	0.6	77.2	86.4	8.0	
Average Queue (m)	0.9	5.2	[18.4	45.4	51.7	3.3	36.7	43.1	2.3	
95th Queue (m)	13.3	11.3	9.9	38.3	74.2	91.0	8.6	9.57	81.7	8.2	
Link Distance (m)	108.8		73.4		647.8	647.8		249.0	249.0		
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)		10.0		0.09			20.0			0.09	
Storage Blk Time (%)	4	2			4			17	က		
Queuing Penalty (veh)	က	-			က			_	~		

Intersection: 4: Bonnycastle Drive & Aspen Springs Drive

NB	LR	15.7	10.0	13.8	71.8					
WB NI	LT LI	9.2 15.	3.9 10.	11.4 13.	76.0 71.					
Movement	Directions Served	Maximum Queue (m) 9	Average Queue (m)	95th Queue (m) 11	Link Distance (m) 76	Upstream Blk Time (%)	Queuing Penalty (veh)	Storage Bay Dist (m)	Storage Blk Time (%)	Queuing Penalty (veh)

Intersection: 5: Fry Crescent (East) & Aspen Springs Drive

Movement	WB	乮	
Directions Served	그	R	
Maximum Queue (m)	9.5	8.5	
Average Queue (m)	1.3	1.2	
95th Queue (m)	6.7	6.1	
Link Distance (m)	74.6	70.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

Queuing and Blocking Report <Total> 2029 Weekday PM Peak Hour Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON 01/24/2022

Intersection: 6: Fry Crescent (West)/Existing Condo Access & Aspen Springs Drive

Movement	EB	WB	NB	SB	
Directions Served	LTR	LTR		LTR	
Maximum Queue (m)	9.8	21.6	9.1	9.0	
Average Queue (m)	1.2	4.2	2.0	6.2	
95th Queue (m)	6.2	16.8	12.1	12.6	
Link Distance (m)	126.5	65.2	58.9	56.9	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Aspen Springs Drive & 10 Aspen Springs Drive Access

Movement	EB	B SB	
Directions Served	П	T LR	
Maximum Queue (m)	9.8		
Average Queue (m)	2.5	5 10.1	
95th Queue (m)	8.9	9 19.0	
Link Distance (m)	76.0	7.07 0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Bowmanville Avenue & Shared Site/Metrolinx Laneway

Movement	EB
Directions Served	В.
Maximum Queue (m)	8.5
Average Queue (m)	1.2
95th Queue (m)	6.1
Link Distance (m)	57.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary
Network wide Queuing Penalty. 1738

Proposed Residential Development, 10 Aspen Springs Drive, Bowmanville, ON Trans-Plan

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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.	$> 25.0 \text{ and } \leq 40.0$
E	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 \leq 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

Municipality of Clarington Zoning By-law 84-63, Excerpts

Parking Space Re	equirement Table
Type or nature of use	Minimum off street parking
	requirement
Post Office, Museum, Art Gallery, Public	1 parking space for each 40 square
Library	metres of gross floor area.
Residential (i) Apartment, Four-plex, Six-plex or Converted Dwelling House	Amended by By-law 85-51 Amended by By-law 2012-035 Replaced by By-Law 2015-062 1 Bedroom Apartment - 1 space per unit 2 Bedroom Apartment - 1.25 spaces per unit Apartment containing 3 or more bedrooms, four-plex, converted dwelling or triplex house - 1.5 spaces per unit Plus 0.25 visitor spaces per dwelling, 10% of which are to be accessible parking spaces.
(ii) Boarding or Rooming House	Replaced by By-Law 2015-062 1 parking space for each dwelling unit plus 1 parking space per room provided for separate living accommodation.
(iii) Mobile Home Park	(a) 2 parking spaces for each Mobile Home site and 1 visitor's parking space for each 4 Mobile Home sites.
	(b) 1 parking space for each 28 square metres of total floor area for all accessory commercial uses within the community hall.
	(c) 1 parking space for each 12 square metres of total floor area for all uses other than accessory commercial uses within the community hall.

Parking Space Requirement Table			
Type or nature of use	Minimum off street parking requirement		
Schools; Public and/or Private	The greater of:		
(i) Elementary	 (a) 1 and one-half parking spaces per classroom; or (b) 1 parking space per 10 square metres of floor area in the general purpose room; or (c) 1 parking space per 10 square metres of floor area in the auditorium 		
(ii) Secondary	The greater of: (a) 4 parking spaces per classroom; or (b) 1 parking space per 10 square metres of floor area in the general purpose room; or		
	(c) 1 parking space per 10 square metres of floor area in the auditorium		
Shopping Centre	1 parking space for each 20 square metres of total leasable floor area.		
Undertaking Establishment	1 parking space for each five seating spaces or fraction thereof with a minimum of ten parking spaces.		
Uses permitted by this By-law other than those listed in this table	1 parking space per 30 square metres of total floor area.		
Vacation Farm Establishment	Added By By-law 85-44 1 parking space per guest room		

Added by By-Law 99-170

f. Private Garage or Carport

Where a private garage or carport provides one of the required parking spaces for a single detached, semi-detached or townhouse dwelling unit, the minimum area inside the private garage or carport shall be 18.58 square metres and the minimum width shall be 3.0 metres. This provision shall apply to all lots registered after January 1, 2000.

entering upon or making use of the said premises, from time to time, parking spaces and areas accordingly.

Added by By-law 99-169 Deleted by By-law 2006-046 Replaced by By-Law 2015-062

b. Accessible Parking Spaces

i) Each accessible parking space shall be a minimum 4.5 metres wide and 5.7 metres long. When paired, the width can be reduced to 3.4 metres, provided a 1.5 metre access aisle is located between the paired spaces.

Added by By-Law 2006-046

ii) Accessible Parking Space Requirement Table

Accessible Parking Space Requirement Table			
Number of Parking Spaces Required By	Accessible Persons Parking Spaces		
Parking Space Requirement Table 3.16			
1 to 25	1		
26 to 50	2		
51 to 75	3		
76 to 100	4		
101 to 150	5		
151 to 200	6		
201 to 300	7		
301 to 400	8		
401 to 500	9		
501 to 1000 2% of total			
Greater than 1000	21 spaces plus 1 space for every		
	additional 100 spaces or part thereof		
	over 1000 parking spaces		

Nursing homes, retirement homes, hospitals, medical and dental clinics shall provide twice the number of Accessible Parking Spaces as shown in the column above.

c. Parking Space Sizes

Replaced by By-Law 2015-062

- i) Each parking space shall be a minimum of 5.7 metres by 2.75 metres.
- ii) Where the two outdoor parking spaces for single detached, semidetached and/or townhouse units are provided side by side the

- combined minimum width of the two spaces may be reduced to $4.6\,$ metres.
- iii) Parking spaces provided in the front yard for detached, semidetached and/or townhouse units must not reduce the minimum landscaped open space within the front yard below 30 percent/
- iv) Parking space size perpendicular to a landscaping strip having a minimum width of 3.0 metres may not be reduced in size to 5.2 metres in length by 2.75 metres in width.

d. Parking Aisle Requirements

Each aisle shall be a minimum width of 6.0 metres for two-way traffic and 4.5 metres for one-way traffic.

e. Parking Off-Site

Notwithstanding Section 3.16 a. where parking spaces are provided in a location other than on the same lot as the use requiring such spaces, they shall be located not more than 150 metres from the same lot, and shall be located within the same zone as the said lot.

Parking Space Requirement Table			
Type or nature of use	Minimum off street parking		
	requirement		
Amended by By-law 86-40 Assembly Hall, Auction Room,	The greater of:		
Auditorium, Arena, Community Centre, Place of Entertainment, Place of Worship, Private Club or other similar	a. 1 parking space per 5 fixed seats or 3 metres of bench seating or portion thereof; or		
places of assembly herein	b. 1 parking space per 9 square metres of gross floor area; or		
	c. 1 parking space for each 4 persons that may be legally accommodated at any one time.		

Bu	ilding Elements	MU1	MU2	MU3
Amount of transparent glazing within the business establishment street façade		50%	50%	50%
Location of	Residential Entrance	Within a street façade; or Along the side of the building but no more than half the width of the building from a street façade.		
Entrance	Non-Residential Entrance	business loc	ne public entra ated on the firs d within a stree	t floor shall be
Maximum size of non-residential units (square metres)		600	600	No limit
Maximum amount of non-residential floor space per property (square metres)		3,000	3,000	No limit
Lands	cape Requirements	MU1	MU2	MU3
Landscaped (Open Space (minimum)	15%	15%	15%
	anting strip abutting an ential zone (metres)	3.0	3.0	3.0
Parl	king and Loading	MU1	MU2	MU3
Minimum nu (4 metres x 9	mber of loading spaces metres)	1	1	1
Minimum distance between a parking space and a building where a walkway is located beside the building (metres)		2.5	2.5	2.5
Minimum number of parking spaces based on the gross floor area of bank, professional office, retail commercial establishments and personal service shop		1 for every 40 m ²	1 for every 40 m ²	1 for every 40 m ²
Minimum number of parking spaces per apartment dwelling unit – (including visitor parking spaces)		1.0	1.0	1.0

16A.5 Additional Regulations in the Mixed-Use Zone

a. Notwithstanding Section 3.7a., no new uses may be established on a lot that contains less than the minimum required lot area and frontage.



TAC Guidelines, Excerpts



contrasting construction materials across the driveway assists in defining a pedestrian crossing zone to the driver.

The radius of the curb return style or the flare required to accommodate an equivalent turning radius is meaningful only when considered in combination with the width of the driveway throat.

8.9.5 WIDTH

The width of a two-way driveway is measured parallel to the road since turns are generally oriented at right angles. The dimension is typically measured beyond any entrance flare. The width of one-way driveways, which are normally skewed, is measured perpendicular to the driveway.

It is desirable to state suitable driveway widths as a design domain. Dimensions at the lower end of the domain are intended to define the minimum spatial and operational requirements. The maximum dimensions assist in preventing driveways from becoming unwieldy with large paved areas and poorly defined travel paths. The most appropriate width of a driveway is determined in combination with the radius of the curb return (or the design vehicle turning radius and flare dimensions, if a straight flared design is adopted), the desired operating characteristics such as turning speed, and physical limitations which may exist at the site.

Table 8.9.1 provides a typical design domain for driveway throat widths and radii for both two-way and one-way operation. In locations where special vehicles such as long combination vehicles or similar vehicles are present, wider driveway throat dimensions or larger radii may be required.

Land Use Dimension (m) Residential Commercial Industrial Width (W) $3.0^{a} - 4.3$ $4.5^{a} - 7.5$ 5.0 - 9.0- One way $7.2^{a} - 12.0^{b}$ $9.0^{a} - 15.0^{b}$ $2.0^{a} - 7.3$ - Two way 3.0 - 4.54.5 - 12.0Right turn radius (R)

Table 8.9.1: Typical Driveway Dimensions

Notes:

- Minimum widths are normally used with radii at or near the upper end of the specified range
- Increased widths may be considered for capacity purposes; where up to 3 exit lanes and 2 entry lanes are employed, 17.0 m is the maximum width exclusive of any median
- c. Applicable to driveways only, not road intersections

8.9.6 ANGLE OF DRIVEWAY

Two-way driveways normally intersect the roadway curb at or near 90°. However, a minimum acute angle of 70°, as measured from the roadway curb line, normally operates in an acceptable manner.

For one-way driveways, where a skewed intersection assists in efficient traffic operation, skews in the range of 45° to 60° are appropriate in industrial areas where pedestrians are infrequent. For commercial and residential land uses, where pedestrian volumes are normally moderate to high, minimum skew angles in the range of 60° to 70° are preferred to improve the driver's visibility of the pedestrian, and vice versa, and to encourage lower turning speeds.



collector roadways, while a 3.0 m minimum is the suggested dimension for both commercial and industrial land uses. If there is a need to provide parallel parking between driveways along the roadway, a spacing of 6.0 to 7.5 m is suitable. If the spacing provided is in the range of 3.0 to 5.0 m, the space may appear inviting to a driver wishing to park, but if used, severely hampers the operation of the driveways by reducing sight lines and interfering with the turning paths of the vehicles.

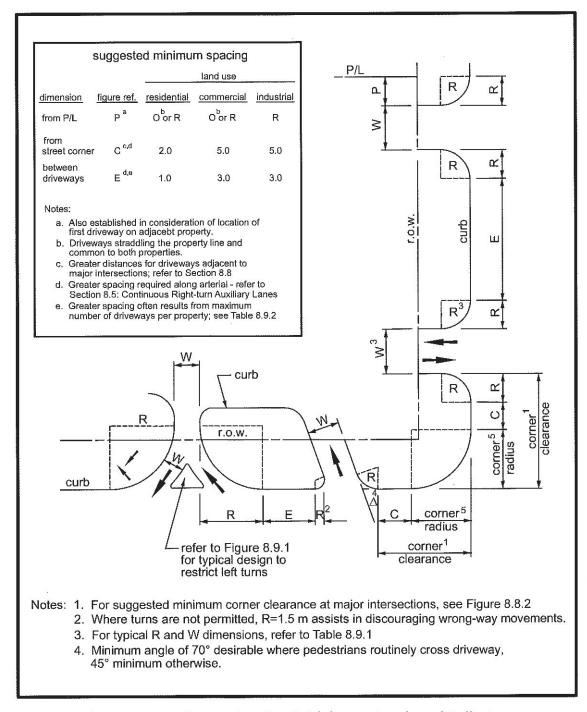


Figure 8.9.2: Driveway Spacing Guidelines – Locals and Collectors

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