



January 10, 2022

Malone Given Parsons Ltd.
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Attention: Mr. Lincoln Lo, MCIP, RPP, PLE
Associate

**Shining Hill Estates Subdivision, Phase 3, Town of Aurora
Transportation Mobility Plan Addendum**

Dear Mr. Lo:

This letter has been prepared as an addendum to Dillon's March 2021 Transportation Mobility Plan study, prepared in support of the Draft Plan of Subdivision application for the above noted development. The letter addresses comments provided by the Region of York and the Town of Aurora on the original submission, and also updates the analyses to reflect subsequent changes to the proposed site plan.

The updated draft plan of subdivision for Phase 3 is provided in **Attachment 1**.

1.0 Agency Comments on March 2021 TMP

1.1 York Region

1.1.1 Transportation Planning Comments

Comment: *The Applicant is required to provide a multi-use path facility along St. John's Sideroad from the western limit of the Shining Hill development Phase 2, easterly to the Yonge Street and St John's Sideroad intersection. This facility will provide both future residents of the Phase 2 and the subject application a facility to safely travel to the intersection of Yonge Street and St John's Sideroad. The applicant shall provide a detailed design.*

Walking and Cycling Connectivity to the intersection of Yonge Street and St. John's Side Road will connect to the existing facilities on the east of Yonge Street.

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It should also be noted that based on the existing transit routes available in the area (provided in Figure 3 of the Transportation Study) that the nearest routes are accessed from the intersection of Yonge Street and St John's Sideroad.

The applicant commits to providing active transportation connectivity along St. John's Sideroad between the subject site and Yonge Street. The project team have undertaken initial field and desktop investigations of constraints and opportunities along the corridor. At this time it is possible that a sidewalk will be proposed (rather than a multi-use path), due to the constraints closer to Yonge Street (the limited width along the north side of the bridge over Tannery Creek; the proximity of the creek to the roadway farther to the west), the relatively low active transportation demand, and the temporary nature of the facilities (i.e., would be replaced when St. John's Sideroad is widened).

It is anticipated that a functional design of this facility will be included in future engineering submissions for the subject site.

In the longer term, it is anticipated that a permanent sidewalk and/or multi-use path would be part of the St. John's Sideroad widening.

Comment: *As a minimum requirement York Region will require the applicant to make physical modifications to widen the eastbound approach of St John's Sideroad at Yonge Street and to provide a multi-use path. As such, it is recommended that a comprehensive design provided to extend the eastbound left-turn and right-turns lanes. This will provide physical capacity for interim growth prior to the widening of St. John's Sideroad and will reduce the likelihood that queues will extend through the Willow Farm Lane intersection.*

Table 11 did not include a summary for the Eastbound Right-Turn lane at the intersection of Yonge Street and St John's Side Road. Table 11 shall be updated accordingly. The design shall be provided to accommodate the queue identified by the Transportation analysis.

Based on the results of Table 11, under the 2028 Future Total analysis, the Eastbound Left-Turns queues (87m) at the intersection of Yonge Street and St John's Sideroad will exceed the available storage of approximately 65m. A preliminary design shall be provided to demonstrate the proposed improvements to the eastbound approach.



A preliminary design has been prepared to illustrate a widening of St. John's Sideroad on the eastbound approach to Yonge Street. The eastbound left turn lane and the second eastbound through lane have been lengthened to the extent feasible while maintaining reasonable taper lengths, avoiding the culvert leading to Tannery Creek, and minimizing impacts to the environmental lands on the south side of the road. The proposed lane dimensions are as follows:

- Eastbound left turn lane:
 - 61 m taper
 - 80 m storage
- Eastbound second through lane:
 - 50 m taper
 - 90 m storage

The left turn taper reflects a 34:1 taper ratio (for a 1.8 m through lane displacement). This taper ratio is consistent with TAC guidelines for left turn tapers (ranging from 15:1 to 36:1 for a 60 km/h design speed, or from 15:1 to 42:1 for a 70 km/h design speed).

The second through lane will double as a right turn lane, and the taper reflects Regional guidelines for a 60 km/h posted speed limit (see York Region standard drawing DS-105).

These modifications will provide additional capacity on the eastbound approach as interim mitigation until St. John's Sideroad is widened.

Comment: The Transportation Study concludes that traffic signals are not warranted at St. John's Sideroad/Willow Farm Lane, therefore introduction of traffic signals will need to be approved by Regional Council. Please note that, if traffic signals are approved, that all construction costs and 10-year maintenance will be borne by the applicant.

The Applicant will be required to provide an intersection design that demonstrates that the intersection will provide dedicated turn lanes, and pedestrian/cycling facilities on the north side of St John's Side Road. The intersection, pedestrian/cycling facilities shall be designed to Regional Standards. Given the westbound through volumes, the design shall provide two westbound through lanes, a westbound through and a through-right turn lane which continues through the intersection. The through-right turn lane shall taper back to one lane on the west side of Willow Farm Lane.



It should be noted that there are existing sightline issues at this intersection. Therefore, the applicant shall address all of the sightline issues for this proposed intersection. This includes the provision of 15 m x 15 m daylight triangles.

Traffic signal warrants are discussed in **Section 2.5**. Traffic signals are anticipated to be warranted (on the basis of the OTM Book 12 four-hour warrant) in approximately 2025 (i.e., by the third year of operations at the proposed school, depending on the pace of enrolment increases).

A conceptual design has been prepared of a roadway widening to accommodate additional turning lanes for the new north leg:

- Westbound right turn lane:
 - 30 m parallel lane
 - 50 m taper
- Eastbound left turn lane:
 - 30 m storage
 - 30 m parallel lane
 - 100 m taper

The parallel lane and taper lengths are as per York Region standard drawing DS-103 and reflect the 60 km/h posted speed limit. The eastbound left turn storage length (not including parallel lane) is approximately comparable to the projected AM peak hour 95th percentile queue at the 2028 horizon (37 m), and exceeds the projected queues under the other traffic scenarios (12 to 13 m).

An exclusive westbound right turn lane is proposed rather than a shared through/right turn lane. A second through lane is not required from a capacity perspective, and the limited length upstream and downstream from the intersection would yield limited benefits in terms of capacity.

At this point the intersection design does not include details related to crosswalks or signal infrastructure (poles, signal heads, detection, controller cabinet, etc.). It is anticipated that these details would be further developed pending the Region's agreement in principle to the proposed alignment, and as details about sidewalk / multi-use trail locations are developed.

A sidewalk or multi-use path will be provided on the north side of the roadway. West of Street "A", a sidewalk is proposed rather than a multi-use path, since it would connect to a sidewalk being constructed as part of Phase 2. East of Street "A", it is

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anticipated that a sidewalk will be provided rather than a multi-use trail (see discussion in **Section 1.1.1**).

15 m x 15 m daylight triangles will be provided on the north leg of the intersection. These are shown in the proposed draft plan.

No changes to the vertical alignment of St. John's Sideroad are proposed. The vertical alignment of the road is an existing condition at an existing intersection and is not affected by the construction of an additional leg on the north side of the intersection. The proposed installation of traffic signals will mitigate sightline concerns for motorists turning left onto St. John's Sideroad. In the longer term, the St. John's Sideroad widening project presents an opportunity to adjust the roadway profile.

Comment: *The applicant is advised that no direct vehicular access will be permitted to St. John's Sideroad from blocks 1, 80-88, 92 or 94.*

Acknowledged.

1.1.2 Sustainable Mobility

Comment: *A TDM Checklist shall be provided as per the Region's Transportation Mobility Plan Guidelines for New Developments (Table 13) and shall include a TDM Communication Strategy Outreach which shall identify a physical location for transit incentive distribution and sustainable transportation information. An associated cost of a rental venue for the outreach shall be provided if an on-site space is not available (e.g. condo lobby, meeting room) this can include a local community centre – a line item estimate of \$800 is recommended. The applicant is responsible for the coordination and for providing a venue for the distribution of incentives. Each event, approximately 4 hours of staff time, can serve approximately 150 residential units. The applicant shall coordinate specific event details with York Region/York Region Transit staff allowing a minimum of 2 months notice.*

The March 2021 TMP included recommendations on TDM measures. Given that the school generates a significant portion of the total traffic volumes, those recommendations focused on the school. These have been identified as recommendations (rather than commitments) given that the school is a separate party and applicant that will be the subject of a separate site plan application.

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The applicant can commit to TDM outreach measures for the residential component of the development. This is outlined in **Table 1**. The development includes 108 residential units. It is proposed that one outreach session be held, given that the unit count is reasonably close to the target number of units per session. Further arrangements can be made closer to occupancy.

Table 1: Proposed Transportation Demand Management Measures

Measure	Approximate cost	Responsibility	Milestone
Information meeting for residents	\$800	Applicant (organization) Region (attendance)	Following full occupancy
Distribution of pre-loaded PRESTO cards	TBD	Region	Part of information meeting

1.1.3 Traffic Signal Operations

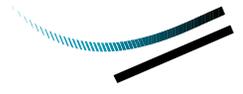
Comment: *Signal Splits and Phasing diagrams for the Bathurst/St. John's intersection should not have grey bands. The splits should be updated to address this.*

The grey bands are intentional and reflect the existing signal timings and operations. As an example, under the existing timings, the eastbound and westbound maximum green times are the same (30 seconds), while the eastbound left turn phase can reach up to 16 seconds in length and does not have a corresponding westbound left turn phase. This results in a grey band of unallocated time in the ring serving the eastbound phase. Increasing the eastbound left turn phase by 16 seconds (resulting in the maximum green time being increased to 46 seconds) would remove the grey band, but would affect the operation of the intersection. (Under that scenario, if the eastbound left turn phase was skipped, the eastbound phase would still have a maximum green time of 46 seconds, rather than the correct 30 seconds.)

Comment: *The minimum initial of 7 seconds for through movements used in the analysis for the Yonge/St. John's intersection is not consistent with the existing timing plans nor the Region's traffic signal operation standards. This should also be updated.*

Agreed. The minimum initial intervals have been adjusted in the revised total future analyses documented in **Section 2.4.1**. The revision does not affect the analysis results because the volumes are high enough that the minimum initial interval is always exceeded, even with the adjustment in place.

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Comment: *Regarding the analysis for the proposed signalized intersection of Willow Farm Lane/Street 'A'/St. John's Sideroad:*

- a) Minimum initial of 5 seconds is not consistent with Region's signal operation standards.*
- b) Flashing Don't Walk time does not appear sufficient to accommodate pedestrian crossing in N-S direction.*

a) Agreed. The minimum initial interval has been increased to 10 seconds north/south and 20 seconds east/west.

b) The flashing don't walk (FDW) intervals were reviewed and changed as follows:

- North-south: 23 m @ 1.2 m/s = 20 s
- East-west: 18 m @ 1.2 m/s = 14 s

These timings are based on the FDW interval accommodating the full crossing at a speed of 1.2 m/s (i.e., the pedestrian clearance interval does not extend into the amber / all-red intervals).

The north-south crossing distance is estimated based on the continuation of the sidewalk on the east side of Willow Farm Lane, measured from the southeast corner to the north side of the westbound left turn lane, then multiplied by two to account for the westbound through and right turn lane and the northeast corner radius. The east-west crossing distance is based on the de facto crosswalk location on the north side of the northbound stop bar (the east-west FDW intervals generally do not govern intersection operations to the same extent because the east-west phases are governed by traffic considerations rather than pedestrian timings).

The FDW intervals would need to be confirmed as the intersection design (including crosswalk locations and lengths) is developed in more detail.

1.1.4 Transit

Comment: Existing YRT transit services operate on Yonge Street vicinity of the subject lands. The applicant is advised to coordinate with the Town of Aurora to provide sidewalk facilities connecting from the internal road network to the Regional road network from Willow Farm Lane to Yonge Street.

See response to comments from Transportation Planning in **Section 1.1.1**.

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1.2 Town of Aurora

1.2.1 Transportation

Comment: A Pavement Marking and Signage Plan must be submitted for the proposed development, please note the following general requirements:

- a) The Pavement Marking and Signage Plan must be prepared provided in accordance to the Town guidelines;*
- b) New signs should be installed on the proposed utility / street light poles whenever possible in order to minimize the number of new u-channel; and,*
- c) All signage must be installed in accordance to the applicable OTM Book standards.*

A pavement marking and signage plan will be prepared in future submissions once the roadway rights-of-way have been finalized, as part of the detailed design of the roadway and other infrastructure (e.g., street light pole locations; driveway locations).

Stop signs will be installed on the stem of all “T” intersections, and on Streets “B” and “D” at the intersection with Street “A”.

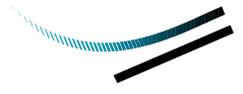
Parking locations will be reviewed and confirmed as the roadway design is developed in more detail and as driveway locations are identified.

Comment: The applicant must obtain confirmation from Building Division that the proposed development satisfy the traffic related Zoning By-law requirements, including but not limited to: parking supply, parking space dimensions, drive aisle widths and loading space requirements.

The residential portion no longer includes the high-density block and all residential units are anticipated to be ground related, street-fronting units (single detached; townhouses). As such, zoning requirements related to parking and loading for the high-density block are no longer expected to be applicable.

The proposed school intends to provide parking and loading in accordance with Zoning By-Law requirements. This will be confirmed in the site plan application, which is being prepared and submitted separately.





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Comment: Sidewalk must be provided on the north side of St. John's Sideroad from the westerly property limit to Yonge Street.

See response to comments from Transportation Planning in **Section 1.1.1**.

Comment: Active transportation elements (i.e. pedestrian and cyclist facilities) must be provided for the proposed development.

The proposed right-of-way widths allow for active transportation elements as follows:

- Street "A": sidewalk on one side of the road; multi-use path on the other side of the road
- Local streets: sidewalk on one side of the road

Schematic cross-sections are included in the civil engineering package.

A pedestrian crossing treatment across Street "A" north of Streets "B"/"D" may be considered in future submissions as design details are prepared. It is noted that a pedestrian crossing in that general location would not be needed from a traffic perspective until Street "A" and the subdivision are extended into Newmarket.

Comment: Sightline Assessment must be completed for the proposed Street B (both north and south legs), Street C and Lane A, at the proposed Street A, using the following TAC calculations:

$$ISD = 0.278 V_{major} t_g$$

Where:

ISD = intersection sight distance (length of the leg of sight triangle along the major road) (m)

V_{major} = design speed of the major road (km/h)

t_g = time gap for minor road vehicle to enter the major road (s)

The time gap (for Case B1, left turn from stop) is 7.5 seconds for passenger car and 9.5 seconds for single-unit truck.

For left turns onto two-lane highways with more than two lanes, add 0.5 seconds for passenger cars and 0.7 seconds for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.

Acceptable mitigation measures must be provided to the satisfaction of Engineering Division, where required.

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Sightline assessments have been undertaken for the local street intersections along Street "A". The Town's comment describes the AASHTO intersection sight distance methodology, as outlined in TAC's *Geometric Design Guide for Canadian Roads* (2017 edition; see Section 9.9.2.3). The design speed of Street "A" is approximately 50 km/h (controlled by the 115- to 125-metre radius curves to the north and south). The intersection sight distance for a 50 km/h design speed is as follows:

- Case B1 (left turn from stop, TAC Table 9.9.4): 105 m
- Case B2 (right turn from the minor road, TAC Table 9.9.6): 95 m

(For reference purposes, the sight lines for 40 km/h design speed are 85 m for Case B1 and 75 m for Case B2.)

The sight lines were tested against the approximate road geometry. The civil design of the internal roadways has not yet begun; for the purpose of the sight line assessment, approximate roadway and sidewalk locations were estimated based on typical roadway cross-sections. The sight line assessments are shown in **Attachment 2**. The assessment found the following:

- At the north intersection of Street "B" and Street "A", the sight line to the north is affected by the horizontal curve north of the intersection. The sight line does not cross the ROW limits, but could be affected in the event of a significant number of parked vehicles on the west side of the road. To improve sight lines, it is recommended that parking be accommodated on the outside of this curve.
- At the south intersection of Street "B" and Street "A", the sight line to the south is affected by the horizontal curve south of the intersection. The 50 km/h design speed sight line passes through private property and therefore could be blocked by a fence or other objects within the residential lot. However, the sight distance exceeds what would be required for a 40 km/h design speed. This is reasonable in this case because northbound motorists will have an average speed below 50 km/h in this section (having just completed a left or right turn from St. John's Sideroad). To further improve sight distance, it is recommended that parking be prohibited in the block between Streets "B" and "E".
- Similarly, at Street "E" and Street "A", the sight distance to the south is less than 105 m, because Street "E" is less than 105 metres north of St. John's Sideroad. The available sight distance extends south to the Street "A" and St. John's Sideroad intersection.
- Sufficient sight distance is available at the other intersections.



2.0 Analysis Updates

The total future analyses documented in the original TMP have been updated and revised to reflect subsequent changes to the site plan, as well as to address comments documented in **Section 1.0**.

2.1 Revisions to Plan of Subdivision

The proposed Draft Plan of Subdivision and the associated development yield have been revised since the original submission.

- 87 single detached homes are proposed along Street “A” and other local streets on the west side of the subdivision (reduced from 88).
- The 200-unit apartment block in the northeast area of the subdivision has been removed and replaced by 21 townhouses fronting a new public roadway (Street “D”).
- There are no changes to the proposed all-girls school (St. Anne’s School).

These changes result in a net reduction of 180 residential units. The updated draft plan is provided in **Attachment 1**.

2.2 Updated Trip Generation

Table 2 presents the number of vehicle trips anticipated to be generated by the residential component of the updated draft plan, compared to the previous version assessed in the March 2021 analyses.

Table 2: Updated Residential Trip Generation

	AM peak hour			PM peak hour		
	In	Out	Total	In	Out	Total
Single detached homes:						
Trip generation rate (per unit)	25%	75%	0.74	63%	37%	0.99
Trips generated (87 units)	17	48	65	54	32	86
Townhouses:						
Trip generation rate (per unit)	23%	77%	0.46	63%	37%	0.56
Trips generated (21 units)	2	8	10	8	4	12
Total trips:	19	56	75	62	36	98
March 2021 trip generation:	36	102	138	109	66	175
Change from March 2021:	-17	-46	-63	-47	-30	-77

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The proposed changes to the draft plan of subdivision are anticipated to reduce the forecasted site trips by 63 vehicle trips during the AM peak hour and 77 vehicle trips during the PM peak hour.

Table 3 presents the updated trip generation for the site overall, including the proposed girls school.

Table 3: Updated Total Site Trip Generation

	AM peak hour			PM peak hour		
	In	Out	Total	In	Out	Total
2023 horizon:						
Residential units	19	56	75	62	36	98
St. Anne's School (gross)	90	75	165	19	23	42
Reduction in SAC trips	-25	-25	-50	-6	-6	-12
Total (gross)	109	131	240	81	59	140
Total (net)	84	106	190	75	53	128
2028 horizon:						
Residential units	19	56	75	62	36	98
St. Anne's School	342	277	619	70	86	156
Reduction in SAC trips	-92	-92	-184	-23	-23	-46
Total (gross)	361	333	694	132	122	254
Total (net)	269	241	510	109	99	208

2.3 Intersection Traffic Volumes

Figure 1 illustrates the updated residential site traffic. **Figure 2** and **Figure 3** illustrate the updated total site traffic volumes (including both residential and school traffic) at the 2023 and 2028 horizons, respectively. **Figure 4** and **Figure 5** illustrate the updated total future traffic volumes at the 2023 and 2028 horizons, respectively.

Figure 1: Updated Site Traffic Volumes (Residential Component)

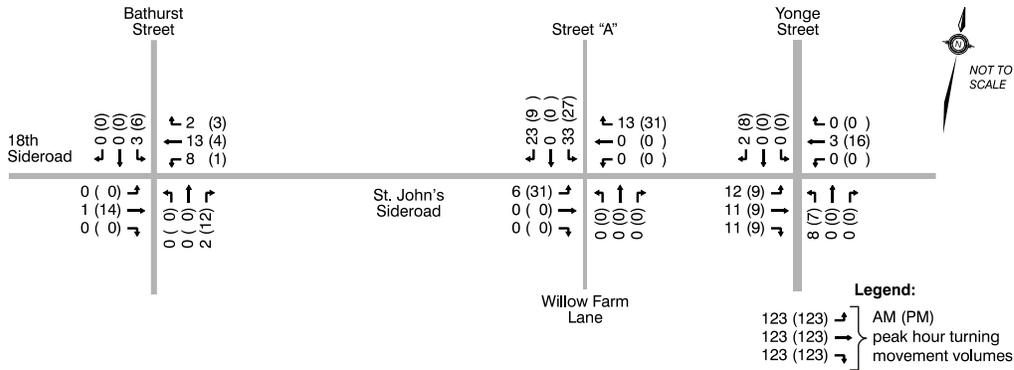


Figure 2: Updated Site Traffic Volumes (2023)

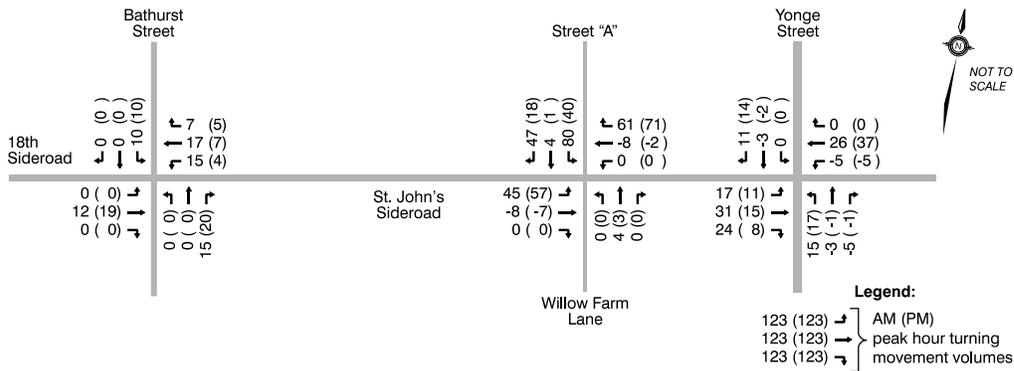


Figure 3: Updated Site Traffic Volumes (2028)

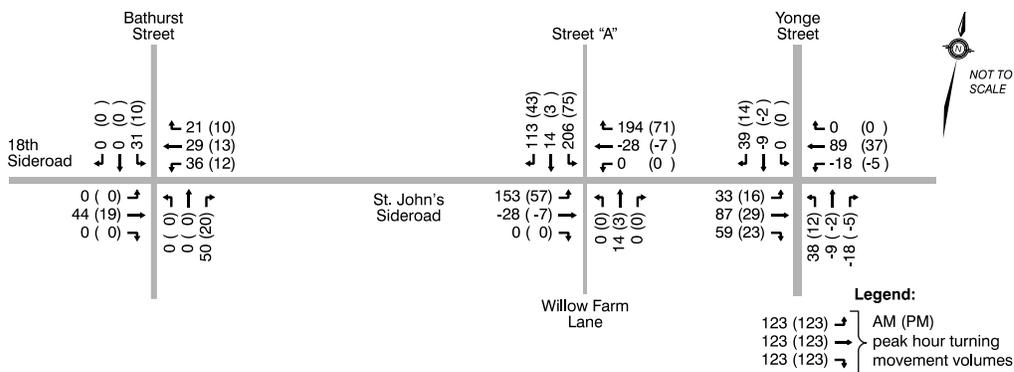


Figure 4: Updated Total Future Traffic Volumes (2023)

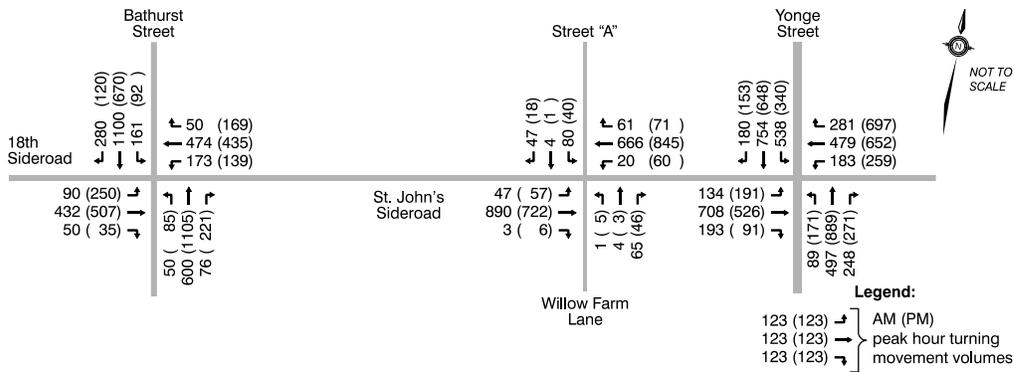
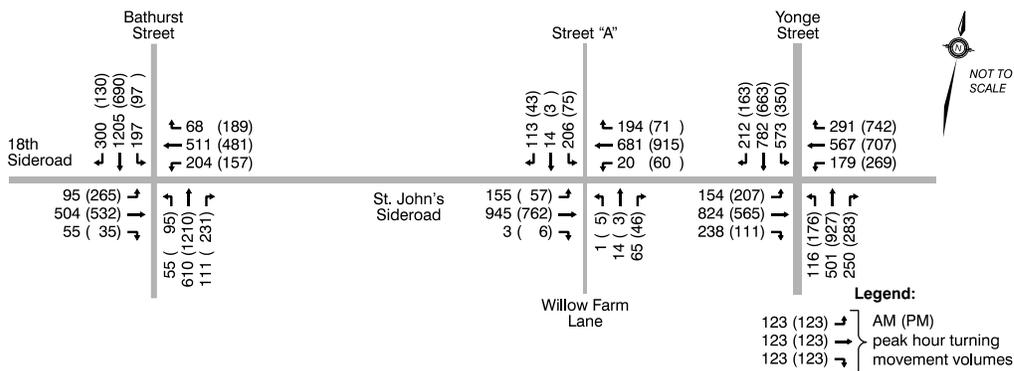


Figure 5: Updated Total Future Traffic Volumes (2028)



2.4 Updated Intersection Operations

The total future operations at all three intersections along St. John's Sideroad were updated to reflect the revised development yield and reduced trip generation. The analyses also reflect modified traffic signal parameters at the intersections at Willow Farm Lane and at Yonge Street, as described in **Section 1.1.3**.¹

¹ The existing and future background analyses at Yonge Street and St. John's Sideroad were not updated to reflect the revised minimum initial length. This parameter did not change the analysis results because the green intervals already exceeded the higher minimum interval length.

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2.4.1 St. John's Sideroad at Yonge Street

Table 4 presents the updated analysis results at St. John's Sideroad and Yonge Street.

Table 4: Total Future Intersection Operations, St. John's Sideroad at Yonge Street

Scenario:	Movement	AM peak hour				PM peak hour			
		v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
2023 total future	EB left	0.78	D	50.3	49	1.03	F	99.1	85
	EB through	1.20	F	140.9	270	0.71	D	39.2	120
	WB left	1.00	F	95.9	91	1.07	F	102	97
	WB through	0.90	E	62.0	202	1.09	F	103	266
	WB right	0.47	A	9.3	34	1.00	E	58.9	215
	NB left	0.67	E	66.9	51	0.93	F	92.8	90
	NB through	0.65	D	47.2	90	0.97	E	65.4	165
	NB right	0.50	B	19.4	52	0.45	A	9.6	32
	SB left	1.23	F	147.6	218	1.18	F	140.8	151
	SB through	0.54	B	15.8	47	0.45	C	24.4	76
SB right	0.26	A	0.9	0	0.22	A	3.9	13	
	Overall	—	E	72.2	—	—	E	65.3	—
2028 total future	EB left	1.02	F	106	80	1.11	F	125	96
	EB through	1.42	F	230	339	0.78	D	42.1	135
	WB left	0.98	F	89.4	87	1.24	F	164	118
	WB through	1.07	F	98.7	259	1.19	F	136	298
	WB right	0.51	B	13.4	47	1.07	E	79.7	242
	NB left	0.90	F	101	74	0.97	F	103	94
	NB through	0.66	D	47.4	91	1.01	E	74.7	176
	NB right	0.51	C	21.3	55	0.48	B	11.9	39
	SB left	1.32	F	184	242	1.21	F	153	157
	SB through	0.56	B	16.1	49	0.46	C	25.6	81
SB right	0.30	A	1.0	0	0.24	A	3.9	13	
	Overall	—	F	106	—	—	F	80.4	—

At the 2023 horizon, the overall level of service is anticipated to be LOS E. Several individual movements are expected to be near or above capacity, including most movements during the PM peak hour; as well, many movements are expected to operate at LOS E or F (whether due to capacity constraints or due to the long traffic signal cycle). Site traffic will contribute to some of these critical movements — particularly the eastbound through and left turn movements during the AM peak hour, and the eastbound left turn and westbound through movement during the PM peak hour — although most of these movements are already expected to be constrained without development of the site. These findings are generally similar to those in the March 2021 report; however, the reduced unit count has resulted in a minor reduction in overall intersection delay (approximately 2 to 3 seconds per vehicle).

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At the 2028 horizon, the overall level of service is anticipated to reach LOS F. Many individual movements will continue to be critical at this horizon. In particular, the eastbound through movement and southbound left turn movement are both expected to be significantly above capacity during the AM peak hour (particularly with the addition of school drop-off traffic), as are the southbound left turn and westbound approach during the PM peak hour. Again, these findings are generally similar to those in the March 2021 report; however, the reduced unit count has resulted in a minor reduction in overall intersection delay (approximately 2 to 3 seconds per vehicle).

Similar to the March 2021 analyses, traffic signal timing adjustments were tested to mitigate the anticipated capacity constraints under the projected future background and total future volumes. The following changes were applied, which are generally the same as applied to the March 2021 analyses:

- The pedestrian phases were changed to remove pedestrian recall on the east leg, so that pedestrians will need to press the pushbutton to call a walk signal. This will enable the northbound through phase interval to be reduced during the AM peak period and provide additional green time to the southbound left turn phase. While normally removing pedestrian recall would not be preferred, in this case the number of pedestrian crossings is very low (0 pedestrians observed in the east crosswalk during the AM peak hour; 1 pedestrian observed during the PM peak hour) and therefore the number of pedestrians affected would be minimal.
- A northbound left turn phase was added in the 2028 total future scenario during the AM and PM peak hours.
- Green times were adjusted on individual phases in conjunction with the other two changes noted above.

In addition to the signal timing mitigation described above, the analyses were adjusted to reflect the geometric modifications to the eastbound approach as described in **Section 1.1.1**. In the previous analyses, a lane utilization factor of 0.75 was applied to the eastbound through movement to reflect the limited storage in the second eastbound through lane that limits capacity during the latter portion of the eastbound green interval. The proposed roadway modifications will result in increased queuing capacity in the second eastbound through lane, which will allow the eastbound approach to operate at full capacity for a greater proportion of the green interval. To reflect the increased capacity, the eastbound lane utilization factor was increased to 0.85.

The updated analyses with these measures in place are presented in **Table 5**.

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Table 5: Mitigated Total Future Intersection Operations, St. John's Sideroad at Yonge Street

Scenario:	Movement	AM peak hour				PM peak hour			
		v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
2023 total future	EB left	0.84	E	57.7	41	1.11	F	129	92
	EB through	1.01	E	67.0	211	0.67	D	38.0	83
	WB left	1.25	F	179	102	0.88	D	51.1	84
	WB through	0.88	E	58.5	198	1.07	F	93.7	262
	WB right	0.47	A	8.8	33	0.99	D	54.7	212
	NB left	0.85	F	100	60	0.93	F	92.8	90
	NB through	0.82	E	60.7	97	0.97	E	65.4	165
	NB right	0.62	C	29.8	64	0.46	B	11.7	37
	SB left	1.07	F	90.4	210	1.18	F	141	151
	SB through	0.53	B	16.0	50	0.45	C	25.4	79
	SB right	0.25	A	1.0	1	0.22	A	3.9	13
	Overall	—	E	55.7	—	—	E	61.9	—
2028 total future	EB left	1.03	F	101	71	1.20	F	159	102
	EB through	1.11	F	97.1	259	0.74	D	39.2	102
	WB left	1.05	F	110	91	0.95	E	62.9	95
	WB through	0.98	E	71.8	244	1.13	F	114	290
	WB right	0.47	B	11.0	41	1.12	F	98.6	265
	NB left	0.66	D	42.7	35	0.67	D	35.4	44
	NB through	0.83	E	61.2	99	1.01	E	74.7	176
	NB right	0.61	C	26.5	60	0.47	B	10.9	37
	SB left	1.33	F	199	267	1.28	F	181	162
	SB through	0.75	D	49.0	124	0.63	D	38.4	99
	SB right	0.36	B	13.9	26	0.30	A	5.8	16
	Overall	—	F	81.1	—	—	E	77.1	—

The timing and geometric modifications are anticipated to result in reduced overall delays, and are expected to improve the PM peak hour overall intersection level of service to LOS E at the 2028 horizon. The modifications will result in increased capacity on the eastbound through movement and for the intersection as a whole. There would still be numerous critical movements at the intersection; some variation in critical movements could materialize depending on how the Region chooses to reallocate green time to make use of the additional eastbound capacity and what movements are prioritized.

These findings reflect an improvement compared to the results from the March 2021 analyses (a 14-second reduction in overall delay during the AM peak hour; a 5-second reduction in overall delay during the PM peak hour) due to the reduction in development traffic and the increased capacity on the eastbound approach.

...cont'd



2.4.2 St. John’s Sideroad at Willow Farm Lane / Street “A”

Table 6 presents the updated analysis results at St. John’s Sideroad and Willow Farm Lane / Street “A” under the existing two-way stop control. The lane configuration includes dedicated eastbound and southbound left turn lanes and a dedicated westbound right turn lane.

Table 6: Total Future Intersection Operations, St. John’s Sideroad at Willow Farm Lane / Street “A”

Scenario:	Movement	AM peak hour				PM peak hour			
		v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
2023 total future	NB approach	0.30	D	25.6	10	0.38	E	40.8	13
	SB left	2.18	F	763	74	1.58	F	587	42
	SB right	0.17	C	18.5	5	0.08	C	21	2
2028 total future	NB approach	0.83	F	121	37	0.50	F	60.3	18
	SB left	17.19	F	Error	Error	3.72	F	Error	Error
	SB right	0.66	F	51.5	32	0.24	F	27.5	7

Under two-way stop control, the southbound left turn movement is expected to exceed capacity during the AM and PM peak hours at both horizons. The reduction in site traffic associated with the reduced residential unit count is expected to slightly improve operations compared to the March 2021 analyses, but mitigation continues to be required.

Table 7 presents operations with traffic signals installed at the intersection. Timing parameters have been adjusted from the March 2021 analyses to reflect comments from the Region, as outlined in **Section 1.1.3**.



Table 7: Mitigated Total Future Intersection Operations, St. John’s Sideroad at Willow Farm Lane / Street “A”

Scenario:	Movement	AM peak hour				PM peak hour			
		v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
2023 total future	EB left	0.14	A	9.8	12	0.18	A	5.8	12
	EB through	0.75	B	18.1	221	0.52	A	6.8	140
	EB right	0.00	A	0.0	0	0.01	A	0.0	0
	WB left	0.11	A	7.0	4	0.14	A	1.9	3
	WB through	0.58	B	14.5	204	0.63	A	6.2	62
	WB right	0.06	A	2.1	6	0.06	A	0.2	0
	NB approach	0.20	B	10.3	9	0.26	B	17.3	13
	SB left	0.30	C	22.4	15	0.26	D	50.2	19
	SB through	0.14	A	6.7	6	0.10	B	18.0	7
	Overall	—	B	15.6	—	—	A	7.4	—
2028 total future	EB left	0.42	B	12.8	37	0.21	A	6.9	13
	EB through	0.75	B	17.1	244	0.55	A	7.7	154
	EB right	0.00	A	0.0	0	0.01	A	0.0	0
	WB left	0.10	A	5.6	2	0.16	A	3.4	4
	WB through	0.56	A	5.9	52	0.69	B	11.1	76
	WB right	0.18	A	0.6	0	0.06	A	0.7	0
	NB approach	0.22	B	14.0	17	0.25	B	16.5	13
	SB left	0.85	E	78.1	84	0.46	E	55.2	32
	SB through	0.32	B	11.2	20	0.21	B	14.7	11
	Overall	—	B	17.0	—	—	B	11.0	—

Under traffic signal control, the intersection is anticipated to operate at a good level of service (LOS A to B). The east-west through movements on St. John’s Sideroad are largely expected to operate at LOS A (LOS B for the eastbound through movement during the AM peak hour). The southbound left turn is expected to operate at LOS E in 2028; however, the capacity and delays would be improved compared to operations under two-way stop control.

2.4.3 St. John’s Sideroad at Bathurst Street

Table 8 presents the updated analysis results at St. John’s Sideroad and Bathurst Street.



Table 8: Intersection Operations, St. John’s Sideroad at Bathurst Street

Scenario:	Movement	AM peak hour				PM peak hour			
		v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
2023 total future	EB left	0.36	C	20.9	23	0.93	E	63.2	89
	EB through	0.67	C	29.4	132	0.74	C	34.8	150
	WB left	0.81	E	63.7	86	0.93	F	97.1	72
	WB through	0.90	E	57.4	189	0.94	E	69.7	163
	WB right	0.09	A	0.3	0	0.34	B	13.1	28
	NB left	0.58	E	56.6	28	0.36	C	31.7	30
	NB through	0.56	C	30.4	77	0.89	D	43.9	172
	NB right	0.13	A	1.9	4	0.33	A	9.8	29
	SB left	0.54	C	23.5	35	0.56	C	29.0	22
	SB through	0.79	C	29.4	141	0.44	C	21.7	73
	SB right	0.35	A	5.4	23	0.15	A	3.6	10
	Overall	—	C	32.0	—	—	D	39.6	—
2028 total future	EB left	0.43	C	24.1	24	1.03	F	90.9	104
	EB through	0.81	D	37.8	163	0.76	D	35.8	160
	WB left	1.48	F	280	120	1.14	F	156	88
	WB through	1.02	F	83.6	210	1.02	F	86.0	188
	WB right	0.13	A	1.5	2	0.38	B	15.1	33
	NB left	0.74	F	84.4	37	0.41	C	33.5	34
	NB through	0.53	C	29.2	79	0.99	E	58.2	200
	NB right	0.18	A	4.9	11	0.35	B	11.2	33
	SB left	0.63	C	27.2	43	0.59	C	31.5	27
	SB through	0.82	C	30.7	161	0.46	C	22.3	75
	SB right	0.37	A	6.4	29	0.17	A	3.5	11
	Overall	—	D	48.7	—	—	D	50.6	—

The intersection is anticipated to operate at an acceptable overall level of service (LOS C to D). By 2028, the westbound through and left turns are anticipated to be at or above capacity during the AM and PM peak hours, and the eastbound left turn and northbound through movement are expected to be at capacity during the PM peak hour. This is similar to the findings from the March 2021 analyses, although operations are slightly better due to the reduced unit count.

The same mitigation was applied as in the March 2021 report:

- During the AM peak hour, the existing eastbound left turn phase was deactivated and replaced with an advance westbound left turn phase, reflecting the higher demand on the westbound left turn phase in the morning.
- During the PM peak hour, the existing eastbound left turn phase was retained. The new westbound left turn phase was assumed to be deactivated during the

...cont’d



PM peak hour, except that it would be activated under 2028 total future conditions.

- Maximum green times on the north-south and/or east-west phases were increased (in 5-second increments) in some cases.

Table 9 presents the updated analysis results with these traffic signal modifications in place.

Table 9: Mitigated Intersection Operations, St. John’s Sideroad at Bathurst Street

Scenario:	Movement	AM peak hour				PM peak hour			
		v/c	LOS	Delay (s/veh)	95 th %ile queue (m)	v/c	LOS	Delay (s/veh)	95 th %ile queue (m)
2023 total future	EB left	0.39	C	32.6	32	0.92	E	60.4	82
	EB through	0.89	D	51.9	161	0.72	C	33.0	149
	WB left	0.80	D	45.4	54	0.88	F	83.9	70
	WB through	0.65	C	27.6	122	0.86	D	55.0	150
	WB right	0.07	A	1.5	3	0.32	B	11.6	26
	NB left	0.62	E	62.6	29	0.35	C	32.4	31
	NB through	0.59	C	31.5	78	0.87	D	41.8	180
	NB right	0.14	A	1.8	3	0.32	B	10.8	32
	SB left	0.55	C	24.8	36	0.56	C	30.0	24
	SB through	0.81	C	30.9	142	0.46	C	22.5	76
	SB right	0.36	A	5.8	24	0.16	A	3.9	11
	Overall	—	C	31.3	—	—	D	36.6	—
2028 total future	EB left	0.43	D	41.4	40	1.02	F	91.5	113
	EB through	1.00	F	80.6	237	0.95	E	66.5	220
	WB left	0.97	F	85.2	93	0.98	F	94.0	73
	WB through	0.66	C	32.4	153	0.97	E	77.5	197
	WB right	0.09	A	4.8	9	0.35	B	12.5	30
	NB left	0.97	F	152	45	0.40	D	35.6	36
	NB through	0.54	C	34.8	89	0.97	E	57.4	216
	NB right	0.19	A	5.6	13	0.34	B	12.7	38
	SB left	0.72	D	37.9	52	0.66	D	40.2	34
	SB through	0.87	D	40.0	186	0.46	C	24.7	83
	SB right	0.39	A	9.6	40	0.17	A	3.7	12
	Overall	—	D	43.9	—	—	D	51.9	—

While several critical movements would remain, the proposed traffic signal timing and phasing changes would enable the majority of movements to operate at or below capacity. An exception is the eastbound left turn, which would marginally exceed capacity during the PM peak hour in 2028. These findings are generally comparable to the results from the March 2021 analyses, with some minor improvements due to the reduced unit count.

...cont’d



As noted in the March 2021 report, the southbound left turn advance phase is operating below capacity. This is an indication that there may be fewer than 3 vehicles queued at the start of green during some cycles. With setback detection in the left turn lanes, the left turn phase would be skipped if fewer than 3 vehicles are queued, which would reduce the length of those cycles and increase the capacity available to other movements at the intersection. Synchro does not account for the effect that setback stop bars have on the proportion of cycles where the left turn phase is skipped. Therefore, the v/c ratios on the other movements may be lower than shown in **Table 9** after accounting for shorter cycles when the southbound left turn phase is skipped.

2.5 Updated Traffic Signal Warrants

The traffic signal warrants from the March 2021 analyses for St. John's Sideroad and Willow Farm Lane / Street "A" were updated to reflect the reduced development yield. Similar to the previous analyses, the four-hour warrant from OTM Book 12 was applied. This warrant applies at locations where a side street does not have prolonged demand throughout the day but experiences significant surges over a shorter period of time; this matches conditions on Street "A", where the need for traffic signals is heavily affected by school traffic, which is concentrated into short periods. For urban conditions where a 2-lane major street carries more than 1,100 vehicles per hour, Justification 4 considers traffic signals to be warranted when the higher-volume minor approach exceeds 80 vehicles per hour. Given that the school traffic during the PM peak hour is expected to comprise approximately 25% of the total PM peak period traffic, it was assumed that the AM peak hour would be reflective of one of the four hours, and the PM peak hour would be reflective of the remaining three hours.

OTM Book 12 notes that right turns may or may not be included in the warrant, depending on the presence or absence of a dedicated right turn lane and the level of delay experienced under two-way stop control. The warrant analysis considered both the overall side street volumes, as well as the volumes with the southbound right turn demand removed; however, it is suggested that the right turn demand should be included in the warrant results at this location, due to the effect of high westbound volumes on right turn delay during the peak hours.

The projected volumes were compared against the Justification 4 minor approach threshold:

- In 2023, the southbound AM peak hour volume is expected to be 131 vehicles, including 84 through/left turns, which would exceed the Justification 4 threshold.

...cont'd



- In 2023, the southbound PM peak hour volume is expected to be 59 vehicles, including 41 through/left turns. The overall volume and left turn volume would fall below the Justification 4 threshold.
- By 2028, the southbound PM peak hour volume is expected to reach 121 vehicles, including 78 through/left turns. Assuming school enrolment (and traffic) increases linearly, the southbound approach is expected to exceed the 80 vph threshold by 2025.

It is recommended that traffic signals be installed, considering the poor operations anticipated under two-way stop control, and considering that even if the justification is not initially met in 2023, it would be met soon thereafter as enrolment in the school grows.

3.0 Summary

The Draft Plan of Subdivision for the proposed Phase 3 of the Shining Hill Estates subdivision has been adjusted since the March 2021 submission. The 200-unit high-density block has been replaced by 21 townhouses fronting a new public roadway (Street "D"). Some other minor changes have been implemented to the internal roadway network and to the single-family blocks. The changes result in a net reduction of 180 residential units.

The proposed changes to the Draft Plan of Subdivision result in the trip generation associated with the subdivision being reduced by 63 trips during the AM peak hour and by 77 trips during the PM peak hour. This is anticipated to result in a modest improvement in total future intersection operations compared to the March 2021 analyses. Traffic conditions will also be improved compared to previous analyses by proposed roadway modifications to St. John's Sideroad on the west side of its intersection with Yonge Street; the modifications will increase the storage length in the eastbound left turn lane and the second eastbound through lane, which will increase eastbound capacity by making more efficient use of the eastbound green interval.

Other than the road widening noted above, the same traffic mitigation measures are proposed as documented in the March 2021 study. Traffic signals continue to be recommended at St. John's Sideroad and Willow Farm Lane / Street "A" to mitigate anticipated capacity and delay constraints during pick-up and drop-off times at the school, and are anticipated to be warranted by approximately 2025 (depending on the pace of enrolment at the school).

...cont'd



Malone Given Parsons Ltd., Mr. Lincoln Lo
Page 24
January 10, 2022

The Town and Region have requested the provision of a sidewalk and/or multi-use path along the north side of St. John's Sideroad between the subject lands and Yonge Street. The applicant commits to providing a connection for active transportation but is still in the process of identifying an alignment and configuration, given the existing geometric constraints particularly in the section immediately west of Yonge Street.

* * *

Should you have any further questions, please do not hesitate to contact me at (416) 229-4647, extension 2373, or at bhooton@dillon.ca.

Yours sincerely,

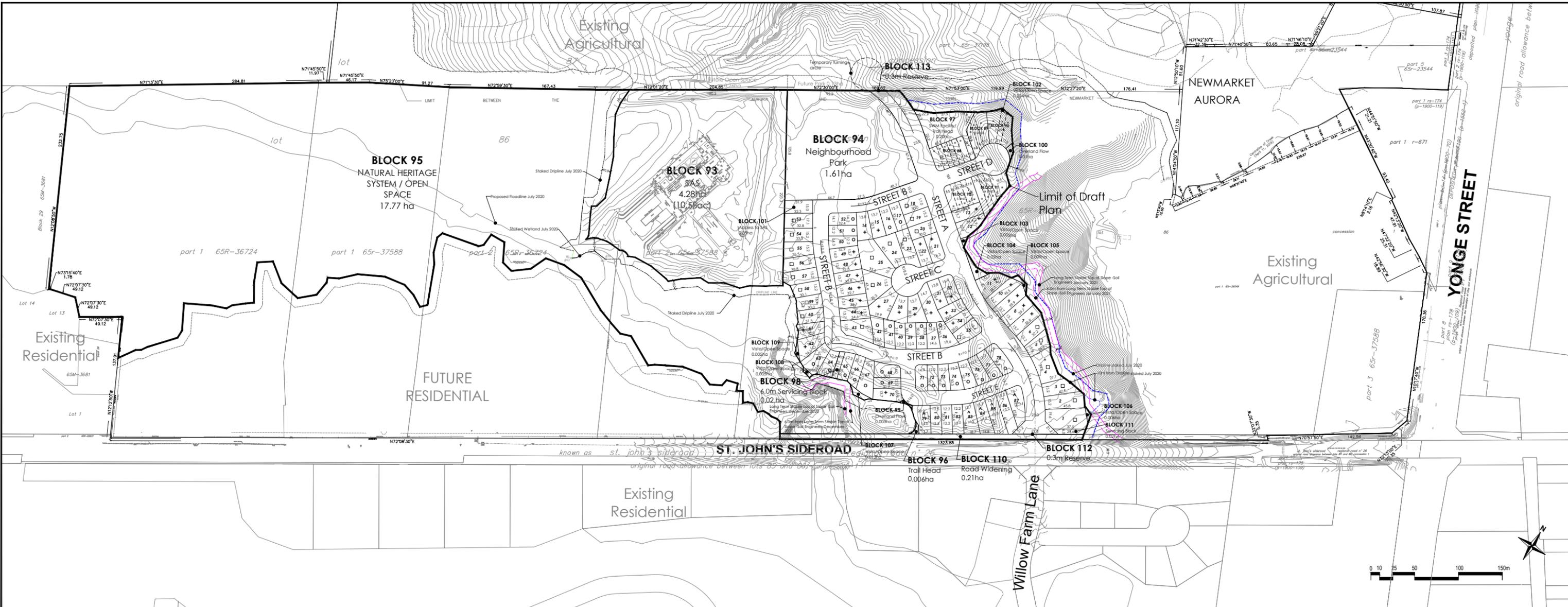
DILLON CONSULTING LIMITED



Brent Hooton, Dipl.T.
Transportation Planner

Our File: 21-1332

Attachment 1:
Updated Draft Plan of Subdivision



DRAFT PLAN OF SUBDIVISION

Part of Lot 86, Concession 1
Town of Aurora
Regional Municipality of York

KEY PLAN



SUBJECT PROPERTY
 OTHER LANDS OWNED BY APPLICANT

SCHEDULE OF LAND USE

LOT / BLOCK	LAND USE	UNITS	AREA
1-78	Single Detached Min. 15.24m	□ 23	1.46
	Single Detached Min. 13.70m	+ 28	1.43
	Single Detached Min. 12.20m	○ 27	1.18
79-87	Lane Access Single Detached Min. 13.70m	▲ 5	0.30
	Lane Access Single Detached Min. 12.20m	~ 4	0.18
88-92	Townhouses Min. 6.1m	= 21	0.54
93	Saint Anne's School		4.28
94	Neighbourhood Park		1.61
95	Natural Heritage / Open Space		17.77
96-97	SWM / Trailhead		0.21
98 & 111	Servicing Blocks		0.04
99-100	Overland Flow		0.01
101	Access to Saint Anne's School		0.05
102-109	Vista's / Open Space		0.07
110	Road Widening		0.21
112-113	0.3m Reserves		0.01
Street A	23.0m Right of Way 436m		1.02
Street B-D	18.0m Right of Way 490m		0.96
Street E	16.5m Right of Way 165m		0.27
Street B	15.0m Right of Way 160m		0.19
TOTAL		108	31.79

OWNER'S AUTHORIZATION

I hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the Town of Aurora.

See Original _____ See Original _____
Angelo DeGasperis _____ Date _____

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided and their relationship to the adjacent lands are correctly shown.

See Original _____ See Original _____
Neil A. LeGrow _____ Date _____

ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13(R.S.O. 1990).
 (a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.
 (b),(c) - As shown on the Draft and Key Plan.
 (d) - Land to be used in accordance with the Schedule of Land Use.
 (i) - Soil is clay loam and sandy loam.
 (h),(k) - Full municipal services to be provided.

Prepared by:



140 Renfrew Drive, Suite 201
Markham, Ontario, L3R 6B3
Tel: (905) 513-0170
www.mgp.ca

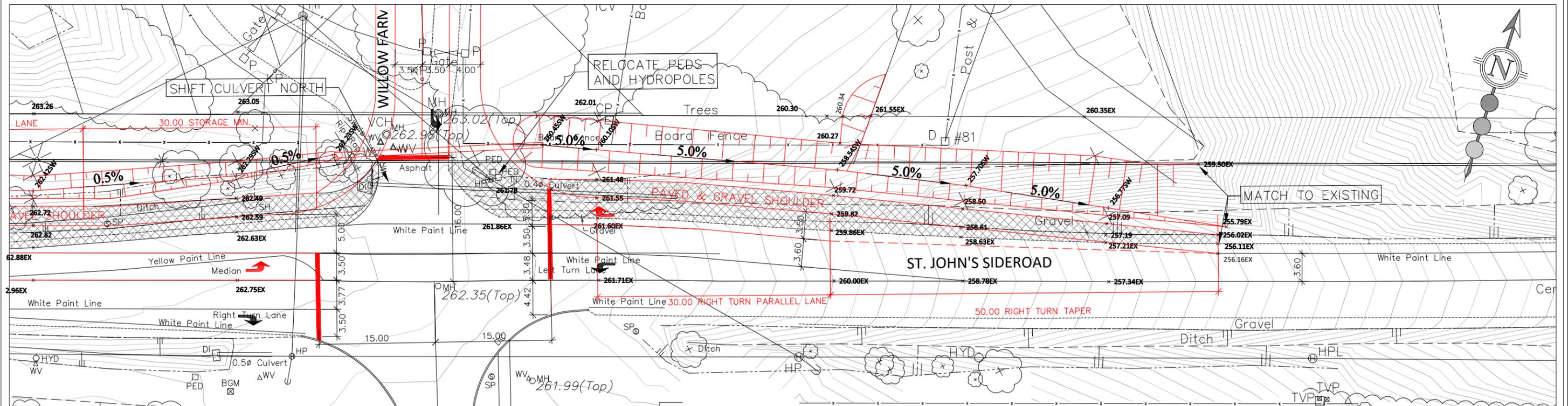
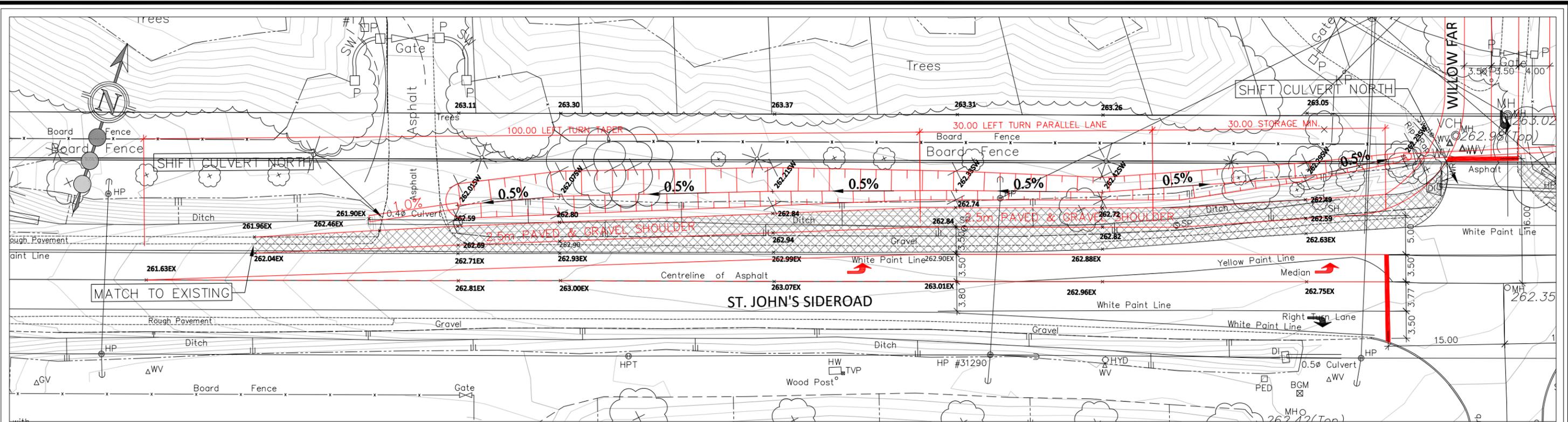
Prepared for:

SHINING HILL ESTATES COLLECTION INC.

Date: March 8, 2021 Project No.: 15-2374

Date	Revision	By
Oct 7/21	Revise the plan according to Town's comments	DR
Nov 1/21	Add servicing block and temporary turning circle	DR

Attachment 2:
Road Modification Conceptual Designs

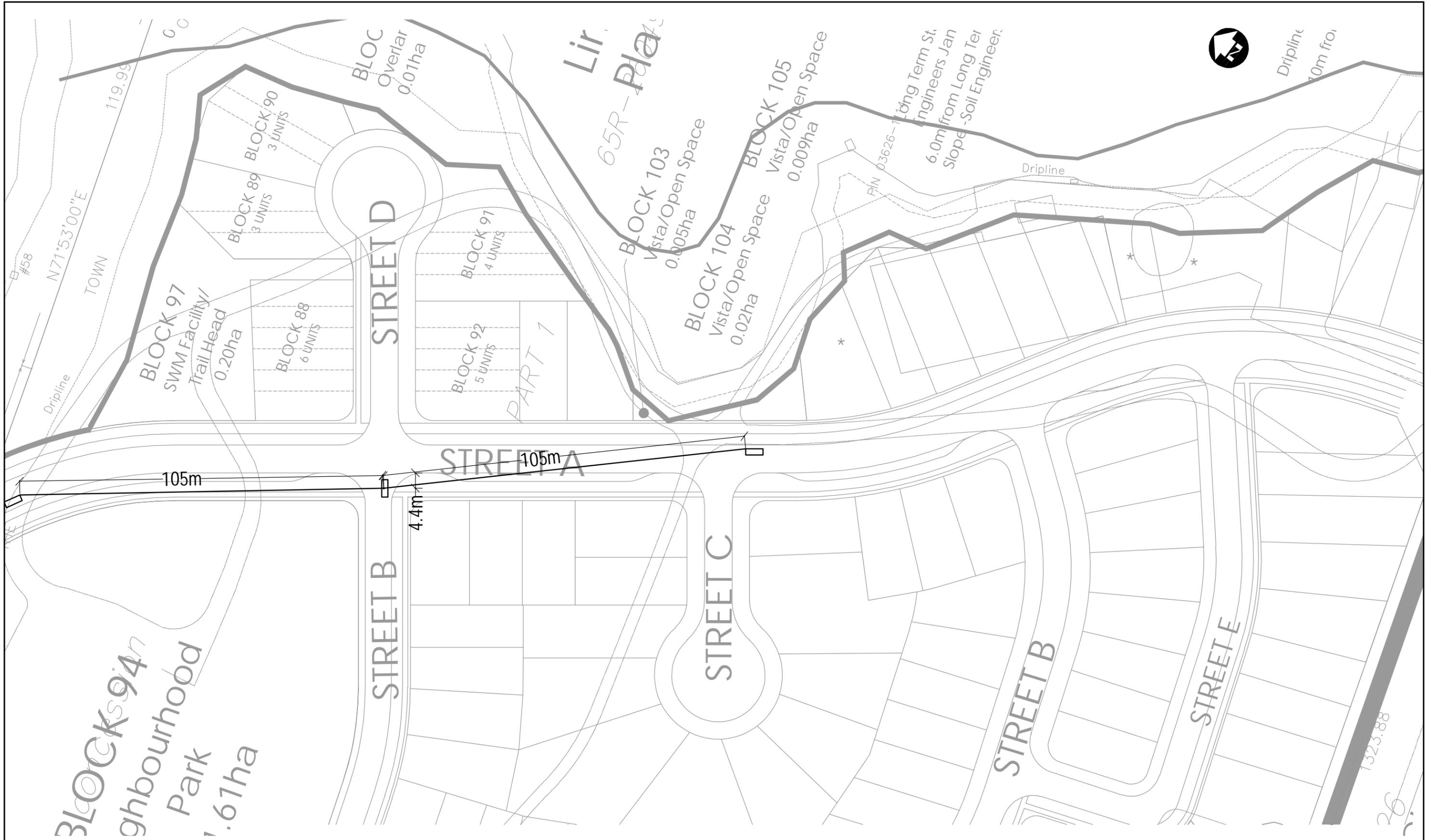


*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

<p>SHINING HILL ESTATES COLLECTION INC.</p>  <p>30 CENTURIAN DRIVE, SUITE 100 MARKHAM, ONTARIO L3R 8B8 TEL: (905) 475-1900 FAX: (905) 475-8335</p>	<p>LEGEND:</p> <ul style="list-style-type: none">  PROPOSED PAVEMENT MARKING  EMBANKMENT (3:1 SLOPE UNLESS OTHERWISE NOTED)  PROPOSED ROAD WIDENING 	<p>SHINING HILL ESTATES PHASE 3 - FSSR (AURORA)</p>		<p>WILLOW FARM LANE TURNING LANES</p>	
		<p>DESIGNED BY: J.F.</p> <p>SCALE: 1:500</p>	<p>CHECKED BY: P.S.</p> <p>DATE: SEPTEMBER 2021</p>	<p>PROJECT No:</p> <p>2183</p>	<p>FIGURE No:</p> <p>1.1</p>

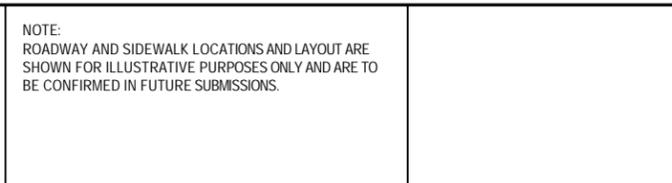
Attachment 3:
Sight Line Assessments

235 YORKLAND BLVD., SUITE 800, TORONTO, ON M2J 4Y8



Conditions of Use
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NOTE:
 ROADWAY AND SIDEWALK LOCATIONS AND LAYOUT ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE TO BE CONFIRMED IN FUTURE SUBMISSIONS.



DESIGN	BJH	REVIEWED BY	MDW
DRAWN	GCC	CHECKED BY	BJH
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1	CLIENT REVIEW	2021-11-04	GCC
No.	ISSUED FOR	DATE	BY

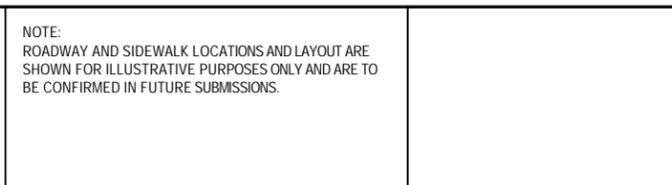
SHINING HILL ESTATES PHASE 3 TOWN OF AURORA		PROJECT NO. 21-1332
SIGHT LINE ASSESSMENT STREET "B" (NORTH) AT STREET "A"		SHEET NO. SD-1

235 YORKLAND BLVD., SUITE 800, TORONTO, ON M2J 4Y8



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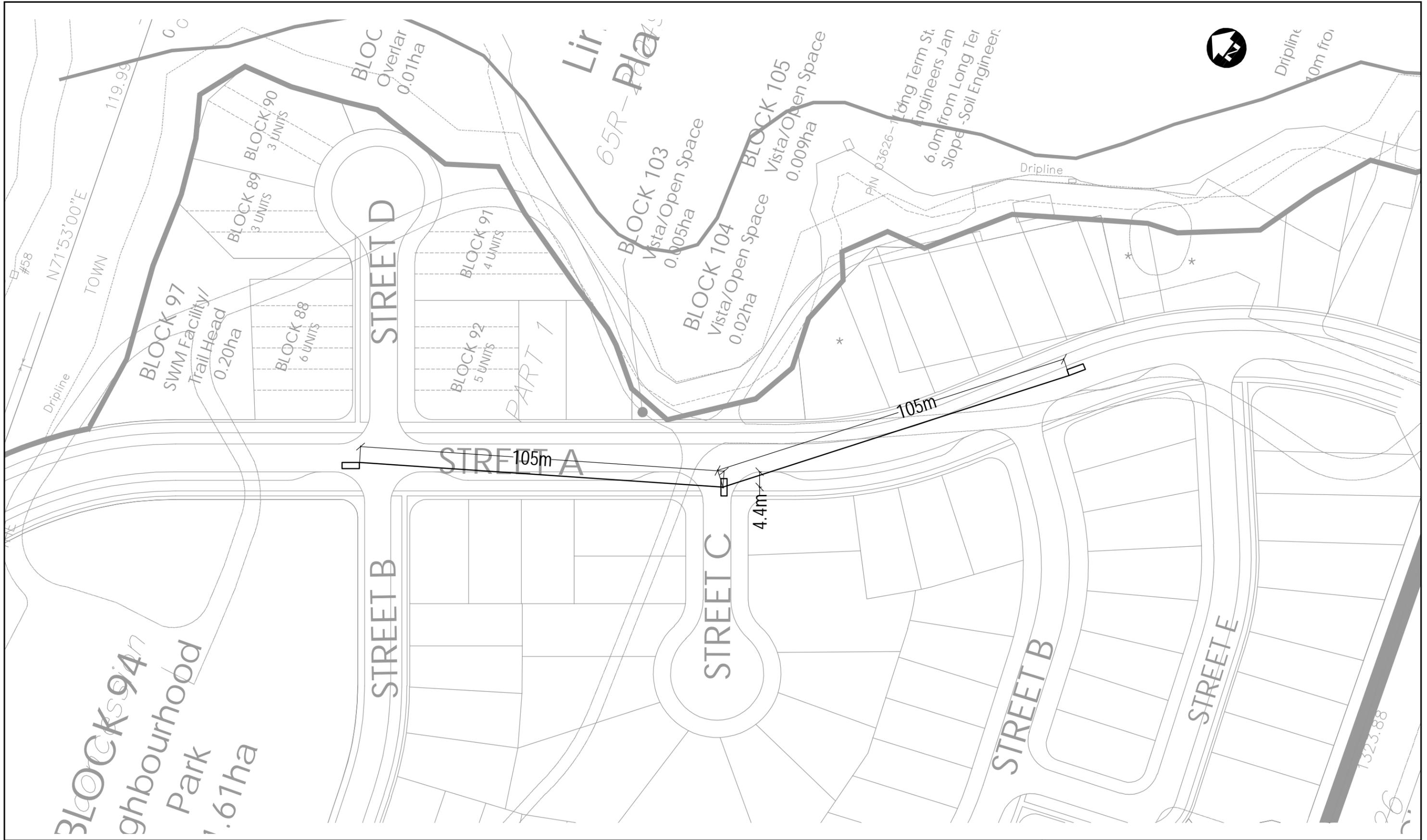
NOTE:
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DRAWN	GCC	CHECKED BY	BJH
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No.	ISSUED FOR	DATE	BY

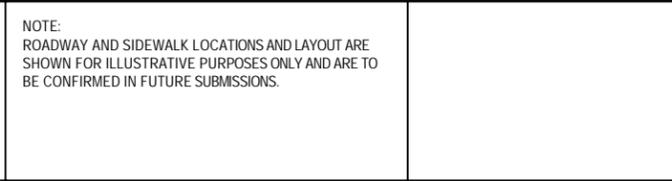
SHINING HILL ESTATES PHASE 3 TOWN OF AURORA		PROJECT NO. 21-1332
SIGHT LINE ASSESSMENT STREET "D" AT STREET "A"		SHEET NO. SD-2

235 YORKLAND BLVD., SUITE 800, TORONTO, ON M2J 4Y8



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DESIGN	BJH	REVIEWED BY	MDW
DRAWN	GCC	CHECKED BY	BJH
DATE	2021-11-04		
SCALE	1:1000 (11X17)		
1	CLIENT REVIEW	2021-11-04	GCC
No.	ISSUED FOR	DATE	BY

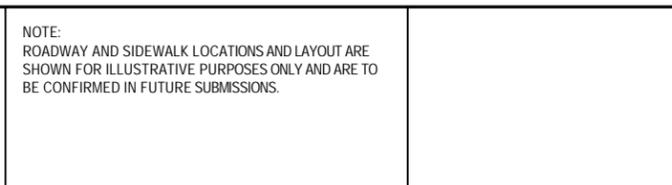
SHINING HILL ESTATES PHASE 3 TOWN OF AURORA		PROJECT NO. 21-1332
SIGHT LINE ASSESSMENT STREET "C" AT STREET "A"		SHEET NO. SD-3

235 YORKLAND BLVD., SUITE 800, TORONTO, ON M2J 4Y8



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 ROADWAY AND SIDEWALK LOCATIONS AND LAYOUT ARE SHOWN FOR ILLUSTRATIVE PURPOSES ONLY AND ARE TO BE CONFIRMED IN FUTURE SUBMISSIONS.



No.	ISSUED FOR	DATE	BY	SCALE
1	CLIENT REVIEW	2021-11-04	GCC	1:1000 (11X17)

DESIGN	REVIEWED BY
BJH	MDW
DRAWN	CHECKED BY
GCC	BJH
DATE	2021-11-04

SHINING HILL ESTATES PHASE 3 TOWN OF AURORA		PROJECT NO. 21-1332
SIGHT LINE ASSESSMENT STREET "B" (SOUTH) AT STREET "A"		SHEET NO. SD-4

Attachment 4:
Synchro Analysis Worksheets

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

AM peak hour
2023 total future

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	708	193	183	479	281	89	497	248	538	754	180
Future Volume (vph)	134	708	193	183	479	281	89	497	248	538	754	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	65.0		50.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.75	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00					1.00					0.97
Frt		0.968				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	2697	0	1708	1845	1512	1652	3330	1670	*2068	3444	1516
Flt Permitted	0.145			0.095			0.334			0.262		
Satd. Flow (perm)	246	2697	0	171	1845	1512	579	3330	1670	447	3444	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				264			167			202
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		448.3			341.9			505.9			608.7	
Travel Time (s)		26.9			20.5			30.4			36.5	
Confl. Peds. (#/hr)			2	2			4					4
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	7%	2%	2%	1%	3%	8%	2%	6%	1%	4%	6%	3%
Adj. Flow (vph)	151	796	217	206	538	316	100	558	279	604	847	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	1013	0	206	538	316	100	558	279	604	847	202
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	32.0	32.0	32.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	39.5	39.5	39.5	11.0	39.5	39.5
Total Split (s)	13.0	48.0		15.0	50.0	50.0	41.0	41.0	41.0	26.0	67.0	67.0
Total Split (%)	10.0%	36.9%		11.5%	38.5%	38.5%	31.5%	31.5%	31.5%	20.0%	51.5%	51.5%
Maximum Green (s)	9.0	40.0		11.0	42.0	42.0	33.5	33.5	33.5	22.0	59.5	59.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	3.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
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
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0	25.0	25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		0			0	0	5	5	5		5	5
Act Effct Green (s)	53.0	40.0		57.0	42.0	42.0	33.5	33.5	33.5	63.0	59.5	59.5
Actuated g/C Ratio	0.41	0.31		0.44	0.32	0.32	0.26	0.26	0.26	0.48	0.46	0.46

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

AM peak hour
2023 total future

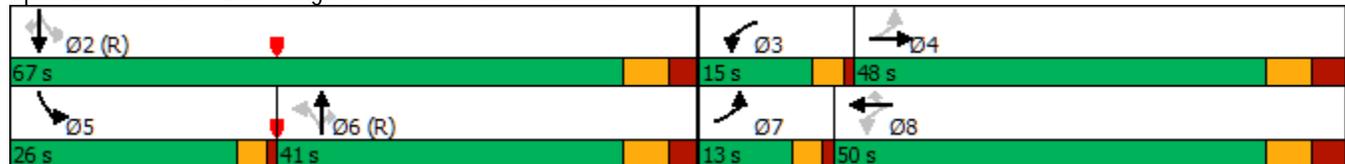


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.78	1.20		1.00	0.90	0.47	0.67	0.65	0.50	1.23	0.54	0.26
Control Delay	50.3	140.9		95.9	62.0	9.3	66.9	47.2	19.4	147.6	15.8	0.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	140.9		95.9	62.0	9.3	66.9	47.2	19.4	147.6	15.8	0.9
LOS	D	F		F	E	A	E	D	B	F	B	A
Approach Delay		129.1			52.9			41.0			62.1	
Approach LOS		F			D			D			E	
Queue Length 50th (m)	24.1	~219.4		~39.3	138.5	9.8	24.3	71.0	24.4	~155.8	41.2	0.0
Queue Length 95th (m)	#49.4	#270.2		#90.6	#201.7	34.0	#51.2	90.1	51.7m	#216.8	m47.2	m0.0
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	65.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	194	843		205	596	667	149	858	554	490	1576	783
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	1.20		1.00	0.90	0.47	0.67	0.65	0.50	1.23	0.54	0.26

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 35 (27%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.23
 Intersection Signal Delay: 72.2
 Intersection Capacity Utilization 112.3%
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

AM peak hour
 2023 total future



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	432	50	173	474	50	50	600	76	161	1100	280
Future Volume (vph)	90	432	50	173	474	50	50	600	76	161	1100	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00										
Frt		0.984				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1819	0	1668	1807	1601	1675	3510	1622	1688	3388	1617
Flt Permitted	0.154			0.420			0.163			0.275		
Satd. Flow (perm)	282	1819	0	737	1807	1601	287	3510	1622	489	3388	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				122			122			243
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		129.9			1758.6			451.2			794.7	
Travel Time (s)		7.8			105.5			23.2			40.9	
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	2%	1%	4%	2%	3%	4%	4%	1%	3%	1%
Adj. Flow (vph)	95	455	53	182	499	53	53	632	80	169	1158	295
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	508	0	182	499	53	53	632	80	169	1158	295
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		8	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	17.5		38.5	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	16.0	37.5		37.5	37.5	37.5	47.5	47.5	47.5	11.0	47.5	47.5
Total Split (%)	14.3%	33.5%		33.5%	33.5%	33.5%	42.4%	42.4%	42.4%	9.8%	42.4%	42.4%
Maximum Green (s)	12.0	30.0		30.0	30.0	30.0	40.0	40.0	40.0	7.0	40.0	40.0
Yellow Time (s)	3.0	4.5		4.5	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	4.0	7.5		7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)				24.0	24.0	24.0	22.0	22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	0
Act Effect Green (s)	44.8	41.3		30.5	30.5	30.5	32.0	32.0	32.0	46.7	43.2	43.2
Actuated g/C Ratio	0.45	0.41		0.31	0.31	0.31	0.32	0.32	0.32	0.47	0.43	0.43

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

AM peak hour
 2023 total future

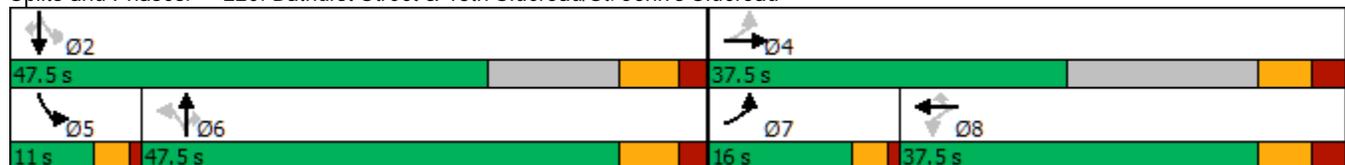


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.36	0.67		0.81	0.90	0.09	0.58	0.56	0.13	0.54	0.79	0.35
Control Delay	20.9	29.4		63.7	57.4	0.3	56.6	30.4	1.9	23.5	29.4	5.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	29.4		63.7	57.4	0.3	56.6	30.4	1.9	23.5	29.4	5.4
LOS	C	C		E	E	A	E	C	A	C	C	A
Approach Delay		28.0			54.8			29.2			24.4	
Approach LOS		C			D			C			C	
Queue Length 50th (m)	10.2	75.8		33.5	95.4	0.0	9.2	57.1	0.0	20.4	107.6	6.3
Queue Length 95th (m)	23.2	132.3		#85.6	#189.2	0.0	#27.7	77.3	3.7	35.4	140.6	23.1
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	304	855		225	552	574	116	1430	733	314	1759	956
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.59		0.81	0.90	0.09	0.46	0.44	0.11	0.54	0.66	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 112
 Actuated Cycle Length: 99.7
 Natural Cycle: 100
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 32.0
 Intersection LOS: C
 Intersection Capacity Utilization 107.4%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad



HCM Unsignalized Intersection Capacity Analysis
 330: Willow Farm Lane/Street "A" & St. John's Sideroad

AM peak hour
 2023 total future

																								
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR												
Lane Configurations																								
Traffic Volume (veh/h)	47	890	3	20	666	61	1	4	65	80	4	47												
Future Volume (Veh/h)	47	890	3	20	666	61	1	4	65	80	4	47												
Sign Control		Free			Free			Stop			Stop													
Grade		0%			0%			0%			0%													
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94												
Hourly flow rate (vph)	50	947	3	21	709	65	1	4	69	85	4	50												
Pedestrians																								
Lane Width (m)																								
Walking Speed (m/s)																								
Percent Blockage																								
Right turn flare (veh)																								
Median type	None					None																		
Median storage (veh)																								
Upstream signal (m)																								
pX, platoon unblocked																								
vC, conflicting volume	774			950			1850			1863			947			1869			1801			709		
vC1, stage 1 conf vol																								
vC2, stage 2 conf vol																								
vCu, unblocked vol	774			950			1850			1863			947			1869			1801			709		
tC, single (s)	4.1			4.1			7.1			6.5			6.2			7.1			6.5			6.2		
tC, 2 stage (s)																								
tF (s)	2.2			2.2			3.5			4.0			3.3			3.5			4.0			3.3		
p0 queue free %	94			97			98			94			78			0			95			89		
cM capacity (veh/h)	851			711			46			67			317			39			74			438		
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2															
Volume Total	50	947	3	21	709	65	74	85	54															
Volume Left	50	0	0	21	0	0	1	85	0															
Volume Right	0	0	3	0	0	65	69	0	50															
cSH	851	1700	1700	711	1700	1700	247	39	320															
Volume to Capacity	0.06	0.56	0.00	0.03	0.42	0.04	0.30	2.18	0.17															
Queue Length 95th (m)	1.5	0.0	0.0	0.7	0.0	0.0	9.7	73.7	4.8															
Control Delay (s)	9.5	0.0	0.0	10.2	0.0	0.0	25.6	763.0	18.5															
Lane LOS	A			B			D			F			C											
Approach Delay (s)	0.5			0.3			25.6			473.7														
Approach LOS							D			F														
Intersection Summary																								
Average Delay				34.1																				
Intersection Capacity Utilization				64.6%			ICU Level of Service			C														
Analysis Period (min)				15																				

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

AM peak hour
2028 total future



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	824	238	179	567	291	116	501	250	573	782	212
Future Volume (vph)	154	824	238	179	567	291	116	501	250	573	782	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	80.0		90.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.75	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00					1.00					0.97
Frt		0.966				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	2691	0	1708	1845	1512	1652	3330	1670	*2068	3444	1516
Flt Permitted	0.100			0.095			0.323			0.258		
Satd. Flow (perm)	170	2691	0	171	1845	1512	560	3330	1670	440	3444	1473
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20				231			157			238
Link Speed (k/h)		60			60			60				60
Link Distance (m)		448.3			341.9			505.9				608.7
Travel Time (s)		26.9			20.5			30.4				36.5
Confl. Peds. (#/hr)			2	2			4					4
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	7%	2%	2%	1%	3%	8%	2%	6%	1%	4%	6%	3%
Adj. Flow (vph)	173	926	267	201	637	327	130	563	281	644	879	238
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	1193	0	201	637	327	130	563	281	644	879	238
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	32.0	32.0	32.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	39.5	39.5	39.5	11.0	39.5	39.5
Total Split (s)	13.0	48.0		15.0	50.0	50.0	41.0	41.0	41.0	26.0	67.0	67.0
Total Split (%)	10.0%	36.9%		11.5%	38.5%	38.5%	31.5%	31.5%	31.5%	20.0%	51.5%	51.5%
Maximum Green (s)	9.0	40.0		11.0	42.0	42.0	33.5	33.5	33.5	22.0	59.5	59.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	3.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes								
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
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0	25.0	25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		0			0	0	5	5	5		5	5
Act Effct Green (s)	53.0	40.0		57.0	42.0	42.0	33.5	33.5	33.5	63.0	59.5	59.5
Actuated g/C Ratio	0.41	0.31		0.44	0.32	0.32	0.26	0.26	0.26	0.48	0.46	0.46

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

AM peak hour
2028 total future

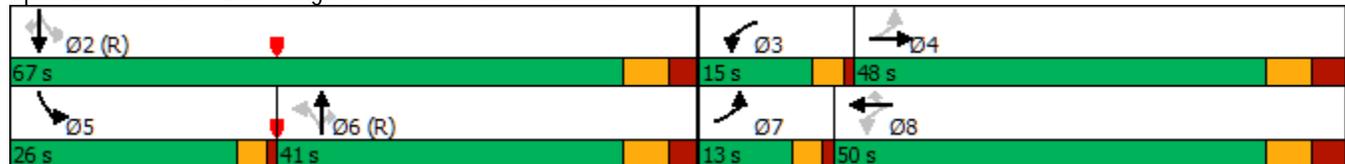


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	1.02	1.42		0.98	1.07	0.51	0.90	0.66	0.51	1.32	0.56	0.30
Control Delay	105.8	229.6		89.4	98.7	13.4	100.6	47.4	21.3	183.5	16.1	1.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	105.8	229.6		89.4	98.7	13.4	100.6	47.4	21.3	183.5	16.1	1.0
LOS	F	F		F	F	B	F	D	C	F	B	A
Approach Delay		214.0			73.2			47.0			75.3	
Approach LOS		F			E			D			E	
Queue Length 50th (m)	~33.0	~287.7		37.4	~189.9	18.7	34.1	71.7	27.5	~180.1	44.1	0.0
Queue Length 95th (m)	#79.6	#338.9		#87.2	#259.4	46.7	#73.9	91.1	55.1m	#241.5	m49.1	m0.0
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	80.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	169	841		205	596	644	144	858	546	488	1576	803
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	1.42		0.98	1.07	0.51	0.90	0.66	0.51	1.32	0.56	0.30

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 35 (27%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.42
 Intersection Signal Delay: 105.5
 Intersection LOS: F
 Intersection Capacity Utilization 118.4%
 ICU Level of Service H
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

AM peak hour
 2028 total future



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	504	55	204	511	68	55	610	111	197	1205	300
Future Volume (vph)	95	504	55	204	511	68	55	610	111	197	1205	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00										
Frt		0.985				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1821	0	1668	1807	1601	1675	3510	1622	1688	3388	1617
Flt Permitted	0.117			0.285			0.127			0.283		
Satd. Flow (perm)	214	1821	0	500	1807	1601	224	3510	1622	503	3388	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				122			122			238
Link Speed (k/h)		60			60			70				70
Link Distance (m)		129.9			1758.6			451.2				794.7
Travel Time (s)		7.8			105.5			23.2				40.9
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	2%	1%	4%	2%	3%	4%	4%	1%	3%	1%
Adj. Flow (vph)	100	531	58	215	538	72	58	642	117	207	1268	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	589	0	215	538	72	58	642	117	207	1268	316
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		8	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	17.5		38.5	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	16.0	37.5		37.5	37.5	37.5	47.5	47.5	47.5	11.0	47.5	47.5
Total Split (%)	14.3%	33.5%		33.5%	33.5%	33.5%	42.4%	42.4%	42.4%	9.8%	42.4%	42.4%
Maximum Green (s)	12.0	30.0		30.0	30.0	30.0	40.0	40.0	40.0	7.0	40.0	40.0
Yellow Time (s)	3.0	4.5		4.5	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	4.0	7.5		7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)				24.0	24.0	24.0	22.0	22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	0
Act Effct Green (s)	45.0	41.4		30.3	30.3	30.3	36.2	36.2	36.2	50.9	47.3	47.3
Actuated g/C Ratio	0.43	0.40		0.29	0.29	0.29	0.35	0.35	0.35	0.49	0.46	0.46

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

AM peak hour
 2028 total future

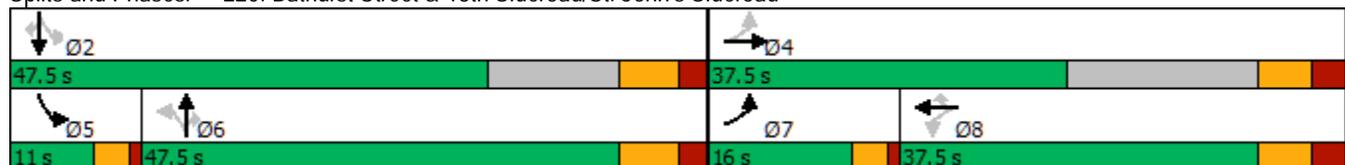


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.43	0.81		1.48	1.02	0.13	0.74	0.53	0.18	0.63	0.82	0.37
Control Delay	24.1	37.8		279.5	83.6	1.5	84.4	29.2	4.9	27.2	30.7	6.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	37.8		279.5	83.6	1.5	84.4	29.2	4.9	27.2	30.7	6.4
LOS	C	D		F	F	A	F	C	A	C	C	A
Approach Delay		35.8			127.5			29.7			26.0	
Approach LOS		D			F			C			C	
Queue Length 50th (m)	13.3	114.8		-69.3	-137.7	0.0	11.2	58.8	0.0	26.0	126.0	9.7
Queue Length 95th (m)	24.3	162.6		#120.1	#209.9	2.4	#36.5	78.7	11.4	43.0	161.1	28.5
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	270	818		145	527	553	87	1365	705	326	1681	922
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.72		1.48	1.02	0.13	0.67	0.47	0.17	0.63	0.75	0.34

Intersection Summary

Area Type: Other
 Cycle Length: 112
 Actuated Cycle Length: 103.9
 Natural Cycle: 100
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.48
 Intersection Signal Delay: 48.7
 Intersection LOS: D
 Intersection Capacity Utilization 116.1%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad



HCM Unsignalized Intersection Capacity Analysis
 330: Willow Farm Lane/Collector Road & St. John's Sideroad

AM peak hour
 2028 total future

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	155	945	3	20	681	194	1	14	65	206	14	113
Future Volume (Veh/h)	155	945	3	20	681	194	1	14	65	206	14	113
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	165	1005	3	21	724	206	1	15	69	219	15	120
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	930			1008			2228	2307	1005	2178	2104	724
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	930			1008			2228	2307	1005	2178	2104	724
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	78			97			92	49	76	0	62	72
cM capacity (veh/h)	744			676			13	29	293	13	39	429
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2			
Volume Total	165	1005	3	21	724	206	85	219	135			
Volume Left	165	0	0	21	0	0	1	219	0			
Volume Right	0	0	3	0	0	206	69	0	120			
cSH	744	1700	1700	676	1700	1700	103	13	204			
Volume to Capacity	0.22	0.59	0.00	0.03	0.43	0.12	0.83	17.19	0.66			
Queue Length 95th (m)	6.8	0.0	0.0	0.8	0.0	0.0	37.1	Err	32.0			
Control Delay (s)	11.2	0.0	0.0	10.5	0.0	0.0	121.2	Err	51.5			
Lane LOS	B			B			F	F	F			
Approach Delay (s)	1.6			0.2			121.2	6205.5				
Approach LOS							F	F				
Intersection Summary												
Average Delay			861.9									
Intersection Capacity Utilization			81.1%		ICU Level of Service				D			
Analysis Period (min)			15									

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

PM peak hour
2023 total future



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	526	91	259	652	697	171	889	271	340	648	153
Future Volume (vph)	191	526	91	259	652	697	171	889	271	340	648	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	65.0		50.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.75	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00		0.98	1.00		0.99	1.00		0.97
Frt		0.978				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1725	2735	0	1708	1881	1633	1685	3461	1670	*2068	3544	1516
Flt Permitted	0.100			0.193			0.392			0.107		
Satd. Flow (perm)	182	2735	0	347	1881	1608	693	3461	1648	186	3544	1470
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				293			240			161
Link Speed (k/h)		60			60			60				60
Link Distance (m)		448.3			341.9			505.9				608.7
Travel Time (s)		26.9			20.5			30.4				36.5
Confl. Peds. (#/hr)	2		3	3		2	5		1	1		5
Confl. Bikes (#/hr)						2						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	2%	1%	2%	3%	3%
Adj. Flow (vph)	201	554	96	273	686	734	180	936	285	358	682	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	650	0	273	686	734	180	936	285	358	682	161
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	32.0	32.0	32.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	39.5	39.5	39.5	11.0	39.5	39.5
Total Split (s)	13.0	48.0		13.0	48.0	48.0	41.0	41.0	41.0	18.0	59.0	59.0
Total Split (%)	10.8%	40.0%		10.8%	40.0%	40.0%	34.2%	34.2%	34.2%	15.0%	49.2%	49.2%
Maximum Green (s)	9.0	40.0		9.0	40.0	40.0	33.5	33.5	33.5	14.0	51.5	51.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	3.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes								
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
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0	25.0	25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		5			5	5	5	5	5		5	5
Act Efect Green (s)	53.0	40.0		53.0	40.0	40.0	33.5	33.5	33.5	55.0	51.5	51.5

Lanes, Volumes, Timings
 210: Yonge Street & St. John's Sideroad

PM peak hour
 2023 total future

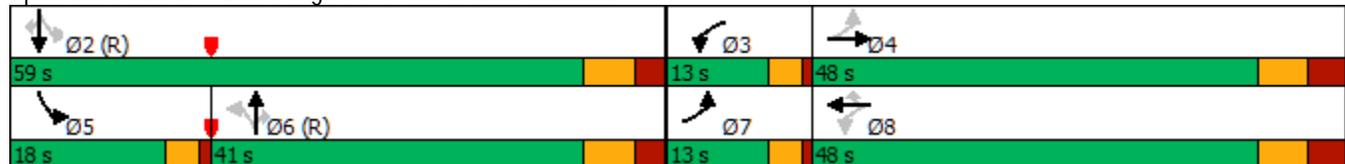


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.44	0.33		0.44	0.33	0.33	0.28	0.28	0.28	0.46	0.43	0.43
v/c Ratio	1.03	0.71		1.07	1.09	1.00	0.93	0.97	0.45	1.18	0.45	0.22
Control Delay	99.1	39.2		102.1	102.6	58.9	92.8	65.4	9.6	140.8	25.4	3.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.1	39.2		102.1	102.6	58.9	92.8	65.4	9.6	140.8	25.4	3.9
LOS	F	D		F	F	E	F	E	A	F	C	A
Approach Delay		53.3			83.6			57.6			56.9	
Approach LOS		D			F			E			E	
Queue Length 50th (m)	-35.4	91.5		-46.3	-192.1	-127.6	43.5	120.7	8.3	-89.6	61.7	0.0
Queue Length 95th (m)	#85.2	120.0		#97.3	#266.4	#214.5	#89.9	#165.0	31.8	#150.9	78.5	12.9
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	65.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	196	920		255	627	731	193	966	633	304	1520	722
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.71		1.07	1.09	1.00	0.93	0.97	0.45	1.18	0.45	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 39 (33%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.18
 Intersection Signal Delay: 65.3
 Intersection LOS: E
 Intersection Capacity Utilization 120.7%
 ICU Level of Service H
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

PM peak hour
 2023 total future



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	507	35	139	435	169	85	1105	221	92	670	120
Future Volume (vph)	250	507	35	139	435	169	85	1105	221	92	670	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.99						
Frt		0.990				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	1882	0	1636	1842	1633	1708	3579	1670	1655	3421	1617
Flt Permitted	0.136			0.349			0.386			0.091		
Satd. Flow (perm)	259	1882	0	601	1842	1612	694	3579	1670	159	3421	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				124			161			125
Link Speed (k/h)		60			60			70				70
Link Distance (m)		129.9			1758.6			451.2			794.7	
Travel Time (s)		7.8			105.5			23.2			40.9	
Confl. Bikes (#/hr)							1					
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	3%	2%	0%	1%	2%	1%	3%	2%	1%
Adj. Flow (vph)	260	528	36	145	453	176	89	1151	230	96	698	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	564	0	145	453	176	89	1151	230	96	698	125
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		8	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	17.5		38.5	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	16.0	37.5		37.5	37.5	37.5	47.5	47.5	47.5	11.0	47.5	47.5
Total Split (%)	14.3%	33.5%		33.5%	33.5%	33.5%	42.4%	42.4%	42.4%	9.8%	42.4%	42.4%
Maximum Green (s)	12.0	30.0		30.0	30.0	30.0	40.0	40.0	40.0	7.0	40.0	40.0
Yellow Time (s)	3.0	4.5		4.5	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	4.0	7.5		7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)				24.0	24.0	24.0	22.0	22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	0
Act Effct Green (s)	48.6	45.1		29.0	29.0	29.0	40.0	40.0	40.0	54.5	51.0	51.0
Actuated g/C Ratio	0.44	0.41		0.26	0.26	0.26	0.36	0.36	0.36	0.49	0.46	0.46

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

PM peak hour
 2023 total future

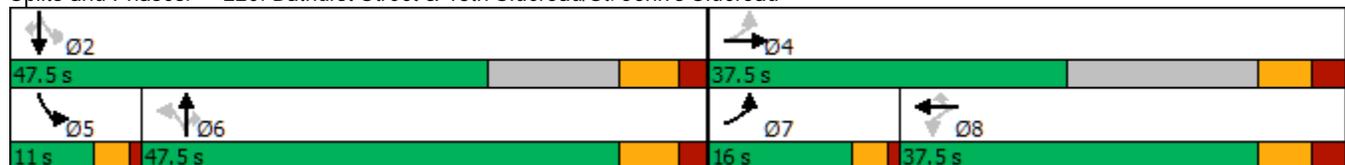


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.93	0.74		0.93	0.94	0.34	0.36	0.89	0.33	0.56	0.44	0.15
Control Delay	63.2	34.7		97.1	69.7	13.1	31.7	43.9	9.8	29.0	21.7	3.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	34.7		97.1	69.7	13.1	31.7	43.9	9.8	29.0	21.7	3.6
LOS	E	C		F	E	B	C	D	A	C	C	A
Approach Delay		43.7			61.9			37.8			20.0	
Approach LOS		D			E			D			B	
Queue Length 50th (m)	38.3	106.6		32.3	101.4	9.1	15.0	131.0	10.6	11.7	56.4	0.0
Queue Length 95th (m)	#89.1	150.0		#72.3	#162.9	27.7	30.2	#172.1	29.1	22.4	72.7	10.4
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	280	782		162	497	526	249	1289	704	172	1571	810
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.72		0.90	0.91	0.33	0.36	0.89	0.33	0.56	0.44	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 112
 Actuated Cycle Length: 111.1
 Natural Cycle: 100
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 39.6
 Intersection LOS: D
 Intersection Capacity Utilization 97.3%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad



HCM Unsignalized Intersection Capacity Analysis
 330: Willow Farm Lane/Collector Road & St. John's Sideroad

PM peak hour
 2023 total future

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	57	722	6	60	845	71	5	3	46	40	1	18
Future Volume (Veh/h)	57	722	6	60	845	71	5	3	46	40	1	18
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	64	811	7	67	949	80	6	3	52	45	1	20
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1029			818			2042	2102	811	2076	2029	949
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1029			818			2042	2102	811	2076	2029	949
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	91			92			82	93	86	0	98	94
cM capacity (veh/h)	683			819			34	44	383	29	48	319
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2			
Volume Total	64	811	7	67	949	80	61	45	21			
Volume Left	64	0	0	67	0	0	6	45	0			
Volume Right	0	0	7	0	0	80	52	0	20			
cSH	683	1700	1700	819	1700	1700	160	29	252			
Volume to Capacity	0.09	0.48	0.00	0.08	0.56	0.05	0.38	1.58	0.08			
Queue Length 95th (m)	2.5	0.0	0.0	2.1	0.0	0.0	13.1	42.1	2.2			
Control Delay (s)	10.8	0.0	0.0	9.8	0.0	0.0	40.8	587.6	20.6			
Lane LOS	B			A			E	F	C			
Approach Delay (s)	0.8			0.6			40.8	407.2				
Approach LOS							E	F				
Intersection Summary												
Average Delay			14.6									
Intersection Capacity Utilization			65.4%		ICU Level of Service				C			
Analysis Period (min)			15									

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

PM peak hour
2028 total future



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	565	111	269	707	742	176	927	283	350	663	163
Future Volume (vph)	207	565	111	269	707	742	176	927	283	350	663	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	65.0		50.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.75	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00		0.98	1.00		0.99	1.00		0.97
Frt		0.975				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1725	2726	0	1708	1881	1633	1685	3461	1670	*2068	3544	1516
Flt Permitted	0.100			0.153			0.386			0.107		
Satd. Flow (perm)	182	2726	0	275	1881	1608	682	3461	1648	186	3544	1470
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				289			228			172
Link Speed (k/h)		60			60			60				60
Link Distance (m)		448.3			341.9			505.9				608.7
Travel Time (s)		26.9			20.5			30.4				36.5
Confl. Peds. (#/hr)	2		3	3		2	5		1	1		5
Confl. Bikes (#/hr)						2						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	2%	1%	2%	3%	3%
Adj. Flow (vph)	218	595	117	283	744	781	185	976	298	368	698	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	712	0	283	744	781	185	976	298	368	698	172
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	32.0	32.0	32.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	39.5	39.5	39.5	11.0	39.5	39.5
Total Split (s)	13.0	48.0		13.0	48.0	48.0	41.0	41.0	41.0	18.0	59.0	59.0
Total Split (%)	10.8%	40.0%		10.8%	40.0%	40.0%	34.2%	34.2%	34.2%	15.0%	49.2%	49.2%
Maximum Green (s)	9.0	40.0		9.0	40.0	40.0	33.5	33.5	33.5	14.0	51.5	51.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	3.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes								
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
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0	25.0	25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		5			5	5	5	5	5		5	5
Act Efect Green (s)	53.0	40.0		53.0	40.0	40.0	33.5	33.5	33.5	55.0	51.5	51.5

Lanes, Volumes, Timings
 210: Yonge Street & St. John's Sideroad

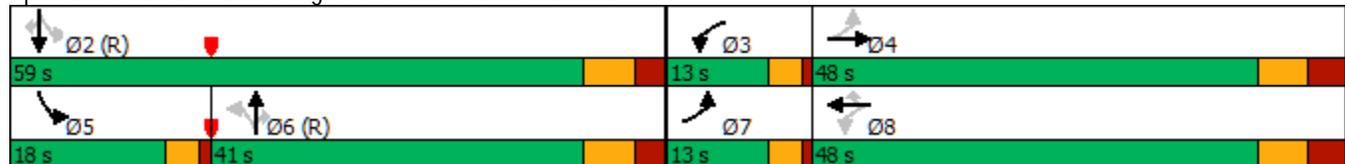
PM peak hour
 2028 total future

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.44	0.33		0.44	0.33	0.33	0.28	0.28	0.28	0.46	0.43	0.43
v/c Ratio	1.11	0.78		1.24	1.19	1.07	0.97	1.01	0.48	1.21	0.46	0.24
Control Delay	125.0	42.1		164.1	135.8	79.7	102.9	74.7	11.9	153.0	25.6	3.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	125.0	42.1		164.1	135.8	79.7	102.9	74.7	11.9	153.0	25.6	3.9
LOS	F	D		F	F	E	F	E	B	F	C	A
Approach Delay		61.5			116.0			65.5			60.4	
Approach LOS		E			F			E			E	
Queue Length 50th (m)	-44.3	103.2		-60.5	-222.0	-164.0	45.4	-129.8	13.1	-94.8	63.5	0.0
Queue Length 95th (m)	#95.7	134.5		#117.7	#297.9	#242.2	#93.8	#175.8	39.0	#157.2	80.7	13.2
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	65.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	196	918		228	627	728	190	966	624	304	1520	729
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.78		1.24	1.19	1.07	0.97	1.01	0.48	1.21	0.46	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 39 (33%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.24
 Intersection Signal Delay: 80.4
 Intersection LOS: F
 Intersection Capacity Utilization 124.5%
 ICU Level of Service H
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

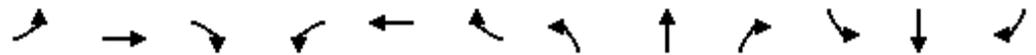
PM peak hour
 2028 total future



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	532	35	157	481	189	95	1210	231	97	690	130
Future Volume (vph)	265	532	35	157	481	189	95	1210	231	97	690	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.99						
Frt		0.991				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	1884	0	1636	1842	1633	1708	3579	1670	1655	3421	1617
Flt Permitted	0.118			0.314			0.378			0.091		
Satd. Flow (perm)	224	1884	0	541	1842	1612	679	3579	1670	159	3421	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				125			154			135
Link Speed (k/h)		60			60			70				70
Link Distance (m)		129.9			1758.6			451.2			794.7	
Travel Time (s)		7.8			105.5			23.2			40.9	
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	3%	2%	0%	1%	2%	1%	3%	2%	1%
Adj. Flow (vph)	276	554	36	164	501	197	99	1260	241	101	719	135
Shared Lane Traffic (%)												
Lane Group Flow (vph)	276	590	0	164	501	197	99	1260	241	101	719	135
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		8	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	17.5		38.5	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	16.0	37.5		37.5	37.5	37.5	47.5	47.5	47.5	11.0	47.5	47.5
Total Split (%)	14.3%	33.5%		33.5%	33.5%	33.5%	42.4%	42.4%	42.4%	9.8%	42.4%	42.4%
Maximum Green (s)	12.0	30.0		30.0	30.0	30.0	40.0	40.0	40.0	7.0	40.0	40.0
Yellow Time (s)	3.0	4.5		4.5	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	4.0	7.5		7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)				24.0	24.0	24.0	22.0	22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	0
Act Effect Green (s)	49.5	46.0		30.0	30.0	30.0	40.0	40.0	40.0	54.5	51.0	51.0
Actuated g/C Ratio	0.44	0.41		0.27	0.27	0.27	0.36	0.36	0.36	0.49	0.46	0.46

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

PM peak hour
 2028 total future

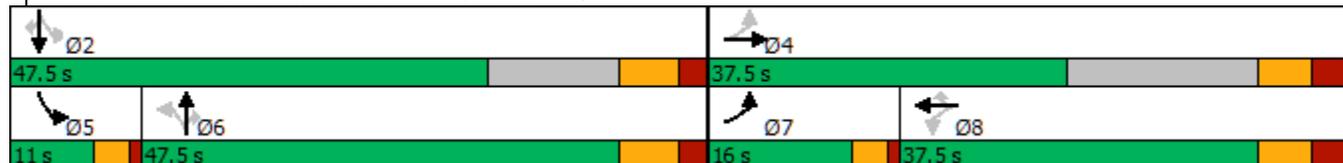


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	1.03	0.76		1.14	1.02	0.38	0.41	0.99	0.35	0.59	0.46	0.17
Control Delay	90.9	35.8		156.3	86.0	15.1	33.5	58.2	11.2	31.5	22.3	3.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.9	35.8		156.3	86.0	15.1	33.5	58.2	11.2	31.5	22.3	3.5
LOS	F	D		F	F	B	C	E	B	C	C	A
Approach Delay		53.3			83.2			49.6			20.6	
Approach LOS		D			F			D			C	
Queue Length 50th (m)	-49.4	113.7		-44.0	-118.7	12.7	17.0	150.2	13.5	12.3	58.5	0.0
Queue Length 95th (m)	#104.2	159.7		#87.7	#188.4	33.1	34.1	#200.4	33.2	#26.8	75.3	10.8
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	268	776		144	493	523	242	1278	695	170	1557	809
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.76		1.14	1.02	0.38	0.41	0.99	0.35	0.59	0.46	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 112
 Actuated Cycle Length: 112
 Natural Cycle: 120
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.14
 Intersection Signal Delay: 50.6
 Intersection LOS: D
 Intersection Capacity Utilization 100.2%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad



HCM Unsignalized Intersection Capacity Analysis
 330: Willow Farm Lane/Collector Road & St. John's Sideroad

PM peak hour
 2028 total future

																
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR				
Lane Configurations																
Traffic Volume (veh/h)	57	762	6	60	915	71	5	3	46	75	3	43				
Future Volume (Veh/h)	57	762	6	60	915	71	5	3	46	75	3	43				
Sign Control	Free			Free			Stop			Stop						
Grade	0%			0%			0%			0%						
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89				
Hourly flow rate (vph)	64	856	7	67	1028	80	6	3	52	84	3	48				
Pedestrians																
Lane Width (m)																
Walking Speed (m/s)																
Percent Blockage																
Right turn flare (veh)																
Median type	None			None												
Median storage (veh)																
Upstream signal (m)																
pX, platoon unblocked																
vC, conflicting volume	1108			863			2196			2226			856	2200	2153	1028
vC1, stage 1 conf vol																
vC2, stage 2 conf vol																
vCu, unblocked vol	1108			863			2196			2226			856	2200	2153	1028
tC, single (s)	4.1			4.1			7.1			6.5			6.2	7.1	6.5	6.2
tC, 2 stage (s)																
tF (s)	2.2			2.2			3.5			4.0			3.3	3.5	4.0	3.3
p0 queue free %	90			91			73			92			86	0	92	83
cM capacity (veh/h)	638			788			22			36			360	23	40	287
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2							
Volume Total	64	856	7	67	1028	80	61	84	51							
Volume Left	64	0	0	67	0	0	6	84	0							
Volume Right	0	0	7	0	0	80	52	0	48							
cSH	638	1700	1700	788	1700	1700	123	23	210							
Volume to Capacity	0.10	0.50	0.00	0.09	0.60	0.05	0.50	3.72	0.24							
Queue Length 95th (m)	2.7	0.0	0.0	2.2	0.0	0.0	18.3	Err	7.3							
Control Delay (s)	11.3	0.0	0.0	10.0	0.0	0.0	60.3	Err	27.5							
Lane LOS	B			A			F			D						
Approach Delay (s)	0.8			0.6			60.3			6232.0						
Approach LOS							F			F						
Intersection Summary																
Average Delay	368.3															
Intersection Capacity Utilization	67.3%			ICU Level of Service			C									
Analysis Period (min)	15															

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

AM peak hour
2023 total future (mitigated)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	134	708	193	183	479	281	89	497	248	538	754	180
Future Volume (vph)	134	708	193	183	479	281	89	497	248	538	754	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	80.0		90.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.85	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00					0.98
Frt		0.968				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3056	0	1708	1845	1512	1652	3330	1670	*2068	3444	1516
Flt Permitted	0.154			0.093			0.334			0.201		
Satd. Flow (perm)	261	3056	0	167	1845	1512	580	3330	1670	343	3444	1490
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23				267			139			202
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		448.3			341.9			505.9			608.7	
Travel Time (s)		26.9			20.5			30.4			36.5	
Confl. Peds. (#/hr)			2	2			4					4
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	7%	2%	2%	1%	3%	8%	2%	6%	1%	4%	6%	3%
Adj. Flow (vph)	151	796	217	206	538	316	100	558	279	604	847	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	1013	0	206	538	316	100	558	279	604	847	202
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	25.0	25.0	25.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	39.5	39.5	39.5	11.0	39.5	39.5
Total Split (s)	11.0	50.0		12.0	51.0	51.0	34.0	34.0	34.0	34.0	68.0	68.0
Total Split (%)	8.5%	38.5%		9.2%	39.2%	39.2%	26.2%	26.2%	26.2%	26.2%	52.3%	52.3%
Maximum Green (s)	7.0	42.0		8.0	43.0	43.0	26.5	26.5	26.5	30.0	60.5	60.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	3.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
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
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0	25.0	25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		0			0	0	5	5	5		5	5
Act Effct Green (s)	53.0	42.0		55.0	43.0	43.0	26.5	26.5	26.5	64.0	60.5	60.5
Actuated g/C Ratio	0.41	0.32		0.42	0.33	0.33	0.20	0.20	0.20	0.49	0.47	0.47

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

AM peak hour
2023 total future (mitigated)

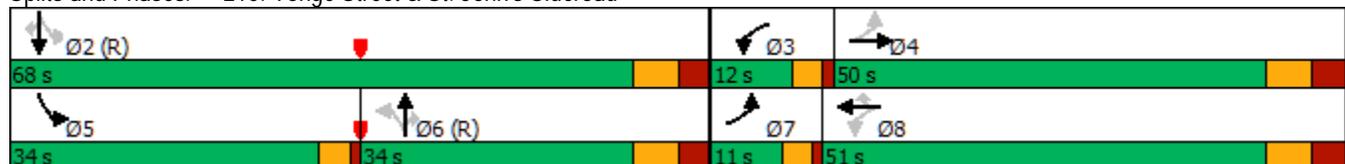


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.84	1.01		1.25	0.88	0.47	0.85	0.82	0.62	1.07	0.53	0.25
Control Delay	57.7	67.0		178.7	58.5	8.8	100.4	60.7	29.8	90.4	16.0	1.0
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	67.0		178.7	58.5	8.8	100.4	60.7	29.8	90.4	16.0	1.0
LOS	E	E		F	E	A	F	E	C	F	B	A
Approach Delay		65.8			67.0			55.7			41.3	
Approach LOS		E			E			E			D	
Queue Length 50th (m)	24.1	~169.2		~52.0	136.8	9.1	26.2	76.4	34.2	~148.7	43.5	0.3
Queue Length 95th (m)	m#41.3	#211.1		#102.0	#197.7	32.7	#59.9	97.1	64.3m#209.7	m49.9	m0.7	
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	80.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	179	1002		165	610	678	118	678	451	566	1602	801
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.84	1.01		1.25	0.88	0.47	0.85	0.82	0.62	1.07	0.53	0.25

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 35 (27%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 55.7
 Intersection LOS: E
 Intersection Capacity Utilization 106.5%
 ICU Level of Service G
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

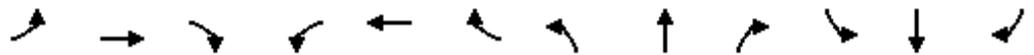
AM peak hour
 2023 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	432	50	173	474	50	50	600	76	161	1100	280
Future Volume (vph)	90	432	50	173	474	50	50	600	76	161	1100	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00										
Frt		0.984				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1819	0	1668	1807	1601	1675	3510	1622	1688	3388	1617
Flt Permitted	0.434			0.158			0.161			0.269		
Satd. Flow (perm)	794	1819	0	277	1807	1601	284	3510	1622	478	3388	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				87			127			240
Link Speed (k/h)		60			60			70				70
Link Distance (m)		129.9			1758.6			451.2			794.7	
Travel Time (s)		7.8			105.5			23.2			40.9	
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	2%	1%	4%	2%	3%	4%	4%	1%	3%	1%
Adj. Flow (vph)	95	455	53	182	499	53	53	632	80	169	1158	295
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	508	0	182	499	53	53	632	80	169	1158	295
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	4	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	17.5	17.5		11.0	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	42.5	42.5		11.0	42.5	42.5	42.5	42.5	42.5	11.0	42.5	42.5
Total Split (%)	39.7%	39.7%		10.3%	39.7%	39.7%	39.7%	39.7%	39.7%	10.3%	39.7%	39.7%
Maximum Green (s)	35.0	35.0		7.0	35.0	35.0	35.0	35.0	35.0	7.0	35.0	35.0
Yellow Time (s)	4.5	4.5		3.0	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	7.5	7.5		4.0	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)				24.0	24.0	22.0	22.0	22.0			22.0	22.0
Pedestrian Calls (#/hr)				0	0	0	0	0			0	0
Act Effct Green (s)	30.4	30.4		45.0	41.5	41.5	30.0	30.0	30.0	44.7	41.1	41.1
Actuated g/C Ratio	0.31	0.31		0.46	0.42	0.42	0.31	0.31	0.31	0.46	0.42	0.42

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

AM peak hour
 2023 total future (mitigated)

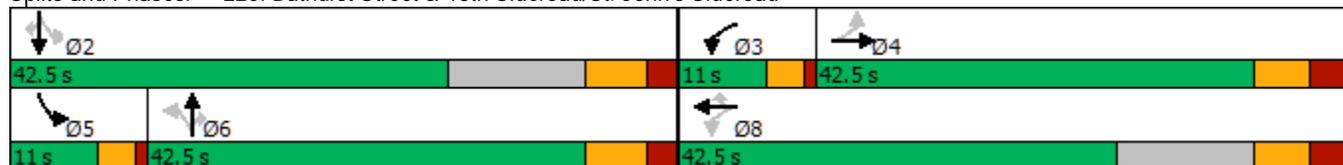


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.39	0.89		0.80	0.65	0.07	0.62	0.59	0.14	0.55	0.81	0.36
Control Delay	32.6	51.9		45.4	27.6	1.5	62.6	31.5	1.8	24.8	30.9	5.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	51.9		45.4	27.6	1.5	62.6	31.5	1.8	24.8	30.9	5.8
LOS	C	D		D	C	A	E	C	A	C	C	A
Approach Delay		48.9			30.2			30.6			25.7	
Approach LOS		D			C			C			C	
Queue Length 50th (m)	15.2	98.0		22.2	80.2	0.0	9.5	59.1	0.0	21.3	112.3	6.9
Queue Length 95th (m)	31.5	#160.5		#54.1	121.5	2.9	#29.1	78.1	3.3	35.8	141.8	24.1
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	287	662		228	859	807	102	1270	668	306	1612	895
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.77		0.80	0.58	0.07	0.52	0.50	0.12	0.55	0.72	0.33

Intersection Summary

Area Type: Other
 Cycle Length: 107
 Actuated Cycle Length: 97.8
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 31.3
 Intersection LOS: C
 Intersection Capacity Utilization 105.4%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad



Lanes, Volumes, Timings
330: Willow Farm Lane/Street "A" & St. John's Sideroad

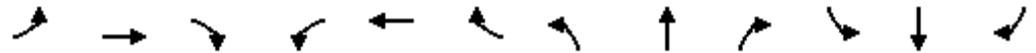
AM peak hour
2023 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	890	3	20	666	61	1	4	65	80	4	47
Future Volume (vph)	47	890	3	20	666	61	1	4	65	80	4	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.7	3.7	3.4	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
Storage Length (m)	15.0		15.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850		0.874			0.861	
Fl _t Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1685	1883	1633	1681	1801	1561	0	1647	0	1825	1654	0
Fl _t Permitted	0.306			0.162				0.996		0.709		
Satd. Flow (perm)	543	1883	1633	287	1801	1561	0	1642	0	1362	1654	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			50			65		45				50
Link Speed (k/h)		60			60			40				50
Link Distance (m)		1758.6			448.3			195.4				116.6
Travel Time (s)		105.5			26.9			17.6				8.4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	0%	5%	2%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	50	947	3	21	709	65	1	4	69	85	4	50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	50	947	3	21	709	65	0	74	0	85	54	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	33.0	33.0		33.0	33.0	
Total Split (s)	32.0	32.0	32.0	32.0	32.0	32.0	33.0	33.0		33.0	33.0	
Total Split (%)	49.2%	49.2%	49.2%	49.2%	49.2%	49.2%	50.8%	50.8%		50.8%	50.8%	
Maximum Green (s)	26.0	26.0	26.0	26.0	26.0	26.0	27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0		3.0	3.0	
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)	6.0	6.0	6.0	6.0	6.0	6.0		6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0	15.0	20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	5	5		5	5	
Act Effct Green (s)	43.8	43.8	43.8	43.8	43.8	43.8		13.6		13.6	13.6	
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.67	0.67		0.21		0.21	0.21	
v/c Ratio	0.14	0.75	0.00	0.11	0.58	0.06		0.20		0.30	0.14	
Control Delay	9.8	18.1	0.0	7.0	14.5	2.1		10.3		22.4	6.7	

Lanes, Volumes, Timings
 330: Willow Farm Lane/Street "A" & St. John's Sideroad

AM peak hour
 2023 total future (mitigated)

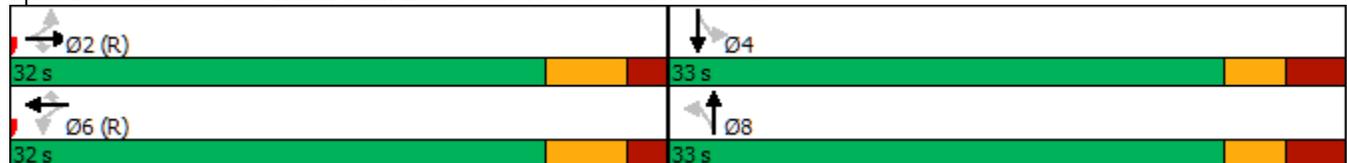


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	9.8	18.1	0.0	7.0	14.5	2.1		10.3		22.4	6.7	
LOS	A	B	A	A	B	A		B		C	A	
Approach Delay		17.6			13.3			10.3			16.3	
Approach LOS		B			B			B			B	
Queue Length 50th (m)	2.0	67.9	0.0	0.6	138.1	0.7		3.2		9.9	0.5	
Queue Length 95th (m)	11.7	#221.2	0.0	m3.9m#203.5	m5.5			8.9		14.6	6.0	
Internal Link Dist (m)		1734.6			424.3			171.4			92.6	
Turn Bay Length (m)	15.0		15.0	30.0								
Base Capacity (vph)	366	1268	1116	193	1213	1072		708		565	716	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.14	0.75	0.00	0.11	0.58	0.06		0.10		0.15	0.08	

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 3 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 15.6
 Intersection LOS: B
 Intersection Capacity Utilization 67.9%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 330: Willow Farm Lane/Street "A" & St. John's Sideroad



Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

AM peak hour
2028 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	824	238	179	567	291	116	501	250	573	782	212
Future Volume (vph)	154	824	238	179	567	291	116	501	250	573	782	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	65.0		50.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.85	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00					1.00					0.98
Frt		0.966				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1612	3049	0	1708	1845	1512	1652	3330	1670	*2068	3444	1516
Flt Permitted	0.089			0.087			0.273			0.197		
Satd. Flow (perm)	151	3049	0	156	1845	1512	474	3330	1670	336	3444	1490
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26				242			156			238
Link Speed (k/h)		60			60			60				60
Link Distance (m)		448.3			341.9			505.9				608.7
Travel Time (s)		26.9			20.5			30.4				36.5
Confl. Peds. (#/hr)			2	2			4					4
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	7%	2%	2%	1%	3%	8%	2%	6%	1%	4%	6%	3%
Adj. Flow (vph)	173	926	267	201	637	327	130	563	281	644	879	238
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	1193	0	201	637	327	130	563	281	644	879	238
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	7.0	25.0	25.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	11.0	39.5	39.5	11.0	39.5	39.5
Total Split (s)	13.0	53.0		14.0	54.0	54.0	11.0	34.0	34.0	29.0	52.0	52.0
Total Split (%)	10.0%	40.8%		10.8%	41.5%	41.5%	8.5%	26.2%	26.2%	22.3%	40.0%	40.0%
Maximum Green (s)	9.0	45.0		10.0	46.0	46.0	7.0	26.5	26.5	25.0	44.5	44.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	4.0	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes								
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
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0		25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		0			0	0		5	5		5	5
Act Effct Green (s)	58.0	45.0		60.0	46.0	46.0	37.0	26.5	26.5	59.0	44.5	44.5
Actuated g/C Ratio	0.45	0.35		0.46	0.35	0.35	0.28	0.20	0.20	0.45	0.34	0.34

Lanes, Volumes, Timings
 210: Yonge Street & St. John's Sideroad

AM peak hour
 2028 total future (mitigated)

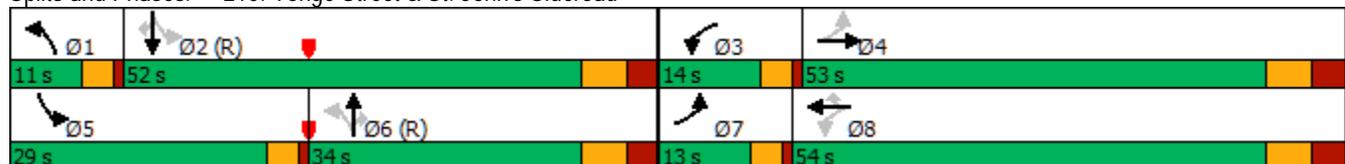


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	1.03	1.11		1.05	0.98	0.47	0.66	0.83	0.61	1.33	0.75	0.36
Control Delay	101.2	97.1		110.4	71.8	11.0	42.7	61.2	26.5	199.1	49.0	13.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.2	97.1		110.4	71.8	11.0	42.7	61.2	26.5	199.1	49.0	13.9
LOS	F	F		F	E	B	D	E	C	F	D	B
Approach Delay		97.6			61.4			48.7			99.1	
Approach LOS		F			E			D			F	
Queue Length 50th (m)	-33.6	-211.8		-41.8	168.7	15.6	20.4	77.2	30.1	-204.5	100.5	11.1
Queue Length 95th (m)	m#70.8	#258.5		#91.3	#243.5	41.4	#35.4	#99.2	59.9m#267.0	m124.3	m26.4	
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	65.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	168	1072		191	652	691	198	678	464	485	1178	666
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	1.11		1.05	0.98	0.47	0.66	0.83	0.61	1.33	0.75	0.36

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.33
 Intersection Signal Delay: 81.1 Intersection LOS: F
 Intersection Capacity Utilization 112.5% ICU Level of Service H
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

AM peak hour
 2028 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	504	55	204	511	68	55	610	111	197	1205	300
Future Volume (vph)	95	504	55	204	511	68	55	610	111	197	1205	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00										
Frt		0.985				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	1821	0	1668	1807	1601	1675	3510	1622	1688	3388	1617
Flt Permitted	0.397			0.091			0.099			0.273		
Satd. Flow (perm)	726	1821	0	160	1807	1601	175	3510	1622	485	3388	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5				73			117			204
Link Speed (k/h)		60			60			70				70
Link Distance (m)		129.9			1758.6			451.2			794.7	
Travel Time (s)		7.8			105.5			23.2			40.9	
Confl. Bikes (#/hr)			1									
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	2%	1%	4%	2%	3%	4%	4%	1%	3%	1%
Adj. Flow (vph)	100	531	58	215	538	72	58	642	117	207	1268	316
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	589	0	215	538	72	58	642	117	207	1268	316
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	4	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	17.5	17.5		11.0	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	47.5	47.5		16.0	47.5	47.5	52.5	52.5	52.5	11.0	52.5	52.5
Total Split (%)	37.4%	37.4%		12.6%	37.4%	37.4%	41.3%	41.3%	41.3%	8.7%	41.3%	41.3%
Maximum Green (s)	40.0	40.0		12.0	40.0	40.0	45.0	45.0	45.0	7.0	45.0	45.0
Yellow Time (s)	4.5	4.5		3.0	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	3.0	3.0		1.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	7.5	7.5		4.0	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lag	Lag		Lead			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)				24.0	24.0	22.0	22.0	22.0			22.0	22.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	0
Act Effct Green (s)	40.1	40.1		59.6	56.1	56.1	42.7	42.7	42.7	57.2	53.7	53.7
Actuated g/C Ratio	0.32	0.32		0.48	0.45	0.45	0.34	0.34	0.34	0.46	0.43	0.43

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

AM peak hour
 2028 total future (mitigated)

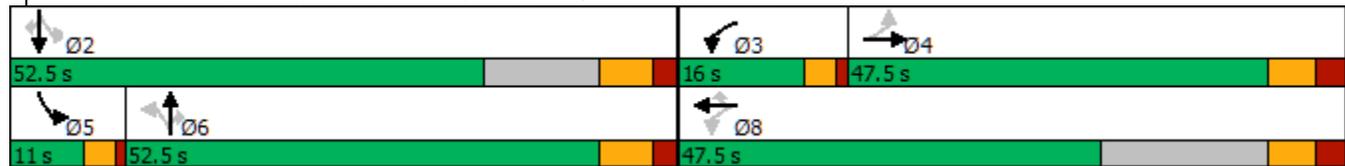


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.43	1.00		0.97	0.66	0.09	0.97	0.54	0.19	0.72	0.87	0.39
Control Delay	41.4	80.6		85.2	32.4	4.8	151.9	34.8	5.6	37.9	40.0	9.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	80.6		85.2	32.4	4.8	151.9	34.8	5.6	37.9	40.0	9.6
LOS	D	F		F	C	A	F	C	A	D	D	A
Approach Delay		74.9			43.8			38.9			34.4	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	20.9	~163.5		40.4	110.8	0.0	14.7	69.8	0.0	32.3	154.1	17.4
Queue Length 95th (m)	39.7	#237.4		#93.4	152.7	8.7	#44.9	88.8	13.1	#51.9	186.3	39.6
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	232	587		221	811	759	63	1267	660	289	1521	839
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	1.00		0.97	0.66	0.09	0.92	0.51	0.18	0.72	0.83	0.38

Intersection Summary

Area Type: Other
 Cycle Length: 127
 Actuated Cycle Length: 124.8
 Natural Cycle: 100
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 43.9
 Intersection LOS: D
 Intersection Capacity Utilization 113.2%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad



Lanes, Volumes, Timings
 330: Willow Farm Lane/Street "A" & St. John's Sideroad

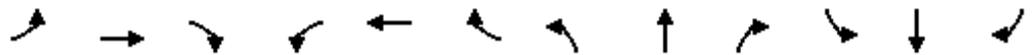
AM peak hour
 2028 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	945	3	20	681	194	1	14	65	206	14	113
Future Volume (vph)	155	945	3	20	681	194	1	14	65	206	14	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.7	3.7	3.4	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
Storage Length (m)	15.0		15.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850		0.890			0.867	
Fl _t Protected	0.950			0.950				0.999		0.950		
Satd. Flow (prot)	1685	1883	1633	1681	1801	1561	0	1681	0	1825	1666	0
Fl _t Permitted	0.310			0.167				0.998		0.691		
Satd. Flow (perm)	550	1883	1633	295	1801	1561	0	1679	0	1327	1666	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			25			206		69			120	
Link Speed (k/h)		60			60			40			50	
Link Distance (m)		1758.6			448.3			195.4			116.6	
Travel Time (s)		105.5			26.9			17.6			8.4	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	0%	5%	2%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	165	1005	3	21	724	206	1	15	69	219	15	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	165	1005	3	21	724	206	0	85	0	219	135	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	33.0	33.0		33.0	33.0	
Total Split (s)	93.0	93.0	93.0	93.0	93.0	93.0	37.0	37.0		37.0	37.0	
Total Split (%)	71.5%	71.5%	71.5%	71.5%	71.5%	71.5%	28.5%	28.5%		28.5%	28.5%	
Maximum Green (s)	87.0	87.0	87.0	87.0	87.0	87.0	31.0	31.0		31.0	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0		3.0	3.0	
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)	6.0	6.0	6.0	6.0	6.0	6.0		6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0	15.0	20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	5	5		5	5	
Act Effct Green (s)	92.7	92.7	92.7	92.7	92.7	92.7		25.3		25.3	25.3	
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71	0.71		0.19		0.19	0.19	
v/c Ratio	0.42	0.75	0.00	0.10	0.56	0.18		0.22		0.85	0.32	
Control Delay	12.8	17.1	0.0	5.6	5.9	0.6		14.0		78.1	11.2	

Lanes, Volumes, Timings
 330: Willow Farm Lane/Street "A" & St. John's Sideroad

AM peak hour
 2028 total future (mitigated)



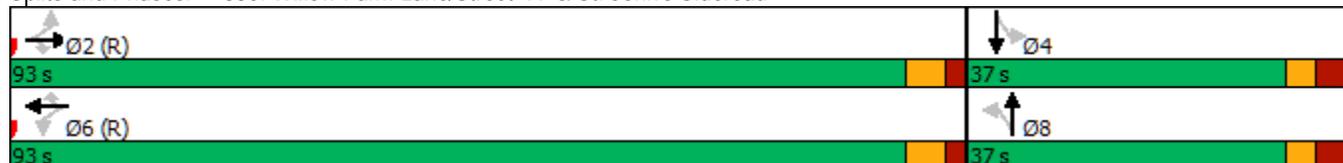
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	12.8	17.1	0.0	5.6	5.9	0.6		14.0		78.1	11.2	
LOS	B	B	A	A	A	A		B		E	B	
Approach Delay		16.5			4.8			14.0			52.6	
Approach LOS		B			A			B			D	
Queue Length 50th (m)	16.9	154.4	0.0	0.9	31.9	0.0		3.5		57.0	3.3	
Queue Length 95th (m)	37.2	243.9	0.0	m1.7	m51.7	m0.4		17.4		84.4	20.1	
Internal Link Dist (m)		1734.6			424.3			171.4			92.6	
Turn Bay Length (m)	15.0		15.0	30.0								
Base Capacity (vph)	392	1343	1172	210	1284	1172		452		316	488	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.42	0.75	0.00	0.10	0.56	0.18		0.19		0.69	0.28	

Intersection Summary

Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	130
Offset:	31 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	17.0
Intersection LOS:	B
Intersection Capacity Utilization	99.5%
ICU Level of Service	F
Analysis Period (min)	15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 330: Willow Farm Lane/Street "A" & St. John's Sideroad



Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

PM peak hour
2023 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	526	91	259	652	697	171	889	271	340	648	153
Future Volume (vph)	191	526	91	259	652	697	171	889	271	340	648	153
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	80.0		90.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.85	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00		0.98	1.00		0.99	1.00		0.98
Frt		0.978				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1725	3099	0	1708	1881	1633	1685	3461	1670	*2068	3544	1516
Flt Permitted	0.108			0.207			0.392			0.107		
Satd. Flow (perm)	196	3099	0	372	1881	1608	694	3461	1648	186	3544	1488
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				294			219			161
Link Speed (k/h)		60			60			60				60
Link Distance (m)		448.3			341.9			505.9			608.7	
Travel Time (s)		26.9			20.5			30.4			36.5	
Confl. Peds. (#/hr)	2		3	3		2	5		1	1		5
Confl. Bikes (#/hr)						2						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	2%	1%	2%	3%	3%
Adj. Flow (vph)	201	554	96	273	686	734	180	936	285	358	682	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	650	0	273	686	734	180	936	285	358	682	161
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	32.0	32.0	32.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	39.5	39.5	39.5	11.0	39.5	39.5
Total Split (s)	12.0	45.0		16.0	49.0	49.0	41.0	41.0	41.0	18.0	59.0	59.0
Total Split (%)	10.0%	37.5%		13.3%	40.8%	40.8%	34.2%	34.2%	34.2%	15.0%	49.2%	49.2%
Maximum Green (s)	8.0	37.0		12.0	41.0	41.0	33.5	33.5	33.5	14.0	51.5	51.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	4.5	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	3.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes								
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
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0	25.0	25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		5			5	5	5	5	5		5	5
Act Efect Green (s)	49.0	37.0		57.0	41.0	41.0	33.5	33.5	33.5	55.0	51.5	51.5

Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

PM peak hour
2023 total future (mitigated)

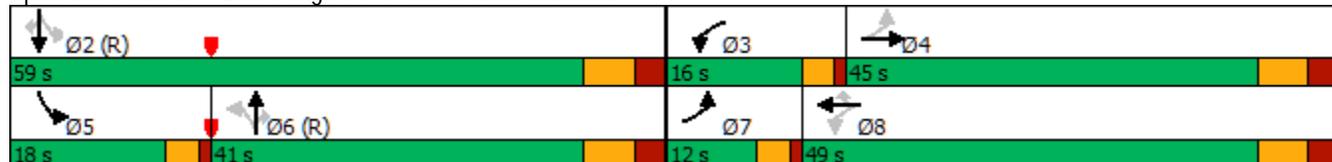


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.41	0.31		0.48	0.34	0.34	0.28	0.28	0.28	0.46	0.43	0.43
v/c Ratio	1.11	0.67		0.88	1.07	0.99	0.93	0.97	0.46	1.18	0.45	0.22
Control Delay	129.0	38.0		51.1	93.7	54.7	92.8	65.4	11.7	140.8	25.4	3.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	129.0	38.0		51.1	93.7	54.7	92.8	65.4	11.7	140.8	25.4	3.9
LOS	F	D		D	F	D	F	E	B	F	C	A
Approach Delay		59.5			69.9			58.0			56.9	
Approach LOS		E			E			E			E	
Queue Length 50th (m)	-41.0	82.1		41.2	-188.1	124.2	43.5	120.7	12.3	-89.6	61.7	0.0
Queue Length 95th (m)	#91.6	82.8		#83.6	#262.4	#211.9	#89.8	#165.0	37.1	#150.9	78.5	12.9
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	80.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	181	965		310	642	742	193	966	617	304	1520	730
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.11	0.67		0.88	1.07	0.99	0.93	0.97	0.46	1.18	0.45	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 39 (33%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.18
 Intersection Signal Delay: 61.9 Intersection LOS: E
 Intersection Capacity Utilization 120.7% ICU Level of Service H
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

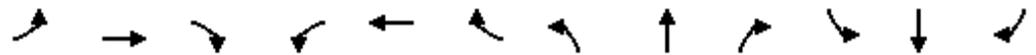
PM peak hour
 2023 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	507	35	139	435	169	85	1105	221	92	670	120
Future Volume (vph)	250	507	35	139	435	169	85	1105	221	92	670	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.99						
Frt		0.990				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	1882	0	1636	1842	1633	1708	3579	1670	1655	3421	1617
Flt Permitted	0.173			0.337			0.386			0.090		
Satd. Flow (perm)	329	1882	0	580	1842	1612	694	3579	1670	157	3421	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				127			155			125
Link Speed (k/h)		60			60			70				70
Link Distance (m)		129.9			1758.6			451.2			794.7	
Travel Time (s)		7.8			105.5			23.2			40.9	
Confl. Bikes (#/hr)							1					
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	3%	2%	0%	1%	2%	1%	3%	2%	1%
Adj. Flow (vph)	260	528	36	145	453	176	89	1151	230	96	698	125
Shared Lane Traffic (%)												
Lane Group Flow (vph)	260	564	0	145	453	176	89	1151	230	96	698	125
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4			8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		8	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		10.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	17.5		38.5	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	14.0	42.5		42.5	42.5	42.5	47.5	47.5	47.5	11.0	47.5	47.5
Total Split (%)	12.2%	37.0%		37.0%	37.0%	37.0%	41.3%	41.3%	41.3%	9.6%	41.3%	41.3%
Maximum Green (s)	10.0	35.0		35.0	35.0	35.0	40.0	40.0	40.0	7.0	40.0	40.0
Yellow Time (s)	3.0	4.5		4.5	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	3.0		3.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	4.0	7.5		7.5	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)				7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)				24.0	24.0	24.0	22.0	22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)				0	0	0	0	0	0		0	0
Act Effct Green (s)	48.7	45.2		31.1	31.1	31.1	40.3	40.3	40.3	52.3	48.8	48.8
Actuated g/C Ratio	0.45	0.41		0.29	0.29	0.29	0.37	0.37	0.37	0.48	0.45	0.45

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

PM peak hour
 2023 total future (mitigated)

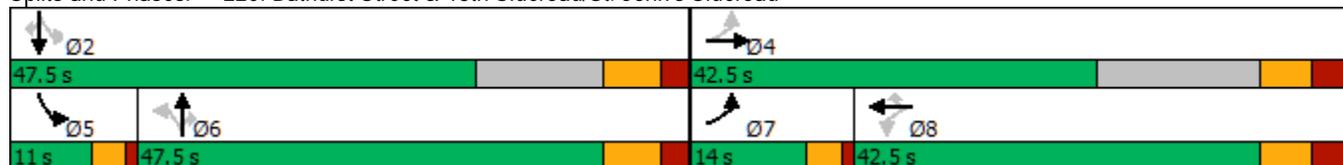


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.92	0.72		0.88	0.86	0.32	0.35	0.87	0.32	0.56	0.46	0.16
Control Delay	60.4	33.0		83.9	55.0	11.6	32.4	41.8	10.8	30.0	22.5	3.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	33.0		83.9	55.0	11.6	32.4	41.8	10.8	30.0	22.5	3.9
LOS	E	C		F	D	B	C	D	B	C	C	A
Approach Delay		41.7			50.5			36.4			20.7	
Approach LOS		D			D			D			C	
Queue Length 50th (m)	38.2	106.6		31.8	98.8	8.3	15.7	137.0	12.0	12.4	59.5	0.0
Queue Length 95th (m)	#82.1	149.4		#70.0	#149.9	25.8	31.4	#180.4	31.5	#24.1	76.4	10.9
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	283	854		187	595	607	256	1322	714	172	1612	828
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.66		0.78	0.76	0.29	0.35	0.87	0.32	0.56	0.43	0.15

Intersection Summary

Area Type: Other
 Cycle Length: 115
 Actuated Cycle Length: 109.1
 Natural Cycle: 100
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 36.6
 Intersection LOS: D
 Intersection Capacity Utilization 97.3%
 ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

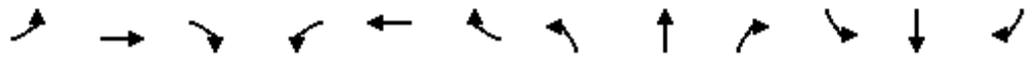


Lanes, Volumes, Timings

330: Willow Farm Lane/Street "A" & St. John's Sideroad

PM peak hour

2023 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	722	6	60	845	71	5	3	46	40	1	18
Future Volume (vph)	57	722	6	60	845	71	5	3	46	40	1	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.7	3.7	3.4	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
Storage Length (m)	15.0		15.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850		0.885			0.857	
Fl _t Protected	0.950			0.950				0.995		0.950		
Satd. Flow (prot)	1685	1902	1633	1765	1818	1561	0	1692	0	1825	1646	0
Fl _t Permitted	0.250			0.310				0.970		0.788		
Satd. Flow (perm)	443	1902	1633	576	1818	1561	0	1649	0	1514	1646	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			27			80		52			20	
Link Speed (k/h)		60			60			40			50	
Link Distance (m)		1758.6			448.3			195.4			116.6	
Travel Time (s)		105.5			26.9			17.6			8.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	64	811	7	67	949	80	6	3	52	45	1	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	811	7	67	949	80	0	61	0	45	21	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	33.0	33.0		33.0	33.0	
Total Split (s)	87.0	87.0	87.0	87.0	87.0	87.0	33.0	33.0		33.0	33.0	
Total Split (%)	72.5%	72.5%	72.5%	72.5%	72.5%	72.5%	27.5%	27.5%		27.5%	27.5%	
Maximum Green (s)	81.0	81.0	81.0	81.0	81.0	81.0	27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0		3.0	3.0	
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)	6.0	6.0	6.0	6.0	6.0	6.0		6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0	15.0	20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	5	5		5	5	
Act Effct Green (s)	98.9	98.9	98.9	98.9	98.9	98.9		13.5		13.5	13.5	
Actuated g/C Ratio	0.82	0.82	0.82	0.82	0.82	0.82		0.11		0.11	0.11	
v/c Ratio	0.18	0.52	0.01	0.14	0.63	0.06		0.26		0.26	0.10	
Control Delay	5.8	6.8	0.0	1.9	6.2	0.2		17.3		50.2	18.0	

Lanes, Volumes, Timings
 330: Willow Farm Lane/Street "A" & St. John's Sideroad

PM peak hour
 2023 total future (mitigated)



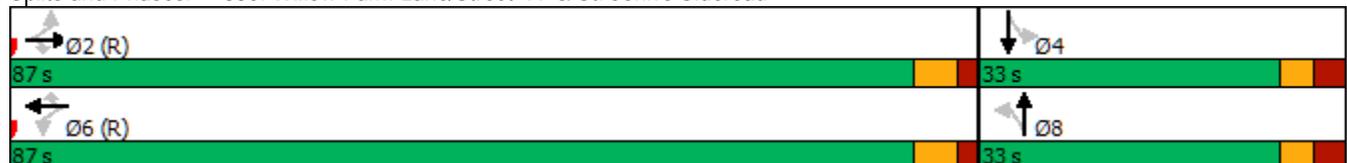
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	5.8	6.8	0.0	1.9	6.2	0.2		17.3		50.2	18.0	
LOS	A	A	A	A	A	A		B		D	B	
Approach Delay		6.6			5.5			17.3			39.9	
Approach LOS		A			A			B			D	
Queue Length 50th (m)	2.7	50.4	0.0	0.5	10.1	0.0		2.1		10.7	0.2	
Queue Length 95th (m)	12.2	139.8	0.1	m3.2	m61.8	m0.1		13.1		19.1	6.9	
Internal Link Dist (m)		1734.6			424.3			171.4			92.6	
Turn Bay Length (m)	15.0		15.0	30.0								
Base Capacity (vph)	365	1567	1350	474	1498	1300		411		340	385	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.18	0.52	0.01	0.14	0.63	0.06		0.15		0.13	0.05	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 83 (69%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 7.4
 Intersection Capacity Utilization 68.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service C

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 330: Willow Farm Lane/Street "A" & St. John's Sideroad



Lanes, Volumes, Timings
210: Yonge Street & St. John's Sideroad

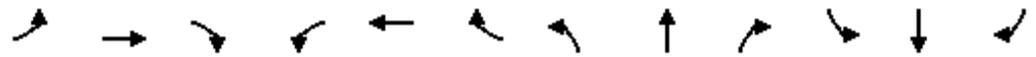
PM peak hour
2028 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	565	111	269	707	742	176	927	283	350	663	163
Future Volume (vph)	207	565	111	269	707	742	176	927	283	350	663	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.2	3.6	3.7	3.2	3.6	3.7	3.0	3.4	4.0	3.0	3.7	3.3
Storage Length (m)	80.0		90.0	70.0		0.0	35.0		100.0	115.0		230.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	*0.85	0.95	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor	1.00	1.00		1.00		0.98	1.00		0.99	1.00		0.98
Frt		0.975				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1725	3090	0	1708	1881	1633	1685	3461	1670	*2068	3544	1516
Flt Permitted	0.108			0.170			0.275			0.107		
Satd. Flow (perm)	196	3090	0	305	1881	1608	487	3461	1648	186	3544	1488
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17				211			238			172
Link Speed (k/h)		60			60			60				60
Link Distance (m)		448.3			341.9			505.9				608.7
Travel Time (s)		26.9			20.5			30.4				36.5
Confl. Peds. (#/hr)	2		3	3		2	5		1	1		5
Confl. Bikes (#/hr)						2						1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	2%	0%	1%	1%	0%	0%	2%	1%	2%	3%	3%
Adj. Flow (vph)	218	595	117	283	744	781	185	976	298	368	698	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	218	712	0	283	744	781	185	976	298	368	698	172
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	7.0	32.0	32.0	7.0	32.0	32.0
Minimum Split (s)	11.0	45.0		11.0	45.0	45.0	11.0	39.5	39.5	11.0	39.5	39.5
Total Split (s)	12.0	45.0		17.0	50.0	50.0	13.0	41.0	41.0	17.0	45.0	45.0
Total Split (%)	10.0%	37.5%		14.2%	41.7%	41.7%	10.8%	34.2%	34.2%	14.2%	37.5%	37.5%
Maximum Green (s)	8.0	37.0		13.0	42.0	42.0	9.0	33.5	33.5	13.0	37.5	37.5
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	3.0	4.5	4.5	3.0	4.5	4.5
All-Red Time (s)	1.0	3.5		1.0	3.5	3.5	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	8.0		4.0	8.0	8.0	4.0	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes								
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
Recall Mode	None	None		None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0			7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0			30.0	30.0		25.0	25.0		25.0	25.0
Pedestrian Calls (#/hr)		5			5	5		5	5		5	5
Act Efect Green (s)	49.0	37.0		58.0	42.0	42.0	46.0	33.5	33.5	54.0	37.5	37.5

Lanes, Volumes, Timings
 210: Yonge Street & St. John's Sideroad

PM peak hour
 2028 total future (mitigated)

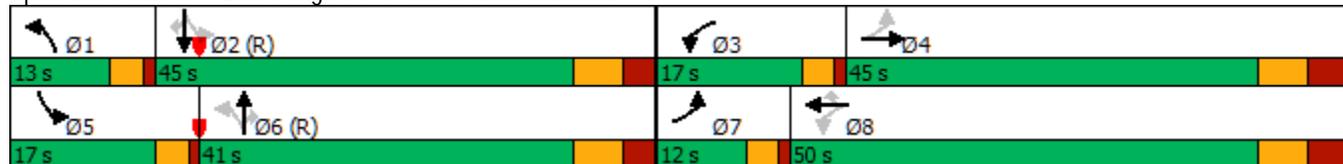


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Actuated g/C Ratio	0.41	0.31		0.48	0.35	0.35	0.38	0.28	0.28	0.45	0.31	0.31
v/c Ratio	1.20	0.74		0.95	1.13	1.12	0.67	1.01	0.47	1.28	0.63	0.30
Control Delay	159.1	39.2		62.9	113.6	98.6	35.4	74.7	10.9	181.3	38.4	5.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	159.1	39.2		62.9	113.6	98.6	35.4	74.7	10.9	181.3	38.4	5.8
LOS	F	D		E	F	F	D	E	B	F	D	A
Approach Delay		67.3			99.2			56.7			76.4	
Approach LOS		E			F			E			E	
Queue Length 50th (m)	-49.8	93.1		42.2	-214.0	-186.5	27.7	-129.8	11.2	-99.4	77.7	0.0
Queue Length 95th (m)	#101.8	101.5		#95.3	#289.8	#264.6	#44.4	#175.8	36.5	#161.8	98.8	16.1
Internal Link Dist (m)		424.3			317.9			481.9			584.7	
Turn Bay Length (m)	80.0			70.0			35.0		100.0	115.0		230.0
Base Capacity (vph)	181	964		299	658	699	276	966	631	287	1107	583
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.20	0.74		0.95	1.13	1.12	0.67	1.01	0.47	1.28	0.63	0.30

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 39 (33%), Referenced to phase 2:SBTL and 6:NBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.28
 Intersection Signal Delay: 77.1
 Intersection LOS: E
 Intersection Capacity Utilization 114.3%
 ICU Level of Service H
 Analysis Period (min) 15
 * User Entered Value
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 210: Yonge Street & St. John's Sideroad



Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

PM peak hour
 2028 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	265	532	35	157	481	189	95	1210	231	97	690	130
Future Volume (vph)	265	532	35	157	481	189	95	1210	231	97	690	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.0	3.5	3.7	3.2	3.7	4.0	3.1	3.3	3.7
Storage Length (m)	30.0		0.0	50.0		50.0	60.0		60.0	60.0		60.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor						0.99						
Frt		0.991				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	1884	0	1636	1842	1633	1708	3579	1670	1655	3421	1617
Flt Permitted	0.103			0.115			0.378			0.082		
Satd. Flow (perm)	196	1884	0	198	1842	1612	679	3579	1670	143	3421	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				145			145			135
Link Speed (k/h)		60			60			70				70
Link Distance (m)		129.9			1758.6			451.2			794.7	
Travel Time (s)		7.8			105.5			23.2			40.9	
Confl. Bikes (#/hr)						1						
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	1%	1%	2%	3%	2%	0%	1%	2%	1%	3%	2%	1%
Adj. Flow (vph)	276	554	36	164	501	197	99	1260	241	101	719	135
Shared Lane Traffic (%)												
Lane Group Flow (vph)	276	590	0	164	501	197	99	1260	241	101	719	135
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	7	4		3	8	8	6	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	7.0	10.0		7.0	10.0	10.0	20.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	17.5		11.0	38.5	38.5	36.5	36.5	36.5	11.0	36.5	36.5
Total Split (s)	18.0	42.5		12.0	42.5	42.5	52.5	52.5	52.5	11.0	52.5	52.5
Total Split (%)	14.5%	34.3%		9.7%	34.3%	34.3%	42.3%	42.3%	42.3%	8.9%	42.3%	42.3%
Maximum Green (s)	14.0	35.0		8.0	35.0	35.0	45.0	45.0	45.0	7.0	45.0	45.0
Yellow Time (s)	3.0	4.5		3.0	4.5	4.5	5.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	3.0		1.0	3.0	3.0	2.5	2.5	2.5	1.0	2.5	2.5
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)	4.0	7.5		4.0	7.5	7.5	7.5	7.5	7.5	4.0	7.5	7.5
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	6.0	6.0	6.0	3.0	6.0	6.0
Recall Mode	None	None		None	None	None	Min	Min	Min	None	Min	Min
Walk Time (s)					7.0	7.0	7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)					24.0	24.0	22.0	22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)					0	0	0	0	0		0	0
Act Effct Green (s)	56.2	40.7		46.2	34.7	34.7	45.0	45.0	45.0	59.5	56.0	56.0
Actuated g/C Ratio	0.45	0.33		0.37	0.28	0.28	0.36	0.36	0.36	0.48	0.45	0.45

Lanes, Volumes, Timings
 220: Bathurst Street & 18th Sideroad/St. John's Sideroad

PM peak hour
 2028 total future (mitigated)

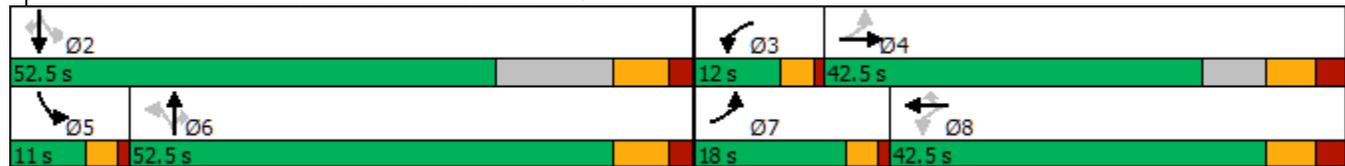


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	1.02	0.95		0.98	0.97	0.35	0.40	0.97	0.34	0.66	0.46	0.17
Control Delay	91.5	66.5		94.0	77.5	12.5	35.6	57.4	12.7	40.2	24.7	3.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	91.5	66.5		94.0	77.5	12.5	35.6	57.4	12.7	40.2	24.7	3.7
LOS	F	E		F	E	B	D	E	B	D	C	A
Approach Delay		74.5			65.8			49.3			23.4	
Approach LOS		E			E			D			C	
Queue Length 50th (m)	-55.0	146.2		25.7	127.0	9.9	18.8	166.1	16.6	14.0	66.0	0.0
Queue Length 95th (m)	#113.4	#220.4		#72.6	#196.9	30.0	36.3	#215.8	37.6	#33.6	83.4	11.5
Internal Link Dist (m)		105.9			1734.6			427.2			770.7	
Turn Bay Length (m)	30.0			50.0		50.0	60.0		60.0	60.0		60.0
Base Capacity (vph)	271	626		167	520	560	247	1301	699	153	1548	806
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.94		0.98	0.96	0.35	0.40	0.97	0.34	0.66	0.46	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 124
 Actuated Cycle Length: 123.7
 Natural Cycle: 120
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 51.9
 Intersection LOS: D
 Intersection Capacity Utilization 98.4%
 ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 220: Bathurst Street & 18th Sideroad/St. John's Sideroad



Lanes, Volumes, Timings
 330: Willow Farm Lane/Street "A" & St. John's Sideroad

PM peak hour
 2028 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	762	6	60	915	71	5	3	46	75	3	43
Future Volume (vph)	57	762	6	60	915	71	5	3	46	75	3	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.0	3.7	3.7	3.4	3.3	3.3	3.7	3.7	3.7	3.7	3.7	3.7
Storage Length (m)	15.0		15.0	30.0		0.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850		0.885			0.859	
Fl _t Protected	0.950			0.950				0.995		0.950		
Satd. Flow (prot)	1685	1902	1633	1765	1818	1561	0	1692	0	1825	1650	0
Fl _t Permitted	0.211			0.286				0.968		0.786		
Satd. Flow (perm)	374	1902	1633	531	1818	1561	0	1646	0	1510	1650	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			27			79		52			48	
Link Speed (k/h)		60			60			40			50	
Link Distance (m)		1758.6			448.3			195.4			116.6	
Travel Time (s)		105.5			26.9			17.6			8.4	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	64	856	7	67	1028	80	6	3	52	84	3	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	856	7	67	1028	80	0	61	0	84	51	0
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Detector Phase	2	2	2	6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	28.0	33.0	33.0		33.0	33.0	
Total Split (s)	87.0	87.0	87.0	87.0	87.0	87.0	33.0	33.0		33.0	33.0	
Total Split (%)	72.5%	72.5%	72.5%	72.5%	72.5%	72.5%	27.5%	27.5%		27.5%	27.5%	
Maximum Green (s)	81.0	81.0	81.0	81.0	81.0	81.0	27.0	27.0		27.0	27.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0		3.0	3.0	
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)	6.0	6.0	6.0	6.0	6.0	6.0		6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	15.0	15.0	15.0	15.0	15.0	15.0	20.0	20.0		20.0	20.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	5	5		5	5	
Act Effct Green (s)	97.7	97.7	97.7	97.7	97.7	97.7		14.7		14.7	14.7	
Actuated g/C Ratio	0.81	0.81	0.81	0.81	0.81	0.81		0.12		0.12	0.12	
v/c Ratio	0.21	0.55	0.01	0.16	0.69	0.06		0.25		0.46	0.21	
Control Delay	6.9	7.7	0.0	3.4	11.1	0.7		16.5		55.2	14.7	

Lanes, Volumes, Timings
 330: Willow Farm Lane/Street "A" & St. John's Sideroad

PM peak hour
 2028 total future (mitigated)



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	6.9	7.7	0.0	3.4	11.1	0.7		16.5		55.2	14.7	
LOS	A	A	A	A	B	A		B		E	B	
Approach Delay		7.6			10.0			16.5			39.9	
Approach LOS		A			A			B			D	
Queue Length 50th (m)	3.1	62.7	0.0	2.4	67.4	0.3		2.1		20.2	0.7	
Queue Length 95th (m)	13.2	153.9	0.1	m4.2	m76.3	m0.2		13.1		32.0	10.8	
Internal Link Dist (m)		1734.6			424.3			171.4			92.6	
Turn Bay Length (m)	15.0		15.0	30.0								
Base Capacity (vph)	304	1549	1335	432	1480	1286		410		339	408	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.21	0.55	0.01	0.16	0.69	0.06		0.15		0.25	0.13	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 82 (68%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 11.0
 Intersection Capacity Utilization 70.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 330: Willow Farm Lane/Street "A" & St. John's Sideroad

