Revised Final Report

Transportation Impact Study - 772 Winston Churchill Boulevard

Prepared for 772 Winston Churchill GP Inc., as General Partner for 772 Winston Churchill Limited Partnership
by IBI Group
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1 Introduction

772 Winston Churchill Boulevard (the 'development site') is located on the west side of Winston Churchill Boulevard, approximately 600 metres south of the intersection of Winston Churchill Boulevard and Royal Windsor Drive in the Town of Oakville, Ontario. The development site is currently vacant.

Previously, IBI Group prepared the report *Transportation Impact Study – 772 Winston Churchill Boulevard* for a proposed commercial development at the development site, dated December 9, 2015 (the "2015 report"). The 2015 report is presented in **Appendix A**.

As the proposed commercial development from the 2015 report was ultimately not constructed, 772 Winston Churchill GP Inc., as General Partner for 772 Winston Churchill Limited Partnership now proposes to construct two industrial buildings totalling 61,463.19 m^2 for warehouse uses (the "proposed development").

The purpose of this report is to analyze the impact that the proposed development will have on the traffic for the surrounding road network. This report takes into consideration future road improvements, background growth, other developments in the area, and examines the location of the proposed site accesses. This report also provides a high-level review of site plan features and examines functional circulation for vehicular traffic.

This report is outlined with the following sections:

- **Section 2** through **Section 4** discuss the transportation impact study (TIS);
- **Section 5** discusses the location and configuration of the proposed site accesses;
- **Section 7** discusses the vehicle swept path analysis; and
- **Section 8** discusses conclusions made and the study recommendations based on the preceding sections.

This report adheres to the scope of investigation developed by IBI Group and discussed with The Regional Municipality of Peel (the applicable road authority under the Regional Municipality of Peel / Regional Municipality of Halton boundary road agreement) on September 24, 2020, and circulated to the Regional Municipality of Halton (collectively, the "Review Agencies"). This correspondence is presented in **Appendix B**.

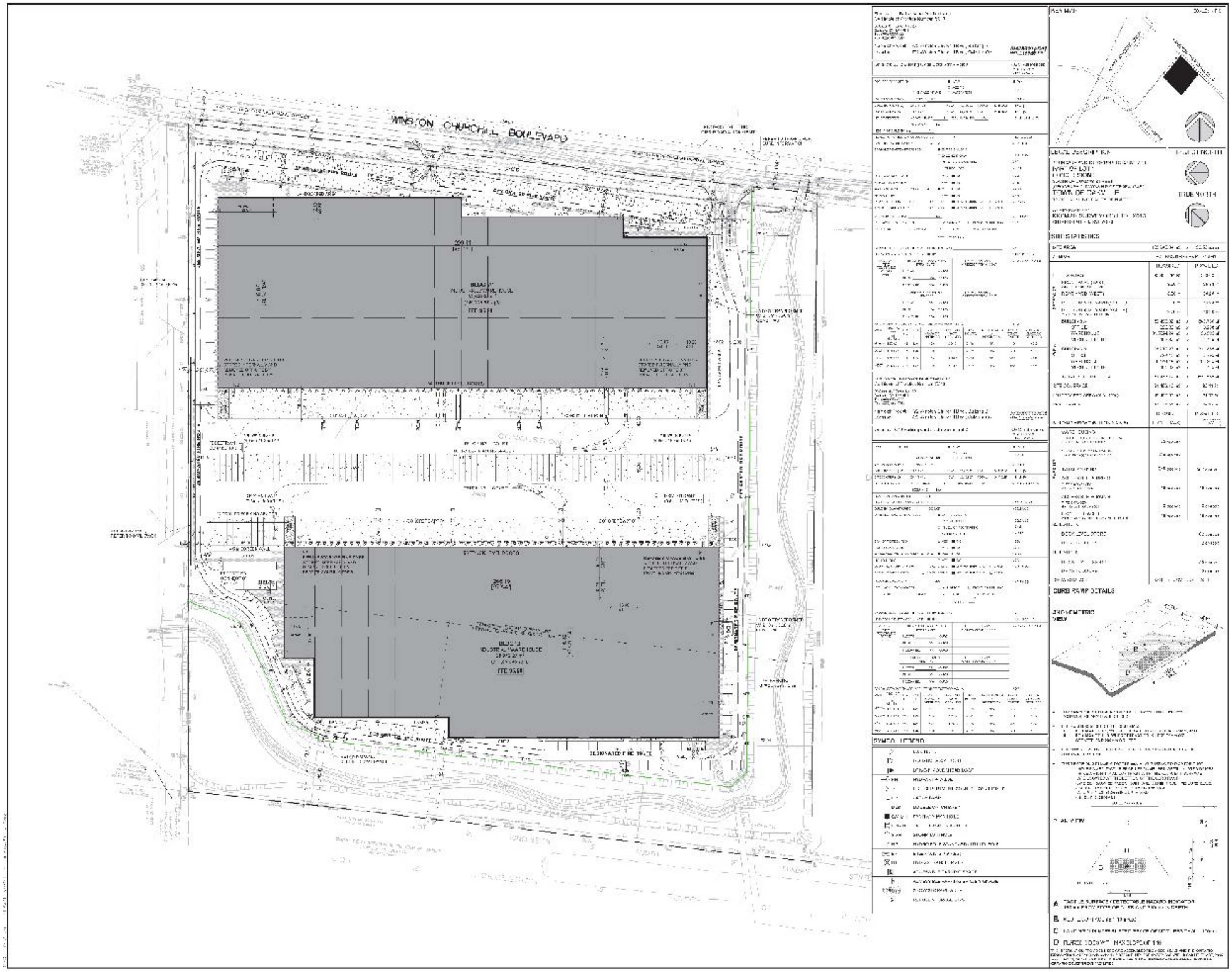
1.1 Project Understanding

1.1.1 Site Description

772 Winston Churchill Boulevard is located at the boundary between the Town of Oakville (Halton Region) and the City of Mississauga (Peel Region), and is currently unoccupied. The proponent is proposing to develop two industrial buildings, occupying a total of 61,463.19 m^2 of gross floor area (GFA) for warehousing uses. Parking is proposed to consist of 373 at-grade parking spaces, accessible via one of two proposed accesses onto Winston Churchill Boulevard.

The proposed site plan is presented in **Exhibit 1-1**. It should be noted that small changes in building sizes may occur as this development moves through the approval process. However, the assumptions in this report are conservative, and differences in traffic operations from these changes are expected to be negligible.

Exhibit 1-1: Proposed Site Plan



1.1.2 Study Area

Based on the location of the proposed development and confirmation with the Review Agencies, it was agreed that the study area would consist of the following intersections, as shown in **Exhibit 1-2**:

1. Winston Churchill Boulevard and Royal Windsor Drive (signalized);
2. Winston Churchill Boulevard and Beryl Road (signalized);
3. Winston Churchill Boulevard and Lakeshore Road (signalized);
4. Winston Churchill Boulevard and Proposed North Site Access (unsignalized); and
5. Winston Churchill Boulevard and Proposed South Site Access / Future Road (signalized).

Exhibit 1-2: Development Study Area

Base Map Source: Conservation Halton. October 6, 2020,
http://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=a2928bf280194294a4027111f8ff284a

2 Existing Traffic Conditions

This section documents the transportation network in the study area in 2020, including existing roadways, traffic control measures, intersection performance, walking and cycling facilities, and transit operations.

2.1 Existing Road Network

2.1.1 Winston Churchill Boulevard

Winston Churchill Boulevard is a north-south arterial road under the jurisdiction of Peel Region. The speed limit along Winston Churchill Boulevard in the study is 60 km/hr. This road has one lane in each direction for the majority of study area. The road becomes a four-lane road with exclusive right-turn and left-turn lanes, as it intersects Royal Windsor Drive. This road also acts as the boundary between the Town of Oakville (Halton Region) to the west and the City of Mississauga (Peel Region) to the east.

2.1.2 Royal Windsor Drive

Royal Windsor Drive is a four-lane east-west arterial road under the jurisdictions of the Town of Oakville (west of Winston Churchill Boulevard), and the City of Mississauga (east of Winston Churchill Boulevard). This road has a speed limit of 60 km/hr.

2.1.3 Beryl Road

Beryl Road is a two-lane east-west local roadway under the jurisdiction of the Town of Oakville. This road intersects Winston Churchill Boulevard from the west and forms a T-intersection. The road has a speed limit of 60 km/hr.

2.1.4 Lakeshore Road West / Lakeshore Road East

Lakeshore Road is a two-lane east-west road. To the west of Winston Churchill Boulevard, this road is referred to as Lakeshore Road East, which is under the jurisdiction of the Town of Oakville, and has a speed limit of 50 km/hr. To the east of Winston Churchill Boulevard, the road is referred to as Lakeshore Road West, which is under the jurisdiction of the City of Mississauga and has a speed limit of 60 km/hr.

2.1.5 Site Accesses

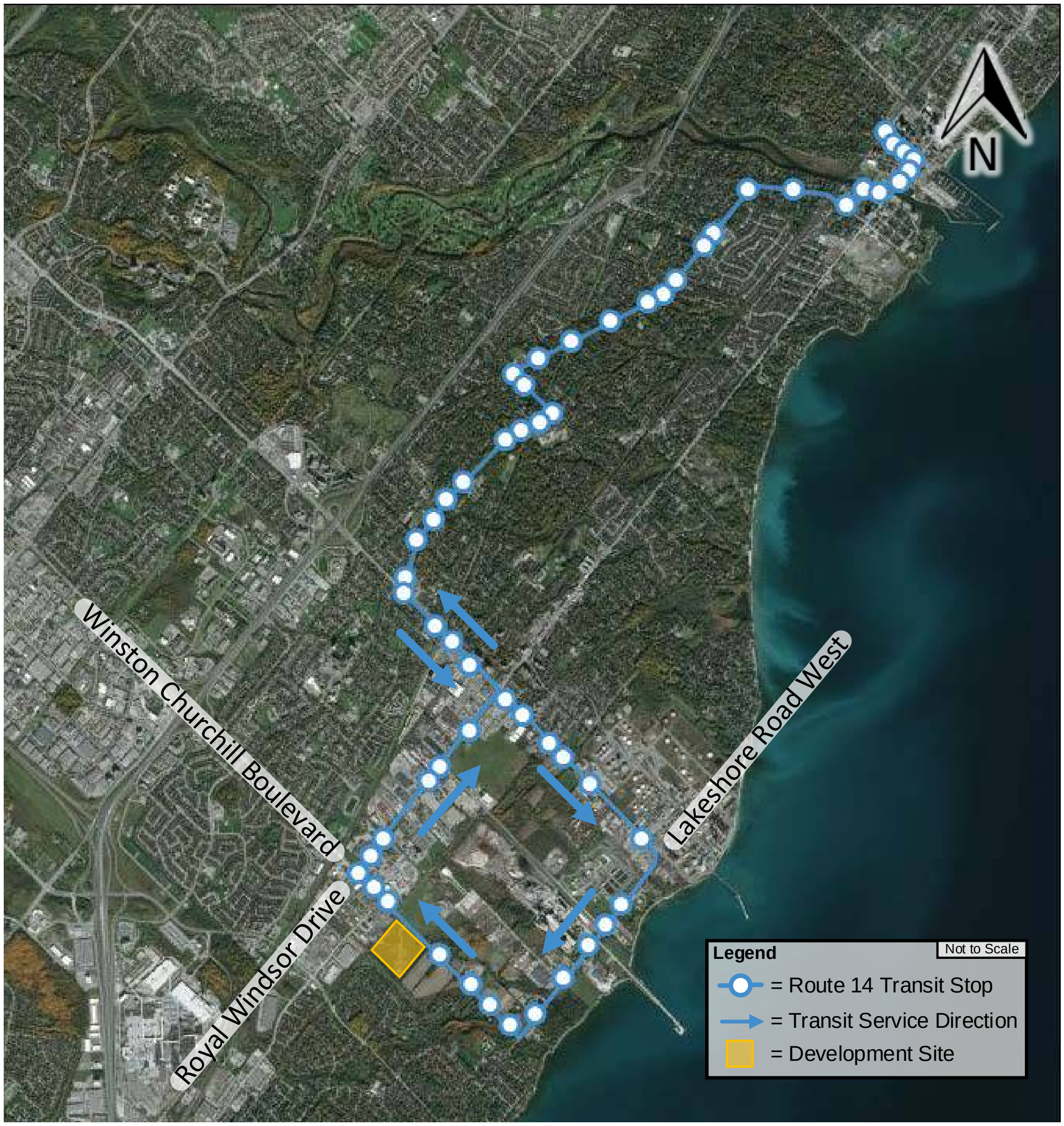
The Proposed North Site Access is to intersect Winston Churchill Boulevard at approximately 180 metres south from the north property line. This unsignalized access is proposed to be restricted to right-in, right-out movements only, and would consist of one lane per direction.

The Proposed South Site Access is to intersect Winston Churchill Boulevard at approximately 56 metres north from the south property line and is approximately 180 metres south of the Proposed North Site Access. The intersection of Winston Churchill Boulevard and the Proposed South Site Access is proposed to be signalized and located opposite of Orr Road, located east of the development site, as described in further detail in **Section 3.1.4**.

2.2 Public Transit Accessibility

Transit Route 14 – Lorne Park, operated by MiWay, provides transit service during the Weekday AM and PM Peak Periods at frequencies of approximately every 30 minutes, and does not operate on weekends or holidays. Transit Route 14 runs between Winston Churchill Boulevard and Port Credit GO Station, with Clarkson GO Station as an intermediate stop. Transit Route 14 is illustrated in **Exhibit 2-1**.

Exhibit 2-1: Existing Transit Network



Base Map Source: MiWay. October 6, 2020, https://www.mississauga.ca/miway-transit/schedules-and-maps/schedules/

2.3 Pedestrian and Cyclist Facilities

Existing cycling infrastructure facilities within the study area include multi-use trail connections along Beryl Road, dedicated bicycle lanes along Royal Windsor Drive between Winston Churchill Drive and Ford Drive, and the Waterfront Trail that runs along Lakeshore Road. A map of the existing cycling infrastructure facilities is presented in **Exhibit 2-2**.

Exhibit 2-2: Study Area Bicycle Route Map

Base Map Source: City of Mississauga. October 7, 2020, https://www.mississaugabikes.ca/wp-content/uploads/2018/07/Mississauga-Cycling-Map-2018-web-with-panels.pdf

The existing pedestrian infrastructure includes the above-noted shared multi-use trail along Beryl Road, as well as the Waterfront Trail along Lakeshore Road. In addition, crosswalks are present at all legs of the study area intersections. All existing crosswalks are equipped with pedestrian signals and all side-street crosswalks are equipped with pedestrian pushbuttons. In lieu of any sidewalks along Winston Churchill Boulevard, south of Beryl Road, there are paved shoulders on either side of Winston Churchill Boulevard that provide a smooth walking surface for pedestrians.

2.4 Signal Timings

The current signal timing plans for all existing signalized intersections were provided by Peel Region staff, which has jurisdiction over the signalized intersections along Winston Churchill Boulevard. The signal timing plans for the signalized study area intersections are provided in **Appendix C**.

It should be noted that, at the intersection of Winston Churchill Boulevard and Royal Windsor, if a pedestrian call is received for the east crosswalk then the maximum extension of the southbound left-turn protected phase is limited so that conflicting pedestrian walk and flashing don't walk can be provided. If no call is received, then the southbound left-turn phase can be extended to the maximum specified by the timing card. This operation was verified in the field, but a minimum phase length error is returned if modelled as per the timing card.

2.5 Turning Movement Counts

The turning movement counts for all existing intersections in the study area were acquired from Spectrum Traffic. The date of completion for each count is presented in **Exhibit 2-3**.

Exhibit 2-3: Traffic Data Information

Intersection	Data Source	Date	Peak Hour	
			AM	PM
Winston Churchill Boulevard and Royal Windsor Drive	Spectrum Traffic	Tuesday, January 31, 2017	8:00 a.m. - 9:00 a.m.	5:00 p.m. - 6:00 p.m.
Winston Churchill Boulevard and Beryl Road	Spectrum Traffic	Tuesday, January 31, 2017	8:00 a.m. - 9:00 a.m.	4:00 p.m. - 5:00 p.m.
Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West	Spectrum Traffic	Tuesday, January 31, 2017	8:00 a.m. - 9:00 a.m.	4:00 p.m. - 5:00 p.m.

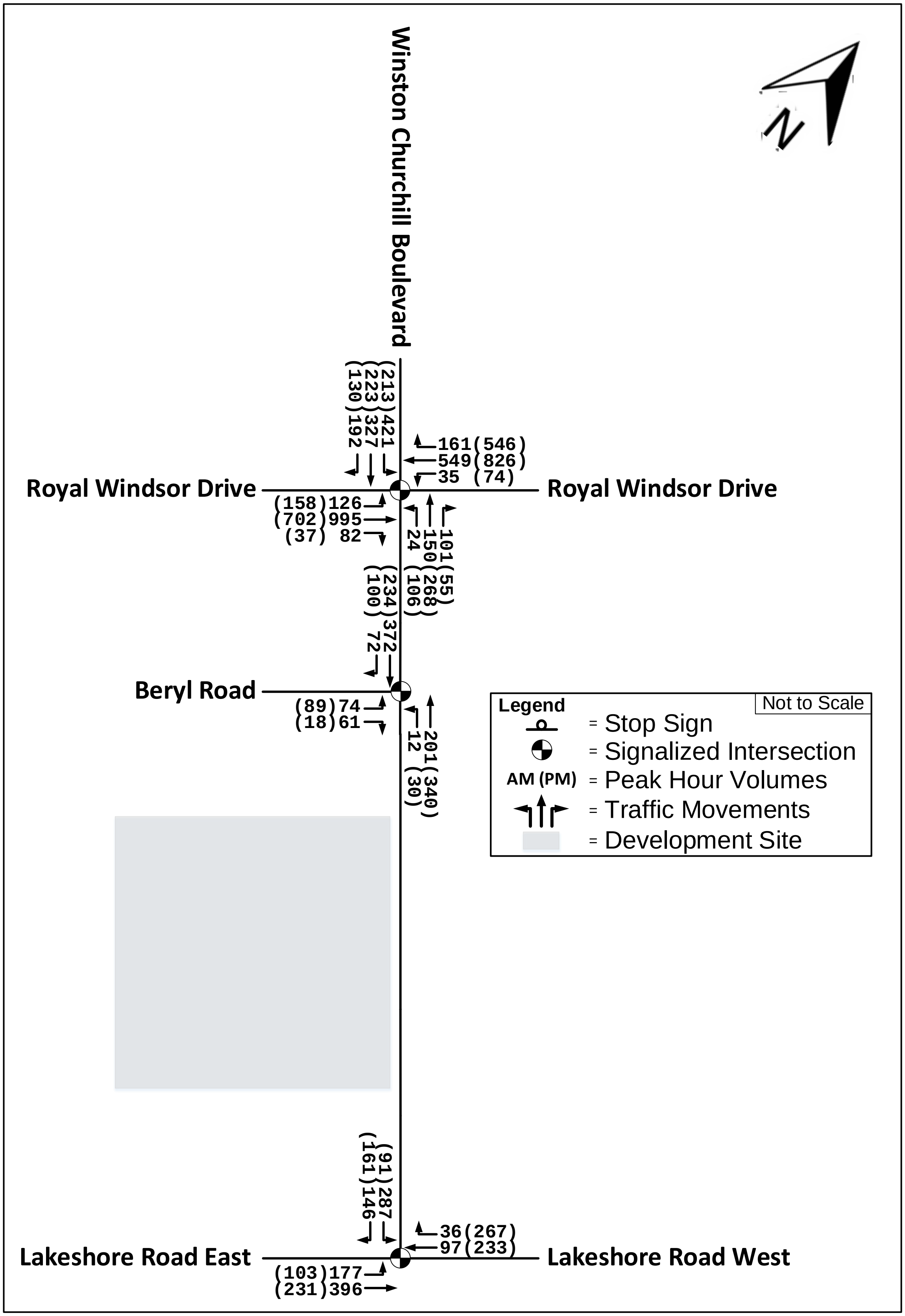
As the counts were completed in 2017, supplemental turning movement counts at the intersection of Winston Churchill Boulevard and Royal Windsor Drive from March 2019 were acquired to determine annual directional traffic growth rates, which are presented in **Exhibit 2-4**. Refer to **Appendix D** for full turning movement count sheets.

Exhibit 2-4: Compounded Annual Traffic Growth Rates

Direction	Compounded Annual Growth Rate	
	AM Peak Hour	PM Peak Hour
Northbound	4.8%	8.8%
Eastbound	13.1%	7.6%
Southbound	11.0%	8.8%
Westbound	5.4%	5.4%

The compounded annualized growth rates, as shown in **Exhibit 2-4**, were applied to the appropriate through movements at the intersection of Winston Churchill Boulevard and Royal Windsor Drive, as well as the eastbound through and westbound through movements at the intersection of Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West. All turning movement counts were subsequently balanced to determine 2020 Existing Conditions volumes, as illustrated in **Exhibit 2-5**. It should be noted that the annual traffic growth rates presented above are solely intended to estimate 2020 Existing Conditions volumes. Separate annual traffic growth rates to determine future traffic volumes post-2020 are discussed in **Section 3.1.1**.

Exhibit 2-5: 2020 Existing Conditions Traffic Volumes



2.6 2020 Existing Conditions Analysis

The intersections were analyzed using the Synchro 11.0 analysis software and the Highway Capacity Manual methodology. As described in Peel Region's **Traffic Impact Study Guidelines** document, the following criteria were used to identify critical movements for signalized intersections:

- Volume to capacity (v/c) ratios for overall intersection operations, through movements, or shared through / turning movements increased to 0.90 or above;
- v/c ratios for exclusive turning movements increased to 1.00 or above; or
- Queues that exceed the provided storage capacity.

A summary of the critical movements for the 2020 Existing Conditions traffic operations analysis can be found in **Exhibit 2-6**, while full Synchro reports are provided in **Appendix E**.

Exhibit 2-6: 2020 Existing Conditions Traffic Operations – Signalized Intersections

Intersection	Intersection LOS	Intersection Delay (s)	Intersection v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour									
Winston Churchill Boulevard and Royal Windsor Drive	D	42.7	0.58	EBL	D	46.5	0.56	51	130
				EBTR	D	53.7	0.90	181	-
				WBL	F	94.4	0.69	29	105
				WBT	D	36.5	0.46	79	-
				WBR	C	31.2	0.11	15	230
				NBL	C	31.4	0.09	12	125
				NBT	C	31.5	0.13	25	-
				NBR	C	30.8	0.07	13	65
				SBL	E	61.9	0.76	73	115
				SBT	B	16.0	0.18	31	-
				SBR	B	16.1	0.16	19	95
Winston Churchill Boulevard and Beryl Road	A	8.1	0.37	EBL	C	25.4	0.36	17	80
				EBR	C	23.5	0.04	8	-
				NBL	A	3.4	0.03	2	115
				NBT	A	3.9	0.17	16	-
				SBTR	A	5.2	0.37	36	-
Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West	B	18.3	0.45	EBL	A	9.5	0.23	24	75
				EBT	B	10.5	0.35	50	-
				WBT	A	8.2	0.09	13	-
				WBR	A	7.9	0.04	4	90
				SBL	D	36.0	0.65	71	125
				SBR	C	24.7	0.09	13	-

Intersection	Intersection LOS	Intersection Delay (s)	Intersection v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
PM Peak Hour									
Winston Churchill Boulevard and Royal Windsor Drive	D	35.5	0.52	EBL	C	29.9	0.60	39	130
				EBTR	C	28.0	0.48	91	-
				WBL	D	36.2	0.31	29	105
				WBT	D	40.9	0.66	124	-
				WBR	D	35.2	0.35	26	230
				NBL	D	38.9	0.31	41	125
				NBT	D	36.3	0.24	42	-
				NBR	C	33.6	0.04	2	65
				SBL	E	63.9	0.62	42	115
				SBT	C	22.9	0.14	27	-
				SBR	C	22.4	0.08	12	95
Winston Churchill Boulevard and Beryl Road	A	7.3	0.30	EBL	C	25.4	0.41	19	80
				EBR	C	22.9	0.01	4	-
				NBL	A	3.6	0.05	4	115
				NBT	A	4.7	0.28	28	-
				SBTR	A	4.7	0.28	25	-
Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West	B	13.9	0.21	EBL	B	11.4	0.17	17	75
				EBT	B	11.7	0.23	33	-
				WBT	B	11.7	0.23	33	-
				WBR	B	11.3	0.18	11	90
				SBL	C	22.4	0.19	22	125
				SBR	C	21.2	0.10	13	-

Note: Red font represents a critical movement.

As shown in **Exhibit 2-6**, overall operations for the signalized study area intersections were found to be operating below capacity thresholds during the Weekday AM and Weekday PM Peak Hours. With respect to individual movements, the shared eastbound through / right-turn movement at the intersection of Winston Churchill Boulevard and Royal Windsor Drive was found to be operating above critical capacity thresholds during the Weekday AM Peak Hour, with a v/c ratio of 0.90. All remaining movement during the Weekday AM and Weekday PM Peak Hours were found to operate below critical thresholds.

3 Future Traffic Conditions

3.1 2026 Future Background Conditions

This section discusses the proposed development horizon year, background traffic growth rates, anticipated future road network improvement, and other development-related traffic in the study area under the 2026 horizon year.

3.1.1 Horizon Year

As per the Peel Region **Traffic Impact Study Guidelines**, described in **Section 2.6**, and as confirmed with the Review Agencies (see **Appendix B**), a horizon year of 2026 (5 years from the anticipated full build-out date of the proposed development) would be used for the traffic analysis under Future Background and Future Total conditions.

3.1.2 Growth Rate

Consistent with Review Agency comments from the 2015 report, a 2.0% annual traffic growth rate was applied to through movements along major roads within the study area (i.e., Winston Churchill Boulevard, Royal Windsor Drive, and Lakeshore Road East / Lakeshore Road West). This results in an absolute increase in traffic volumes of approximately 12.6% between 2020 and 2026.

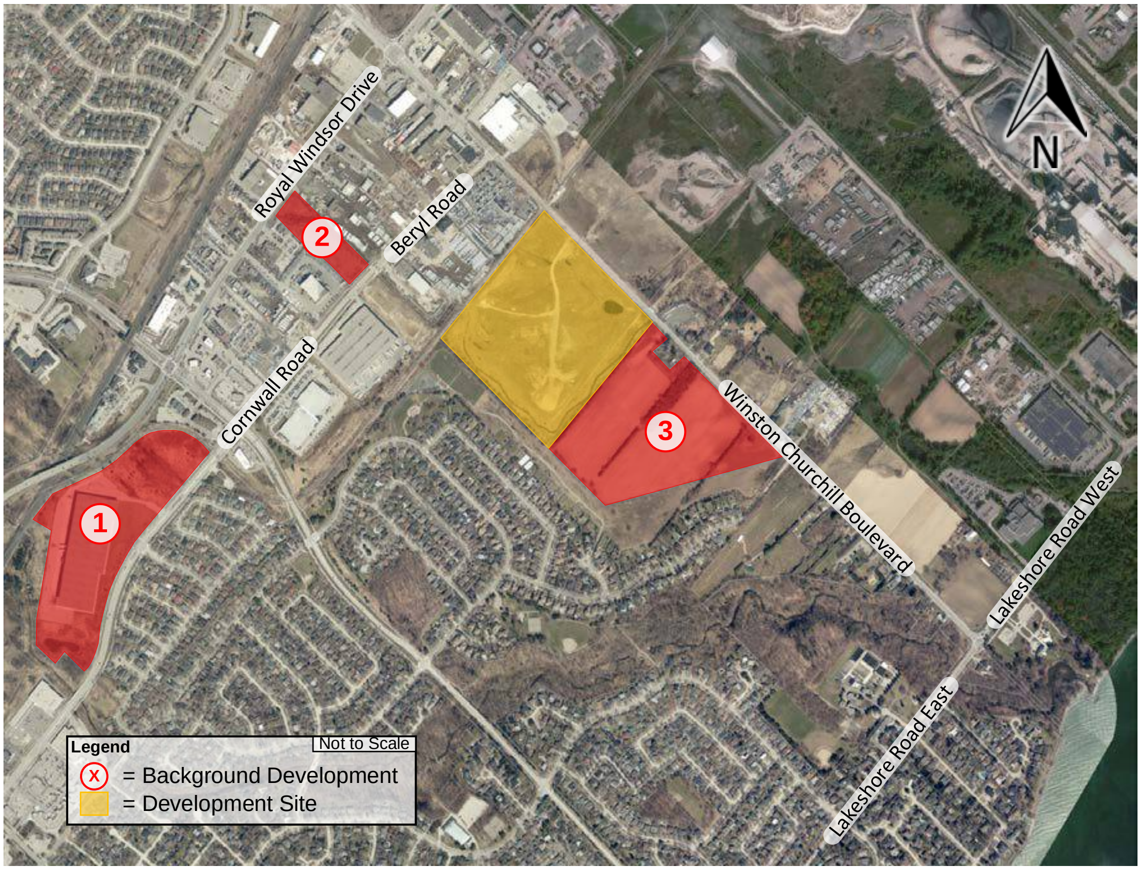
3.1.3 Background Developments

Based on correspondence with the Review Agencies (see **Appendix B**), three background developments which are expected to generate traffic volumes affecting the study area intersections have been identified in the vicinity of the development site. Details regarding these background development are presented in **Exhibit 3-1** and are illustrated geographically in **Exhibit 3-2**.

Exhibit 3-1: Background Development Summary

ID	Address / Location	Size and Nature of Background Development
1	2175 Cornwall Road	1 warehouse building consisting of approximately 28,900 m^2 GFA.
2	2395 Cornwall Road	1 industrial building consisting of 5,094 m^2 GFA.
3	560 Winston Churchill Boulevard	2 warehouse buildings, totalling 58,655 m^2 GFA in size.

Exhibit 3-2: Background Developments



In lieu of any identified transportation impact studies published for the proposed 560 Winston Churchill Boulevard and 2395 Cornwall Road developments, background development site trips were estimated using average rate and fitted curve data (where applicable) from the publication **Trip Generation Manual, 10th Edition** (Institute of Transportation Engineers, September 2017). The estimated net vehicle trips for the proposed background developments at 560 Winston Churchill Boulevard and 2395 Cornwall Road are presented in **Exhibit 3-3**. Trip generation source data is presented in **Appendix F**.

Exhibit 3-3: Background Development Trip Generation

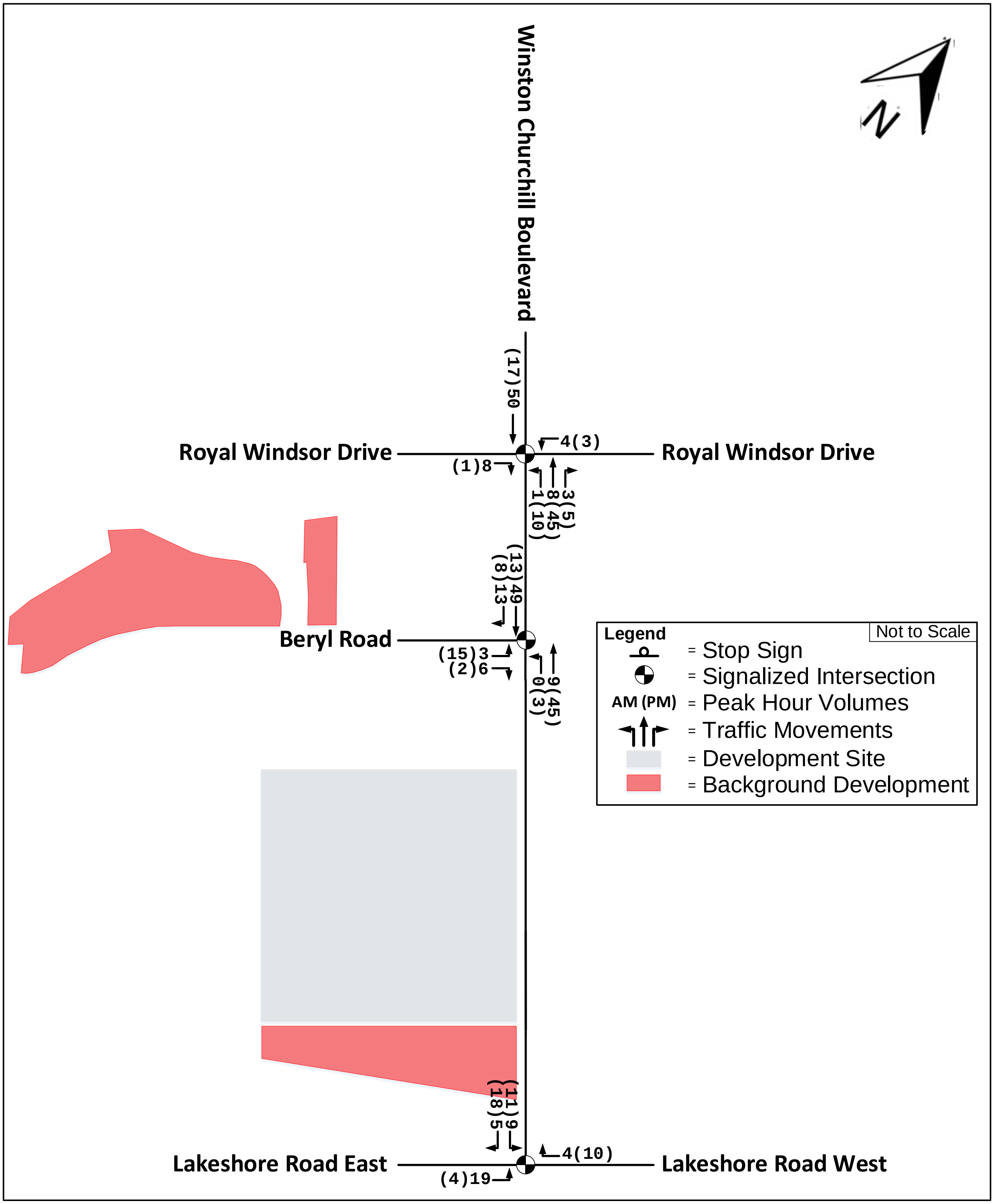
560 Winston Churchill Boulevard, Oakville					
LUC 150: Warehousing – 631,357.17 ft^2 (58,655 m^2)					
Term	**Unit**	**Weekday AM Peak Hour**		**Weekday PM Peak Hour**	
Trip Generation Equation	vehicle trips / 1000 ft^2	T = 0.12(X) + 25.32		T = 0.12(X) + 27.82	
Total Trips	vehicles / hour	**101**		**104**	
New Inbound Trips	vehicles / hour	78	77%	28	27%
New Outbound Trips	vehicles / hour	23	23%	76	73%
2395 Cornwall Road, Oakville					
LUC 110: General Light Industrial – 54,831 ft^2 (5,094 m^2)					
Term	**Unit**	**Weekday AM Peak Hour**		**Weekday PM Peak Hour**	
Trip Generation Equation	vehicle trips / 1000 ft^2	-		-	
Total Trips	vehicles / hour	**38**		**35**	
New Inbound Trips	vehicles / hour	33	88%	5	13%
New Outbound Trips	vehicles / hour	5	12%	30	87%

Trips associated with the 2175 Cornwall Road background development were assigned to the study area according to the trip distribution scheme and other supporting information presented in the following documents:

- **2175 Cornwall Road Traffic Impact Study Update, Oakville, ON** (McIntosh Perry Consulting Engineers Ltd., November 2020); and
- **Response to Paradigm Transportation Solution Limited Technical Review Comments for the 2175 Cornwall Road, Traffic Impact Study Update, Oakville** (McIntosh Perry Consulting Engineers Ltd., March 2021).

With respect to the 2395 Cornwall Road and 560 Winston Churchill Boulevard background developments, trips were assigned to the study area intersections based on data from the 2016 Transportation Tomorrow Survey (TTS). Background development trip assignments are illustrated in **Exhibit 3-4**.

Exhibit 3-4: Background Development Site Trips



3.1.4 Planned Road Improvements

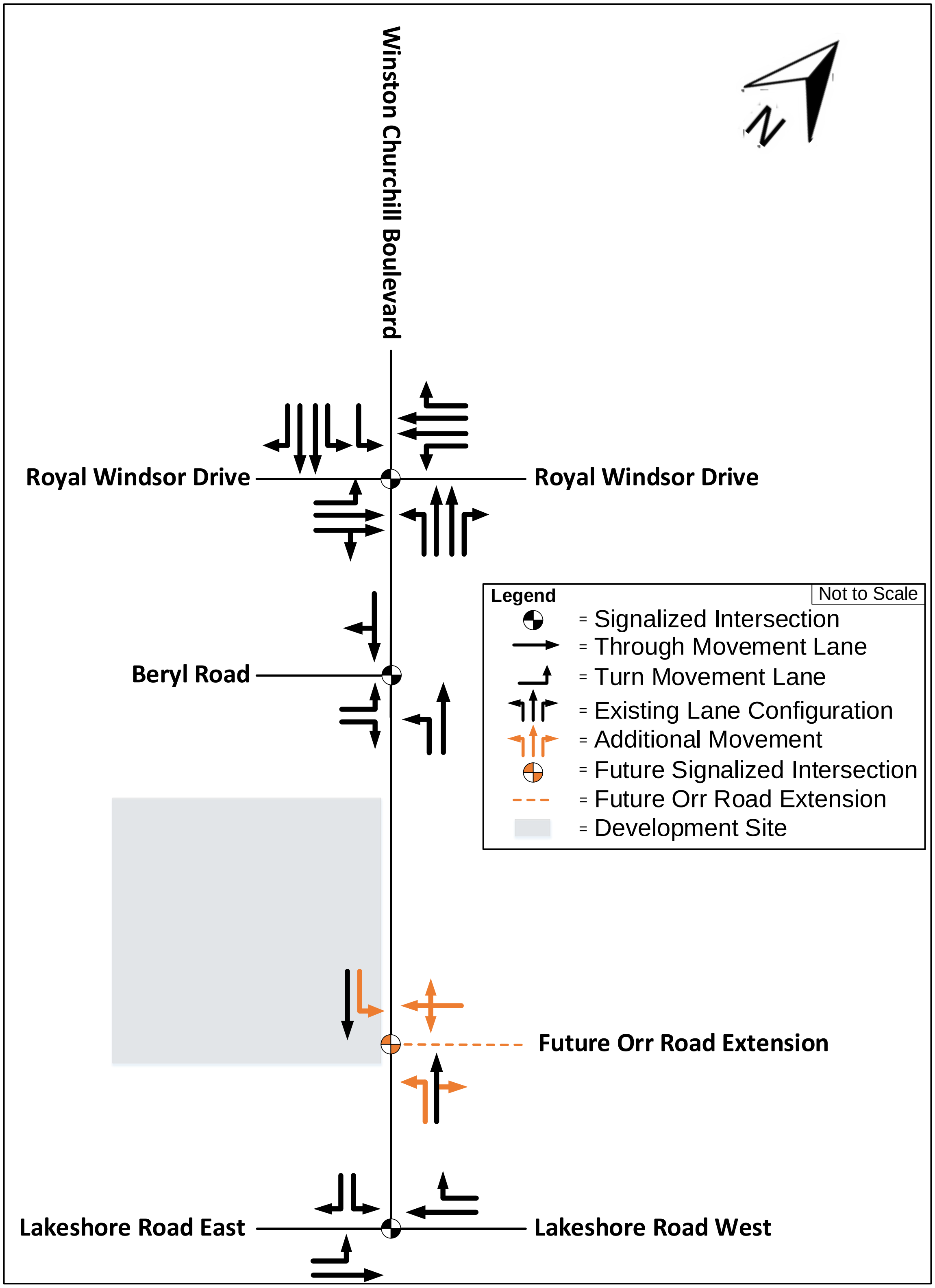
As mentioned in **Section 1**, a previous transportation impact study for the development site had been issued on December 9, 2015 (see **Appendix A**). Comments received from Peel Region, Halton Region, and the Town of Oakville with regards to the 2015 report include the consideration of a westward extension of Orr Road (located east of the development site) to form a signalized intersection with Winston Churchill Boulevard. This future signalized intersection would align with the Proposed South Site Access and would be equipped with an exclusive northbound left-turn lane[1] and an exclusive southbound left-turn lane[2]. A future dedicated southbound left-turn lane[3], opposite the northbound left-turn lane was assumed for the purposes of analysis. These future roadway changes are illustrated in **Exhibit 3-5** and **Exhibit 3-6**. It is our understanding that the Orr Road extension would take place after the proposed development has been constructed. As a result, no traffic volumes would be present under 2026 Future Background conditions. Furthermore, it should also be noted that the lane configurations for the Future Orr Road Extension are conceptual at this time and are subject to change during detailed design stages. Therefore, intersection capacity analysis results for this intersection is discussed in the 2026 Future Total conditions scenario (**Section 3.2**).

[1] 20 metres of vehicle storage assumed for the purposes of analysis.
[2] 90 metres of vehicle storage assumed for the purposes of analysis.
[3] 20 metres of vehicle storage assumed for the purposes of analysis.

Exhibit 3-5: Future Road Extension of Orr Road to Winston Churchill Boulevard

Base Map Source: Conservation Halton. October 6, 2020,
http://camaps.maps.arcgis.com/apps/webappviewer/index.html?id=a2928bf280194294a4027111f8ff284a

Exhibit 3-6: Future Signalized Intersection Lane Configurations



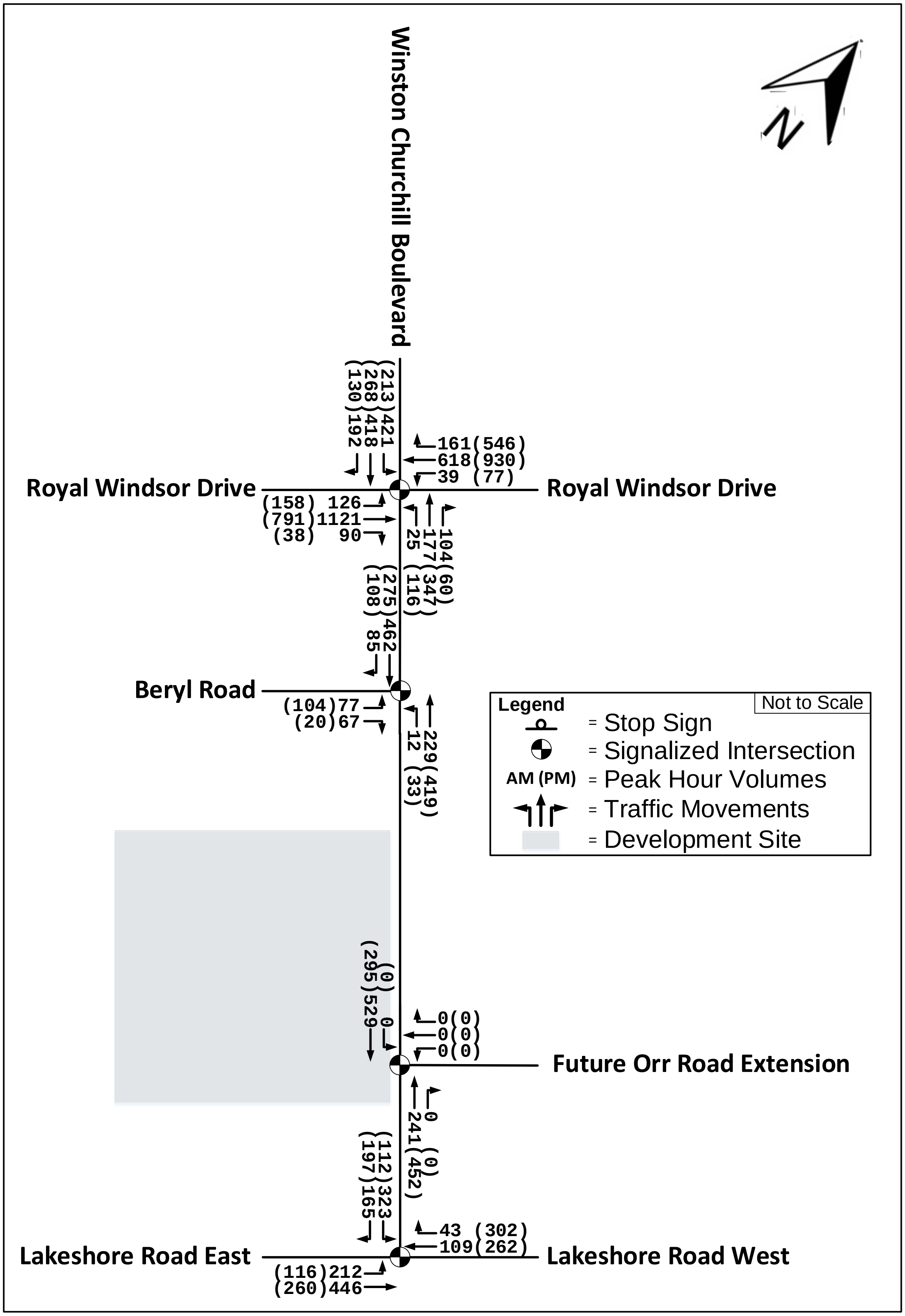
This future roadway extension and signalized intersection with Winston Churchill Boulevard has been accounted for in 2026 Future Background and 2026 Future Total Conditions.

Based on Review Agency comments, no other road improvements are planned by 2026 that will significantly affect traffic operations in the study area.

3.1.5 2026 Future Background Conditions Analysis

New trips resulting from background traffic growth were added to the 2020 Existing Conditions scenario, producing the 2026 Future Background Conditions traffic volumes illustrated in **Exhibit 3-7**.

Exhibit 3-7: 2026 Future Background Conditions Traffic Volumes



The 2026 Future Background traffic analysis results are presented in **Exhibit 3-8**. Full Synchro reports are provided in **Appendix G**.

Exhibit 3-8: 2026 Future Background Conditions Traffic Operations – Signalized Intersections

Intersection	Intersection			Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
	LOS	Delay (s)	v/c Ratio						
AM Peak Hour									
Winston Churchill Boulevard and Royal Windsor Drive	D	49.9	0.65	EBL	D	53.3	0.64	56	130
				EBTR	E	73.7	1.01	227	-
				WBL	F	109.7	0.76	32	105
				WBT	D	37.7	0.52	90	-
				WBR	C	31.2	0.11	15	230
				NBL	C	31.7	0.10	13	125
				NBT	C	31.8	0.15	28	-
				NBR	C	31.0	0.08	15	65
				SBL	E	61.9	0.76	73	115
				SBT	B	16.6	0.22	40	-
				SBR	B	16.4	0.18	24	95
Winston Churchill Boulevard and Beryl Road	A	8.3	0.43	EBL	C	25.4	0.37	17	80
				EBR	C	23.4	0.05	8	-
				NBL	A	3.4	0.03	2	115
				NBT	A	4.1	0.20	18	-
				SBTR	A	6.0	0.46	48	-
Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West	B	19.4	0.50	EBL	B	10.0	0.28	29	75
				EBT	B	11.0	0.40	57	-
				WBT	A	8.3	0.10	14	-
				WBR	A	7.9	0.04	4	90
				SBL	D	39.9	0.73	87	125
				SBR	C	24.8	0.11	14	-
Winston Churchill Boulevard and Future Orr Road Extension	A	0.3	0.35	NBT	A	0.1	0.13	-	-
				SBT	A	0.3	0.08	-	-

Intersection	Intersection			Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
	LOS	Delay (s)	v/c Ratio						
PM Peak Hour									
Winston Churchill Boulevard and Royal Windsor Drive	D	36.9	0.58	EBL	D	35.8	0.69	39	130
				EBTR	C	29.2	0.54	105	-
				WBL	D	39.2	0.38	32	105
				WBT	D	43.7	0.74	144	-
				WBR	D	35.9	0.39	36	230
				NBL	D	40.1	0.35	45	125
				NBT	D	37.3	0.31	54	-
				NBR	C	33.7	0.04	4	65
				SBL	E	63.9	0.62	42	115
				SBT	C	23.3	0.17	32	-
				SBR	C	22.4	0.08	12	95
Winston Churchill Boulevard and Beryl Road	A	7.3	0.35	EBL	C	25.4	0.45	21	80
				EBR	C	22.6	0.01	5	-
				NBL	A	3.8	0.06	4	115
				NBT	A	5.3	0.35	37	-
				SBTR	A	5.2	0.33	31	-
Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West	B	14.3	0.25	EBL	B	11.8	0.20	19	75
				EBT	B	12.0	0.26	37	-
				WBT	B	12.0	0.26	37	-
				WBR	B	11.6	0.20	11	90
				SBL	C	23.0	0.23	27	125
				SBR	C	21.4	0.12	14	-
Winston Churchill Boulevard and Future Orr Road Extension	A	0.3	0.30	NBT	A	0.3	0.24	-	-
				SBT	A	0.2	0.16	-	-

Note: Red font represents a critical movement.

As shown in the above analysis, the shared eastbound through / right turn movement at the intersection of Winston Churchill Boulevard and Royal Windsor Drive during the Weekday AM Peak Hour is anticipated to operate above capacity (v/c ratio of 1.01) and with delays in excess of 1 minute. These results indicate that the addition of background traffic is expected to exacerbate the operational constraint previously noted under 2020 Existing Conditions.

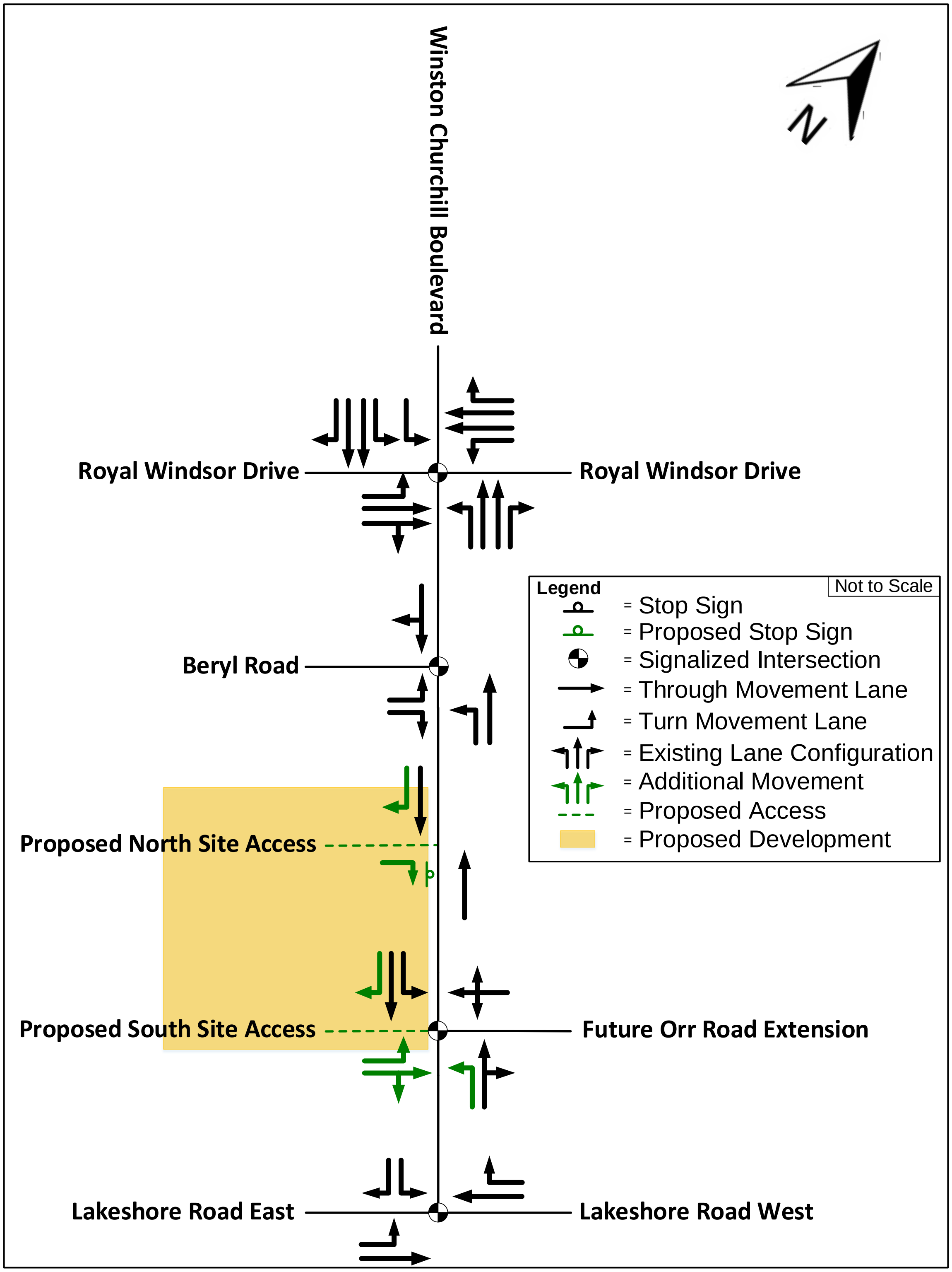
3.2 2026 Future Total Traffic Conditions

The 2026 Future Total traffic conditions analyzes a scenario in which the anticipated site traffic volumes are added to the 2026 Future Background traffic volumes.

3.2.1 Proposed Site Accesses

As discussed in **Section 2.1.5**, vehicular traffic will access the proposed development via either the Proposed North Site Access (right-in movements only) or the Proposed South Site Access. The proposed full build-out lane configurations are illustrated in **Exhibit 3-9**.

Exhibit 3-9: Future Total Lane Configurations



3.2.2 Trip Generation

Trip Generation Manual, 10th Edition (Institute of Transportation Engineers, September 2017), as mentioned in **Section 3.1.3**, was used to determine the associated number of trips to be generated by the proposed development. It should be noted that the trip generation estimates and subsequent traffic analysis are based on an earlier development concept which consisted of 65,265.68 m^2 of GFA for warehousing uses (i.e., a 3,802.49 m^2 GFA larger development). Given that the proposed development is smaller in size when compared to the previous development concept, the anticipated numbers of site trips are expected to be less than those presented below, resulting in a conservative analysis. As a result, traffic operations are likely to be better than presented in this report.

Based on a review of existing transit network, pedestrian facility, cyclist facility, and observed non-motorized movement counts, it is anticipated that most trips generated by the proposed development will be by vehicle. As a result, no reduction is applied for non-auto trips. This is anticipated to be a conservative estimate, as there may be carpooling and a number of transit riders accessing the site.

Based on the nature of the proposed development, its location context, and the data quality, fitted curve data for vehicle trips, Land Use Code 150: Warehousing – General Urban/Suburban was used. The estimated net new trips generated by the proposed development are illustrated in **Exhibit 3-10**.

Exhibit 3-10: Proposed Development Trip Generation

772 Winston Churchill Boulevard, Oakville					
LUC 150: Warehousing – 734,805.66 ft^2 (63,265.68 m^2)					
Term	**Unit**	**Weekday AM Peak Hour**		**Weekday PM Peak Hour**	
Trip Generation Equation	vehicle trips / 1000 ft^2	T = 0.12(X) + 25.32		T = 0.12(X) + 27.82	
Total Trips	vehicles / hour	**113**		**116**	
New Inbound Trips	vehicles / hour	87	77%	31	27%
New Outbound Trips	vehicles / hour	26	23%	85	73%

As shown in **Exhibit 3-10**, the proposed development is expected to generate up to 113 net new vehicle trips during the Weekday AM Peak Hour (87 inbound trips and 26 outbound trips) and up to 116 net new vehicle trips during the Weekday PM Peak Hour (31 inbound trips and 85 outbound trips). Trip generation source data is presented in **Appendix F**.

3.2.3 Trip Distribution and Assignment

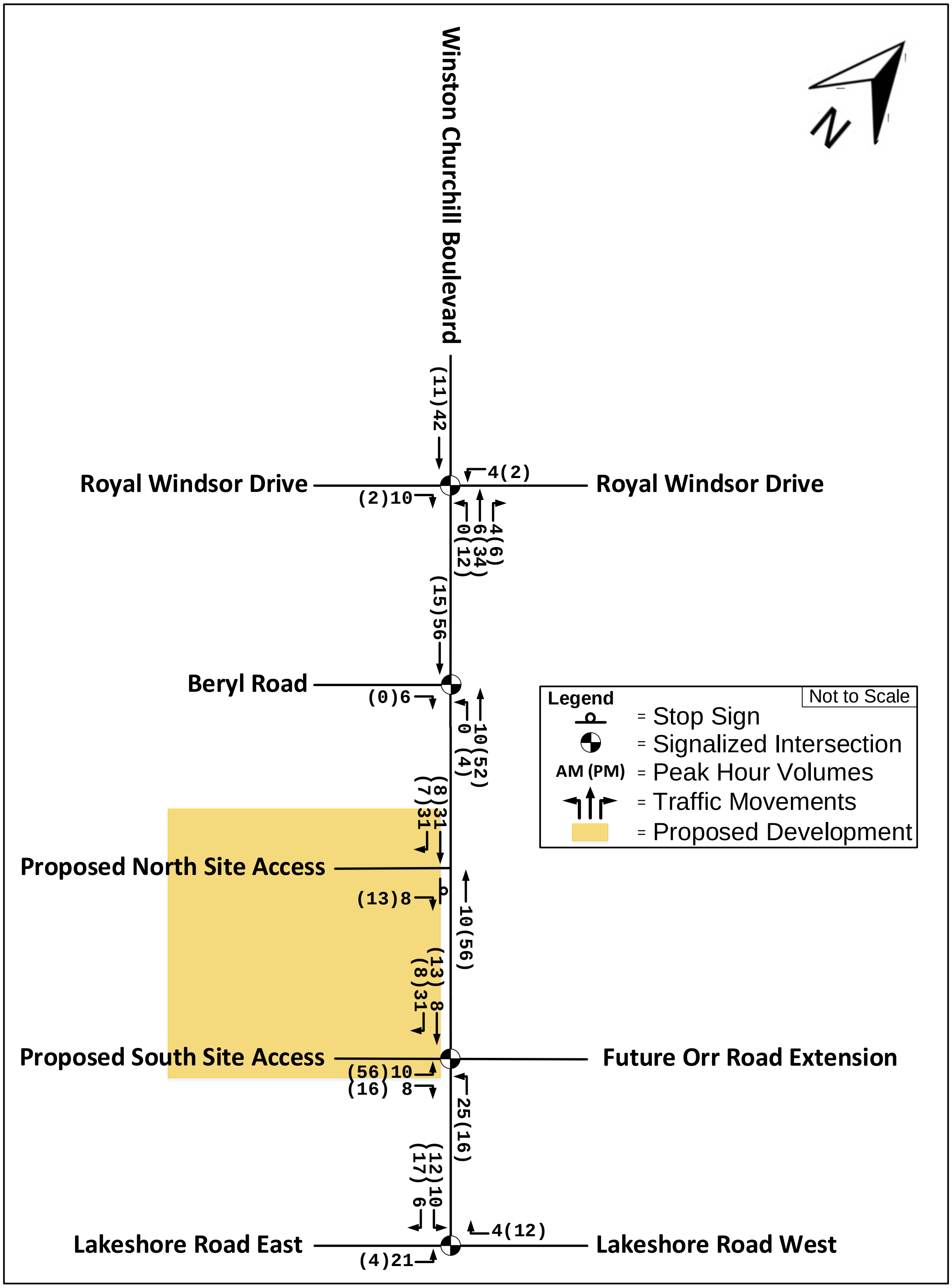
The trip distribution for site trips was determined based on the travel patterns of existing traffic at the study area intersections, and is presented in **Exhibit 3-11**.

Exhibit 3-11: Site Trip Distribution

To / From	Inbound Trips		Outbound Trips	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
North (along Winston Churchill Boulevard)	48%	36%	23%	40%
East (along Royal Windsor Drive)	5%	6%	15%	7%
East (along Lakeshore Road West)	5%	39%	39%	14%
West (along Royal Windsor Drive)	11%	6%	0%	14%
West (along Beryl Road)	7%	0%	0%	5%
West (along Lakeshore Road East)	24%	13%	23%	20%
Total	**100%**	**100%**	**100%**	**100%**

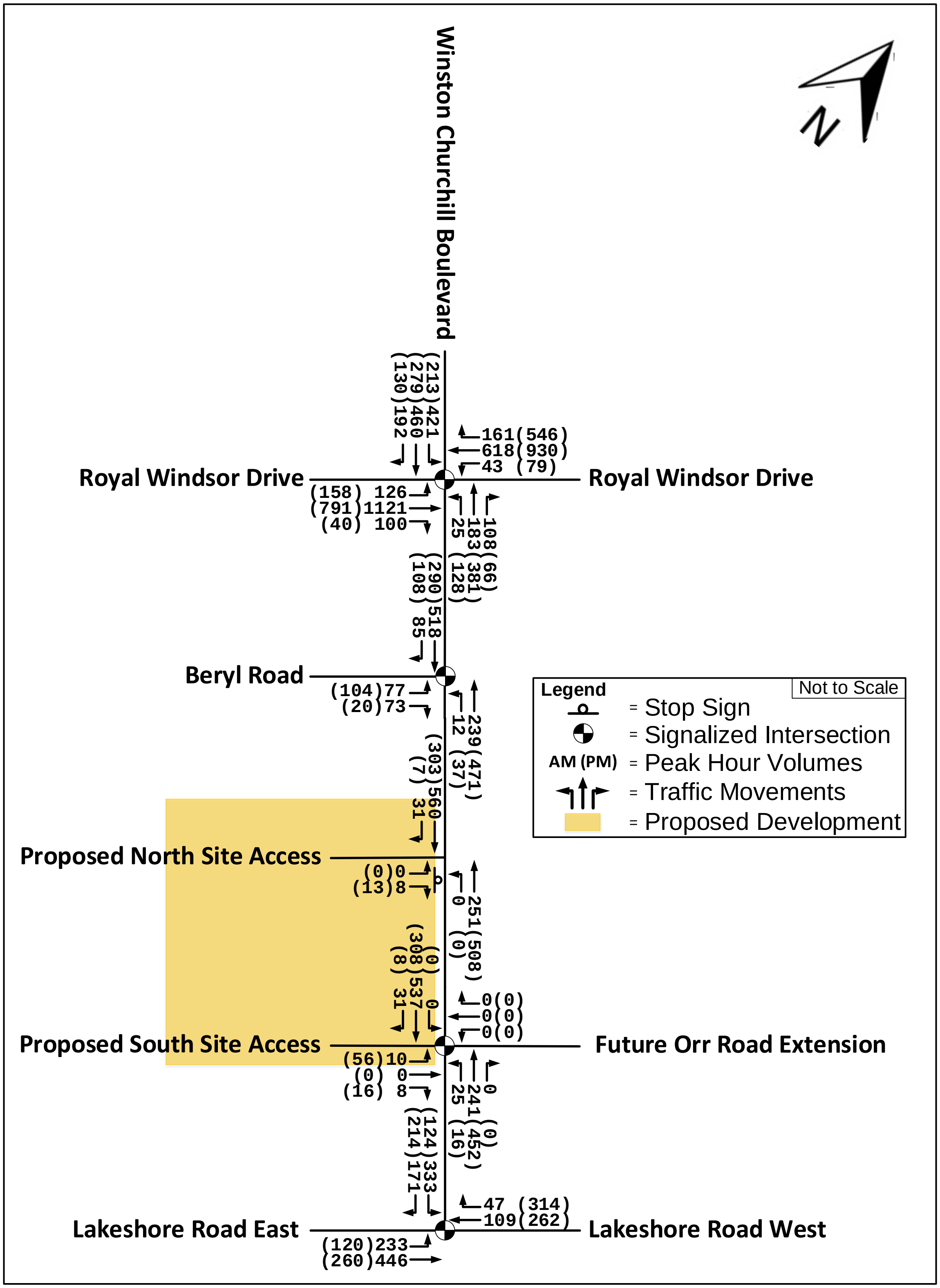
Site trips were assigned to the study area roadways based on logical travel patterns, as illustrated in **Exhibit 3-12**.

Exhibit 3-12: Net New Site Traffic Volumes



New trips resulting from the construction of the proposed development were added to the 2026 Future Background conditions scenario, producing the 2026 Future Total traffic volumes illustrated in **Exhibit 3-13**.

Exhibit 3-13: 2026 Future Total Conditions Traffic Volumes



3.2.4 2026 Future Total Conditions Analysis

Using these 2026 Future Total Conditions traffic volumes, traffic operations analysis was conducted to determine future intersection performance with the impact of the proposed development. The results of the traffic operations analysis are presented in the following subsections. Full Highway Capacity Manual analysis for the 2026 Future Total Conditions scenario is presented in **Appendix H**.

As initially discussed in **Section 3.2.2**, it should be noted that the trip generation estimates used for the 2026 Future Total analysis is based on an earlier development concept which had consisted of approximately 3,802.49 m^2 GFA of additional space for warehouse uses. As the proposed development is smaller in size when compared to the previous development concept, the traffic operations presented in this section are likely to be better than reported.

3.2.4.1 Signalized Intersections

The 2026 Future Total analysis results for the study area signalized intersections are presented in **Exhibit 3-14**.

Exhibit 3-14: 2026 Future Total Conditions Traffic Operations – Signalized Intersections

Intersection	Intersection LOS	Intersection Delay (s)	Intersection v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
AM Peak Hour									
Winston Churchill Boulevard and Royal Windsor Drive	D	50.8	0.66	EBL	D	53.3	0.64	56	130
				EBTR	E	76.4	1.02	230	-
				WBL	F	127.6	0.84	36	105
				WBT	D	37.7	0.52	90	-
				WBR	C	31.2	0.11	15	230
				NBL	C	31.9	0.10	13	125
				NBT	C	31.9	0.15	29	-
				NBR	C	31.1	0.09	16	65
				SBL	E	61.9	0.76	73	115
				SBT	B	16.9	0.25	44	-
				SBR	B	16.4	0.18	24	95
Winston Churchill Boulevard and Beryl Road	A	8.5	0.49	EBL	C	25.4	0.37	17	80
				EBR	C	23.4	0.05	9	-
				NBL	A	3.4	0.03	2	115
				NBT	A	4.0	0.20	18	-
				SBTR	A	6.5	0.51	56	-
Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West	B	19.8	0.51	EBL	B	10.3	0.31	32	75
				EBT	B	11.0	0.40	57	-
				WBT	A	8.3	0.10	14	-
				WBR	A	8.0	0.05	4	90
				SBL	D	41.2	0.76	91	125
				SBR	C	24.9	0.11	14	-
Winston Churchill Boulevard and Proposed South Site Access / Future Orr Road Extension	A	5.4	0.37	EBL	C	30.5	0.20	5	-
				EBTR	C	28.5	0.01	-	-
				WBLTR	A	1.8	0.04	3	20
				NBL	A	2.1	0.17	15	-
				NBTR	A	6.2	0.37	83	-
				SBL	A	6.8	0.02	2	20
				SBT	D	53.3	0.64	56	130
				SBR	E	76.4	1.02	230	-

Intersection	Intersection LOS	Intersection Delay (s)	Intersection v/c Ratio	Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
PM Peak Hour									
Winston Churchill Boulevard and Royal Windsor Drive	D	37.0	0.59	EBL	D	35.8	0.69	39	130
				EBTR	C	29.3	0.54	105	-
				WBL	D	39.6	0.39	33	105
				WBT	D	43.7	0.74	144	-
				WBR	D	36.2	0.40	40	230
				NBL	D	41.2	0.39	49	125
				NBT	D	37.8	0.34	59	-
				NBR	C	33.7	0.04	6	65
				SBL	E	63.9	0.62	42	115
				SBT	C	23.4	0.17	33	-
				SBR	C	22.4	0.08	12	95
Winston Churchill Boulevard and Beryl Road	A	7.0	0.40	EBL	C	25.4	0.45	21	80
				EBR	C	22.6	0.01	5	-
				NBL	A	2.8	0.07	2	115
				NBT	A	5.6	0.39	57	-
				SBTR	A	5.3	0.34	33	-
Winston Churchill Boulevard and Lakeshore Road East / Lakeshore Road West	B	14.5	0.26	EBL	B	11.9	0.21	20	75
				EBT	B	12.0	0.26	37	-
				WBT	B	12.0	0.26	37	-
				WBR	B	11.6	0.21	11	90
				SBL	C	23.3	0.26	29	125
				SBR	C	21.6	0.13	14	-
Winston Churchill Boulevard and Proposed South Site Access / Future Orr Road Extension	A	5.3	0.35	EBL	C	28.1	0.43	14	-
				EBTR	C	24.8	0.01	-	-
				WBLTR	A	2.8	0.02	2	20
				NBL	A	4.2	0.34	36	-
				NBTR	A	2.0	0.23	10	-
				SBL	A	2.7	0.00	-	20
				SBT	D	35.8	0.69	39	130
				SBR	C	29.3	0.54	105	-

Note: Red font represents a critical movement.

Based on the analysis presented in **Exhibit 3-14**, overall operations at the study area signalized intersections are anticipated to remain below critical capacity thresholds during the Weekday AM and PM Peak Hours. With respect to individual movements, the shared eastbound through / right-turn movement at the Winston Churchill Boulevard and Royal Windsor Drive intersection during the Weekday AM Peak Hour is expected to continue operating above capacity (v/c ratio of 1.02). However, it should be noted that the difference in the v/c ratio is marginal when compared to the 2026 Future Background Conditions scenario (v/c ratio of 1.01). All remaining movements are anticipated to operate below critical thresholds. Measures to mitigate this identified capacity constraint are discussed further in **Section 3.2.5**.

3.2.4.2 Unsignalized Intersections

The 2026 Future Total analysis results for the study area unsignalized intersection are presented in **Exhibit 3-15**.

Exhibit 3-15: 2026 Future Total Conditions Traffic Operations – Unsignalized Intersections

Intersection	Intersection Delay (s)	Lane	Lane LOS	Lane Delay (s)	Lane v/c Ratio	Lane 95th Percentile Queue (m)	Lane Storage Capacity (m)
AM Peak Hour							
Winston Churchill Boulevard and Proposed North Site Access	0.1	EBR	B	13.5	0.05	1	-
PM Peak Hour							
Winston Churchill Boulevard and Proposed North Site Access	1.5	EBR	B	14.7	0.17	5	-

As shown in **Exhibit 3-15**, no capacity or queuing concerns are anticipated at the Proposed North Site Access during the Weekday AM and PM Peak Hours.

3.2.5 Traffic Operations Mitigation Measures

In order to improve traffic operations for the shared eastbound through / right-turn movement for the intersection of Winston Churchill Boulevard and Royal Windsor Drive to within capacity, the re-allocation of 7 seconds from the southbound left-turn / southbound through signal phases to the eastbound / westbound phases is recommended. No changes to the existing cycle length are proposed.

Comparisons of Unmitigated and Mitigated 2026 Future Background and 2026 Future Total traffic operations at the Winston Churchill Boulevard and Royal Windsor Drive intersection during the Weekday AM Peak Hour resulting from these signal timing adjustments are presented in **Exhibit 3-16** and **Exhibit 3-17**, respectively. Full Highway Capacity Manual analysis for the Mitigated 2026 Future Background and 2026 Future Total Conditions analysis is presented in **Appendix I**.

Exhibit 3-16: 2026 Future Background Conditions Traffic Operations, Unmitigated and Mitigated, Signal Timing Plan Adjustment – Intersection of Winston Churchill Boulevard and Royal Windsor Drive

Intersection	Intersection			Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
	LOS	Delay (s)	v/c Ratio						
AM Peak Hour (2026 Unmitigated Future Background Conditions)									
Winston Churchill Boulevard and Royal Windsor Drive	D	49.9	0.65	EBL	D	53.3	0.64	56	130
				EBTR	E	73.7	1.01	227	-
				WBL	F	109.7	0.76	32	105
				WBT	D	37.7	0.52	90	-
				WBR	C	31.2	0.11	15	230
				NBL	C	31.7	0.10	13	125
				NBT	C	31.8	0.15	28	-
				NBR	C	31.0	0.08	15	65
				SBL	E	61.9	0.76	73	115
				SBT	B	16.6	0.22	40	-
				SBR	B	16.4	0.18	24	95
AM Peak Hour (2026 Mitigated Future Background Conditions)									
Winston Churchill Boulevard and Royal Windsor Drive	D	40.2	0.65	EBL	D	39.6	0.52	48	130
				EBTR	D	47.5	0.88	192	-
				WBL	F	105.6	0.76	32	105
				WBT	C	31.9	0.45	82	-
				WBR	C	26.8	0.11	14	230
				NBL	D	36.8	0.11	14	125
				NBT	D	36.7	0.17	30	-
				NBR	D	36.3	0.12	22	65
				SBL	E	62.4	0.77	73	115
				SBT	C	20.5	0.25	45	-
				SBR	B	19.7	0.16	21	95

Note: Red font represents a critical movement.

Exhibit 3-17: 2026 Future Total Conditions Traffic Operations, Unmitigated and Mitigated, Signal Timing Plan Adjustments – Intersection of Winston Churchill Boulevard and Royal Windsor Drive

Intersection	Intersection			Movement	LOS	Delay (s)	v/c Ratio	95th Percentile Queue (m)	Storage Capacity (m)
	LOS	Delay (s)	v/c Ratio						
AM Peak Hour (2026 Unmitigated Future Total Conditions)									
Winston Churchill Boulevard and Royal Windsor Drive	D	50.8	0.66	EBL	D	53.3	0.64	56	130
				EBTR	E	76.4	1.02	230	-
				WBL	F	127.6	0.84	36	105
				WBT	D	37.7	0.52	90	-
				WBR	C	31.2	0.11	15	230
				NBL	C	31.9	0.10	13	125
				NBT	C	31.9	0.15	29	-
				NBR	C	31.1	0.09	16	65
				SBL	E	61.9	0.76	73	115
				SBT	B	16.9	0.25	44	-
				SBR	B	16.4	0.18	24	95
AM Peak Hour (2026 Mitigated Future Total Conditions)									
Winston Churchill Boulevard and Royal Windsor Drive	D	40.26	0.66	EBL	D	39.6	0.52	48	130
				EBTR	D	48.2	0.89	195	-
				WBL	F	123.7	0.84	36	105
				WBT	C	31.9	0.45	82	-
				WBR	C	26.8	0.11	14	230
				NBL	D	37.0	0.12	14	125
				NBT	D	36.8	0.18	31	-
				NBR	D	36.5	0.13	24	65
				SBL	E	62.4	0.77	73	115
				SBT	C	20.8	0.27	49	-
				SBR	B	19.7	0.16	21	95

Note: Red font represents a critical movement.

Based on the above, when compared to Unmitigated traffic operations, the v/c ratio for the shared eastbound through / right-turn movement at the Winston Churchill Boulevard and Royal Windsor Drive intersection during the Weekday AM Peak Hour is anticipated to decrease from 1.01 (Unmitigated) to 0.88 for 2026 Future Background Conditions, and from 1.02 (Unmitigated) to 0.89 for 2026 Future Total Conditions. The resulting changes are anticipated to improve operations for the shared eastbound through / right-turn movement to below critical capacity thresholds without adversely affecting overall intersection operations or any other individual movements during the Weekday AM Peak Hour.

4 Traffic Study Recommendations/Conclusions

Based on the completed analysis, the following conclusions can be made:

- Trip generation estimates and the corresponding future total traffic analysis are based on an earlier development concept, which consisted of approximately 3,802.49 m^2 GFA of additional space for warehouse uses over the proposed development. Based on the larger previous development concept, a total of 113 and 116 two-way trips are anticipated to be produced during the Weekday AM and PM peak hours, respectively. This takes into account no trip reduction due to non-auto trips such as transit and carpooling.
- The shared eastbound through / right-turn movement at the Winston Churchill Boulevard and Royal Windsor Drive intersection during the Weekday AM Peak Hour was found to be operating above critical capacity thresholds under 2020 Existing Conditions. All remaining movements during the Weekday AM and PM Peak Hours were found to operate below critical capacity thresholds.
- The study area intersections are anticipated to operate with sufficient reserve capacity under the 2026 Future Background and 2026 Future Total Conditions during the Weekday AM and PM Peak Hours, with the exception of the shared eastbound through / right-turn movement at the Winston Churchill Boulevard and Royal Windsor Drive intersection during the Weekday AM Peak Hour, as identified under 2020 Existing Conditions. The identified capacity constraint may be mitigated through signal timing adjustments.
- Overall, the traffic generated by the proposed development is anticipated to not have a significant impact on traffic operations within the study area. No new capacity or queuing concerns are anticipated as a result of the addition of site traffic, and increases to delays are minimal.

5 Access Location Analysis

The Transportation Association of Canada's (TAC) **Geometric Design Guide for Canadian Roads** (June 2017) was used to determine if the minimum stopping sight distance and the minimum departure sight distances are present at the location of the proposed site accesses. A design speed of 70 km/h was used (the posted speed limit of 60 km/h for Winston Churchill Boulevard, plus 10 km/h to account for driver speed variances under suburban conditions) in this analysis.

5.1 North Site Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the Proposed North Site Access. It should be noted that while proposed to be a right-in, right-out only access, the analysis reflects an earlier iteration which accommodated left-in and left-out movements.

5.1.1 Stopping Sight Distance

Stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the site access. For vehicles approaching the site, this distance is given by Equation 2.5.2 in TAC:

$$SSD = 0.278Vt + 0.039\frac{V^2}{a}$$

Where:

SSD = Stopping sight distance (m)
t = Brake reaction time (2.5 s)
V = Design speed (70 km/h)
a = Deceleration rate (3.4 m/s^2)

The resulting stopping sight distance requirements for the Proposed North Site Access onto Winston Churchill Boulevard are illustrated in **Exhibit 5-1**.

Exhibit 5-1: North Site Access – Stopping Sight Distance Summary

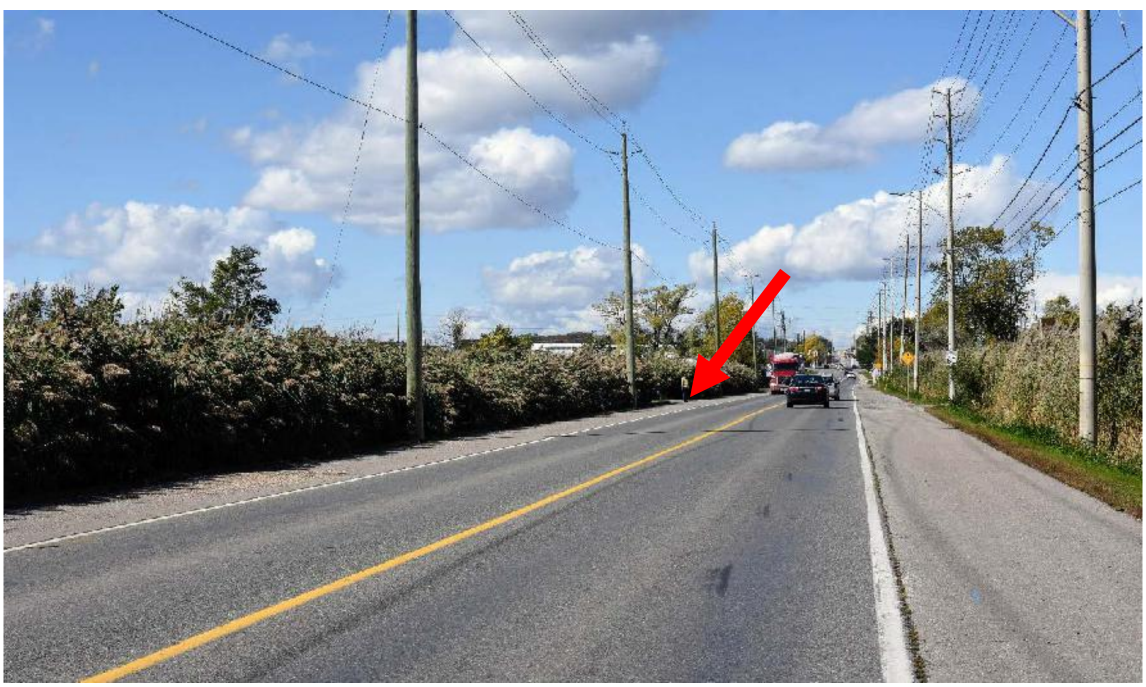
Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance	Maximum Distance Observed on Site
Approaching intersection from the north	105 m	✔	>650 m
Approaching intersection from the south	105 m	✔	>400 m

As shown in **Exhibit 5-1**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 5-2** and **Exhibit 5-3**.

Exhibit 5-2: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the Site Access)

Red arrow indicates the location of the proposed site access.

Exhibit 5-3: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the Site Access)



Red arrow indicates the location of the proposed site access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the site access. As shown in both **Exhibit 5-2** and **Exhibit 5-3**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound site traffic.

5.1.2 Departure Sight Distance

Departure sight distance (also known as Intersection Sight Distance) refers to the sight distance necessary for a driver to depart from a driveway and merge into traffic without causing a vehicle travelling along Winston Churchill Boulevard to have to decrease their speed by more than 30%. The specified departure sight distance for vehicles is given by Equation 9.9.1 in TAC:

$$ISD = 0.278\ (V_{major} \times t_g)$$

where:

ISD	=	Intersection sight distance (m)
V_{major}	=	Design speed (60 km/h)
t_g	=	Time gap for turning movement from stop (11.5 s for left-turns by trucks, 10.5 s for right-turns by trucks)

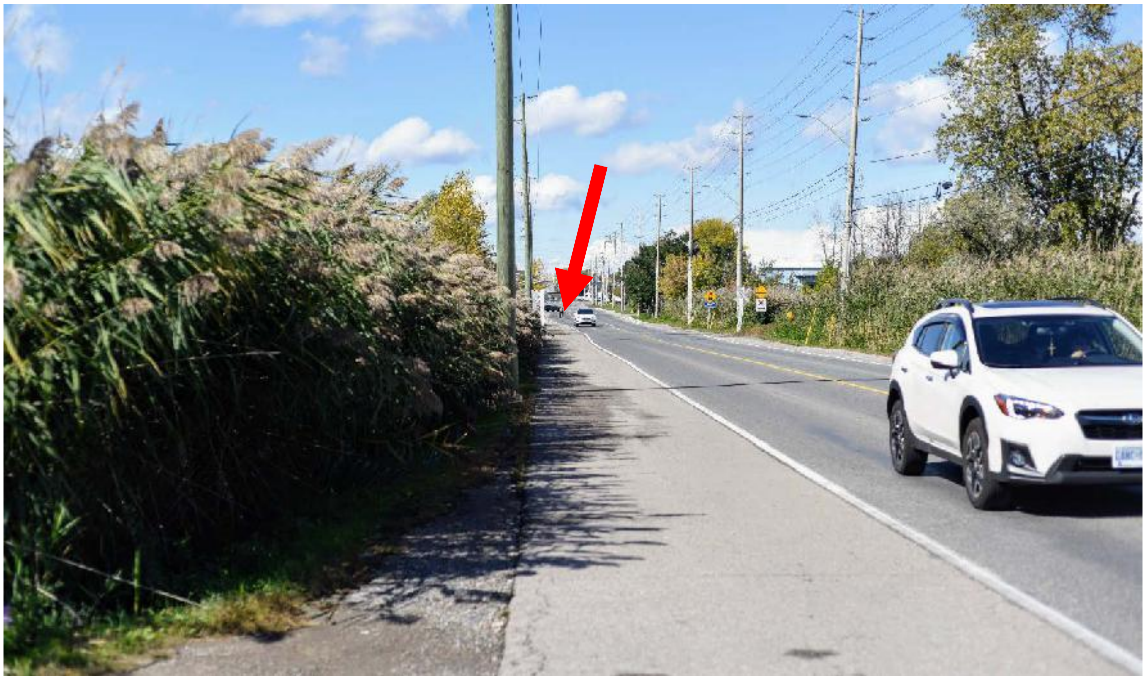
The departure sight distance requirements for the Proposed North Site Access onto Winston Churchill Boulevard are illustrated in **Exhibit 5-4**.

Exhibit 5-4: North Site Access – Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance	Maximum Distance Observed on Site
Left-turn from intersection – looking north	225 m	✔	>650 m
Left-turn from intersection – looking south	225 m	✔	>400 m
Right-turn from intersection – looking north	205 m	✔	>650 m

As shown in **Exhibit 5-4**, the observed departure sight distances meet or exceed the minimum distances specified by the TAC guidelines for vehicles making left or right-turns from the site access. **Exhibit 5-5** and **Exhibit 5-6** show the view of a motorist positioned at the site access and illustrate the observations presented in **Exhibit 5-4**.

Exhibit 5-5: Departure Sight Distance – Looking North from Site Access



Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 5-6: Departure Sight Distance – Looking South from Site Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 5-5** and **Exhibit 5-6**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the proposed site access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

5.2 South Site Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the Proposed South Site Access.

5.2.1 Stopping Sight Distance

Stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the site access. For vehicles approaching the site, this distance is given by Equation 2.5.2 in TAC:

$$SSD = 0.278Vt + 0.039\frac{V^2}{a}$$

Where:

SSD = Stopping sight distance (m)
t = Brake reaction time (2.5 s)
V = Design speed (70 km/h)
a = Deceleration rate (3.4 m/s^2)

The resulting stopping sight distance requirements for the Proposed South Site Access onto Winston Churchill Boulevard are illustrated in **Exhibit 5-7**.

Exhibit 5-7: South Site Access – Stopping Sight Distance Summary

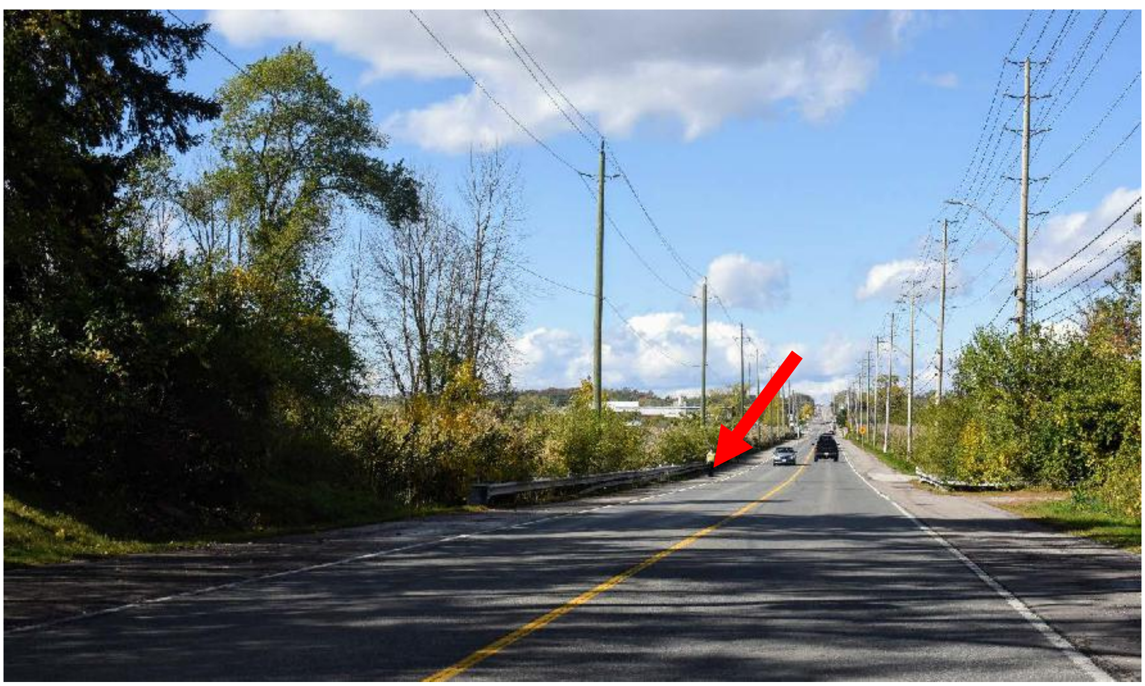
Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance	Maximum Distance Observed on Site
Approaching intersection from the north	105 m	✔	>550 m
Approaching intersection from the south	105 m	✔	>500 m

As shown in **Exhibit 5-7**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 5-8** and **Exhibit 5-9**.

Exhibit 5-8: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the Site Access)

Red arrow indicates the location of the proposed site access.

Exhibit 5-9: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the Site Access)



Red arrow indicates the location of the proposed site access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the site access. As shown in both **Exhibit 5-8** and **Exhibit 5-9**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound site traffic.

5.2.2 Departure Sight Distance

Departure sight distance (also known as Intersection Sight Distance) refers to the sight distance necessary for a driver to depart from a driveway and merge into traffic without causing a vehicle travelling along Winston Churchill Boulevard to have to decrease their speed by more than 30%. The specified departure sight distance for vehicles is given by Equation 9.9.1 in TAC:

$$ISD = 0.278\ (V_{major} \times t_g)$$

where:

ISD	=	Intersection sight distance (m)
V_{major}	=	Design speed (60 km/h)
t_g	=	Time gap for turning movement from stop (11.5 s for left-turns by trucks, 10.5 s for right-turns by trucks)

The departure sight distance requirements for the Proposed South Site Access onto Winston Churchill Boulevard are illustrated in **Exhibit 5-10**.

Exhibit 5-10: South Site Access – Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance	Maximum Distance Observed on Site
Left-turn from intersection – looking north	225 m	✔	>550 m
Left-turn from intersection – looking south	225 m	✔	>500 m
Right-turn from intersection – looking north	205 m	✔	>550 m

As shown in **Exhibit 5-10**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the site access. **Exhibit 5-11** and **Exhibit 5-12** show the view of a motorist positioned at the site access and illustrate the observations presented in **Exhibit 5-10**.

Exhibit 5-11: Departure Sight Distance – Looking North from Site Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 5-12: Departure Sight Distance – Looking South from Site Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 5-11** and **Exhibit 5-12**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the proposed site access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

5.3 Review of At-Grade Railway Crossing Standards

The proposed development is located south of an at-grade railway crossing at Winston Churchill Boulevard. This crossing consists of one track and is part of a railway spur that provides train access to several industrial land uses in the vicinity of the development site. Given the development site's proximity to this railway crossing, a review of Transport Canada's **Grade Crossing Regulations** (February 2021) ("GCR") and **Grade Crossing Standards** (January 2019) ("GCS") was undertaken to assess whether the location of the proposed north site access meets applicable standards.

According to the GCR, at least one of the following criteria must be met in order for construction of an access road (i.e., a driveway) onto a road approach to a public grade crossing to be permitted:

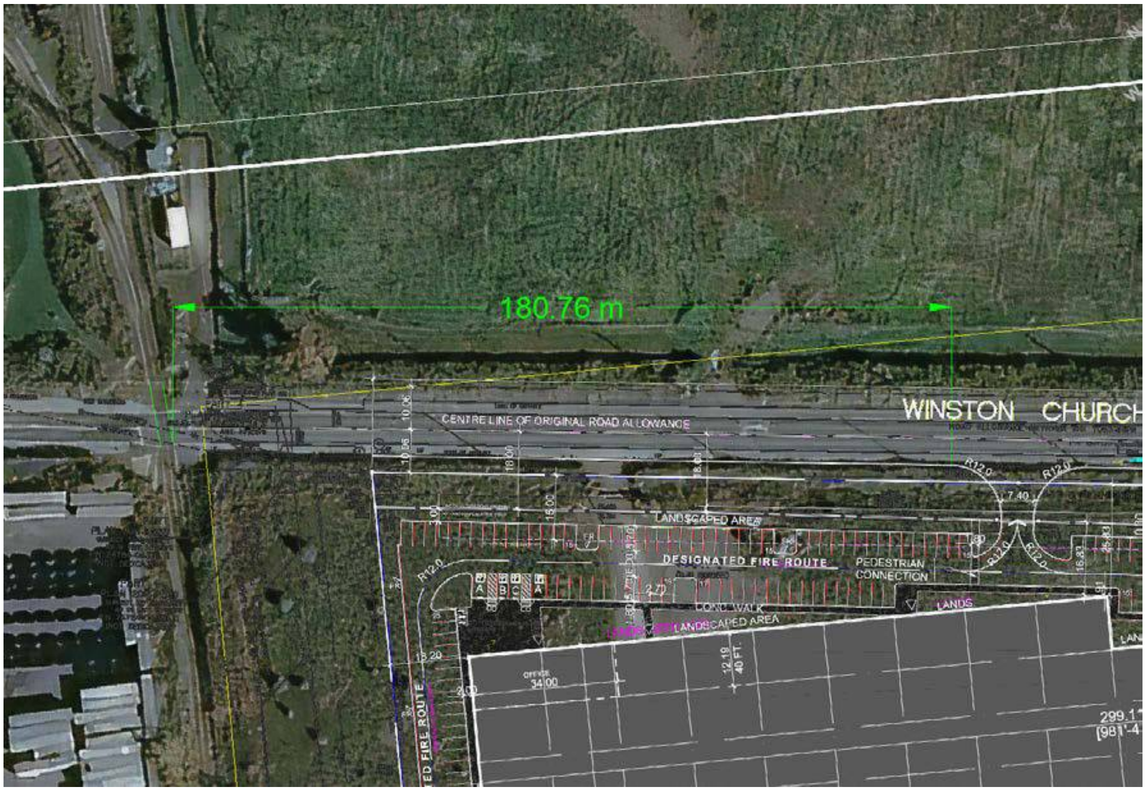
- The railway design speed is 25 km/h or less; or
- The distance between the nearest rail of the grade crossing and any point on the intersecting road exceeds 30 metres, as per the GCS.

A review of Transport Canada's Grade Crossing Inventory[4] indicates that the railway design speed at the railway crossing is 15 mph (approximately 24.1 km/h). Given that the railway design speed for the railway crossing is less than 25 km/h, criterion 1 is determined to be met.

With respect to criterion 2, the distance between the railway crossing and the proposed north site access is illustrated in **Exhibit 5-13**.

[4] https://open.canada.ca/data/en/dataset/d0f54727-6c0b-4e5a-aa04-ea1463cf9f4c

Exhibit 5-13: Distance between the Proposed North Site Access and the Railway Crossing



While criterion 2 does not need to be met due to criterion 1 meeting the necessary requirements, it is shown in **Exhibit 5-13** that the distance between the nearest rail of the railway crossing and the closest point of the proposed north site access is approximately 181 metres, which significantly exceeds the 30-metre requirement of criterion 2, as stipulated in the GCS.

Therefore, based on the guidance provided in the GCR and GCS, the location of the proposed north site access meets the relevant standards.

5.4 Access Location Analysis Summary

Based on our review of the sight distances at the location of the proposed accesses, stopping sight distances and departure sight distances are anticipated to meet or exceed the minimum requirements as specified by TAC. This suggests that departing vehicles are expected to be able to determine if a suitable gap in arterial road traffic exists, and approaching vehicles are expected to have an unobstructed view of outbound proposed development site traffic sufficient enough in order to safely react to a hazard.

Furthermore, based on our review of Transport Canada’s Grade Crossing Regulations and Grade Crossing Standards, the location of the proposed north site access meets the relevant standards for separation from the railway crossing to the north.

5.5 Other Safety Factors

Based on field observations, all road segments in the study area have appropriate and clearly visible lane markings. Based on the 2026 future total analysis, it is concluded that all existing storage lengths can sufficiently accommodate the modelled queue lengths during both peak hours. As a result, no major weaving and merging issues are anticipated.

Given the low pedestrian and cyclist volumes observed, it is anticipated that there will be little to no pedestrian and cyclist activities in the study area. Thus, pedestrian and cyclists conflict with other road users are not anticipated.

6 Winston Churchill Boulevard Corridor Review

As requested by Review Agency staff, sight distance analysis was conducted at other existing and proposed accesses along Winston Churchill Boulevard between the at-grade railway crossing north of the development site, and Deer Run Avenue. The results of this analysis is presented in this section. It should be noted that stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the site access. For vehicles approaching the site, this distance is given by Equation 2.5.2 in TAC:

$$SSD = 0.278Vt + 0.039\frac{V^2}{a}$$

Where:

SSD	= Stopping sight distance (m)
t	= Brake reaction time (2.5 s)
V	= Design speed (70 km/h)
a	= Deceleration rate (3.4 m/s^2)

As well, departure sight distance (also known as Intersection Sight Distance) refers to the sight distance necessary for a driver to depart from a driveway and merge into traffic without causing a vehicle travelling along Winston Churchill Boulevard to have to decrease their speed by more than 30%. The specified departure sight distance for vehicles is given by Equation 9.9.1 in TAC:

$$ISD = 0.278\ (V_{major} \times t_g)$$

where:

ISD	=	Intersection sight distance (m)
V_{major}	=	Design speed (60 km/h)
t_g	=	Time gap for turning movement from stop (11.5 s for left-turns by trucks, 10.5 s for right-turns by trucks)

6.1 568 Winston Churchill Boulevard North Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 568 Winston Churchill north access.

6.1.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-1**.

Exhibit 6-1: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-1**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-2** and **Exhibit 6-3**.

Exhibit 6-2: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-3: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-2** and **Exhibit 6-3**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.1.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-4**.

Exhibit 6-4: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking north	205 m	✔

As shown in **Exhibit 6-4**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-5** and **Exhibit 6-6** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-4**.

Exhibit 6-5: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-6: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-5** and **Exhibit 6-6**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.2 568 Winston Churchill Boulevard South Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 568 Winston Churchill Boulevard south access.

6.2.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-7**.

Exhibit 6-7: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-7**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-8** and **Exhibit 6-9**.

Exhibit 6-8: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-9: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-8** and **Exhibit 6-9**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.2.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-10**.

Exhibit 6-10: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking north	205 m	✔

As shown in **Exhibit 6-10**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-11** and **Exhibit 6-12** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-10**.

Exhibit 6-11: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-12: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-11** and **Exhibit 6-12**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.3 Proposed 560 Winston Churchill Boulevard North Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the Proposed 560 Winston Churchill Boulevard north access.

6.3.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-13**.

Exhibit 6-13: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-13**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-14** and **Exhibit 6-15**.

Exhibit 6-14: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-15: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-14** and **Exhibit 6-15**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.3.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-16**.

Exhibit 6-16: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking north	205 m	✔

As shown in **Exhibit 6-16**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-17** and **Exhibit 6-18** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-16**.

Exhibit 6-17: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-18: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-17** and **Exhibit 6-18**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.4 Proposed 560 Winston Churchill Boulevard South Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the Proposed 560 Winston Churchill Boulevard south access.

6.4.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-19**.

Exhibit 6-19: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-19**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-20** and **Exhibit 6-21**.

Exhibit 6-20: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-21: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-20** and **Exhibit 6-21**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.4.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-22**.

Exhibit 6-22: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✓
Left-turn from intersection – looking south	225 m	✓
Right-turn from intersection – looking north	205 m	✓

As shown in **Exhibit 6-22**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-23** and **Exhibit 6-24** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-22**.

Exhibit 6-23: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-24: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-23** and **Exhibit 6-24**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.5 Deer Run Avenue Emergency Access Gate

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing Deer Run Avenue emergency access gate.

6.5.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-25**.

Exhibit 6-25: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-25**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-26** and **Exhibit 6-27**.

Exhibit 6-26: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-27: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-26** and **Exhibit 6-27**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.5.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-28**.

Exhibit 6-28: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking north	205 m	✔

As shown in **Exhibit 6-28**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-29** and **Exhibit 6-30** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-28**.

Exhibit 6-29: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-30: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-29** and **Exhibit 6-30**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.6 535 Winston Churchill Boulevard South Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 535 Winston Churchill Boulevard south access.

6.6.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-31**.

Exhibit 6-31: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-31**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-32** and **Exhibit 6-33**.

Exhibit 6-32: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-33: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-32** and **Exhibit 6-33**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.6.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-34**.

Exhibit 6-34: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-34**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-35** and **Exhibit 6-36** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-34**.

Exhibit 6-35: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-36: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-35** and **Exhibit 6-36**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.7 535 Winston Churchill Boulevard North Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 535 Winston Churchill Boulevard north access.

6.7.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-37**.

Exhibit 6-37: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-37**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-38** and **Exhibit 6-39**.

Exhibit 6-38: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-39: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-38** and **Exhibit 6-39**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.7.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-40**.

Exhibit 6-40: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-40**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-41** and **Exhibit 6-42** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-40**.

Exhibit 6-41: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-42: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-41** and **Exhibit 6-42**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.8 555 Winston Churchill Boulevard South Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 555 Winston Churchill Boulevard south access.

6.8.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-43**.

Exhibit 6-43: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-43**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-44** and **Exhibit 6-45**.

Exhibit 6-44: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-45: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-44** and **Exhibit 6-45**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.8.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-46**.

Exhibit 6-46: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-46**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-47** and **Exhibit 6-48** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-46**.

Exhibit 6-47: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-48: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-47** and **Exhibit 6-48**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.9 555 Winston Churchill Boulevard North Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the 555 Winston Churchill Boulevard north access.

6.9.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-49**.

Exhibit 6-49: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-49**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-50** and **Exhibit 6-51**.

Exhibit 6-50: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-51: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-50** and **Exhibit 6-51**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.9.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-52**.

Exhibit 6-52: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-52**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-53** and **Exhibit 6-54** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-52**.

Exhibit 6-53: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-54: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-53** and **Exhibit 6-54**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.10 595 Winston Churchill Boulevard Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 595 Winston Churchill Boulevard site access.

6.10.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-55**.

Exhibit 6-55: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-55**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-56** and **Exhibit 6-57**.

Exhibit 6-56: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-57: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-56** and **Exhibit 6-57**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.10.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-58**.

Exhibit 6-58: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-58**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-59** and **Exhibit 6-60** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-58**.

Exhibit 6-59: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-60: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-59** and **Exhibit 6-60**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.11 645 Winston Churchill Boulevard South Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 645 Winston Churchill Boulevard south access.

6.11.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-61**.

Exhibit 6-61: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-61**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-62** and **Exhibit 6-63**.

Exhibit 6-62: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-63: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-62** and **Exhibit 6-63**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.11.2 Departure Sight Distance

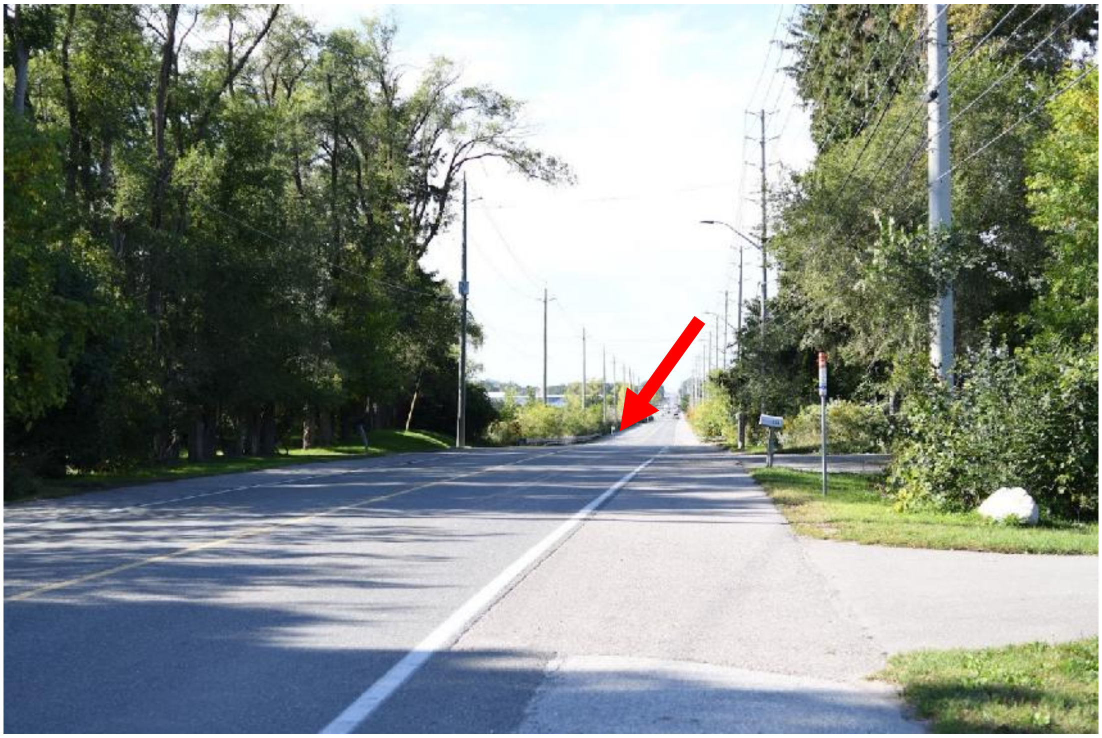
The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-64**.

Exhibit 6-64: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-64**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-65** and **Exhibit 6-66** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-64**.

Exhibit 6-65: Departure Sight Distance – Looking North from the Access



Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-66: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-65** and **Exhibit 6-66**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.12 645 Winston Churchill Boulevard North Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 645 Winston Churchill Boulevard north access.

6.12.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-67**.

Exhibit 6-67: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-67**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-68** and **Exhibit 6-69**.

Exhibit 6-68: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-69: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-68** and **Exhibit 6-69**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.12.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-70**.

Exhibit 6-70: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-70**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-71** and **Exhibit 6-72** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-70**.

Exhibit 6-71: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-72: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-71** and **Exhibit 6-72**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.13 655 Winston Churchill Boulevard Access / 663 Winston Churchill Boulevard South Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing combined 655 Winston Churchill Boulevard access / 663 Winston Churchill Boulevard south access.

6.13.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-73**.

Exhibit 6-73: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-73**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-74** and **Exhibit 6-75**.

Exhibit 6-74: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-75: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-74** and **Exhibit 6-75**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.13.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-76**.

Exhibit 6-76: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-76**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-77** and **Exhibit 6-78** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-76**.

Exhibit 6-77: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-78: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-77** and **Exhibit 6-78**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.14 663 Winston Churchill Boulevard North Site Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the existing 663 Winston Churchill Boulevard north access.

6.14.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-79**.

Exhibit 6-79: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-79**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-80** and **Exhibit 6-81**.

Exhibit 6-80: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-81: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-80** and **Exhibit 6-81**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.14.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-82**.

Exhibit 6-82: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-82**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-83** and **Exhibit 6-84** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-82**.

Exhibit 6-83: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-84: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-83** and **Exhibit 6-84**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.15 Future Orr Road

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and the future Orr Road.

6.15.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-85**.

Exhibit 6-85: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-85**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-86** and **Exhibit 6-87**.

Exhibit 6-86: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-87: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-86** and **Exhibit 6-87**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.15.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-88**.

Exhibit 6-88: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-88**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-89** and **Exhibit 6-90** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-88**.

Exhibit 6-89: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-90: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-89** and **Exhibit 6-90**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.16 Proposed 759-805 Winston Churchill Boulevard Access

The following sections discuss stopping sight distance and departure sight distance at the intersection of Winston Churchill Boulevard and a proposed 759-805 Winston Churchill Boulevard access.

6.16.1 Stopping Sight Distance

The resulting stopping sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-91**.

Exhibit 6-91: Stopping Sight Distance Summary

Scenario	Minimum TAC Stopping Sight Distance	Meets Minimum TAC Stopping Sight Distance
Approaching intersection from the north	105 m	✔
Approaching intersection from the south	105 m	✔

As shown in **Exhibit 6-91**, stopping sight distance exceeds the minimum distance specified by TAC guidelines for vehicles approaching the access from the north and from the south. This is illustrated in **Exhibit 6-92** and **Exhibit 6-93**.

Exhibit 6-92: Stopping Sight Distance – North of Access (Looking Southbound from a point 105 m north of the access)

Red arrow indicates the location of the access.

Exhibit 6-93: Stopping Sight Distance – South of Access (Looking Northbound from a point 105 m south of the access)

Red arrow indicates the location of the access.

As noted above, stopping sight distance refers to the distance necessary for a driver travelling on Winston Churchill Boulevard to avoid a collision by coming to a complete stop in reaction to a vehicle departing from the access. As shown in both **Exhibit 6-92** and **Exhibit 6-93**, sightlines exceed these minimum requirements, indicating that a motorist on Winston Churchill Boulevard is expected to have an unobstructed view of outbound traffic.

6.16.2 Departure Sight Distance

The departure sight distance requirements for this access onto Winston Churchill Boulevard are illustrated in **Exhibit 6-94**.

Exhibit 6-94: Departure Sight Distance Summary

Scenario	Minimum TAC Departure Sight Distance	Meets Minimum TAC Departure Sight Distance
Left-turn from intersection – looking north	225 m	✔
Left-turn from intersection – looking south	225 m	✔
Right-turn from intersection – looking south	205 m	✔

As shown in **Exhibit 6-94**, the observed departure sight distances meet or exceed the minimum distances specified by TAC guidelines for vehicles making left or right-turns from the access. **Exhibit 6-95** and **Exhibit 6-96** show the view of a motorist positioned at the access and illustrate the observations presented in **Exhibit 6-94**.

Exhibit 6-95: Departure Sight Distance – Looking North from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

Exhibit 6-96: Departure Sight Distance – Looking South from the Access

Red arrow indicates the specified departure sight distance for vehicles (225 m).

As shown in **Exhibit 6-95** and **Exhibit 6-96**, the departure sight distance meets or exceeds the minimum distances specified by TAC. This indicates that sightlines are sufficient for outbound motorists from the access to determine if there is a suitable gap in Winston Churchill Boulevard traffic.

6.17 Corridor Review Summary

Based on our review of the sight distances at existing and proposed accesses along Winston Churchill Boulevard within the study area, stopping sight distances and departure sight distances are anticipated to meet or exceed the minimum requirements as specified by TAC at all known locations. This suggests that departing vehicles are expected to be able to determine if a suitable gap in arterial road traffic exists, and approaching vehicles are expected to have an unobstructed view of outbound proposed traffic sufficient enough in order to safely react to a hazard.

6.18 Other Safety Factors

Based on field observations, all road segments in the study area have appropriate and clearly visible lane markings. While weaving and merging conflicts may occur at the closely spaced residential and commercial accesses on the east side of Winston Churchill Boulevard, volumes at these locations were observed to be very low. Therefore, the likelihood of actual conflicts occurring is expected to be very low. Nevertheless, access consolidation should be considered if these properties redevelop into uses which generate higher traffic volumes.

Given the low pedestrian and cyclist volumes observed, it is anticipated that there will be little to no pedestrian and cyclist activities in the study area. Thus, pedestrian and cyclists conflict with other road users are not anticipated. However, as the presence of paved shoulders on both sides of Winston Churchill Boulevard provides separation between vehicles and cyclists, appropriate replacement facilities should be considered if Winston Churchill Boulevard is rebuilt to an urban cross-section.

7 Vehicle Swept Path Analysis

A vehicle swept path analysis was conducted using AutoTurn to demonstrate that tractor trailer trucks can enter and exit the site in a forward motion, and that access to loading docks is functional. The vehicle swept path analysis is presented in **Appendix J** and indicates that access to loading docks by tractor trailer trucks via the proposed south site access is functional.

8 Study Conclusions and Recommendations

IBI Group undertook a transportation impact study and a safety study for the proposed development at 772 Winston Churchill Boulevard in Oakville, Ontario. The transportation impact study and the safety study demonstrated that there are no anticipated operational issues on the road network, and no anticipated safety issues associated with the development site because of the proposed development's construction.

The conclusions for the two portions of the study are summarized below.

8.1 Traffic Study

- Trip generation estimates and the corresponding future total traffic analysis are based on an earlier development concept, which consisted of approximately 3,802.49 m^2 GFA of additional space for warehouse uses over the proposed development. Based on the larger previous development concept, a total of 113 and 116 two-way trips are anticipated to be produced during the Weekday AM and PM peak hours, respectively. This takes into account no trip reduction due to non-auto trips such as transit and carpooling.
- The shared eastbound through / right-turn movement at the Winston Churchill Boulevard and Royal Windsor Drive intersection during the Weekday AM Peak Hour was found to be operating above critical capacity thresholds under 2020 Existing Conditions. All remaining movements during the Weekday AM and PM Peak Hours were found to operate below critical capacity thresholds.
- The study area intersections are anticipated to operate with sufficient reserve capacity under the 2026 Future Background and 2026 Future Total Conditions during the Weekday AM and PM Peak Hours, with the exception of the shared eastbound through / right-turn movement at the Winston Churchill Boulevard and Royal Windsor Drive intersection during the Weekday AM Peak Hour, as identified under 2020 Existing Conditions. The identified capacity constraint may be mitigated through signal timing adjustments.
- Overall, the traffic generated by the proposed development is anticipated to not have a significant impact on traffic operations within the study area. No new capacity or queuing concerns are anticipated as a result of the addition of site traffic, and increases to delays are minimal.

8.2 Access Location Analysis

- All known existing and proposed access and intersections along Winston Churchill Boulevard were observed to have sufficient sight line distances to accommodate vehicles movements, including heavy vehicles which require larger departure gaps.
- No major weaving, merging, pedestrian conflicts, cyclist conflicts, and heavy-vehicle conflicts are anticipated under present traffic volumes.
- Access consolidation may be considered if low-volume residential properties redevelop into uses which generate higher volumes of traffic.
- Replacement cycling facilities may be considered if Winston Churchill Boulevard is rebuilt to an urban cross-section.

8.3 Winston Churchill Boulevard Corridor Review

- Both proposed accesses to the development site have sufficient sight line distances to accommodate vehicles accessing the site, including heavy vehicles which require larger departure gaps.
- No major weaving, merging, pedestrian conflicts, cyclist conflicts, and heavy-vehicle conflicts are anticipated as a result of the proposed development's construction.

8.4 Vehicle Swept Path Analysis

- A vehicle swept path analysis was undertaken using AutoTurn to demonstrate that tractor trailer trucks can enter and exit the site in a forward motion, and that access to loading docks is functional. Based on the analysis, access to loading docks by tractor trailer trucks via the proposed south site access is functional.

Appendix A

Transportation Impact Study – 772 Winston Churchill Boulevard Report, December 9, 2015

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Transmittal

To/Attention	Company/Address	Telephone No
Heinz Hecht	Town of Oakville 1225 Trafalgar Road Oakville, ON L6H 0H3	905-845-6601
cc		

Delivered By	Hand Delivered	**No of Copies**	8
From	Scott Arbuckle		
Sent By	Gavin Davis		
Date	December 10, 2015		
Project No	39329		
Subject	Traffic Impact Statement		

Comments

8 Copies of the TIS for 772 Winston Churchill Boulevard

Final Report

Transportation Impact Study
772 Winston Churchill Boulevard

Prepared for H.H. Angus & Associates Ltd. Consulting Engineers
by IBI Group

December 2015

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1 Introduction

IBI Group was retained by H.H. Angus & Associates Ltd. Consulting Engineers to complete a transportation impact study and a safety study for the proposed development at 772 Winston Churchill Boulevard in Oakville, Ontario.

The purpose of this report is to analyze the impact that the subject development will have on the traffic for the surrounding road network. This report takes into consideration future road improvements, background growth, and other developments in the area. The study also examined the sight line distance requirement at the two proposed accesses and other potential road user conflicts in accessing the site. A swept path analysis was also conducted to examine the on-site vehicle circulation.

This report is outlined with the following sections:

- Sections 2, 3, and 4 discuss the Traffic Impact Study; and
- Section 5 discusses the sight line assessment, safety analysis, and on-site vehicle circulation assessment.

The Town of Oakville and Halton Region confirmed the study area intersections and the general scope of work for all components of the study. The correspondence can be found in **Appendix A**.

1.1 Project Understanding

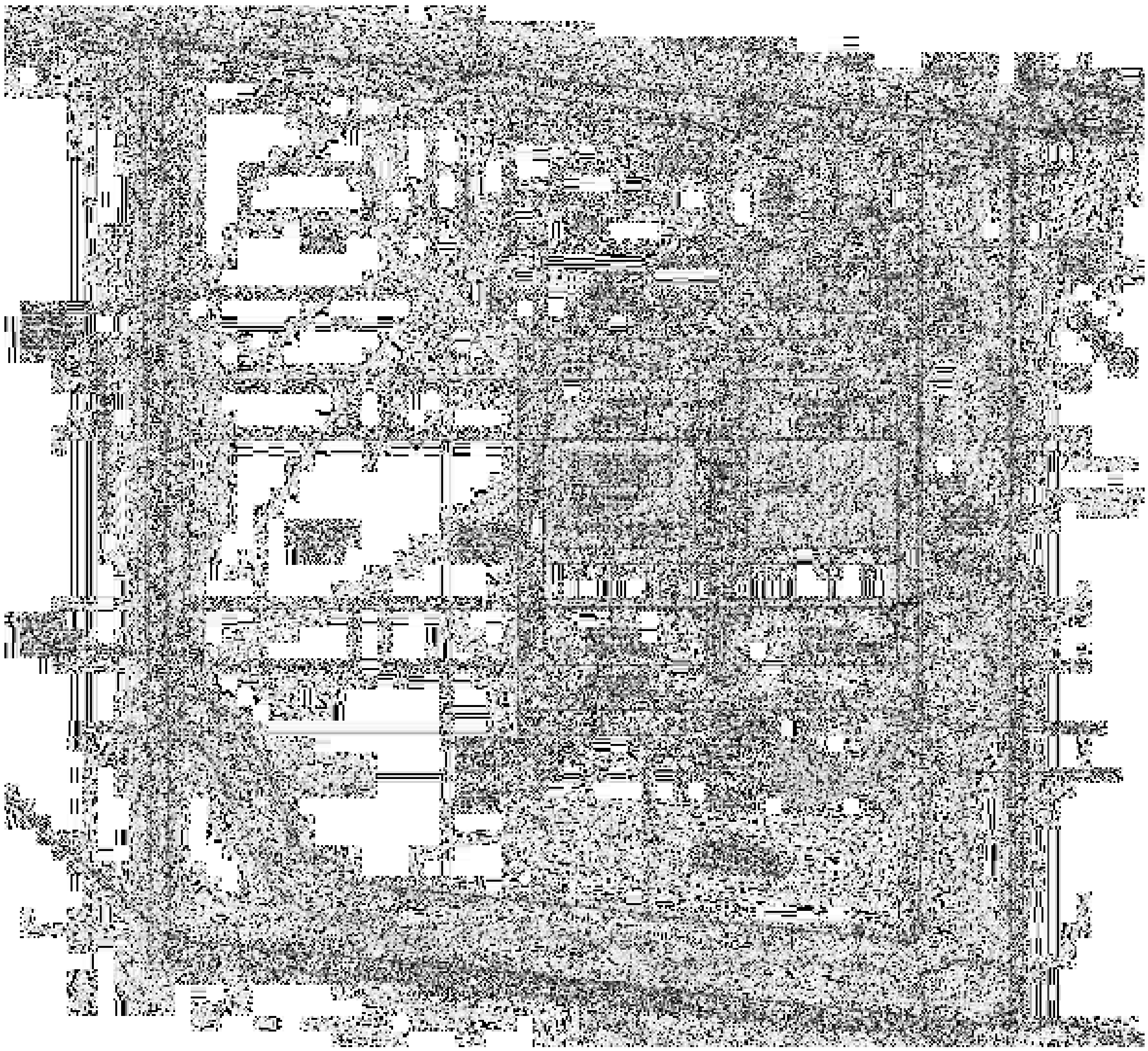
1.1.1 Site Description

772 Winston Churchill Boulevard is located at the boundary between the Town of Oakville and the City of Mississauga. The site is currently unoccupied. It is proposed to be developed as a data storage centre.

The current site plan is presented in **Exhibit 1-1**. The Gross Floor Area (GFA) is approximately 13,515 m^2 of total building area and 7,395 m^2 of outdoor area with the proposed expansion. The site is expected to be broken down as follows:

- Ground Floor – 12,440 m^2;
- Mezzanine Floor – 1,075 m^2; and
- M&E Equipment Outdoor Yard – 7,395 m^2.

Exhibit 1-1: Site Plan



1.1.2 Study Area

Based on the location of the development and confirmation with the Town of Oakville and Halton Region, it was agreed that the study area would consist of the following intersections, as shown in **Exhibit 1-2**:

- Winston Churchill Boulevard and Royal Windsor Drive – signalized;
- Winston Churchill Boulevard and Beryl Road – signalized;
- Winston Churchill Boulevard and Lakeshore Road – signalized;
- Winston Churchill Boulevard and southern site access (Access 1) – signalized; and
- Winston Churchill Boulevard and northern site access (Access 2) - unsignalized.

Exhibit 1-2: Study Area

2 Existing Traffic Conditions

2.1 Existing Road Network

2.1.1 Winston Churchill Boulevard

Winston Churchill Boulevard is a north-south arterial road under the jurisdiction of Peel Region. The speed limit along Winston Churchill Boulevard in the study is 60 km/hr. This road has one lane in each direction for the majority of study area. The road becomes a four-lane road with exclusive right-turn and left-turn lanes, as it intersects Royal Windsor Drive. The road also acts as the boundary between the Town of Oakville (Halton Region) to the west and the City of Mississauga (Peel Region) to the east.

2.1.2 Royal Windsor Drive

Royal Windsor Drive is a four-lane east-west arterial road under the jurisdictions of the Town of Oakville west of Winston Churchill Boulevard, and the City of Mississauga east of Winston Churchill Boulevard. This road has a speed limit of 60 km/hr.

2.1.3 Beryl Road

Beryl Road is a two-lane east-west local roadway under the jurisdiction of the Town of Oakville. This road intersects Winston Churchill Boulevard from the west and forms a T-intersection. The road has a speed limit of 60 km/hr.

2.1.4 Lakeshore Road West / Lakeshore Road East

Lakeshore Road is a two-lane east-west road. To the west of Winston Churchill Boulevard, this road is called Lakeshore Road East, which is under the jurisdiction of the Town of Oakville and has a speed limit of 50 km/hr. To the east of Winston Churchill Boulevard, the road is called the Lakeshore Road West, which is under the jurisdiction of the City of Mississauga and has a speed limit of 60 km/hr.

2.1.5 Site Accesses

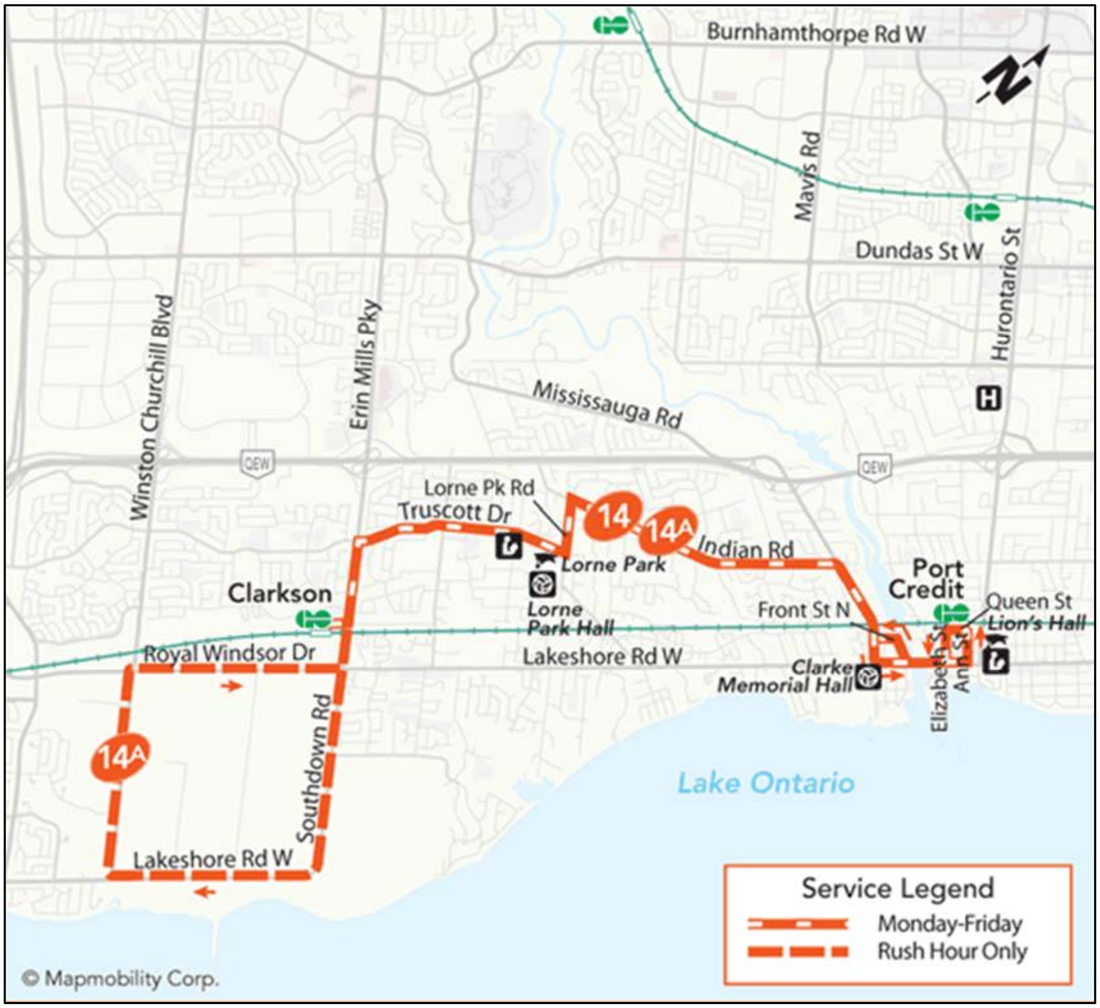
The proposed Access 1 is to intersect Winston Churchill Boulevard at approximately 325m south from the north property line. The intersection between Access 1 and Winston Churchill Boulevard is to be in alignment with the proposed future extension of Orr Road. This access is proposed to be a full movement access, allowing both left-turn and right-turn movements when entering or leaving the site.

The proposed Access 2 is to intersect Winston Churchill Boulevard at approximately 135m south from the north property line, and is approximately 190m north of Access 1. This unsignalized access is proposed to be a right-in right-out only access, allowing only right-turn movements when entering and leaving the site.

2.2 Public Transit Accessibility

Bus route 14A, operated by MiWay, provides transit services to the proposed development during peak hours periods from Monday to Friday. Bus route 14A services as an extension loop of bus route 14, which runs between the Clarkson Go Station and the Port Credit Go Station. The extension loop continues south past Clarkson Go Station, follows Southdown Road, Lakeshore Road West, Winston Churchill Boulevard, and Royal Windsor Drive in a clockwise direction, and returns to Clarkson Go Station. Bus route 14A is illustrated by **Exhibit 2-1**.

Exhibit 2-1 Existing Transit Services within the Study Area



2.3 Pedestrian and Cyclist Facilities

The existing cycling infrastructure includes a shared walking and cycling trail that is parallel to Lakeshore Road, on the south side of Lakeshore Road. In addition, Royal Windsor Drive is equipped with cycling lanes in both eastbound and westbound directions, to the west of Winston Churchill Boulevard. Lastly, Beryl Road has shared lane usage between vehicles and cyclists.

The existing pedestrian infrastructure includes the previously discussed shared walking and cycling trail along Lakeshore Road. In addition, crosswalks are present among all legs of the study intersections. All crosswalks are equipped with pedestrian signals and all side-street crosswalks are equipped with pedestrian push-buttons. There is currently no sidewalks along Winston Churchill Boulevard.

Exhibit 2-2 shows the existing pedestrian and cyclist routes in the study area.

Exhibit 2-2 Pedestrian and Cyclist Routes

2.4 Field Investigations

Field observations were completed on Friday, November 20th, 2015 during the PM peak hour period. The following observations were made during the field visit:

- There were no operational concerns at any of the study intersections;
- There were some queuing at the intersection of Winston Churchill Boulevard and Royal Windsor Drive; however, queues in all approaches were able to clear within one cycle; and
- Pedestrian and cyclist activities were low in the study area.

In addition to these observations, sight distance measurements were taken as part of the field observations. The sigh line assessment is discussed in more details in Section 5.1.

2.5 Signal Timings

The current signal timings for all existing signalized intersections are provided by the Peel Region, which has jurisdictions over the Winston Churchill Boulevard signalized intersections. The signal timing summary for this intersection is provided in **Appendix B**.

2.6 Turning Movement Counts

The turning movement counts for all existing intersections in the study area were provided by Peel Region. The date of completion for each count is presented in **Exhibit 2-3**. Refer to **Appendix C** for full turning movement count sheets.

Exhibit 2-3: List of Turning Movement Counts

INTERSECTION	COMPLETION DATE
Winston Churchill Boulevard and Royal Windsor Drive	Tuesday, June 4, 2013
Winston Churchill Boulevard and Beryl Road	
Winston Churchill Boulevard and Lakeshore Road	

As the counts were completed in 2013, an annual traffic volume growth rate of 2% was used, as advised by the Halton Region, to grow the volumes to represent 2015 existing volumes. The 2015 existing traffic volumes used for the traffic analysis are presented in **Exhibit 2-4**.

Exhibit 2-4: 2015 Existing Conditions Volumes

2.7 2015 Existing Conditions Analysis

The intersections were analyzed using the Synchro 9.0 analysis software and the Highway Capacity Manual methodology. As described in the Halton Region's Transportation Impact Study

Guidelines document (2015), the following criteria were used to identify the critical movements for signalized intersections:

- Volume / Capacity (V/C) ratios for overall intersection operations, through movements, or shared through /turning movements increased to 0.85 or above;
- V/C ratios for exclusive movements increased to 0.95 or above; or
- Queues that exceed the provided storage capacity.

The following criteria were used to identify the critical movements for unsignalized intersections:

- Level of Service (LOS), based on average delay per vehicle, on individual movements exceeds LOS "D"; or
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

A summary of the critical movements for the existing conditions can be found in **Exhibit 2-5**, while full Synchro reports are provided in **Appendix D**.

Exhibit 2-5: 2015 Existing Conditions Analysis Summary

INTERSECTION	PEAK PERIOD	OVERALL		CRITICAL MOVEMENT			
		DELAY (S) (LOS)	V/C Ratio	MOVEMENT	DELAY (LOS)	V/C Ratio	95TH PERCENTILE QUEUE LENGTH / AVAILABLE STORAGE
Winston Churchill Boulevard & Royal Windsor Road	AM	28.4 (LOS C)	0.64	-	-	-	-
	PM	33.6 (LOS C)	0.73	-	-	-	-
Winston Churchill Boulevard & Beryl Road	AM	11 (LOS B)	0.32	-	-	-	-
	PM	11.3 (LOS B)	0.36	-	-	-	-
Lakeshore Road & Winston Churchill Boulevard	AM	16.9 (LOS B)	0.37	-	-	-	-
	PM	11.3 (LOS B)	0.24	-	-	-	-

Based on the above analysis, it can be concluded that overall traffic operations are operating well under existing conditions. All three intersections in the study area are operating reasonably below their theoretical capacity. There is no individual critical movement at any of these intersections.

3 Future Traffic Conditions

3.1 2020 Future Background Conditions

3.1.1 Horizon Year

The Halton Region Transportation Impact Study Guidelines were consulted to determine the appropriate horizon year to use. Based on the Guidelines, it was agreed upon that a 2020 horizon year would be used for the traffic analysis under the future conditions. This was confirmed with the Town of Oakville and Halton Region.

3.1.2 Planned Road Improvements

Based on a past development application for the same site. and Halton Region's feedback in response to this application, the site's full-movement access (Access 1) will need to align with the future extension of Orr Road and will require signalization. To provide a conservative estimate for the worst-case performance at this future intersection, it is assumed that the Orr Road extension to Winston Churchill Boulevard will be completed by the future horizon year of 2020. This also includes any background traffic which may use the future Orr Road extension.

Based on comments from the Halton Region and Peel Region staff, it was determined that there were no other road improvements planned within the horizon year that will significantly affect traffic operations in the study area.

3.1.3 Growth Rate and Future Background Traffic

3.1.3.1 Growth Rate

It is anticipated that traffic volumes along the Winston Churchill Boulevard will generally be consistent, based on the existing land use and lack of new development applications within the study area. A growth rate assessment along the Winston Churchill Boulevard was conducted, based on a review of the historical two-way AADT volumes, presented in **Exhibit 3-1**. The assessment indicated a minor growth rate in the southbound direction and zero growth rate in the northbound direction.

Exhibit 3-1: Estimated Growth Rate

	LINK VOLUME AT WINSTON CHURCHILL BOULEVARD, 1.3 KM NORTH OF LAKESHORE RD	
YEAR	NB VOLUME	SB VOLUME
1996	2474	2533
1997	2683	2503
1998	2387	2617
1999	3940	3536
2001	3253	3482
2002	3366	3342
2003	4352	3556
2004	3501	3551
2005	3063	3268
2006	3277	3904
2007	3581	3801

	LINK VOLUME AT WINSTON CHURCHILL BOULEVARD, 1.3 KM NORTH OF LAKESHORE RD	
YEAR	NB VOLUME	SB VOLUME
2008	3405	3614
2009	3022	3191
2010	2892	3089
2011	3408	3578
2012	2909	2940
2013	2753	3316
2014	2724	2851
Growth Rate:	**-0.04%**	**0.65%**

A recent Transportation Impact Study, completed by LEA Consulting Ltd., for the development at 701 and 805 Winston Churchill Boulevard, conducted a growth rate assessment for Royal Windsor Drive and Lakeshore Road. Based on a review of Cordon count data from years 2006, 2009, 2011, and 2014, this Transportation Impact Study determined a negative growth rate during the AM Peak hour period and minimal growth rate during the PM peak hour period.

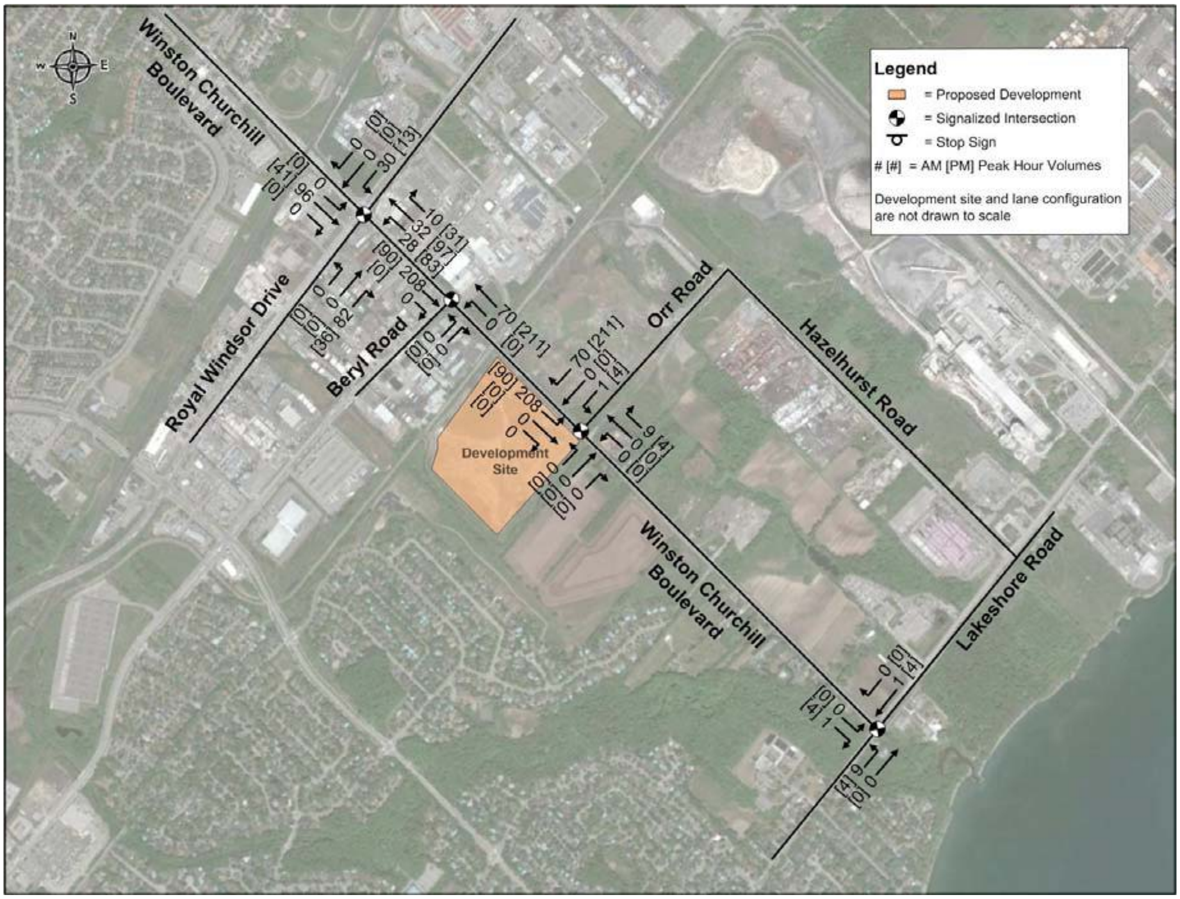
As advised by the Halton Region staff, a 2% annual growth rate was applied for all movements, to account for background traffic growth that are not captured by background developments. It should be noted that the 2% growth is a conservative estimate, since historic traffic counts in the past 10 years have demonstrated lower growth rates than this rate.

3.1.3.2 Background Developments

As the proposed development is situated at the boundary of Oakville and Mississauga, both the Town of Oakville and the City of Mississauga were consulted for their respective background development applications. Based on feedback from the Halton Region, there are no new developments anticipated to be constructed and occupied by the Horizon year of 2020. Based on a review of Peel Region's development applications, one background development located at 701 and 805 Winston Churchill Boulevard, was identified.

The application of this particular background development is currently under the review of Peel Region staff. The development application proposed an extension of the existing Orr Road from Hazelhurst Road, to connect to Winston Churchill Boulevard. As a result, the Transportation Impact Study associated with this development application forecasted a traffic volume which will use the future Orr Road extension to access Winston Churchill Boulevard. It is currently unknown whether this background development will be built and occupied by the horizon year of 2020. However, to provide a conservative worst-case scenario estimate, especially at the future signalized intersection of Winston Churchill Boulevard and future Orr Road extension, it is assumed that this development will be fully built and occupied by 2020. The background traffic volume for the above development is shown by **Exhibit 3-2**.

Exhibit 3-2: Traffic Volumes from Background Developments



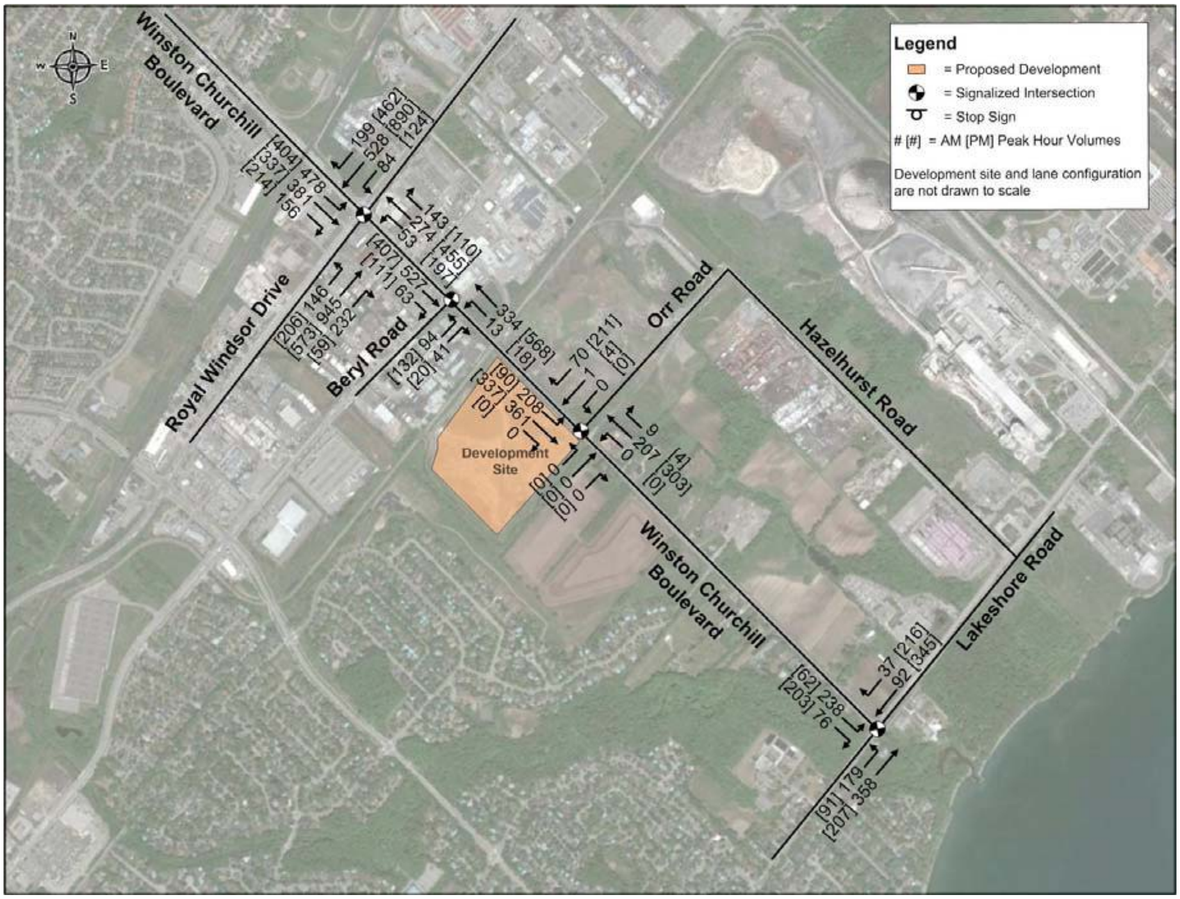
3.1.3.3 Background Developments and Growth Summary

To summarize the information provided in the previous two sections, the following growth rates were used for the future conditions:

- Taking into consideration a generally consistent traffic volume along all roadways in the study area over the past 10 years, it is anticipated that the 2% per annum growth rate will account for the potential trips generated by the background developments; and
- The proposed background development at 701 and 805 Winston Churchill Boulevard is assumed to be fully built and occupied by 2020, in order to provide a conservative estimate for the traffic volume using the future Orr Road, once it is extended and connected to Winston Churchill Boulevard.

Based on the above statements, the 2020 future background volumes are presented in **Exhibit 3-3**.

Exhibit 3-3: 2020 Future Background Conditions Volumes



3.1.4 Future Background Conditions New Traffic Signals

A signal warrant was conducted for the future signalized intersection at Winston Churchill Boulevard and the Orr Road extension, as shown by **Exhibit 3-4**.

Exhibit 3-4 Traffic Signal Warrant for Future Background Conditions

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		COMPLIANCE			
				SECTION		ENTIRE %	REQUIREMENT
		FREE FLOW	RESTRICTED FLOW	NUMERICAL	%		
1. Minimum Vehicular Volume	A. Vehicle volume. All approaches (average hour)	480	720	475	99%	90%	150%
	B. Vehicle volume, along minor streets (average hour)	120	170	108	90%		
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	720	367	76%	4%	150%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	2	4%		

As shown by the signal warrant analysis, a traffic signal is not warranted under 2020 background traffic conditions at the future intersection at Winston Churchill Boulevard and the Orr Road extension. However, the intersection is to be signalized once the proposed development is fully built and occupied (as requested by Peel Region, in response to the previously submitted development application for this same site), it is assumed that this particular intersection is to be fully signalized.

Once the proposed development is fully built, Access 1 of the site will act as the west leg of this future intersection, therefore making it operationally a 4-legged full-intersection. Based on the Halton Region's feedback in response to the previously submitted development application, it is also assumed that this future intersection will be equipped with a southbound right-turn lane (storage length of 45m) and a northbound left-turn lane (storage length of 30m). In addition, based on a review of the signal timing plans at adjacent intersections, the signal timing at this intersection is assumed to have the following parameters, as shown by **Exhibit 3-5**.

Exhibit 3-5 Assumed Signal Timing Parameters for the Future Signalized Intersection

PARAMETERS	AM PEAK HOUR PERIOD		PM PEAK HOUR PERIOD	
	NORTHBOUND/ SOUTHBOUND TIMING (S)	EASTBOUND/ WESTBOUND TIMING (S)	NORTHBOUND/ SOUTHBOUND TIMING (S)	EASTBOUND/ WESTBOUND TIMING (S)
Walk Time	7	7	7	7
Flashing Don't Walk Time	11	12	11	12
Minimum Vehicle Green	8	8	8	8
Recall Mode	Fixed	No Recall	Fixed	No Recall
Amber Time	4	4	4	4
All-Red Time	2	3	2	3
Total Split	59	31	64	26
Cycle Length	90		90	

3.1.5 2020 Future Background Traffic Analysis

The 2020 future background traffic analysis results are presented in **Exhibit 3-6**. Full Synchro reports are provided in **Appendix E**.

Exhibit 3-6: 2020 Future Background - Synchro Analysis Summary

INTERSECTION	PEAK PERIOD	OVERALL		CRITICAL MOVEMENT			
		DELAY (S) (LOS)	V/C Ratio	MOVEMENT	DELAY (LOS)	V/C Ratio	95TH PERCENTILE QUEUE LENGTH / AVAILABLE STORAGE
Winston Churchill Boulevard & Royal Windsor Road	AM	32.9 (LOS C)	0.84	-	-	-	-
	PM	47.7 (LOS D)	1.11	EBL	162.3 (LOS F)	**1.21**	99.3 / 128
				WBT	44.6 (LOS D)	0.85	144.4 / -
				NBL	115.6 (LOS F)	**1.03**	108.6 / 84
	PM (Optimized)*	46.7 (LOS D)	0.98	EBL	75.1 (LOS E)	0.95	87.5 / 128
				WBT	53 (LOS D)	0.92	159.1 / -
				NBL	94.5 (LOS F)	0.97	100.4 / 84
				SBL	82.9 (LOS F)	0.96	88.0 / 105
Winston Churchill Boulevard & Beryl Road	AM	10.5 (LOS B)	0.50	-	-	-	-
	PM	11.3 (LOS B)	0.49	-	-	-	-
Lakeshore Road & Winston Churchill Boulevard	AM	17.0 (LOS B)	0.41	-	-	-	-
	PM	24.2 (LOS C)	0.27	-	-	-	-
Winston Churchill Boulevard & Site Access 1/Orr Road Extension	AM	7.6 (LOS A)	0.50	-	-	-	-
	PM	12.2 (LOS B)	0.35	-	-	-	-

*PM (Optimized) refers to an alternative timing split scenario in which 3 seconds of westbound through green time is reallocated to advance eastbound left phase, and 4 seconds of southbound left green time is reallocated to northbound through phase.

As shown in the above analysis, the study area intersections are anticipated to operate with sufficient reserve capacity during both AM and PM peak periods, with the exception of the following movements at the intersection of Winston Churchill Boulevard at Royal Windsor Drive:

- Westbound through movement will operate with v/c ratio of 0.85 and LOS of ‘D’ during PM peak period;
- Eastbound left turn movement will operate with v/c ratio of 1.21 and LOS of ‘F’ during PM peak period; and
- Northbound left turn movement will operate with v/c ratio of 1.03 and LOS of ‘F’ during PM peak period.

In order to improve traffic operations for the eastbound left-turn and northbound left-turn movements for this intersection, the existing signal timings were modified. As a result of the optimization, green times were re-allocated to these movements from their respective opposing movements. The resulting change are anticipated to improve the operations for the eastbound left turn and northbound left turn movements without adversely affecting the overall intersection operations. Northbound left turn movements will continue to have 95th percentile queues longer than the available storage. However, it should be noted that the 50th percentile queue length is shorter than the available storage, indicating that there is no anticipated spillover on average.

3.2 2020 Future Total Traffic Conditions

The 2020 future total traffic conditions analyzes a scenario in which the anticipated site traffic volumes are added to the 2020 future background traffic volumes.

3.2.1 Trip Generation

The proposed development at 772 Winston Churchill Boulevard will use a total of 20,910 m^2 of GFA (including 13,515 m^2 of total building area and 7,395 m^2 of outdoor yard area). The proposed development will be a data storage centre. The Trip Generation 9th edition (Institute of Transportation Engineers, 2012) manual was used to determine the associated number of trips to be generated by the proposed development. Initially, Land Use Code (LUC) 160 for Data Centre was consulted. However, given the small sample size (4 and 3 number of studies, respectively during AM and PM peak hour periods) for this specific LUC, it was not used in this study. Instead, LUC 150 for Warehousing and LUC 152 for High-Cube Warehouse/Distribution Centre are used jointly. Based on the descriptions provided in the Trip Generation manual, LUC 150 Warehousing is described as “devoted to the storage of materials, but they may also include office and maintenance areas”. LUC 152 High-Cube Warehouse/Distribution Center” is described as “used for the storage of materials, goods and merchandise prior to their distribution……” and furthermore “……with small employment counts due to a high level of mechanization”. Additionally, each of these two LUCs has higher trip generation rate than LUC 160 Data Centre, and therefore provides a more conservative estimate. As a result, LUC 150 and 152 are used jointly to represent the type of use for the data centre. A previously submitted Transportation Impact Study, completed in 2005 by Javar Consultants Inc for the same development site, used the same approach. The study assumed that the individual trip generation estimate, respectively from the two LUC, contributes to 50% of the total trip generation for the proposed development. The same study also made a comparison between the forecasted trips and the observed trips from adjacent development of similar size, and concluded that the 50% assumption is realistic. As a result, this same assumption is applied in this study.

Based on a review of existing transit network, pedestrian facility, cyclist facility, and observed non-motorized movement counts, it is anticipated that most trips generated by the proposed development will be by vehicle. As a result, no reduction is applied for non-auto trips. This is anticipated to be a conservative estimate, as there may be carpooling and a number of transit riders accessing the site.

Based on the joint estimate using LUC 150 Warehousing and LUC 152 High-Cube Warehouse/Distribution Centre, the potential trips generated by the proposed development are illustrated in **Exhibit 3-7**.

Exhibit 3-7: Trip Generation

		WAREHOUSE (150)		HIGH-CUBE WAREHOUSE/DISTRIBUTION CENTRE (152)		APPLIED (SUM OF 50% OF LUC 150 AND 50% OF LUC 152)	
TERM	UNIT	WEEKDAY AM PEAK HOUR	WEEKDAY PM PEAK HOUR	WEEKDAY AM PEAK HOUR	WEEKDAY PM PEAK HOUR	WEEKDAY AM PEAK HOUR	WEEKDAY PM PEAK HOUR
Average Rate (per 1000 square feet of GFA)		0.30	0.32	0.11	0.12	-	-
GFA of the site	1000 square feet	225.1	225.1	225.1	225.1	-	-
Total Trips	veh / h	68	72	25	27	47	50
Non-Auto Reduction	0%	-	-	-	-	-	-
Net Trip Generation	veh / h	68	72	25	27	47	50
Inbound Percentage	%	79%	25%	69%	31%	-	-
New Inbound Trips	veh / h	54	18	17	8	36	13
Outbound Percentage	%	21%	75%	31%	69%	-	-
New Outbound Trips	veh / h	14	54	8	19	11	37

As shown in **Exhibit 3-7**, the net trips generated by the subject development are 47 and 50 two-way trips during the AM and PM peak hour, respectively.

3.2.2 Trip Distribution and Assignment

For all existing intersections, their existing turning movement counts were reviewed. It is assumed that the trip distribution and assignment at any existing intersections will resemble the same pattern as the observed turning movement counts, as the proposed land use is comparable to adjacent land uses.

For trip distribution at the site accesses, a trip distribution assumption of 75% to and from the north, and 25% to and from the south was used. This assumption was based on the observed traffic pattern at Winston Churchill Boulevard and Beryl Road, and it was also used in the previous Transportation Impact Study submitted in 2005 by Javar Consultants Inc. and was. This is anticipated to be an appropriate reflection of the traffic distribution of the traffic pattern for the proposed development.

Since Access 1 of the proposed development is planned to be signalized, it is assumed that all traffic entering and leaving the site will access the site through Access 1. This implies that no vehicle will be using the right-in right-out Access 2 and therefore the operational capacity for Access 2 is not analyzed. This is anticipated to provide a conservative worst-case scenario estimate for the future conditions, as Access 1 is the governing access due to allowing full movements and being signalized. The resulting trip distribution and assignment are respectively presented in **Exhibit 3-8** and **Exhibit 3-9**.

Exhibit 3-8: Trip Distribution

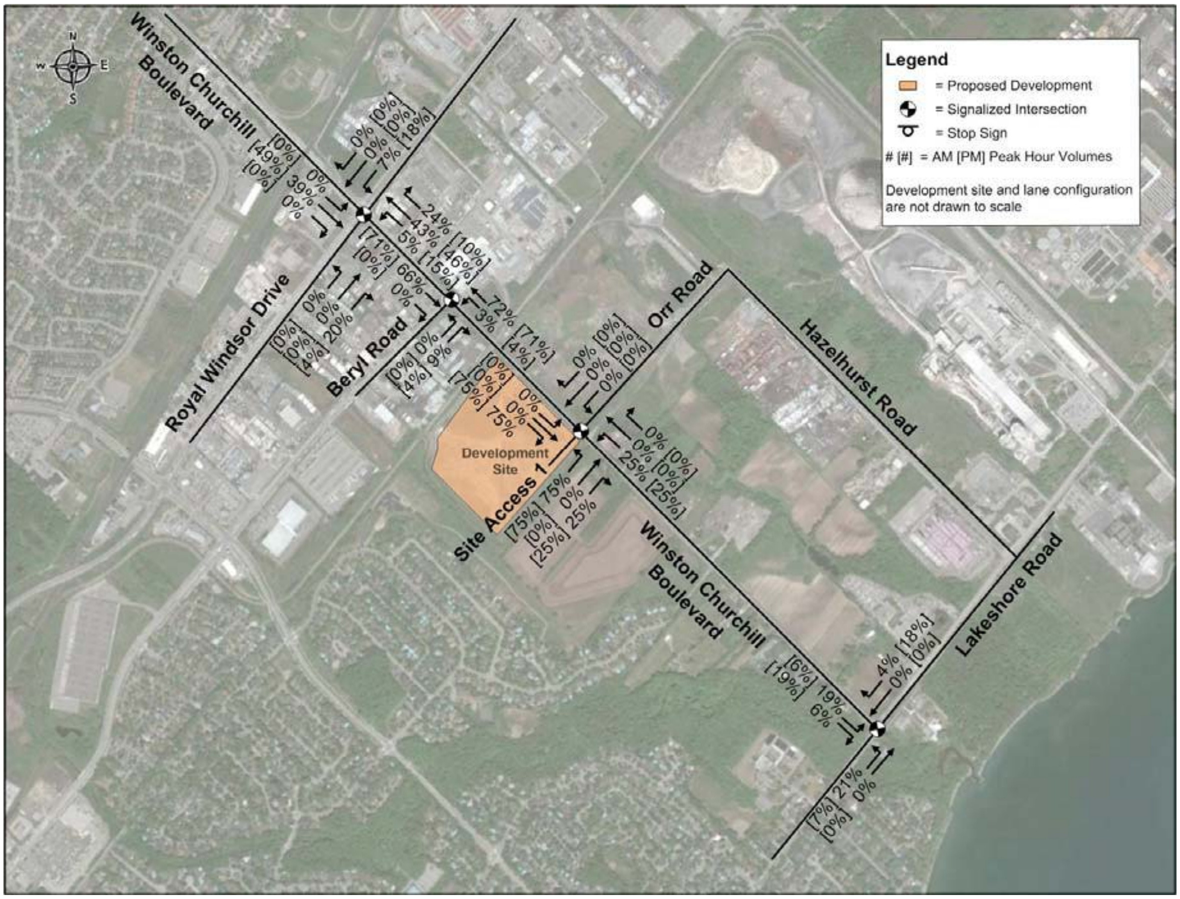
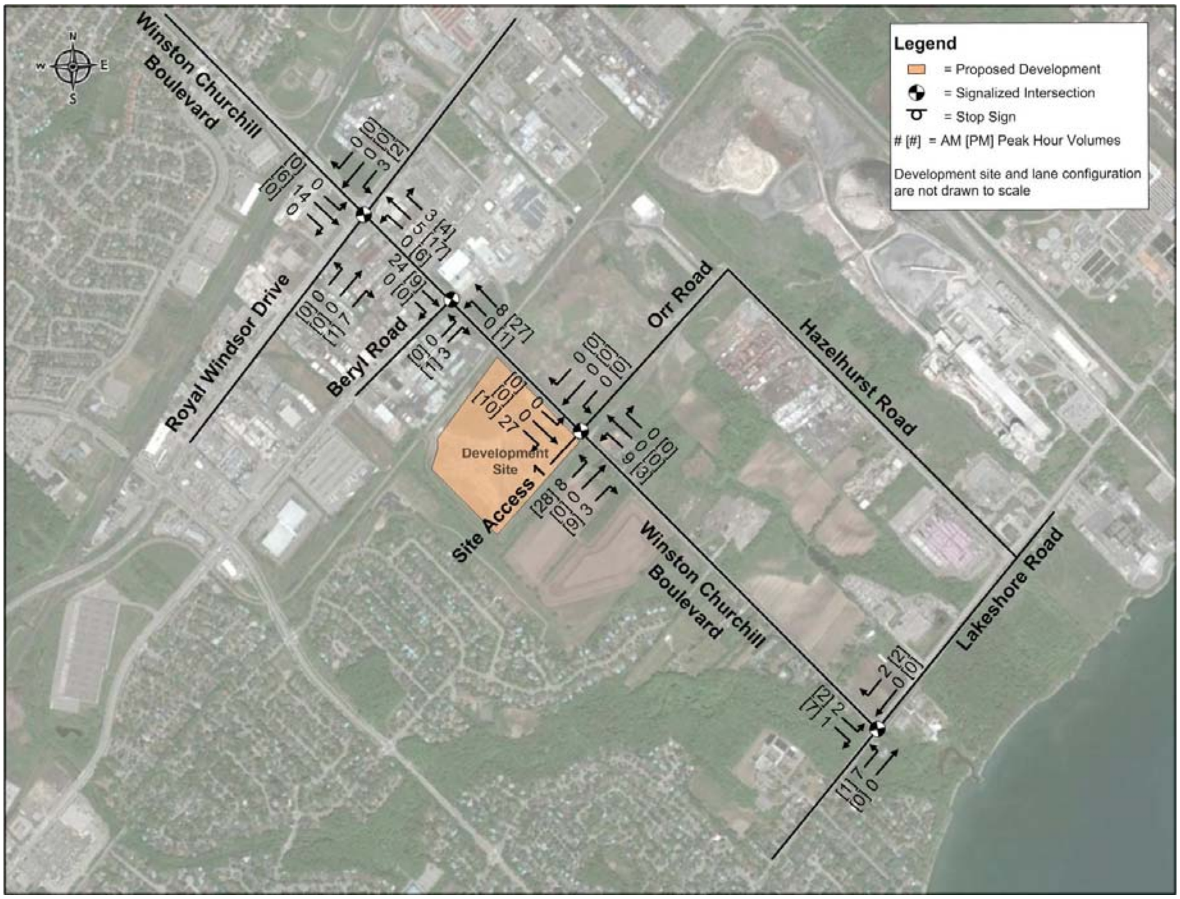
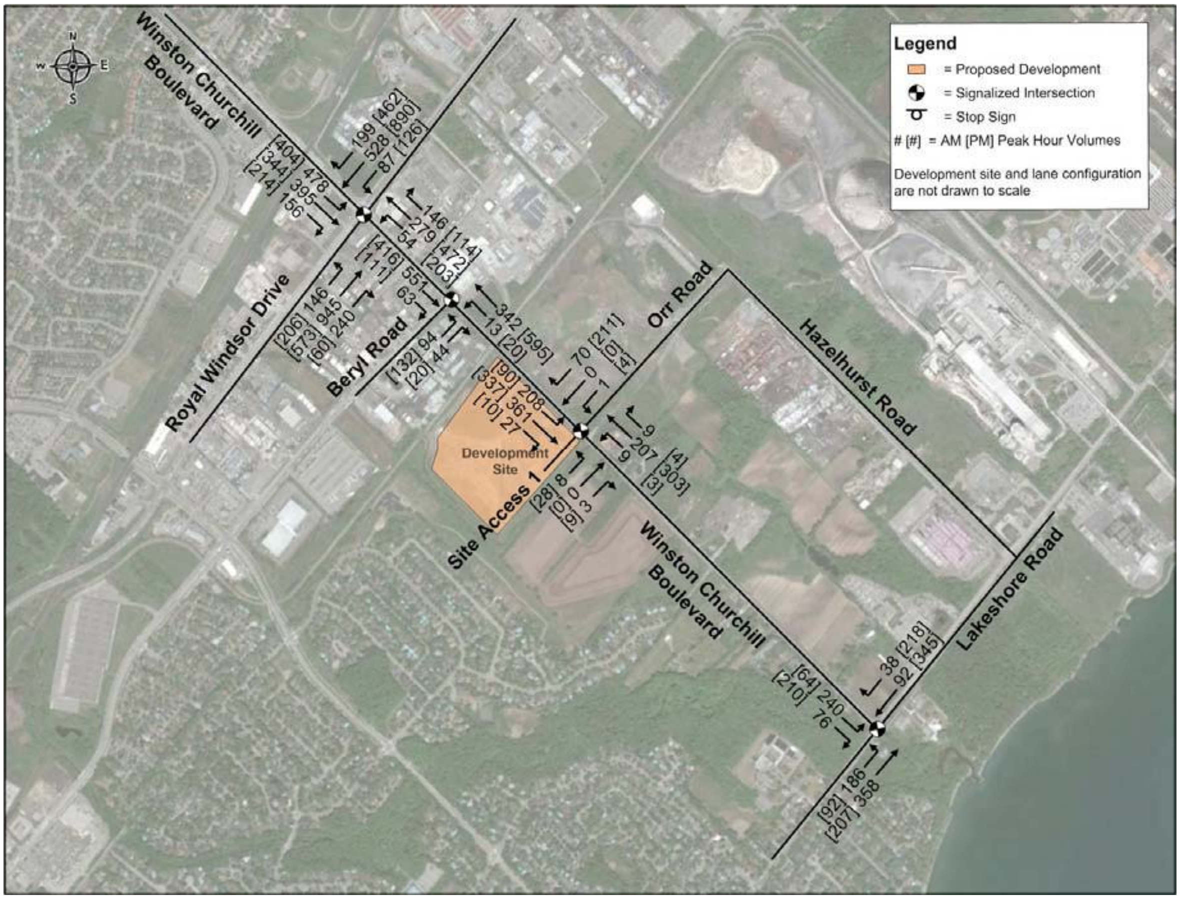


Exhibit 3-9: Site Traffic Volumes



The 2020 future total traffic volumes is the summation of the 2020 future background volumes and the site generated traffic. The resultant volumes are presented in **Exhibit 3-10**.

Exhibit 3-10: 2020 Future Total Conditions Volumes



3.2.3 Future Total Conditions New Traffic Signals

Using the 2020 future total conditions volumes, the signal warrant was conducted again for the future signalized intersection at Winston Churchill Boulevard and the Orr Road extension, as shown by **Exhibit 3-11Exhibit 3-4**.

Exhibit 3-11 Traffic Signal Warrant for Future Total Conditions

JUSTIFICATION	DESCRIPTION	MINIMUM REQUIREMENT 1 LANE HIGHWAYS		COMPLIANCE			
				SECTION		ENTIRE %	REQUIREMENT
		FREE FLOW	RESTRICTED FLOW	NUMERICAL	%		
1. Minimum Vehicular Volume	A. Vehicle volume. All approaches (average hour)	480	720	500	104%	104%	150%
	B. Vehicle volume, along minor streets (average hour)	120	170	126	105%		
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	480	720	374	78%	32%	150%
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	16	32%		

The traffic signal is still not warranted in the future total conditions. However, it is again assumed that this intersection is to be fully signalized, based on comments provided by Peel Region. The signal timing at this intersection is assumed to have the same signal timing parameters, as presented in **Exhibit 3-5**.

3.2.4 2020 Future Total Analysis

The future total analysis results are presented in **Exhibit 3-12**. Full Synchro reports are provided in **Appendix F**.

Exhibit 3-12: 2020 Future Total - Synchro Analysis Summary

INTERSECTION	PEAK PERIOD	OVERALL		CRITICAL MOVEMENT			
		DELAY (S) (LOS)	V/C	MOVEMENT	DELAY (LOS)	V/C	95TH PERCENTILE QUEUE LENGTH / AVAILABLE STORAGE
Winston Churchill Boulevard & Royal Windsor Road	AM	33.6 (LOS C)	0.88	WBL	111.6 (LOS F)	0.97	65.0 / 81
	PM	48.3 (LOS D)	1.13	EBL	162.3 (LOS F)	1.21	99.3 / 128
				WBT	44.6 (LOS D)	0.85	144.4 / -
				NBL	126.6 (LOS F)	1.07	113.6 / 84
	PM (Optimized)*	47.6 (LOS D)	1.00	EBL	86.2 (LOS F)	0.98	87.1 / 128
				WBT	53.4 (LOS D)	0.92	159.1 / -
				NBL	98.0 (LOS F)	0.98	105.5 / 84
				SBL	82.9 (LOS F)	0.96	88.0 / 105
Winston Churchill Boulevard & Beryl Road	AM	10.6 (LOS B)	0.52	-	-	-	-
	PM	11.3 (LOS B)	0.51	-	-	-	-
Lakeshore Road & Winston Churchill Boulevard	AM	16.8 (LOS B)	0.41	-	-	-	-
	PM	20.4 (LOS C)	0.27	-	-	-	-
Winston Churchill Boulevard & Site Access 1/Orr Road Extension	AM	7.7 (LOS A)	0.50	-	-	-	-
	PM	13.1 (LOS B)	0.35	-	-	-	-

*PM (Optimized) refers to an alternative timing split scenario in which, 3 seconds of westbound through green time is reallocated to advance eastbound left phase, and 4 seconds of southbound left green time is reallocated to northbound through phase.

Overall, 2020 future total traffic operations for the study area intersections are anticipated to operate similar to the 2020 future background conditions, due to the amount of site-generated traffic volume being relatively low compared to the high background traffic volumes. The 2020 future total traffic analysis indicates that the additional traffic generated by the proposed development will have marginal effects to traffic operations at the study area intersections, compared to the 2020 future background conditions. Under the 2020 future total traffic operations, the study area intersections are anticipated to operate with sufficient reserve capacity during both AM and PM peak hours with the exception of the following movements at the intersection of Winston Churchill Boulevard at Royal Windsor Drive:

- Westbound through movement will operate with v/c ratio of 0.85 and LOS of ‘D’ during PM peak period;
- Eastbound left turn movement will operate with v/c ratio of 1.21 and LOS of ‘F’ during PM peak period; and
- Northbound left turn movement will operate with v/c ratio of 1.07 and LOS of ‘F’ during PM peak period.

In order to improve traffic operations for the eastbound left-turn and northbound left-turn movements for this intersection, the existing signal timings were modified and as a result of green time being re-allocated to these movements from their respective opposing movements (similar to the improved scenario in future background conditions). The resulting change is anticipated to improve the operations for the eastbound left turn and northbound left turn movements without adversely affecting the overall intersection operations. Northbound left turn movements are likely to continue to have 95th percentile queues longer than the available storage. However, it should be noted that the 50th percentile queue length is shorter than the available storage, indicating that there is no anticipated spillover on average.

An auxiliary study was conducted to review the left-turn and right-turn queue length at the future signalized intersection of Winston Churchill Boulevard at Site Access 1/Orr Road Extension. It is our understanding that a northbound left turn and a southbound right turn exclusive lanes will be implemented at this intersection. This study compared the anticipated queue lengths at the intersection with the available physical spaces available to accommodate the queues. Under the 2020 future total conditions, the queue lengths for these movements are presented in **Exhibit 3-13**.

Exhibit 3-13 Queue Lengths for Future Signalized Intersections

INTERSECTION	MOVEMENT			
	MOVEMENT	DELAY (s) (LOS)	V/C	95TH PERCENTILE QUEUE LENGTH (M)
Winston Churchill Boulevard & Site Access 1/Orr Road Extension	NBL	2.2 (LOS A)	0.02	1.5
	SBR	2.2 (LOS A)	0.02	1.1
	NBL	5.1 (LOS A)	0.00	1.3
	SBR	2.8 (LOS A)	0.01	0.0

The queue length analysis indicates that the anticipated queue lengths are minimal for both the northbound left-turn and the southbound right-turn movement at this future signalized intersection. Therefore, queues for these movements will be sufficiently accommodated by the available physical spaces that are to be used to construct the storage lanes.

3.2.5 2020 Future Total Analysis with Unsignalized Site Access

Based on the results of the signal warrant under the future total traffic volumes, the future intersection of Winston Churchill Boulevard and Site Access 1/Orr Road Extension does not warrant a traffic signal. As a result, an unsignalized scenario for this intersection is also tested. The operational performance for each movement at this particular intersection is presented in **Exhibit 3-14**. Traffic movements at all other intersections will have similar operational performance to what was previously presented in **Section 3.2.4**.

Exhibit 3-14 2020 Future Total with Unsignalized Site Access – Synchro Analysis Summary

INTERSECTION	PEAK PERIOD	OVERALL		MOVEMENT			
		DELAY (S) (LOS)	V/C	MOVEMENT	DELAY (LOS)	V/C	95TH PERCENTILE QUEUE LENGTH / ANTICAPATED STORAGE
Winston Churchill Boulevard & Site Access 1/Orr Road Extension	AM	3.9 (-)	-	EBL/EBT/EBR	27.6 (LOS D)	0.07	1.8 / -
				WBL/WBT/WBR	10.2 (LOS B)	0.10	2.7 / -
				NBL	8.2 (LOS A)	0.01	0.2 / 30.0
				NBT/NBR	0.0 (-)	0.14	0.0 / -
				SBL/SBT	4.2 (LOS A)	0.17	4.9 / -
				SBR	0.0 (-)	0.02	0.0 / 45.0
	PM	5.2 (-)	-	EBL/EBT/EBR	38.7 (LOS E)	0.28	8.4 / -
				WBL/WBT/WBR	12.9 (LOS B)	0.34	12.0 / -
				NBL	8.0 (LOS A)	0.00	0.1 / 30.0
				NBT/NBR	0.0 (-)	0.20	0.0 / -
				SBL/SBT	2.4 (LOS A)	0.08	2.1 / -
				SBR	0.0 (-)	0.01	0.0 / 45.0

Overall, the intersection is anticipated to operate with sufficient reserve capacity during both AM and PM peak hours with the exception of the eastbound movements during the PM peak period. This movement will operate with a LOS “E” during the PM peak period. However, because its V/C ratio is well under its theoretical capacity and its 95th percentile queue length (approximately 1.5 vehicle length) is not significant, traffic operations are not anticipated to be a concern.

4 Traffic Study Recommendations/Conclusions

Based on the completed analysis, the following conclusions can be made:

- The proposed development is anticipated to generate a total of 47 and 50 two-way trips during the AM and PM peak hours, respectively. This takes into account a 0% reduction due to non-auto trips such as transit and carpooling.
- The study intersections are operating with sufficient reserve capacity under the existing conditions during both AM and PM peak periods;
- The study intersections are anticipated to operate with sufficient reserve capacity under the 2020 future background and 2020 future total conditions during both AM and PM peak periods, with the exception of eastbound left-turn, westbound through, and northbound left-turn movements at the intersection of Winston Churchill

Boulevard and Royal Windsor Road during PM peak period. However, these anticipated problems can be mitigated through adjustments to the signal timing. Note that the increase in traffic demand is mostly as a result of background traffic growth and development. The site-generated traffic volume has marginal contribution to the overall traffic operation; and

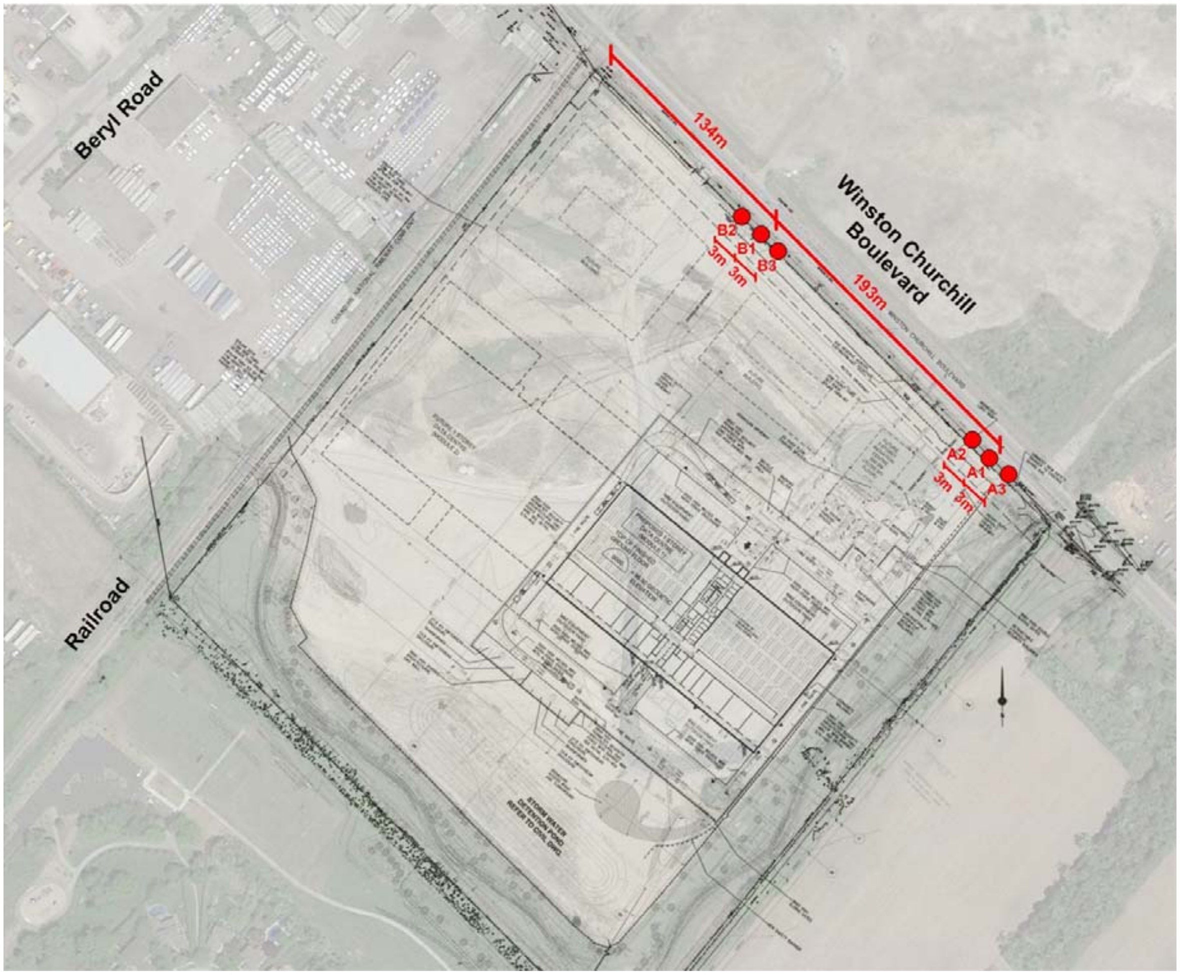
- The northbound left-turn and southbound right-turn storage lanes at the future intersection of Winston Churchill Boulevard and Site Access 1/Orr Road Extension are anticipated to have very minimal queues. The existing physical spaces that are available for the construction of storage bays well exceed the anticipated queue lengths.
- A traffic signal is not warranted at the intersection of Winston Churchill Boulevard and Site Access 1/Orr Road Extension. The 2020 future total traffic operations indicate that this intersection would operate well as an unsignalized intersection, without any lengthy delays or capacity problems.

5 Safety Review

5.1 Sightline Study

A sight distance analysis was completed for inbound and outbound vehicles to and from Access 2 (right-in right-out) and Access 1 (full-access). Given that the locations of both accesses have not been finalized, sight lines were measured from three locations in the vicinity of each of the two proposed accesses. The sight distance survey points are illustrated in **Exhibit 5-1**. Survey points B-1, B-2, and B-3 represent the approximate locations of Access 2 (respectively 131m, 134m, and 137m south from the northern corner of the property line). Survey Point A-1, A-2, and A-3 represent the approximate locations of Access 1 (respectively 324m, 327m, and 330m south from the northern corner of the property line).

Exhibit 5-1 Sight Distance Measurement Locations



5.1.1 Field Observations

Field observations concluded that sight lines looking away and toward the two proposed accesses are generally clear from visual obstructions. Field observations noted a large frontage of bushes at the current property, but these are anticipated to be removed once the site is fully built. Field observations noted a small bridge over an existing ditch, located approximately 51meters south of the proposed location of Access 1. The field observation confirmed that a small vertical crest is experienced for vehicles travelling northbound and southbound as they traverse the bridge. This vertical grade, depending on the driver's eye level, may cause sight lines to be hindered when looking south from the access or approaching the site from the south. Based on TAC Geometric Design Guide for Canadian Roads, It is assumed that driver's eye level is at 1.05 metres above the pavement, with a target height of 0.38 metres. Sight distance measurements were taken at approximately 1 metre from the edge of the existing pavement, as this was the farthest possible distance that the observer may stand at, before the sight lines are blocked by the existing vegetation.

Exhibit 5-2 Sight Distance Observations

SURVEY POINT	LOOKING TO THE LEFT (NORTH)	LOOKING TO THE RIGHT (SOUTH)
Access 1 (Location A)	No obstruction 	Small vertical crest just south of the bridge 
Access 2 (Location B)	No obstruction 	No obstruction 

5.1.2 Sight Distance Requirements

The minimum stopping and turning sight distances were calculated according to the methodology outlined by the Transportation Association of Canada's (TAC) Geometric Design Guide for Canadian Roads.

The observed available stopping sight distances, the calculated minimum stopping sight distances, and the calculated minimum decision sight distances are summarized in **Exhibit 5-3**. The latter two sight distances for Access 1 and 2 were based on a design speed of 70 km/hr (10km/hr higher than the posted speed of 60 km/hr). A 0% grade was used for both directions.

Exhibit 5-3 Observed and Calculated Stopping Sight Distances

LOCATION	OBSERVED AVAILABLE STOPPING SIGHT DISTANCE (M)	MINIMUM STOPPING SIGHT DISTANCE (M)
A-1	275+ (north) / 150 (south)	110
A-2	275+ (north) / 150 (south)	110
A-3	275+ (north) / 153 (south)	110
B-1	300+ (north) / 300+ (south)	110
B-2	300+ (north) / 300+ (south)	110
B-3	300+ (north) / 300+ (south)	110

The observed available stopping sight distances exceed the calculated minimum stopping sight distances in all scenarios. Therefore, all sight distances are satisfactory.

The turning sight distance is defined as the minimum sight distance required for drivers to be able to maintain a speed equal to 70% of their initial speed when accommodating turning vehicles. Turning sight distances were calculated for the design speeds of 60km/hr, 65 km/hr, and 70 km/hr (respectively the posted speed limit, posted speed limit +5 km/hr and posted speed limit +10 km/hr). The observed available turning sight distances and calculated turning sight distances for vehicles exiting the accesses are summarized in **Exhibit 5-4**. Note that this analysis assumes both accesses are stop-controlled and allow full movements, in order to provide a complete and conservative review.

Exhibit 5-4 Turning Sight Distances

LOCATION (ACCESS 1)	CONFLICTING MOVEMENT FROM ACCESS	OBSERVED AVAILABLE SIGHT DISTANCE (M)	CALCULATED SIGHT DISTANCE (M)		
			60 KM/H	65 KM/H	70 KM/H
A-1	Left-turn (traffic approaching from left)	275+	115	128	140
	Left-turn (traffic approaching from right)	150	125	135	146
	Right-turn (traffic approaching from left)	275+	108	117	126
A-2	Left-turn (traffic approaching from left)	275+	115	128	140
	Left-turn (traffic approaching from right)	150	125	135	146
	Right-turn (traffic approaching from left)	275+	108	117	126
A-3	Left-turn (traffic approaching from left)	275+	115	128	140
	Left-turn (traffic approaching from right)	153	125	135	146
	Right-turn (traffic approaching from left)	275+	108	117	126
B-1	Left-turn (traffic approaching from left)	300+	115	128	140
	Left-turn (traffic approaching from right)	300+	125	135	146
	Right-turn (traffic approaching from left)	300+	108	117	126
B-2	Left-turn (traffic approaching from left)	300+	115	128	140
	Left-turn (traffic approaching from right)	300+	125	135	146
	Right-turn (traffic approaching from left)	300+	108	117	126
B-3	Left-turn (traffic approaching from left)	300+	115	128	140
	Left-turn (traffic approaching from right)	300+	125	135	146
	Right-turn (traffic approaching from left)	300+	108	117	126

The following conclusions are made from the turning sight distance assessment:

- Under unsignalized stop-controlled operation, minimum turning sight distance requirements are met at all potential locations (A-1, A-2, A-3) for Access 1. However, because this access is to be signalized, the turning sight distance assessment serves more for the purpose of providing background sight line information under stop-controlled operation.
- The minimum turning sight distance requirements are met at all potential locations (B-1, B-2, B-3) for Access 2.

5.1.3 Mitigation Measures

In order to ensure that the minimum sight distances are satisfied at all times, it is recommended that any existing vegetation adjacent to both proposed accesses be removed or trimmed back to avoid obstructing the sight lines of existing vehicles. Additionally, consideration could be given to Access 2 when finalizing the driveway decision to allow for left-in and left-out movements, as all of the sight lines were acceptable at this location.

5.2 On-Site Circulation Review

For this proposed development site, a swept-path analysis was conducted to assess the on-site circulation for vehicles. The design vehicles include a Tractor-Semitrailer (WB-20) truck, a Medium Single-Unit (MSU) truck, and a Passenger Car (P), in accordance with the TAC Geometric Design Guide for Canadian Roads. Note that the site plan is designed in conformance with the same By-law requirements where the minimum width of the access aisle must be 6.0 m. In reference to **Appendix G** using AutoTURN 7.0, all truck-loading and in-site circulation manoeuvres can be safely accommodated for all tested vehicle types. In addition, the on-site parking spaces can be safely accommodated for passenger vehicles.

5.3 Other Safety Factors

Based on field observations, all road segments in the study area have appropriate and clearly visible lane markings. Based on the 2020 future total analysis, it is concluded that all existing storage lengths can sufficiently accommodate the modelled queue lengths during both peak hours, with the exception of 95% percentile northbound left turn queue at the intersection of Winston Churchill Boulevard and Royal Windsor Drive during PM peak period. As a result, no major weaving and merging issues are anticipated.

Based on field observations, it was noted that the proposed location of Access 1 is behind the existing guard rail. As a result, the existing guard rail and its chevron sign would need to be re-located further to the south, as indicated in the site plan, to accommodate Access 1. Although the proposed development does not generate any southbound left-turn traffic at this future signalized intersection, there is currently no information regarding the heavy-vehicle percentages in the southbound left-turn traffic as a result of background development. Therefore, when constructing this future intersection, it may be desirable to construct all approaching lanes with wider lane width and allow setbacks for stop bars, to accommodate truck turning.

Given the low pedestrian and cyclist volumes observed, it is anticipated that there will be little to no pedestrian and cyclist activities in the study area. Thus, pedestrian and cyclists conflict with other road users are not anticipated.

5.4 Safety Review Conclusions and Recommendations

Based on the above safety review, the following conclusions are made:

- Both accesses of the subject development have sufficient sight line distances to accommodate vehicles accessing the site;
- All truck-loading manoeuvres can be safely accommodated in forward direction without encroaching into the adjacent property boundaries;
- On-site parking spaces can be safely accommodated for passenger vehicles; and
- No major weaving, merging, pedestrian conflicts, cyclist conflicts, and heavy-vehicle conflicts are anticipated as a result of the subject development.

6 Study Conclusions and Recommendations

IBI Group undertook a transportation impact study and a safety study for the proposed development at 772 Winston Churchill Boulevard in Oakville, Ontario. The transportation impact study and the safety study demonstrated that there are no operational issues on the road network and no safety issues associated with the subject site because of the proposed development.

The conclusions for the three portions of the study are summarized below.

6.1 Traffic Study

- The proposed development is anticipated to generate a total of 47 and 50 two-way trips during the AM and PM peak hours, respectively. This takes into account no reduction due to non-auto trips such as transit and carpooling.
- The study intersections are operating with sufficient reserve capacity under the existing conditions during both AM and PM peak periods;
- The study intersections are anticipated to operate with sufficient reserve capacity under the 2020 future background and 2020 future total conditions during both AM and PM peak periods, with the exception of eastbound left-turn, westbound through, and northbound left-turn movements at the intersection of Winston Churchill Boulevard and Royal Windsor Road during PM peak period. However, these anticipated problems can be mitigated through adjustments to the signal timing. Note that the increase in traffic demand is mostly as a result of background traffic growth and development. The site-generated traffic volume has marginal contribution to the overall traffic operation; and
- The northbound left-turn and southbound right-turn storage lanes at the future intersection of Winston Churchill Boulevard and Site Access 1/Orr Road Extension are anticipated to have very minimal queues. The existing physical spaces that are available for the construction of storage bays well exceeds the anticipated queue lengths.
- A traffic signal is not warranted at the intersection of Winston Churchill Boulevard and Site Access 1/Orr Road Extension. The 2020 future total traffic operations indicate that this intersection would operate well as an unsignalized intersection, without any lengthy delays or capacity problems.

6.2 Safety Review

- Both accesses of the subject development have sufficient sight line distances to accommodate vehicles accessing the site;
- All truck-loading manoeuvres can be safely accommodated in forward direction without encroaching into the adjacent property boundaries;
- On-site parking spaces can be safely accommodated for passenger vehicles; and
- No major weaving, merging, pedestrian conflicts, cyclist conflicts, and heavy-vehicle conflicts are anticipated as a result of the subject development.

Appendix A

Scope of Work Confirmation

Peter Richards

From: Lin Rogers <lin.rogers@oakville.ca>
Sent: Thursday, November 05, 2015 9:50 AM
To: Peter Richards; Heinz Hecht
Cc: Scott Arbuckle
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Hi Peter,

Thanks for your message. The only thing I would add is a review of on-site circulation including but not limited to truck movements, parking arrangements, and pedestrian/cycling movements. Typically, the town requires that a vehicular movement plan be submitted for the site either as a separate drawing or as part of the transportation study.

I trust this addresses your inquiry at this time. Feel free to contact me if you have any other questions.

Best,
Lin

Lin Rogers, P.Eng.
Transportation Engineer
Engineering and Construction
Town of Oakville | 905-845-6601, ext.3236 | f: 905-338-4414 | www.oakville.ca

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From: Peter Richards [mailto:peter.richards@ibigroup.com]
Sent: Thursday, November 05, 2015 8:04 AM
To: Heinz Hecht
Cc: Scott Arbuckle; Lin Rogers
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Good morning;

Thank you for the update. Halton Region has no comments and have accepted our scope, while Peel Region will comment once the report has been submitted.

Can you please advise whether or not you have any additional comments on the attached proposed scope of work? If you are okay with the items, we will begin our study.

Thank you.

Pete

Peter Richards P.Eng.

Associate
email peter.richards@ibigroup.com web www.ibigroup.com

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7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61402 fax +1 416 596 0644

From: Heinz Hecht [mailto:heinz.hecht@oakville.ca]
Sent: Thursday, October 29, 2015 9:25 AM
To: Peter Richards
Cc: Scott Arbuckle; Lin Rogers
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Peter,

Just to let you know that Winston Churchill Boulevard is under the jurisdiction of the Region of Halton and Peel who will be the ultimate approval authority for the terms of reference and submitted reports. Notwithstanding, I have also forwarded your request to Lin Rogers who is the town's transportation engineer for development applications who may wish to offer further comment.

Heinz

From: Peter Richards [mailto:peter.richards@ibigroup.com]
Sent: Thursday, October 29, 2015 9:14 AM
To: Heinz Hecht
Cc: Scott Arbuckle
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Good morning Heinz;

I was wondering if you have had a chance to review the proposed scope of work for the traffic study at 772 Winston Churchill Blvd? The scope has also been provided to Halton and Peel for their review and comment.

If you could confirm the attached scope meets the requirements of the Town of Oakville, then we can proceed on this basis, accounting for any additional comments from Halton and Peel Regions.

Thank you.

Pete

Peter Richards P.Eng.

Associate
email peter.richards@ibigroup.com web www.ibigroup.com

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Heinz Hecht, MCIP, RPP
Manager, Current Planning - East District
Planning Services
Town of Oakville | 905-845-6601, ext.3311 | f: 905-338-4414 | www.oakville.ca

[Complete our Community Development customer service survey](#)

Vision: To be the most livable town in Canada
Please consider the environment before printing this email.
http://www.oakville.ca/privacy.html

From: Peter Richards
Sent: Monday, October 26, 2015 2:58 PM
To: 'heinz.hecht@oakville.ca'
Cc: Scott Arbuckle
Subject: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Good afternoon Heinz;

I'm working with Scott Arbuckle at IBI Group on the proposed site at 772 Winston Churchill Boulevard. Based on recent transportation comments made by Halton Region and the Town of Oakville, I have prepared a scope of work for a traffic impact study for your review and approval. I have also circulated this to Matt Krusto at Halton Region for their review.

Can you please let me know who would be the appropriate person to contact at Peel Region for this project review?

Looking forward to hearing from you.

Pete

Peter Richards P.Eng.

Associate
email peter.richards@ibigroup.com web www.ibigroup.com

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ibigroup.com

October 26, 2015

Heinz Hecht
Manager, Current Planning - East District
Planning Services
Town of Oakville

Dear Mr. Hecht:

SCOPE OF WORK FOR TRAFFIC IMPACT STUDY FOR PROPOSED DEVELOPMENT AT 772 WINSTON CHURCHILL BOULEVARD, OAKVILLE

This letter provides our proposed scope of work for the proposed development at 772 Winston Churchill Boulevard in Oakville, Ontario. The development would be located on the west side of Winston Churchill Boulevard.

We are aware of two previous submissions for traffic studies for the development site, with comments being provided by Halton Region, the Region of Peel, and the Town of Oakville. These comments have included the need to provide for a future signalized access opposing Orr Road, and also the provision of an exclusive northbound left-turn lane and southbound right-turn lane at this future signalized intersection.

Halton Region's Transportation Impact Study Guidelines (January 2015) were consulted during the preparation of this scope of work, and recent comments made by the various municipalities have been taken into consideration.

Work Plan

The tasks that will be completed are as follows:

1. **Existing Conditions Analysis**: Based on the proposed development's land uses and size, we plan to analyze the development peak hours, which will occur during the weekday AM peak period (between 7:00 AM – 9:00 AM) and the weekday PM peak period (between 4:00 PM – 6:00 PM).

   Intersections to be analyzed for capacity purposes:

   - Winston Churchill Boulevard / Royal Windsor Drive
   - Winston Churchill Boulevard / Beryl Road
   - Winston Churchill Boulevard / Lakeshore Road
   - Winston Churchill Boulevard / Site accesses

   Traffic counts at the study area intersections will be obtained through the Town of Oakville, Halton Region, or the Region of Peel, if available, or determined through new turning movement counts. The 2015 existing traffic operations will be analyzed using the software program Synchro for the Weekday AM and Weekday PM peak hours, for the intersections noted above.

2. **Review of Pedestrian and Bicycle Facilities**: The existing pedestrian and bicycle facilities in the study area will be noted.

3. **Transit Routes**: Existing transit routes within the study area will be identified, as per Halton Region's Transportation Impact Study Guidelines.

4. **2020 Background Traffic Conditions**: A study horizon 5 years after the completion of the traffic impact study date would be 2020. Therefore, the 2020 background traffic conditions will be analyzed for the study area intersections. The 2020 background traffic analysis will identify and determine the impacts of adjacent developments without the proposed site traffic. Any future road network or intersection changes proposed by the Town of Oakville, Halton Region, or the Region of Peel, or outlined in their respective Capital Works program, will be taken into consideration. This includes the planned future signalization of the proposed access on Winston Churchill Boulevard and the extension of Orr Road.

   We will confirm any background developments to be included, as well as an applicable growth rate for the study area road network. A blanket growth rate might be applied in lieu of background development information. Intersection operations will be analyzed for 2020, and any deficiencies and recommended road improvements will be noted.

5. **Site Traffic Generation and Trip Distribution**: The trip generation for the proposed residential development will be based on information from the Institute of Transportation Engineers publication, *Trip Generation, 9th Edition*. The trip generation rate used in the July 2005 report ***Traffic Impact Study: 772 Winston Churchill Boulevard, Oakville*** prepared by Giffels Associated Limited will also be reviewed. Additionally, any user-specific trip generation information, such as any historical data available from the client, will be considered.

   The trip distribution for the proposed site will be based on a review of the 2011 Transportation Tomorrow Survey (TTS), as well as a review of existing travel patterns, and the available road network. The previously determined trip distribution rate used in the July 2005 Giffels report will be reviewed to determine its appropriateness to carry forward. The Giffels report assumed 75% of trips were destined to/from the north on Winston Churchill Boulevard, while 25% were destined to the south on Winston Churchill Boulevard.

   The forecast site traffic for the development will be added to the road network based on the trip distribution, and assigned to the network based on logical travel routes and available traffic capacity.

6. **Sightline Study**: As part of the field investigations, IBI Group will measure the available sight distances with respect to the proposed site access. Approaching stopping sight distance and decision sight distances, as well as departure sight distances from the proposed access, will be measured and compared to the applicable standards (i.e., TAC).

Heinz Hecht
– October 26, 2015

7. **Safety Analysis**: IBI Group will conduct a review of potential safety and/or operational issues at the proposed site access, as outlined in the Halton Region's TIS Guidelines. These include any weaving issues, merging issues, vehicle/pedestrian conflicts, access conflicts, cyclist movements, or heavy truck conflicts, if applicable.

8. **2020 Total Traffic Conditions**: The estimated site traffic volumes will be combined with the 2020 background traffic volumes to determine the 2020 total traffic volumes for the study area intersections.

   Intersection operations analysis will be undertaken for the Weekday AM and Weekday PM peak hours. Any necessary road improvements required to accommodate total traffic volumes will be identified, such as additional turning lanes, storage length modifications, or signal timing adjustments.

If you have any questions about the proposed scope of work for the 772 Winston Churchill Boulevard development, please contact me.

Yours truly,

IBI GROUP

Peter Richards, P.Eng.
Associate
416-596-1930 ext. 61408
peter.richards@ibigroup.com

Peter Richards

From:	Krusto, Matt <Matt.Krusto@halton.ca>
Sent:	Tuesday, November 03, 2015 11:48 AM
To:	Peter Richards
Cc:	Scott Arbuckle; Damian.jamroz@peelregion.ca
Subject:	RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Hi Peter,

I am back in the office this week. From what I gathered from staff, they didn't have any comments on the scope of work. Sorry they didn't directly advise you of this. I took a look at the scope as well and there are no additional comments.

As Winston Churchill Boulevard is a boundary road between Peel and Halton, through the boundary road agreement, Peel Region has authority over access and property (based on the agreement). Therefore, Damian from Peel may have additional comments regarding the scope of work, east side development issues/co-ordination, etc.,

Matt

Matt Krusto | Transportation Co-ordinator
Transportation Planning
Infrastructure Planning & Policy
Public Works Department, Region of Halton
E: matt.krusto@halton.ca | T: 905-825-6000 x 7225

From: Peter Richards [mailto:peter.richards@ibigroup.com]
Sent: Tuesday, November 03, 2015 9:42 AM
To: Jakaitis, Alicia
Cc: Krusto, Matt; Scott Arbuckle; Damian.jamroz@peelregion.ca
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Good morning all;

I was wondering if you could provide an update as to whether or not the scope of work for the proposed development at 772 Winston Churchill Blvd is suitable. If you need anything from me to help with your review, do not hesitate to contact me.

Thanks in advance for your help.

Pete

Peter Richards P.Eng.

Associate
email peter.richards@ibigroup.com web www.ibigroup.com

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Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61402 fax +1 416 596 0644

From: Peter Richards
Sent: Wednesday, October 28, 2015 9:11 AM
To: 'Jakaitis, Alicia'
Cc: Krusto, Matt; Scott Arbuckle; 'Damian.jamroz@peelregion.ca'
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Hi Alicia;

Thank you for the prompt response. Matt noted he worked on this file quite a long time ago, too.

The pre-consultation comments are attached, and are reflected in our proposed scope of work (also attached).

I'm looking for confirmation on the scope of work from Halton, Peel, and Oakville, so that we can proceed, and undertake a study that addresses everyone's concerns.

Let me know if you have any further questions. Thank you.

Pete

Peter Richards P.Eng.

Associate
email peter.richards@ibigroup.com web www.ibigroup.com

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From: Jakaitis, Alicia [mailto:Alicia.Jakaitis@halton.ca]
Sent: Wednesday, October 28, 2015 9:04 AM
To: Peter Richards
Cc: Krusto, Matt; Scott Arbuckle
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Hi Peter,

I remember looking at this over 10 years ago when I was working at Peel Region! Do you mind sending me a copy of the comments provided by the Town and Oakville. Please also circulate the scope to Damian.jamroz@peelregion.ca

Thanks, Alicia

Alicia Jakaitis
Acting Senior Transportation Planner
Transportation Planning | Infrastructure Planning & Policy
Public Works, Halton Region
(905) 825-6000 ext. 7556
alicia.jakaitis@halton.ca

From: Peter Richards [mailto:peter.richards@ibigroup.com]
Sent: Tuesday, October 27, 2015 1:43 PM
To: Jakaitis, Alicia

Cc: Krusto, Matt; Scott Arbuckle
Subject: FW: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Good afternoon Alicia;

Given Matt's absence, and our schedule for this study, I was wondering if you could review the traffic scope of work and provide me some comments this week? Please see the email below and the attached scope of work.

Please let me know if you have any questions.

Pete

Peter Richards P.Eng.

Associate
email peter.richards@ibigroup.com web www.ibigroup.com

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Toronto ON M4V 2Y7 Canada
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From: Peter Richards
Sent: Monday, October 26, 2015 2:54 PM
To: 'matt.krusto@halton.ca'
Cc: Scott Arbuckle; 'amanda.mcneish@halton.ca'
Subject: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Good afternoon Matt;

I'm working with Scott Arbuckle at IBI Group on the proposed site at 772 Winston Churchill Boulevard. Based on recent transportation comments made by Halton Region and the Town of Oakville, I have prepared a scope of work for a traffic impact study for your review and approval.

Can you please let me know who would be the appropriate person to contact at Peel Region for this project review? If you are unaware, I will ask Heinz Hecht when I circulate the scope of work to the Town of Oakville.

Looking forward to hearing from you.

Pete

Peter Richards P.Eng.

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October 26, 2015

Matt Krusto
Regional Municipality of Halton
1151 Bronte Road
Oakville, Ontario L6M 3L1

Dear Mr. Krusto:

SCOPE OF WORK FOR TRAFFIC IMPACT STUDY FOR PROPOSED DEVELOPMENT AT 772 WINSTON CHURCHILL BOULEVARD, OAKVILLE

This letter provides our proposed scope of work for the proposed development at 772 Winston Churchill Boulevard in Oakville, Ontario. The development would be located on the west side of Winston Churchill Boulevard.

We are aware of two previous submissions for traffic studies for the development site, with comments being provided by Halton Region, the Region of Peel, and the Town of Oakville. These comments have included the need to provide for a future signalized access opposing Orr Road, and also the provision of an exclusive northbound left-turn lane and southbound right-turn lane at this future signalized intersection.

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If you have any questions about the proposed scope of work for the 772 Winston Churchill Boulevard development, please contact me.

Yours truly,

IBI GROUP

Peter Richards, P.Eng.
Associate
416-596-1930 ext. 61408
peter.richards@ibigroup.com

Peter Richards

From:	Jamroz, Damian <Damian.Jamroz@peelregion.ca>
Sent:	Thursday, October 29, 2015 2:19 PM
To:	Peter Richards
Cc:	Jakaitis, Alicia; Krusto, Matt; Scott Arbuckle; Masley, Mark; Carrick, Sean; Vandenburg, Ryan
Subject:	RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Hi Peter,

Peel will review the terms of reference and coordinate a response through Alicia and Matt, as well involve our Planning section.

Thank you, DAJ

Kind Regards,

Damian A. Jamroz
Supervisor, Traffic Development & Permits
Transportation Division, Public Works

Office No.: 905-791-7800 ext. 7856

From: Peter Richards [mailto:peter.richards@ibigroup.com]
Sent: October 28, 2015 9:11 AM
To: Jakaitis, Alicia
Cc: Krusto, Matt; Scott Arbuckle; Jamroz, Damian
Subject: RE: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

Hi Alicia;

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Sent: Wednesday, October 28, 2015 9:04 AM
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Thanks, Alicia

Alicia Jakaitis
Acting Senior Transportation Planner
Transportation Planning | Infrastructure Planning & Policy
Public Works, Halton Region
(905) 825-6000 ext. 7556
alicia.jakaitis@halton.ca

From: Peter Richards [mailto:peter.richards@ibigroup.com]
Sent: Tuesday, October 27, 2015 1:43 PM
To: Jakaitis, Alicia
Cc: Krusto, Matt; Scott Arbuckle
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Pete

Peter Richards P.Eng.

Associate
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From: Peter Richards
Sent: Monday, October 26, 2015 2:54 PM
To: 'matt.krusto@halton.ca'
Cc: Scott Arbuckle; 'amanda.mcneish@halton.ca'
Subject: 772 Winston Churchill Blvd - Transportation Study Scope of Work Review

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Looking forward to hearing from you.

Pete

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Appendix B

Signal Timings

REGION OF PEEL / CITY OF MISSISSAUGA INTERSECTION DATABASE SUMMARY

INTERSECTION NAME:	Royal Windsor Dr @ Winston Churchill Blvd	T2000'C' PICK UP		APPROVED BY:	R. Laing
INTERSECTION NUMBER:	67	DATE:	July 26, 1999	COMPLETED BY:	MT
T.R.I. #:	1902061	TIME:	12:00 hrs	REVISION #:	18
CONTROLLER TYPE:	EPAC 380	Network #		DATE:	November 12, 2014
				NEW DATA IMPLEMENTED:	Nov. 13 / 14

CDT #: 67

PHASE	DIRECTION	VEH. MIN. (sec.)	PED. WALK (sec.)	PED. CLEAR.	AMBER (sec.)	ALL RED (sec.)	COMM. DELAY	MINS. (SS + 2 sec) V	MINS. (SS + 2 sec) P	SPECIAL FEATURE
1	EB P.P. LT	5			3		1	9	9	
2	EW GREEN		11	17	4	3	1	36	36	C
3	SB PRO LT ARROW	8			3	2	1	19	19	
4	NS GREEN	8	14	23	4	4	1	19	48	E

SPLIT TABLE

SPLIT #	PHASES 1 EB LT	2 EW	3 SB PRO L	4 NS
1	0	40	35	25
2	0	45	27	28
3	10	40	22	28

OFFSET TABLE

OFFSET #	%
1	45
2	63
3	77

ACTIVITY SCHEDULE INFORMATION

ACT. SCH. NO.	DAY OF WEEK	TIME PERIOD	MODE	CYCLE (sec.)	OFFSET #	SPLIT #	SPF #
1	MON. - FRI.	00:00	LO	101	2	2	2
1	MON. - FRI.	06:00	CC	120	1	1	1
1	MON. - FRI.	09:30	CC	100	2	2	2
1	MON. - FRI.	15:00	CC	120	3	3	3
1	MON. - FRI.	19:30	CC	100	2	2	2
1	MON. - FRI.	0:00	LO	101	2	2	2
2	SAT	00:00	LO	101	2	2	2
2	SAT	07:00	CC	100	2	2	2
2	SAT	00:00	LO	101	2	2	2
3	SUN./HOL.	00:00	LO	101	2	2	2
3	SUN./HOL.	08:00	CC	100	2	2	2
3	SUN./HOL.	23:00	LO	101	2	2	2

SPECIAL FUNCTION OMIT STATUS

SPF #	1 EB LT	2 NA	3 CAL
1	Y	Y	N
2	Y	Y	N
3	N	Y	N

PHASE OMIT OPERATION SPECIAL FUNCTIONS ASSIGNMENTS

1	EB P.P. LT
2	NA
3	CAL = CALL ALL PHASES

COMMENTS:

- revise Split #1 as shown in red (increase SBLT time in the AM peak)
- revise SPF #1 as shown in red (remove EBLT omit in the PM peak)

REGION OF PEEL / CITY OF MISSISSAUGA INTERSECTION DATABASE SUMMARY

INTERSECTION NAME:	WINSTON CHURCHILL BLVD @ BERYL RD.	T2000'C' PICK UP DATE:		APPROVED BY:	R. Lang
SYSTEM NUMBER:	929	DATE:		COMPLETED BY:	AP /
T.R.I. #:	01901761	TIME:		REVISION #:	2
CONTROLLER TYPE:	EPAC 380	Control Area:	WCB #1	DATE:	April 1, 2013
				NEW DATA IMPLEMENTED:	April 10, 2013

CDT #: 929

PHASE	DIRECTION	VEH. MIN. (sec.)	PED. WALK (sec.)	PED. CLEAR.	AMBER (sec.)	ALL RED (sec.)	COMM. DELAY	MINS. (SS + 2 sec) V	MINS. (SS + 2 sec) P	SPECIAL FEATURE
1	NOT IN USE						0	0	0	
2	SB GREEN		7	11	4	3	1	26	26	C
3	NOT IN USE						0	0	0	
4	WB GREEN (Ped.)	8	7	12	4	3	1	29	29	
5	NOT IN USE						0	0	0	
6	NB GREEN		7	11	4	3	1	26	26	C
7	NOT IN USE						0	0	0	
8	EB GREEN	8	7	12	4	3	1	29	29	

SPLIT TABLE

SPLIT #	PHASE 1	2	3	4	5	6	7	8
	NIU	SB	NIU	WB	NIU	NB	NIU	EB
1	0	70	0	30	0	70	0	30
2	0	65	0	35	0	65	0	35
3	0	70	0	30	0	70	0	30

OFFSET TABLE

OFFSET #	%
1	94
2	21
3	94

ACTIVITY SCHEDULE INFORMATION

ACT. SCH. NO	DAY OF WEEK	TIME PERIOD	MODE	CYCLE (sec.)	OFFSET #	SPLIT #	SPF #
1	MON. - FRI.	0:00	LO	101	2	2	2
1	MON. - FRI.	6:00	CC	100	1	1	1
1	MON. - FRI.	9:30	CC	85	2	2	2
1	MON. - FRI.	15:00	CC	100	3	3	3
1	MON. - FRI.	19:30	CC	85	2	2	2
1	MON. - FRI.	0:00	LO	101	2	2	2
2	SAT.	0:00	LO	101	2	2	2
2	SAT.	7:00	CC	85	2	2	2
2	SAT.	0:00	LO	101	2	2	2
3	SUN./HOL.	0:00	LO	101	2	2	2
3	SUN./HOL.	8:00	CC	85	2	2	2
3	SUN./HOL.	23:00	LO	101	2	2	2

SPECIAL FUNCTION OMIT STATUS

SPF #	1	2	3
	NA	NA	CAL
1	Y	Y	N
2	Y	Y	N
3	N	Y	N
31	N	N	N

PHASE OMIT OPERATION SPECIAL FUNCTIONS ASSIGNMENTS

1	NA
2	NA
3	CAL = CALL ALL PHASES

COMMENTS:

Change CDT Table as shown in red

Change Activity Schedule Information Table as shown in red

Change Split Table as shown in red

Mississauga Database

Known Cycle Length	Split #	Total % Ph. 1-4	Split Table Phases: Ph. 1 %	Phase Time Sec.	Ph. 2 %	Phase Time Sec.	Ph. 3 %	Phase Time Sec.	Ph. 4 %	Phase Time Sec.	Ph. 5 %	Phase Time Sec.	Ph. 6 %	Phase Time Sec.	Ph. 7 %	Phase Time Sec.	Ph. 8 %	Phase Time Sec.	Total % Ph. 5 - 8
100	1	100	0	0.0	70	70.0	0	0.0	30	30.0	0	0.0	70	70.0	0	0.0	30	30.0	100
85	2	100	0	0.0	65	55.3	0	0.0	35	29.8	0	0.0	65	55.3	0	0.0	35	29.8	100
100	3	100	0	0.0	70	70.0	0	0.0	30	30.0	0	0.0	70	70.0	0	0.0	30	30.0	100
0		0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
0		0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
0		0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0

Sum of 1&2 = 5&6		Sum of 3&4 = 7&8		Calculated: Total 1-4 Actual Cycle	Calculated: Total 5-8 Actual Cycle
70	70	30	30	100	100
65	65	35	35	85	85
70	70	30	30	100	100
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

MAX II Split

Ph. 1 sec.	Diff.	Ph. 2 sec.	Diff.	Ph. 3 sec.	Diff.	Ph. 4 sec.	Diff.	Ph. 5 sec.	Diff.	Ph. 6 sec.	Diff.	Ph. 7 sec.	Diff.	Ph. 8 sec.	Diff.
0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Winston Churchill Blvd. / Beryl Road

CDT

	DIRECTION	MIN. (sec.)	WALK	PED CLEAR	Amber (sec.)	RED (sec.)	COMM DELAY	(SS + 2 sec) V	(SS + 2 sec) P	FEATURE
1	NIU						0	0	0	
2	S/B Green		7	11	4	3	1	26	26	C
3	Not In Use						0	0	0	
4	Computer Phase		7	12	4	3	1	29	29	
5	NIU						0	0	0	
6	N/B Green		7	11	4	3	1	26	26	C
7	NIU						0	0	0	
8	E/B Green		7	12	4	3	1	29	29	

REGION OF PEEL / CITY OF MISSISSAUGA INTERSECTION DATABASE SUMMARY

INTERSECTION NAME:	**Winston Churchill Blvd @ Lakeshore Rd.**	T2000'C' PICK UP		APPROVED BY:	
INTERSECTION NUMBER:	**653**	DATE:		COMPLETED BY:	Rick Laing
T.R.I. #:	19000	TIME:		REVISION #:	0
CONTROLLER TYPE:	EPAC 340	WCB #1		DATE:	December 4, 2015
				NEW DATA IMPLEMENTED:	

CDT #: 653

PHASE	DIRECTION	VEH. MIN. (sec.)	PED. WALK (sec.)	PED. CLEAR.	AMBER (sec.)	ALL RED (sec.)	COMM. DELAY	MINS. (SS + 2 sec) V	MINS. (SS + 2 sec) P	SPECIAL FEATURE
1	NOT IN USE						0	0	0	
2	EW GREEN		7	12	4	2	1	26	26	C
3	SB LT ARROW						0	0	0	
4	NS GREEN	8	7	10	4	3	1	18	27	

SPLIT TABLE

SPLIT #	PHASES (%) 1 NA	2 EW	3 NA	4 NS
1	0	65	0	35
2	0	60	0	40
3	0	60	0	40

OFFSET TABLE

OFFSET #	%
1	45
2	63
3	99

ACTIVITY SCHEDULE INFORMATION

ACT. SCH. NO.	DAY OF WEEK	TIME PERIOD	MODE	CYCLE (sec.)	OFFSET #	SPLIT #	SPF #
1	MON. - FRI.	0:00	LO	101	2	2	2
1	MON. - FRI.	6:45	CC	90	1	1	1
1	MON. - FRI.	9:15	CC	85	2	2	2
1	MON. - FRI.	15:30	CC	90	3	3	3
1	MON. - FRI.	18:30	CC	85	2	2	2
1	MON. - FRI.	22:00	LO	101	2	2	2
2	SAT.	0:00	LO	101	2	2	2
2	SAT.	6:45	CC	85	2	2	2
2	SAT.	22:00	LO	101	2	2	2
3	SUN./HOL.	0:00	LO	101	2	2	2
3	SUN./HOL.	6:45	CC	85	2	2	2
3	SUN./HOL.	22:00	LO	101	2	2	2

SPECIAL FUNCTION OMIT STATUS

SPF #	1 NA	2 NA	3 CAL
1	Y	Y	N
2	Y	Y	N
3	Y	Y	N
31	N	N	N

PHASE OMIT OPERATION SPECIAL FUNCTIONS ASSIGNMENTS

1	NA
2	NA
3	CAL = CALL ALL PHASES

COMMENTS: **NEW DATA IMPLEMENTED:**

New Signal Installation

Appendix C

Turning Movement Counts

MG8 ENG

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Region of Peel
Site #: 0001902061
Intersection: Winston Churchill Blvd & Royal Windsor
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
VELE

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total: 1311
North Entering: 800
North Peds: 0
Peds Cross: ⋈

Cyclists	0	0	0	0
Trucks	7	19	26	52
Cars	129	229	390	748
Totals	136	248	416	

Cyclists	1
Trucks	35
Cars	475
Totals	511

East Leg Total: 2035
East Entering: 680
East Peds: 1
Peds Cross: ⧗

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
1	51	566	618

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
156	17	0	173
421	38	1	460
42	5	0	47
619	60	1	

N
W E
S

Cyclists	Trucks	Cars	Totals
0	6	121	127
1	35	787	823
0	11	120	131
1	52	1028	

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
1287	67	1	1355

Winston Churchill Blvd

Peds Cross: ⧗
West Peds: 0
West Entering: 1081
West Leg Total: 1699

Cars	391
Trucks	35
Cyclists	0
Totals	426

Cars	16	198	110	324
Trucks	6	12	6	24
Cyclists	0	1	0	1
Totals	22	211	116	

Peds Cross: ⋈
South Peds: 0
South Entering: 349
South Leg Total: 775

Comments

MG8 ENG

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Municipality: Region of Peel
Site #: 0001902061
Intersection: Winston Churchill Blvd & Royal Windsor
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
VELE

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total: 1041
North Entering: 494
North Peds: 0
Peds Cross:

Cyclists	0	0	0	0
Trucks	14	23	15	52
Cars	112	145	185	442
Totals	126	168	200	

Cyclists	1
Trucks	42
Cars	504
Totals	547

East Leg Total: 1391
East Entering: 757
East Peds: 0
Peds Cross:

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
2	69	569	640

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
255	14	0	269
408	44	1	453
35	0	0	35
698	58	1	

N

W E

S

Cyclists	Trucks	Cars	Totals
0	9	111	120
3	60	313	376
0	15	17	32
3	84	441	

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
550	81	3	634

Winston Churchill Blvd

Peds Cross:
West Peds: 0
West Entering: 528
West Leg Total: 1168

Cars	197
Trucks	38
Cyclists	0
Totals	235

Cars	49	138	52	239
Trucks	11	19	6	36
Cyclists	1	1	0	2
Totals	61	158	58	

Peds Cross:
South Peds: 0
South Entering: 277
South Leg Total: 512

Comments

MG8 ENG

Afternoon Peak Diagram

Specified Period		One Hour Peak	
From:	15:00:00	**From:**	16:45:00
To:	18:00:00	**To:**	17:45:00

Municipality: Region of Peel
Site #: 0001902061
Intersection: Winston Churchill Blvd & Royal Windsor
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
VELE

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total: 1689
North Entering: 796
North Peds: 0
Peds Cross: ⋈

Cyclists	1	1	0	2
Trucks	7	8	10	25
Cars	178	249	342	769
Totals	186	258	352	

Cyclists	5
Trucks	14
Cars	874
Totals	893

East Leg Total: 2194
East Entering: 1274
East Peds: 1
Peds Cross: ⧗

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
3	35	1022	1060

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
397	5	0	402
749	24	2	775
94	3	0	97
1240	32	2	

N
W E
S

Cyclists	Trucks	Cars	Totals
0	2	177	179
1	22	476	499
0	6	14	20
1	30	667	

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
885	33	2	920

Winston Churchill Blvd

Peds Cross: ⧗
West Peds: 0
West Entering: 698
West Leg Total: 1758

Cars	357
Trucks	17
Cyclists	1
Totals	375

Cars	95	300	67	462
Trucks	4	7	1	12
Cyclists	0	5	1	6
Totals	99	312	69	

Peds Cross: ⋈
South Peds: 0
South Entering: 480
South Leg Total: 855

Comments

MG8 ENG

Total Count Diagram

Municipality: Region of Peel
Site #: 0001902061
Intersection: Winston Churchill Blvd & Royal Windsor
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
VELE

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total: 9594
North Entering: 4754
North Peds: 0
Peds Cross: ⋈

Cyclists	2	7	2	11
Trucks	75	135	118	328
Cars	1040	1373	2002	4415
Totals	1117	1515	2122	

Cyclists	16
Trucks	285
Cars	4539
Totals	4840

East Leg Total: 13373
East Entering: 6751
East Peds: 9
Peds Cross: ⧗

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
21	432	5393	5846

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
1960	109	3	2072
3913	286	17	4216
429	33	1	463
6302	428	21	

N
W E
S

Cyclists	Trucks	Cars	Totals
4	61	1111	1176
9	290	3660	3959
0	73	303	376
13	424	5074	

Royal Windsor Drive

Cars	Trucks	Cyclists	Totals
6156	453	13	6622

Winston Churchill Blvd

Peds Cross: ⧗
West Peds: 0
West Entering: 5511
West Leg Total: 11357

Cars	2105
Trucks	241
Cyclists	8
Totals	2354

Cars	440	1468	494	2402
Trucks	71	115	45	231
Cyclists	2	9	2	13
Totals	513	1592	541	

Peds Cross: ⋈
South Peds: 0
South Entering: 2646
South Leg Total: 5000

Comments

MG8 ENG
Traffic Count Summary

Intersection: Winston Churchill Blvd & Royal W | Count Date: 4-Jun-2013 | Municipality: Region of Peel

North Approach Totals						North/South Total Approaches	South Approach Totals					
	Includes Cars, Trucks, & Cyclists							Includes Cars, Trucks, & Cyclists				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	7	0	1	8	0	8	7:00:00	0	0	0	0	0
8:00:00	405	197	125	727	0	1017	8:00:00	26	143	121	290	0
9:00:00	342	224	157	723	0	1007	9:00:00	24	189	71	284	0
11:00:00	0	0	0	0	0	0	11:00:00	0	0	0	0	0
12:00:00	181	141	120	442	0	696	12:00:00	47	155	52	254	0
13:00:00	200	168	126	494	0	771	13:00:00	61	158	58	277	0
14:00:00	175	162	94	431	0	646	14:00:00	45	125	45	215	0
15:00:00	0	0	1	1	0	5	15:00:00	1	3	0	4	0
16:00:00	200	160	161	521	0	940	16:00:00	121	232	66	419	0
17:00:00	250	217	152	619	0	1087	17:00:00	101	302	65	468	0
18:00:00	362	246	180	788	0	1223	18:00:00	87	285	63	435	0
Totals:	2122	1515	1117	4754	0	7400		513	1592	541	2646	0

East Approach Totals						East/West Total Approaches	West Approach Totals					
	Includes Cars, Trucks, & Cyclists							Includes Cars, Trucks, & Cyclists				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds		Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	1	2	2	5	0	31	7:00:00	3	21	2	26	0
8:00:00	38	394	144	576	1	1587	8:00:00	118	771	122	1011	0
9:00:00	54	461	172	687	0	1661	9:00:00	120	738	116	974	0
11:00:00	1	10	2	13	0	28	11:00:00	7	8	0	15	0
12:00:00	42	407	218	667	3	1174	12:00:00	118	363	26	507	0
13:00:00	35	453	269	757	0	1285	13:00:00	120	376	32	528	0
14:00:00	46	415	215	676	0	1169	14:00:00	135	337	21	493	0
15:00:00	0	0	1	1	0	1	15:00:00	0	0	0	0	0
16:00:00	67	616	270	953	0	1555	16:00:00	188	389	25	602	0
17:00:00	72	690	341	1103	3	1775	17:00:00	179	473	20	672	0
18:00:00	107	768	438	1313	2	1994	18:00:00	187	482	12	681	0
Totals:	463	4216	2072	6751	9	12260		1175	3958	376	5509	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	927	912	567	608	596	871	941	1062

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001902061

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Cyclists - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	6	6	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	73	67	25	25	24	23	1	0	2	2	0	0	1	1	0	0	0	0	0	0
7:30:00	174	101	64	39	49	25	4	3	4	2	2	2	1	0	0	0	0	0	0	0
7:45:00	290	116	110	46	82	33	9	5	9	5	3	1	1	0	0	0	0	0	0	0
8:00:00	398	108	181	71	121	39	13	4	16	7	5	2	1	0	0	0	0	0	0	0
8:15:00	489	91	240	59	160	39	24	11	19	3	6	1	1	0	0	0	0	0	0	0
8:30:00	564	75	293	53	178	18	30	6	23	4	9	3	1	0	0	0	0	0	0	0
8:45:00	646	82	346	53	220	42	37	7	29	6	11	2	1	0	0	0	0	0	0	0
9:00:00	711	65	389	43	268	48	42	5	31	2	15	4	1	0	1	1	0	0	0	0
9:00:08	711	0	389	0	268	0	42	0	31	0	15	0	1	0	1	0	0	0	0	0
11:00:00	711	0	389	0	268	0	42	0	31	0	15	0	1	0	1	0	0	0	0	0
11:15:00	751	40	417	28	298	30	45	3	36	5	19	4	1	0	1	0	0	0	0	0
11:30:00	799	48	446	29	324	26	50	5	38	2	21	2	1	0	1	0	0	0	0	0
11:45:00	834	35	475	29	354	30	52	2	47	9	23	2	1	0	1	0	0	0	0	0
12:00:00	881	47	507	32	377	23	53	1	54	7	26	3	1	0	1	0	0	0	0	0
12:15:00	943	62	535	28	410	33	58	5	65	11	29	3	1	0	1	0	0	0	0	0
12:30:00	981	38	574	39	436	26	62	4	68	3	35	6	1	0	1	0	0	0	0	0
12:45:00	1030	49	604	30	464	28	67	5	73	5	39	4	1	0	1	0	0	0	0	0
13:00:00	1066	36	652	48	489	25	68	1	77	4	40	1	1	0	1	0	0	0	0	0
13:15:00	1115	49	696	44	509	20	72	4	78	1	41	1	1	0	3	2	1	1	0	0
13:30:00	1152	37	720	24	530	21	74	2	84	6	44	3	1	0	4	1	1	0	0	0
13:45:00	1183	31	749	29	548	18	79	5	93	9	45	1	1	0	4	0	1	0	0	0
14:00:00	1227	44	789	40	573	25	82	3	99	6	49	4	1	0	4	0	1	0	0	0
14:00:07	1227	0	789	0	574	1	82	0	99	0	49	0	1	0	4	0	1	0	0	0
15:00:00	1227	0	789	0	574	0	82	0	99	0	49	0	1	0	4	0	1	0	0	0
15:15:00	1271	44	822	33	612	38	86	4	102	3	52	3	1	0	4	0	1	0	0	0
15:30:00	1317	46	863	41	639	27	90	4	107	5	54	2	1	0	4	0	1	0	0	0
15:45:00	1354	37	896	33	678	39	93	3	109	2	58	4	1	0	4	0	1	0	0	0
16:00:00	1414	60	935	39	723	45	95	2	113	4	61	3	1	0	4	0	1	0	0	0
16:15:00	1470	56	989	54	765	42	99	4	120	7	66	5	1	0	4	0	1	0	0	0
16:30:00	1523	53	1028	39	797	32	101	2	122	2	68	2	1	0	4	0	1	0	0	0
16:45:00	1583	60	1083	55	835	38	103	2	126	4	68	0	2	1	5	1	1	0	0	0
17:00:00	1653	70	1133	50	865	30	105	2	131	5	71	3	2	0	5	0	1	0	0	0
17:15:00	1732	79	1192	59	912	47	106	1	132	1	71	0	2	0	5	0	1	0	0	0
17:30:00	1821	89	1268	76	963	51	110	4	132	0	73	2	2	0	6	1	2	1	0	0
17:45:00	1925	104	1332	64	1013	50	113	3	134	2	75	2	2	0	6	0	2	0	0	0
18:00:00	2002	77	1373	41	1040	27	118	5	135	1	75	0	2	0	7	1	2	0	0	0
18:00:03	2002	0	1373	0	1040	0	118	0	135	0	75	0	2	0	7	0	2	0	0	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001902061

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Cyclists - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	1	1	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0
7:15:00	7	6	93	92	29	28	4	4	15	14	5	4	0	0	0	0	0	0	0	0
7:30:00	15	8	161	68	61	32	5	1	22	7	8	3	0	0	0	0	0	0	0	0
7:45:00	23	8	238	77	94	33	7	2	34	12	11	3	0	0	0	0	0	0	1	1
8:00:00	32	9	352	114	133	39	7	0	44	10	13	2	0	0	0	0	0	0	1	0
8:15:00	45	13	464	112	178	45	9	2	50	6	17	4	0	0	1	1	0	0	1	0
8:30:00	57	12	582	118	217	39	10	1	60	10	25	8	0	0	1	0	0	0	1	0
8:45:00	68	11	672	90	252	35	11	1	71	11	32	7	0	0	1	0	0	0	1	0
9:00:00	80	12	778	106	283	31	13	2	78	7	35	3	0	0	1	0	0	0	1	0
9:00:08	80	0	778	0	283	0	13	0	78	0	36	1	0	0	1	0	0	0	1	0
11:00:00	81	1	787	9	284	1	13	0	79	1	36	0	0	0	1	0	0	0	1	0
11:15:00	87	6	858	71	330	46	13	0	85	6	42	6	0	0	1	0	0	0	1	0
11:30:00	95	8	956	98	366	36	13	0	91	6	46	4	0	0	1	0	0	0	3	2
11:45:00	103	8	1077	121	417	51	15	2	99	8	49	3	0	0	1	0	0	0	4	1
12:00:00	121	18	1163	86	483	66	15	0	110	11	55	6	0	0	1	0	0	0	4	0
12:15:00	131	10	1244	81	533	50	15	0	118	8	58	3	0	0	1	0	0	0	4	0
12:30:00	138	7	1353	109	591	58	15	0	131	13	62	4	0	0	1	0	0	0	4	0
12:45:00	143	5	1459	106	659	68	15	0	140	9	65	3	0	0	1	0	0	0	4	0
13:00:00	156	13	1571	112	738	79	15	0	154	14	69	4	0	0	2	1	0	0	4	0
13:15:00	167	11	1655	84	790	52	17	2	169	15	74	5	1	1	2	0	0	0	4	0
13:30:00	176	9	1762	107	846	56	18	1	181	12	77	3	1	0	2	0	0	0	4	0
13:45:00	184	8	1860	98	892	46	19	1	185	4	80	3	1	0	2	0	0	0	4	0
14:00:00	196	12	1946	86	937	45	20	1	193	8	85	5	1	0	3	1	0	0	4	0
14:00:07	196	0	1946	0	937	0	20	0	193	0	85	0	1	0	3	0	0	0	4	0
15:00:00	196	0	1946	0	938	1	20	0	193	0	85	0	1	0	3	0	0	0	4	0
15:15:00	206	10	2085	139	987	49	22	2	202	9	86	1	1	0	4	1	0	0	4	0
15:30:00	222	16	2220	135	1043	56	23	1	213	11	88	2	1	0	5	1	0	0	4	0
15:45:00	244	22	2370	150	1134	91	24	1	225	12	93	5	1	0	5	0	1	1	4	0
16:00:00	258	14	2514	144	1196	62	25	1	236	11	96	3	1	0	8	3	1	0	4	0
16:15:00	276	18	2667	153	1276	80	27	2	242	6	99	3	1	0	8	0	2	1	6	2
16:30:00	292	16	2827	160	1342	66	27	0	245	3	101	2	1	0	8	0	2	0	6	0
16:45:00	301	9	3026	199	1458	116	30	3	257	12	101	0	1	0	13	5	3	1	7	1
17:00:00	323	22	3174	148	1528	70	32	2	261	4	103	2	1	0	13	0	3	0	7	0
17:15:00	348	25	3372	198	1635	107	32	0	268	7	104	1	1	0	14	1	3	0	7	0
17:30:00	375	27	3589	217	1750	115	33	1	274	6	105	1	1	0	15	1	3	0	7	0
17:45:00	395	20	3775	186	1855	105	33	0	281	7	106	1	1	0	15	0	3	0	8	1
18:00:00	429	34	3913	138	1960	105	33	0	286	5	109	3	1	0	17	2	3	0	9	1
18:00:03	429	0	3913	0	1960	0	33	0	286	0	109	0	1	0	17	0	3	0	9	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001902061

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Cyclists - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	3	3	23	23	18	18	4	4	2	2	2	2	0	0	0	0	0	0	0	0
7:30:00	8	5	51	28	44	26	7	3	7	5	6	4	0	0	0	0	1	1	0	0
7:45:00	11	3	88	37	80	36	7	0	10	3	8	2	0	0	0	0	1	0	0	0
8:00:00	17	6	133	45	111	31	9	2	10	0	9	1	0	0	0	0	1	0	0	0
8:15:00	23	6	184	51	135	24	10	1	14	4	12	3	0	0	0	0	1	0	0	0
8:30:00	24	1	249	65	154	19	13	3	19	5	12	0	0	0	1	1	1	0	0	0
8:45:00	31	7	273	24	167	13	15	2	24	5	15	3	0	0	1	0	1	0	0	0
9:00:00	32	1	304	31	174	7	18	3	26	2	17	2	0	0	2	1	1	0	0	0
9:00:08	32	0	304	0	174	0	18	0	26	0	17	0	0	0	2	0	1	0	0	0
11:00:00	32	0	304	0	174	0	18	0	26	0	17	0	0	0	2	0	1	0	0	0
11:15:00	39	7	332	28	187	13	20	2	30	4	17	0	0	0	2	0	1	0	0	0
11:30:00	48	9	361	29	198	11	25	5	38	8	18	1	0	0	2	0	1	0	0	0
11:45:00	57	9	399	38	209	11	27	2	44	6	19	1	0	0	2	0	1	0	0	0
12:00:00	65	8	437	38	224	15	32	5	48	4	19	0	0	0	2	0	1	0	0	0
12:15:00	81	16	489	52	238	14	34	2	55	7	22	3	0	0	2	0	1	0	0	0
12:30:00	95	14	528	39	250	12	39	5	59	4	23	1	0	0	2	0	1	0	0	0
12:45:00	107	12	548	20	260	10	42	3	60	1	23	0	0	0	2	0	1	0	0	0
13:00:00	114	7	575	27	276	16	43	1	67	7	25	2	1	1	3	1	1	0	0	0
13:15:00	123	9	604	29	284	8	44	1	71	4	27	2	1	0	3	0	1	0	0	0
13:30:00	129	6	632	28	293	9	45	1	74	3	28	1	1	0	3	0	1	0	0	0
13:45:00	136	7	653	21	304	11	51	6	79	5	28	0	1	0	3	0	1	0	0	0
14:00:00	149	13	683	30	317	13	53	2	84	5	29	1	1	0	3	0	1	0	0	0
14:00:07	149	0	684	1	317	0	53	0	84	0	29	0	1	0	3	0	1	0	0	0
15:00:00	150	1	685	1	317	0	53	0	85	1	29	0	1	0	3	0	1	0	0	0
15:15:00	176	26	742	57	341	24	55	2	88	3	32	3	2	1	3	0	1	0	0	0
15:30:00	198	22	798	56	354	13	59	4	90	2	37	5	2	0	3	0	1	0	0	0
15:45:00	233	35	864	66	361	7	61	2	93	3	40	3	2	0	3	0	1	0	0	0
16:00:00	262	29	906	42	372	11	61	0	96	3	40	0	2	0	3	0	1	0	0	0
16:15:00	285	23	974	68	387	15	62	1	100	4	41	1	2	0	3	0	1	0	0	0
16:30:00	307	22	1057	83	401	14	63	1	103	3	41	0	2	0	3	0	1	0	0	0
16:45:00	335	28	1119	62	412	11	66	3	106	3	42	1	2	0	4	1	1	0	0	0
17:00:00	357	22	1195	76	435	23	67	1	107	1	42	0	2	0	5	1	1	0	0	0
17:15:00	378	21	1294	99	447	12	67	0	109	2	42	0	2	0	6	1	2	1	0	0
17:30:00	409	31	1374	80	466	19	68	1	111	2	42	0	2	0	9	3	2	0	0	0
17:45:00	430	21	1419	45	479	13	70	2	113	2	43	1	2	0	9	0	2	0	0	0
18:00:00	440	10	1468	49	494	15	71	1	115	2	45	2	2	0	9	0	2	0	0	0
18:00:03	440	0	1468	0	494	0	71	0	115	0	45	0	2	0	9	0	2	0	0	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001902061

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Cyclists - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	2	2	19	19	2	2	0	0	2	2	0	0	1	1	0	0	0	0	0	0
7:15:00	20	18	150	131	22	20	3	3	7	5	3	3	1	0	2	2	0	0	0	0
7:30:00	46	26	337	187	53	31	7	4	20	13	6	3	1	0	2	0	0	0	0	0
7:45:00	68	22	550	213	82	29	8	1	30	10	7	1	1	0	3	1	0	0	0	0
8:00:00	111	43	755	205	116	34	9	1	34	4	8	1	1	0	3	0	0	0	0	0
8:15:00	136	25	961	206	151	35	10	1	45	11	13	5	1	0	3	0	0	0	0	0
8:30:00	167	31	1124	163	173	22	13	3	55	10	17	4	1	0	3	0	0	0	0	0
8:45:00	194	27	1293	169	195	22	14	1	63	8	18	1	1	0	3	0	0	0	0	0
9:00:00	225	31	1454	161	220	25	15	1	73	10	20	2	1	0	3	0	0	0	0	0
9:00:08	225	0	1455	1	220	0	15	0	73	0	20	0	1	0	3	0	0	0	0	0
11:00:00	232	7	1460	5	220	0	15	0	75	2	20	0	1	0	3	0	0	0	0	0
11:15:00	252	20	1563	103	223	3	19	4	89	14	26	6	1	0	3	0	0	0	0	0
11:30:00	273	21	1639	76	225	2	19	0	99	10	28	2	1	0	3	0	0	0	0	0
11:45:00	298	25	1709	70	226	1	22	3	109	10	31	3	1	0	4	1	0	0	0	0
12:00:00	338	40	1777	68	234	8	27	5	120	11	32	1	1	0	4	0	0	0	0	0
12:15:00	367	29	1873	96	238	4	31	4	134	14	41	9	1	0	4	0	0	0	0	0
12:30:00	401	34	1947	74	241	3	32	1	150	16	44	3	1	0	6	2	0	0	0	0
12:45:00	426	25	2016	69	247	6	34	2	166	16	47	3	1	0	7	1	0	0	0	0
13:00:00	449	23	2090	74	251	4	36	2	180	14	47	0	1	0	7	0	0	0	0	0
13:15:00	485	36	2175	85	253	2	39	3	188	8	48	1	1	0	7	0	0	0	0	0
13:30:00	507	22	2267	92	257	4	40	1	199	11	53	5	2	1	7	0	0	0	0	0
13:45:00	543	36	2347	80	261	4	41	1	206	7	53	0	3	1	7	0	0	0	0	0
14:00:00	575	32	2395	48	264	3	43	2	212	6	55	2	3	0	7	0	0	0	0	0
14:00:07	575	0	2395	0	264	0	43	0	212	0	55	0	3	0	7	0	0	0	0	0
15:00:00	575	0	2395	0	264	0	43	0	212	0	55	0	3	0	7	0	0	0	0	0
15:15:00	619	44	2477	82	272	8	44	1	218	6	56	1	3	0	8	1	0	0	0	0
15:30:00	656	37	2556	79	275	3	48	4	226	8	57	1	3	0	8	0	0	0	0	0
15:45:00	703	47	2673	117	279	4	49	1	231	5	59	2	3	0	8	0	0	0	0	0
16:00:00	750	47	2757	84	280	1	55	6	238	7	64	5	4	1	8	0	0	0	0	0
16:15:00	785	35	2863	106	282	2	55	0	245	7	65	1	4	0	8	0	0	0	0	0
16:30:00	841	56	2985	122	284	2	58	3	252	7	65	0	4	0	8	0	0	0	0	0
16:45:00	891	50	3080	95	286	2	58	0	259	7	67	2	4	0	8	0	0	0	0	0
17:00:00	926	35	3196	116	294	8	58	0	271	12	70	3	4	0	9	1	0	0	0	0
17:15:00	972	46	3287	91	294	0	59	1	274	3	71	1	4	0	9	0	0	0	0	0
17:30:00	1019	47	3421	134	297	3	60	1	278	4	72	1	4	0	9	0	0	0	0	0
17:45:00	1068	49	3556	135	300	3	60	0	281	3	73	1	4	0	9	0	0	0	0	0
18:00:00	1110	42	3659	103	303	3	61	1	290	9	73	0	4	0	9	0	0	0	0	0
18:00:03	1111	1	3660	1	303	0	61	0	290	0	73	0	4	0	9	0	0	0	0	0

MG8 ENG

Morning Peak Diagram

Specified Period		One Hour Peak	
From:	7:00:00	**From:**	7:30:00
To:	9:00:00	**To:**	8:30:00

Municipality: Region of Peel
Site #: 0001900000
Intersection: Winston Churchill Blvd & Beryl Roa
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
MILAN

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total: 645
North Entering: 333
North Peds: 1
Peds Cross: ⋈

Cyclists	0	0	0
Trucks	12	20	32
Cars	43	258	301
Totals	55	278	

Cyclists	1
Trucks	28
Cars	283
Totals	312

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
0	15	51	66

Beryl Road

N
W E
S

Cyclists	Trucks	Cars	Totals
0	12	70	82
0	6	30	36
0	18	100	

Winston Churchill Blvd

Peds Cross: ⧖
West Peds: 2
West Entering: 118
West Leg Total: 184

Cars	288
Trucks	26
Cyclists	0
Totals	314

Cars	8	213	221
Trucks	3	16	19
Cyclists	0	1	1
Totals	11	230	

Peds Cross: ⋈
South Peds: 3
South Entering: 241
South Leg Total: 555

Comments

MG8 ENG

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 11:30:00
To: 12:30:00

Municipality: Region of Peel
Site #: 0001900000
Intersection: Winston Churchill Blvd & Beryl Roa
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
MILAN

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total: 488
North Entering: 224
North Peds: 3
Peds Cross: ⋈

Cyclists	0	3	3
Trucks	12	40	52
Cars	46	123	169
Totals	58	166	

Cyclists	0
Trucks	43
Cars	221
Totals	264

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
0	15	58	73

Beryl Road

N
W E
S

Cyclists	Trucks	Cars	Totals
0	14	56	70
0	5	23	28
0	19	79	

Winston Churchill Blvd

Peds Cross: ⧗
West Peds: 0
West Entering: 98
West Leg Total: 171

Cars	146
Trucks	45
Cyclists	3
Totals	194

Cars	12	165	177
Trucks	3	29	32
Cyclists	0	0	0
Totals	15	194	

Peds Cross: ⋈
South Peds: 3
South Entering: 209
South Leg Total: 403

Comments

MG8 ENG

Afternoon Peak Diagram

Specified Period		One Hour Peak	
From:	15:00:00	**From:**	16:45:00
To:	18:00:00	**To:**	17:45:00

Municipality: Region of Peel
Site #: 0001900000
Intersection: Winston Churchill Blvd & Beryl Roa
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
MILAN

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total: 799
North Entering: 373
North Peds: 3
Peds Cross: ⋈

Cyclists	0	1	1
Trucks	7	11	18
Cars	90	264	354
Totals	97	276	

Cyclists	7
Trucks	18
Cars	401
Totals	426

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
0	8	105	113

Beryl Road

N
W E
S

Cyclists	Trucks	Cars	Totals
1	5	109	115
1	0	16	17
2	5	125	

Winston Churchill Blvd

Peds Cross: ⧗
West Peds: 0
West Entering: 132
West Leg Total: 245

Cars	280
Trucks	11
Cyclists	2
Totals	293

Cars	15	292	307
Trucks	1	13	14
Cyclists	0	6	6
Totals	16	311	

Peds Cross: ⋈
South Peds: 1
South Entering: 327
South Leg Total: 620

Comments

MG8 ENG

Total Count Diagram

Municipality: Region of Peel
Site #: 0001900000
Intersection: Winston Churchill Blvd & Beryl Roa
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
MILAN

**** Signalized Intersection ****

Major Road: Winston Churchill Blvd runs N/S

North Leg Total:	4649
North Entering:	2171
North Peds:	19
Peds Cross:	⋈

Cyclists	2	17	19
Trucks	97	160	257
Cars	419	1476	1895
Totals	518	1653	

Cyclists	18
Trucks	247
Cars	2213
Totals	2478

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
3	112	513	628

Beryl Road

N
W E
S

Cyclists	Trucks	Cars	Totals
2	105	554	661
1	26	160	187
3	131	714	

Winston Churchill Blvd

Peds Cross:	⧖
West Peds:	4
West Entering:	848
West Leg Total:	1476

Cars	1636
Trucks	186
Cyclists	18
Totals	1840

Cars	94	1659	1753
Trucks	15	142	157
Cyclists	1	16	17
Totals	110	1817	

Peds Cross:	⋈
South Peds:	16
South Entering:	1927
South Leg Total:	3767

Comments

MG8 ENG

Traffic Count Summary

Intersection: Winston Churchill Blvd & Beryl Ro	Count Date: 4-Jun-2013	Municipality: Region of Peel

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Cyclists							Includes Cars, Trucks, & Cyclists				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	5	5	10	0	18	7:00:00	0	8	0	8	0
8:00:00	0	234	44	278	1	502	8:00:00	10	214	0	224	2
9:00:00	0	275	63	338	0	522	9:00:00	6	178	0	184	2
11:00:00	0	5	2	7	0	15	11:00:00	0	8	0	8	0
12:00:00	0	129	53	182	0	367	12:00:00	14	171	0	185	4
13:00:00	0	166	45	211	3	379	13:00:00	11	157	0	168	1
14:00:00	0	141	62	203	2	352	14:00:00	10	139	0	149	4
15:00:00	0	7	4	11	0	23	15:00:00	0	12	0	12	0
16:00:00	0	187	71	258	2	595	16:00:00	20	317	0	337	2
17:00:00	0	222	84	306	7	655	17:00:00	24	325	0	349	1
18:00:00	0	275	84	359	4	653	18:00:00	11	283	0	294	0
Totals:	0	1646	517	2163	19	4081		106	1812	0	1918	16

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Cyclists							Includes Cars, Trucks, & Cyclists				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0	2	7:00:00	1	0	1	2	0
8:00:00	0	0	0	0	0	74	8:00:00	45	0	29	74	4
9:00:00	0	0	0	0	0	112	9:00:00	82	0	30	112	0
11:00:00	0	0	0	0	0	2	11:00:00	1	0	1	2	0
12:00:00	0	0	0	0	0	87	12:00:00	61	0	26	87	0
13:00:00	0	0	0	0	0	96	13:00:00	77	0	19	96	0
14:00:00	0	0	0	0	0	98	14:00:00	73	0	25	98	0
15:00:00	0	0	0	0	0	3	15:00:00	3	0	0	3	0
16:00:00	0	0	0	0	0	128	16:00:00	104	0	24	128	0
17:00:00	0	0	0	0	0	116	17:00:00	93	0	23	116	0
18:00:00	0	0	0	0	0	130	18:00:00	121	0	9	130	0
Totals:	0	0	0	0	0	848		661	0	187	848	4

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	48	84	65	81	79	108	101	125

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001900000

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Cyclists - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	5	5	4	4	0	0	0	0	1	1	0	0	0	0	0	0	0	0
7:15:00	0	0	39	34	10	6	0	0	4	4	4	3	0	0	0	0	1	1	0	0
7:30:00	0	0	93	54	21	11	0	0	9	5	5	1	0	0	0	0	1	0	0	0
7:45:00	0	0	145	52	26	5	0	0	13	4	9	4	0	0	0	0	1	0	1	1
8:00:00	0	0	220	75	38	12	0	0	19	6	10	1	0	0	0	0	1	0	1	0
8:15:00	0	0	280	60	55	17	0	0	23	4	14	4	0	0	0	0	1	0	1	0
8:30:00	0	0	351	71	64	9	0	0	29	6	17	3	0	0	0	0	1	0	1	0
8:45:00	0	0	405	54	79	15	0	0	34	5	23	6	0	0	1	1	1	0	1	0
9:00:00	0	0	474	69	88	9	0	0	38	4	23	0	0	0	2	1	1	0	1	0
9:01:40	0	0	478	4	90	2	0	0	39	1	23	0	0	0	2	0	1	0	1	0
11:00:00	0	0	478	0	90	0	0	0	39	0	23	0	0	0	2	0	1	0	1	0
11:15:00	0	0	496	18	97	7	0	0	49	10	27	4	0	0	2	0	1	0	1	0
11:30:00	0	0	520	24	106	9	0	0	52	3	29	2	0	0	2	0	1	0	1	0
11:45:00	0	0	542	22	117	11	0	0	62	10	33	4	0	0	2	0	1	0	1	0
12:00:00	0	0	575	33	129	12	0	0	70	8	37	4	0	0	3	1	1	0	1	0
12:15:00	0	0	607	32	141	12	0	0	83	13	39	2	0	0	4	1	1	0	3	2
12:30:00	0	0	643	36	152	11	0	0	92	9	41	2	0	0	5	1	1	0	4	1
12:45:00	0	0	668	25	160	8	0	0	100	8	42	1	0	0	5	0	1	0	4	0
13:00:00	0	0	706	38	167	7	0	0	102	2	44	2	0	0	6	1	1	0	4	0
13:15:00	0	0	737	31	176	9	0	0	105	3	47	3	0	0	9	3	1	0	4	0
13:30:00	0	0	762	25	184	8	0	0	116	11	53	6	0	0	10	1	2	1	4	0
13:45:00	0	0	794	32	194	10	0	0	119	3	58	5	0	0	10	0	2	0	4	0
14:00:00	0	0	822	28	208	14	0	0	123	4	64	6	0	0	10	0	2	0	6	2
14:01:56	0	0	828	6	210	2	0	0	123	0	64	0	0	0	10	0	2	0	6	0
15:00:00	0	0	829	1	211	1	0	0	123	0	65	1	0	0	10	0	2	0	6	0
15:15:00	0	0	863	34	235	24	0	0	127	4	71	6	0	0	10	0	2	0	6	0
15:30:00	0	0	915	52	242	7	0	0	129	2	74	3	0	0	11	1	2	0	7	1
15:45:00	0	0	959	44	259	17	0	0	133	4	77	3	0	0	11	0	2	0	7	0
16:00:00	0	0	998	39	267	8	0	0	139	6	80	3	0	0	12	1	2	0	8	1
16:15:00	0	0	1048	50	280	13	0	0	143	4	83	3	0	0	12	0	2	0	8	0
16:30:00	0	0	1105	57	293	13	0	0	145	2	84	1	0	0	12	0	2	0	11	3
16:45:00	0	0	1143	38	311	18	0	0	148	3	90	6	0	0	14	2	2	0	13	2
17:00:00	0	0	1205	62	335	24	0	0	152	4	96	6	0	0	14	0	2	0	15	2
17:15:00	0	0	1263	58	361	26	0	0	156	4	96	0	0	0	14	0	2	0	16	1
17:30:00	0	0	1346	83	381	20	0	0	157	1	96	0	0	0	15	1	2	0	16	0
17:45:00	0	0	1407	61	401	20	0	0	159	2	97	1	0	0	15	0	2	0	16	0
18:00:00	0	0	1469	62	418	17	0	0	160	1	97	0	0	0	17	2	2	0	19	3
18:01:13	0	0	1476	7	419	1	0	0	160	0	97	0	0	0	17	0	2	0	19	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001900000

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Cyclists - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:01:40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:01:56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:01:13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001900000

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Cyclists - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	1	1	37	29	0	0	0	0	2	2	0	0	0	0	0	0	0	0	1	1
7:30:00	5	4	92	55	0	0	0	0	10	8	0	0	0	0	1	1	0	0	1	0
7:45:00	5	0	156	64	0	0	2	2	14	4	0	0	0	0	1	0	0	0	2	1
8:00:00	8	3	203	47	0	0	2	0	18	4	0	0	0	0	1	0	0	0	2	0
8:15:00	10	2	251	48	0	0	3	1	23	5	0	0	0	0	1	0	0	0	4	2
8:30:00	13	3	305	54	0	0	3	0	26	3	0	0	0	0	2	1	0	0	4	0
8:45:00	13	0	333	28	0	0	3	0	31	5	0	0	0	0	2	0	0	0	4	0
9:00:00	13	0	364	31	0	0	3	0	33	2	0	0	0	0	3	1	0	0	4	0
9:01:40	13	0	372	8	0	0	3	0	33	0	0	0	0	0	3	0	0	0	4	0
11:00:00	13	0	372	0	0	0	3	0	33	0	0	0	0	0	3	0	0	0	4	0
11:15:00	16	3	402	30	0	0	4	1	35	2	0	0	0	0	3	0	0	0	6	2
11:30:00	18	2	431	29	0	0	4	0	43	8	0	0	0	0	3	0	0	0	6	0
11:45:00	21	3	472	41	0	0	5	1	54	11	0	0	0	0	3	0	0	0	8	2
12:00:00	24	3	515	43	0	0	6	1	61	7	0	0	0	0	3	0	0	0	8	0
12:15:00	27	3	557	42	0	0	7	1	65	4	0	0	0	0	3	0	0	0	9	1
12:30:00	30	3	596	39	0	0	7	0	72	7	0	0	0	0	3	0	0	0	9	0
12:45:00	32	2	620	24	0	0	7	0	76	4	0	0	0	0	3	0	0	0	9	0
13:00:00	32	0	650	30	0	0	9	2	81	5	0	0	0	0	5	2	0	0	9	0
13:15:00	35	3	684	34	0	0	9	0	83	2	0	0	0	0	5	0	0	0	11	2
13:30:00	35	0	710	26	0	0	9	0	88	5	0	0	0	0	5	0	0	0	11	0
13:45:00	36	1	735	25	0	0	11	2	94	6	0	0	0	0	5	0	0	0	13	2
14:00:00	40	4	772	37	0	0	11	0	97	3	0	0	0	0	6	1	0	0	13	0
14:01:56	40	0	777	5	0	0	11	0	97	0	0	0	0	0	6	0	0	0	13	0
15:00:00	40	0	783	6	0	0	11	0	98	1	0	0	0	0	6	0	0	0	13	0
15:15:00	44	4	859	76	0	0	11	0	101	3	0	0	0	0	7	1	0	0	15	2
15:30:00	50	6	928	69	0	0	12	1	111	10	0	0	0	0	7	0	0	0	15	0
15:45:00	57	7	1011	83	0	0	12	0	112	1	0	0	1	1	8	1	0	0	15	0
16:00:00	58	1	1083	72	0	0	12	0	113	1	0	0	1	0	8	0	0	0	15	0
16:15:00	66	8	1162	79	0	0	13	1	117	4	0	0	1	0	8	0	0	0	15	0
16:30:00	70	4	1252	90	0	0	14	1	119	2	0	0	1	0	8	0	0	0	15	0
16:45:00	73	3	1314	62	0	0	14	0	125	6	0	0	1	0	10	2	0	0	15	0
17:00:00	79	6	1391	77	0	0	15	1	127	2	0	0	1	0	11	1	0	0	16	1
17:15:00	83	4	1478	87	0	0	15	0	129	2	0	0	1	0	12	1	0	0	16	0
17:30:00	85	2	1552	74	0	0	15	0	134	5	0	0	1	0	16	4	0	0	16	0
17:45:00	88	3	1606	54	0	0	15	0	138	4	0	0	1	0	16	0	0	0	16	0
18:00:00	90	2	1655	49	0	0	15	0	141	3	0	0	1	0	16	0	0	0	16	0
18:01:13	94	4	1659	4	0	0	15	0	142	1	0	0	1	0	16	0	0	0	16	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001900000

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Cyclists - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	3	3	0	0	5	4	2	1	0	0	0	0	0	0	0	0	0	0	1	1
7:30:00	9	6	0	0	11	6	6	4	0	0	1	1	0	0	0	0	0	0	2	1
7:45:00	24	15	0	0	16	5	9	3	0	0	3	2	0	0	0	0	0	0	4	2
8:00:00	37	13	0	0	24	8	9	0	0	0	6	3	0	0	0	0	0	0	4	0
8:15:00	54	17	0	0	38	14	16	7	0	0	6	0	0	0	0	0	0	0	4	0
8:30:00	79	25	0	0	41	3	18	2	0	0	7	1	0	0	0	0	0	0	4	0
8:45:00	91	12	0	0	46	5	21	3	0	0	7	0	0	0	0	0	0	0	4	0
9:00:00	105	14	0	0	51	5	23	2	0	0	9	2	0	0	0	0	0	0	4	0
9:01:40	105	0	0	0	52	1	24	1	0	0	9	0	0	0	0	0	0	0	4	0
11:00:00	105	0	0	0	52	0	24	0	0	0	9	0	0	0	0	0	0	0	4	0
11:15:00	113	8	0	0	56	4	27	3	0	0	9	0	0	0	0	0	0	0	4	0
11:30:00	125	12	0	0	61	5	34	7	0	0	10	1	0	0	0	0	0	0	4	0
11:45:00	140	15	0	0	67	6	37	3	0	0	12	2	0	0	0	0	0	0	4	0
12:00:00	152	12	0	0	74	7	38	1	0	0	13	1	0	0	0	0	0	0	4	0
12:15:00	165	13	0	0	78	4	44	6	0	0	14	1	0	0	0	0	0	0	4	0
12:30:00	181	16	0	0	84	6	48	4	0	0	15	1	0	0	0	0	0	0	4	0
12:45:00	198	17	0	0	86	2	48	0	0	0	15	0	0	0	0	0	0	0	4	0
13:00:00	212	14	0	0	90	4	55	7	0	0	16	1	0	0	0	0	0	0	4	0
13:15:00	221	9	0	0	100	10	61	6	0	0	16	0	0	0	0	0	0	0	4	0
13:30:00	237	16	0	0	104	4	64	3	0	0	19	3	0	0	0	0	0	0	4	0
13:45:00	249	12	0	0	108	4	69	5	0	0	19	0	0	0	0	0	0	0	4	0
14:00:00	268	19	0	0	112	4	72	3	0	0	19	0	0	0	0	0	0	0	4	0
14:01:56	271	3	0	0	112	0	72	0	0	0	19	0	0	0	0	0	0	0	4	0
15:00:00	271	0	0	0	112	0	72	0	0	0	19	0	0	0	0	0	0	0	4	0
15:15:00	307	36	0	0	115	3	75	3	0	0	19	0	0	0	0	0	0	0	4	0
15:30:00	327	20	0	0	120	5	80	5	0	0	20	1	0	0	0	0	0	0	4	0
15:45:00	342	15	0	0	128	8	85	5	0	0	20	0	1	1	0	0	0	0	4	0
16:00:00	358	16	0	0	133	5	88	3	0	0	22	2	1	0	0	0	0	0	4	0
16:15:00	374	16	0	0	135	2	91	3	0	0	24	2	1	0	0	0	0	0	4	0
16:30:00	403	29	0	0	140	5	94	3	0	0	26	2	1	0	0	0	0	0	4	0
16:45:00	419	16	0	0	142	2	96	2	0	0	26	0	1	0	0	0	0	0	4	0
17:00:00	442	23	0	0	152	10	97	1	0	0	26	0	1	0	0	0	0	0	4	0
17:15:00	480	38	0	0	154	2	98	1	0	0	26	0	2	1	0	0	0	0	4	0
17:30:00	513	33	0	0	158	4	99	1	0	0	26	0	2	0	0	0	1	1	4	0
17:45:00	528	15	0	0	158	0	101	2	0	0	26	0	2	0	0	0	1	0	4	0
18:00:00	554	26	0	0	160	2	105	4	0	0	26	0	2	0	0	0	1	0	4	0
18:01:13	554	0	0	0	160	0	105	0	0	0	26	0	2	0	0	0	1	0	4	0

MG8 ENG

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:15:00
To: 8:15:00

Municipality: Region of Peel
Site #: 0001901711
Intersection: Lakeshore Bld & Winston Churchill
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
STEVE

**** Signalized Intersection ****

Major Road: Lakeshore Bld runs W/E

North Leg Total: 452
North Entering: 272
North Peds: 1
Peds Cross: ⋈

Cyclists	0	0	0
Trucks	3	18	21
Cars	62	189	251
Totals	65	207	

Cyclists	1
Trucks	17
Cars	162
Totals	180

East Leg Total: 630
East Entering: 111
East Peds: 0
Peds Cross: ⧗

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
2	8	134	144

Lakeshore Boulevard

Cyclists	Trucks	Cars	Totals
1	3	144	148
1	5	306	312
2	8	450	

N
W E
S

Cars	Trucks	Cyclists	Totals
18	14	0	32
72	5	2	79
90	19	2	

Lakeshore Boulevard

Cars	Trucks	Cyclists	Totals
495	23	1	519

Peds Cross: ⧗
West Peds: 0
West Entering: 460
West Leg Total: 604

Comments

MG8 ENG

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 11:30:00
To: 12:30:00

Municipality: Region of Peel
Site #: 0001901711
Intersection: Lakeshore Bld & Winston Churchill
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
STEVE

**** Signalized Intersection ****

Major Road: Lakeshore Bld runs W/E

North Leg Total: 340
North Entering: 164
North Peds: 12
Peds Cross: ⋈

Cyclists	1	1	2
Trucks	7	31	38
Cars	68	56	124
Totals	76	88	

Cyclists	0
Trucks	21
Cars	155
Totals	176

East Leg Total: 450
East Entering: 235
East Peds: 0
Peds Cross: ⧖

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
2	9	202	213

Cars	Trucks	Cyclists	Totals
81	17	0	98
134	2	1	137
215	19	1	

Lakeshore Boulevard

N
W E
S

Cyclists	Trucks	Cars	Totals
0	4	74	78
0	1	126	127
0	5	200	

Lakeshore Boulevard

Cars	Trucks	Cyclists	Totals
182	32	1	215

Peds Cross: ⧖
West Peds: 0
West Entering: 205
West Leg Total: 418

Comments

MG8 ENG

Afternoon Peak Diagram

Specified Period		One Hour Peak	
From:	15:00:00	**From:**	16:45:00
To:	18:00:00	**To:**	17:45:00

Municipality: Region of Peel
Site #: 0001901711
Intersection: Lakeshore Bld & Winston Churchill
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
STEVE

**** Signalized Intersection ****

Major Road: Lakeshore Bld runs W/E

North Leg Total: 491
North Entering: 227
North Peds: 4
Peds Cross: ⋈

Cyclists	2	0	2
Trucks	0	10	10
Cars	171	44	215
Totals	173	54	

Cyclists	4
Trucks	12
Cars	248
Totals	264

East Leg Total: 719
East Entering: 485
East Peds: 0
Peds Cross: ⧗

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
8	2	460	470

Lakeshore Boulevard

Cars	Trucks	Cyclists	Totals
174	12	2	188
289	2	6	297
463	14	8	

N
W E
S

Cyclists	Trucks	Cars	Totals
2	0	74	76
7	4	169	180
9	4	243	

Lakeshore Boulevard

Cars	Trucks	Cyclists	Totals
213	14	7	234

Peds Cross: ⧗
West Peds: 0
West Entering: 256
West Leg Total: 726

Comments

MG8 ENG

Total Count Diagram

Municipality: Region of Peel
Site #: 0001901711
Intersection: Lakeshore Bld & Winston Churchill
TFR File #: 1
Count date: 4-Jun-2013

Weather conditions:

Person(s) who counted:
STEVE

**** Signalized Intersection ****

Major Road: Lakeshore Bld runs W/E

North Leg Total: 3100
North Entering: 1537
North Peds: 25
Peds Cross: ⋈

Cyclists	9	5	14	Cyclists	12
Trucks	21	141	162	Trucks	114
Cars	735	626	1361	Cars	1437
Totals	765	772		Totals	1563

East Leg Total: 4531
East Entering: 2230
East Peds: 1
Peds Cross: ⧗

Winston Churchill Blvd

Cyclists	Trucks	Cars	Totals
31	52	2071	2154

Lakeshore Boulevard

Cars	Trucks	Cyclists	Totals
742	95	4	841
1336	31	22	1389
2078	126	26	

N
W E
S

Cyclists	Trucks	Cars	Totals
8	19	695	722
27	27	1475	1529
35	46	2170	

Lakeshore Boulevard

Cars	Trucks	Cyclists	Totals
2101	168	32	2301

Peds Cross: ⧗
West Peds: 0
West Entering: 2251
West Leg Total: 4405

Comments

MG8 ENG
Traffic Count Summary

Intersection: Lakeshore Bld & Winston Churchill | Count Date: 4-Jun-2013 | Municipality: Region of Peel

North Approach Totals							South Approach Totals					
	Includes Cars, Trucks, & Cyclists					North/South		Includes Cars, Trucks, & Cyclists				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	8	0	1	9	0	9	7:00:00	0	0	0	0	0
8:00:00	169	0	58	227	0	227	8:00:00	0	0	0	0	0
9:00:00	197	0	87	284	2	284	9:00:00	0	0	0	0	3
11:00:00	9	0	10	19	0	19	11:00:00	0	0	0	0	0
12:00:00	64	0	53	117	7	117	12:00:00	0	0	0	0	0
13:00:00	95	0	64	159	11	159	13:00:00	0	0	0	0	1
14:00:00	85	0	57	142	0	142	14:00:00	0	0	0	0	1
15:00:00	1	0	3	4	0	4	15:00:00	0	0	0	0	1
16:00:00	43	0	124	167	0	167	16:00:00	0	0	0	0	0
17:00:00	49	0	138	187	1	187	17:00:00	0	0	0	0	0
18:00:00	52	0	170	222	4	222	18:00:00	0	0	0	0	4
Totals:	772	0	765	1537	25	1537		0	0	0	0	10

East Approach Totals							West Approach Totals					
	Includes Cars, Trucks, & Cyclists					East/West		Includes Cars, Trucks, & Cyclists				
Hour Ending	Left	Thru	Right	Grand Total	Total Peds	Total Approaches	Hour Ending	Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	1	1	2	0	18	7:00:00	6	10	0	16	0
8:00:00	0	76	29	105	0	547	8:00:00	135	307	0	442	0
9:00:00	0	90	23	113	1	482	9:00:00	110	259	0	369	0
11:00:00	0	7	3	10	0	30	11:00:00	5	15	0	20	0
12:00:00	0	122	90	212	0	425	12:00:00	69	144	0	213	0
13:00:00	0	133	61	194	0	390	13:00:00	73	123	0	196	0
14:00:00	0	136	64	200	0	393	14:00:00	52	141	0	193	0
15:00:00	0	8	3	11	0	25	15:00:00	8	6	0	14	0
16:00:00	0	256	195	451	0	696	16:00:00	92	153	0	245	0
17:00:00	0	282	207	489	0	760	17:00:00	85	186	0	271	0
18:00:00	0	275	165	440	0	707	18:00:00	87	180	0	267	0
Totals:	0	1386	841	2227	1	4473		722	1524	0	2246	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	169	198	64	95	85	43	49	52

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001901711

Interval Time	Passenger Cars - North Approach						Trucks - North Approach						Cyclists - North Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		North Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	8	8	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	29	21	0	0	9	8	3	3	0	0	1	1	0	0	0	0	0	0	0	0
7:30:00	64	35	0	0	28	19	7	4	0	0	2	1	0	0	0	0	0	0	0	0
7:45:00	105	41	0	0	40	12	11	4	0	0	4	2	0	0	0	0	0	0	0	0
8:00:00	159	54	0	0	55	15	18	7	0	0	4	0	0	0	0	0	0	0	0	0
8:15:00	218	59	0	0	71	16	21	3	0	0	4	0	0	0	0	0	0	0	1	1
8:30:00	267	49	0	0	84	13	26	5	0	0	6	2	0	0	0	0	0	0	1	0
8:45:00	297	30	0	0	107	23	32	6	0	0	6	0	1	1	0	0	0	0	2	1
9:00:00	337	40	0	0	136	29	36	4	0	0	8	2	1	0	0	0	2	2	2	0
9:00:12	337	0	0	0	138	2	36	0	0	0	8	0	1	0	0	0	2	0	2	0
11:00:00	345	8	0	0	146	8	37	1	0	0	8	0	1	0	0	0	2	0	2	0
11:15:00	356	11	0	0	152	6	41	4	0	0	8	0	1	0	0	0	2	0	2	0
11:30:00	366	10	0	0	162	10	47	6	0	0	8	0	1	0	0	0	2	0	2	0
11:45:00	374	8	0	0	179	17	56	9	0	0	9	1	1	0	0	0	2	0	5	3
12:00:00	388	14	0	0	195	16	58	2	0	0	12	3	1	0	0	0	2	0	9	4
12:15:00	401	13	0	0	213	18	69	11	0	0	14	2	2	1	0	0	2	0	13	4
12:30:00	422	21	0	0	230	17	78	9	0	0	15	1	2	0	0	0	3	1	14	1
12:45:00	433	11	0	0	239	9	83	5	0	0	15	0	2	0	0	0	3	0	17	3
13:00:00	451	18	0	0	255	16	88	5	0	0	15	0	3	1	0	0	3	0	20	3
13:15:00	473	22	0	0	266	11	90	2	0	0	15	0	3	0	0	0	3	0	20	0
13:30:00	485	12	0	0	280	14	97	7	0	0	17	2	4	1	0	0	5	2	20	0
13:45:00	498	13	0	0	296	16	100	3	0	0	18	1	4	0	0	0	5	0	20	0
14:00:00	519	21	0	0	307	11	104	4	0	0	18	0	4	0	0	0	5	0	20	0
14:00:16	519	0	0	0	307	0	104	0	0	0	18	0	4	0	0	0	5	0	20	0
15:00:00	519	0	0	0	310	3	105	1	0	0	18	0	4	0	0	0	5	0	20	0
15:15:00	526	7	0	0	345	35	107	2	0	0	19	1	4	0	0	0	5	0	20	0
15:30:00	535	9	0	0	380	35	109	2	0	0	19	0	4	0	0	0	5	0	20	0
15:45:00	544	9	0	0	407	27	112	3	0	0	20	1	4	0	0	0	5	0	20	0
16:00:00	548	4	0	0	432	25	119	7	0	0	20	0	4	0	0	0	5	0	20	0
16:15:00	556	8	0	0	466	34	125	6	0	0	21	1	4	0	0	0	5	0	21	1
16:30:00	567	11	0	0	497	31	127	2	0	0	21	0	4	0	0	0	5	0	21	0
16:45:00	572	5	0	0	529	32	130	3	0	0	21	0	4	0	0	0	7	2	21	0
17:00:00	585	13	0	0	567	38	131	1	0	0	21	0	4	0	0	0	7	0	21	0
17:15:00	592	7	0	0	612	45	135	4	0	0	21	0	4	0	0	0	7	0	23	2
17:30:00	609	17	0	0	663	51	138	3	0	0	21	0	4	0	0	0	9	2	24	1
17:45:00	616	7	0	0	700	37	140	2	0	0	21	0	4	0	0	0	9	0	25	1
18:00:00	626	10	0	0	735	35	141	1	0	0	21	0	5	1	0	0	9	0	25	0
18:00:13	626	0	0	0	735	0	141	0	0	0	21	0	5	0	0	0	9	0	25	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001901711

Interval Time	Passenger Cars - East Approach						Trucks - East Approach						Cyclists - East Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		East Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
7:15:00	0	0	17	16	6	6	0	0	1	1	1	0	0	0	0	0	0	0	0	0
7:30:00	0	0	32	15	12	6	0	0	2	1	4	3	0	0	0	0	0	0	0	0
7:45:00	0	0	50	18	14	2	0	0	4	2	7	3	0	0	2	2	0	0	0	0
8:00:00	0	0	71	21	17	3	0	0	4	0	13	6	0	0	2	0	0	0	0	0
8:15:00	0	0	89	18	24	7	0	0	6	2	15	2	0	0	2	0	0	0	0	0
8:30:00	0	0	107	18	27	3	0	0	6	0	17	2	0	0	2	0	0	0	0	0
8:45:00	0	0	131	24	28	1	0	0	7	1	19	2	0	0	2	0	0	0	0	0
9:00:00	0	0	156	25	33	5	0	0	9	2	20	1	0	0	2	0	0	0	1	1
9:00:12	0	0	158	2	33	0	0	0	9	0	20	0	0	0	2	0	0	0	1	0
11:00:00	0	0	163	5	36	3	0	0	9	0	20	0	0	0	2	0	0	0	1	0
11:15:00	0	0	197	34	50	14	0	0	10	1	21	1	0	0	3	1	0	0	1	0
11:30:00	0	0	220	23	61	11	0	0	12	2	25	4	0	0	3	0	0	0	1	0
11:45:00	0	0	245	25	85	24	0	0	12	0	31	6	0	0	3	0	0	0	1	0
12:00:00	0	0	281	36	109	24	0	0	12	0	37	6	0	0	3	0	0	0	1	0
12:15:00	0	0	317	36	128	19	0	0	14	2	39	2	0	0	4	1	0	0	1	0
12:30:00	0	0	354	37	142	14	0	0	14	0	42	3	0	0	4	0	0	0	1	0
12:45:00	0	0	387	33	150	8	0	0	14	0	45	3	0	0	5	1	0	0	1	0
13:00:00	0	0	409	22	160	10	0	0	15	1	47	2	0	0	5	0	0	0	1	0
13:15:00	0	0	431	22	176	16	0	0	16	1	49	2	0	0	6	1	0	0	1	0
13:30:00	0	0	466	35	183	7	0	0	16	0	53	4	0	0	6	0	0	0	1	0
13:45:00	0	0	504	38	197	14	0	0	17	1	56	3	0	0	6	0	0	0	1	0
14:00:00	0	0	542	38	213	16	0	0	17	0	58	2	0	0	6	0	0	0	1	0
14:00:16	0	0	544	2	213	0	0	0	17	0	58	0	0	0	6	0	0	0	1	0
15:00:00	0	0	550	6	216	3	0	0	17	0	58	0	0	0	6	0	0	0	1	0
15:15:00	0	0	609	59	269	53	0	0	19	2	63	5	0	0	6	0	1	1	1	0
15:30:00	0	0	662	53	304	35	0	0	20	1	69	6	0	0	7	1	1	0	1	0
15:45:00	0	0	737	75	354	50	0	0	24	4	71	2	0	0	7	0	2	1	1	0
16:00:00	0	0	797	60	395	41	0	0	25	1	72	1	0	0	7	0	2	0	1	0
16:15:00	0	0	854	57	449	54	0	0	27	2	75	3	0	0	9	2	2	0	1	0
16:30:00	0	0	921	67	500	51	0	0	28	1	78	3	0	0	12	3	2	0	1	0
16:45:00	0	0	992	71	542	42	0	0	29	1	81	3	0	0	14	2	2	0	1	0
17:00:00	0	0	1067	75	592	50	0	0	30	1	82	1	0	0	14	0	2	0	1	0
17:15:00	0	0	1139	72	641	49	0	0	31	1	84	2	0	0	17	3	2	0	1	0
17:30:00	0	0	1213	74	681	40	0	0	31	0	88	4	0	0	20	3	4	2	1	0
17:45:00	0	0	1281	68	716	35	0	0	31	0	93	5	0	0	20	0	4	0	1	0
18:00:00	0	0	1333	52	742	26	0	0	31	0	95	2	0	0	22	2	4	0	1	0
18:00:13	0	0	1336	3	742	0	0	0	31	0	95	0	0	0	22	0	4	0	1	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001901711

Interval Time	Passenger Cars - South Approach						Trucks - South Approach						Cyclists - South Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		South Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
9:00:12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
11:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
11:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
11:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
11:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
12:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
12:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
12:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
12:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1
13:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
13:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
13:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
13:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
14:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1
14:00:16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1
15:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
15:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
15:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
15:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
16:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
16:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
16:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
16:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
17:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
17:15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
17:30:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
17:45:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0
18:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4
18:00:13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0

MG8 ENG

Count Date: 4-Jun-2013 Site #: 0001901711

Interval Time	Passenger Cars - West Approach						Trucks - West Approach						Cyclists - West Approach						Pedestrians	
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		West Cross	
	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr	Cum	Incr
7:00:00	6	6	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15:00	25	19	68	58	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
7:30:00	58	33	155	87	0	0	0	0	2	1	0	0	1	1	1	1	0	0	0	0
7:45:00	110	52	232	77	0	0	0	0	4	2	0	0	1	0	1	0	0	0	0	0
8:00:00	139	29	311	79	0	0	1	1	5	1	0	0	1	0	1	0	0	0	0	0
8:15:00	169	30	374	63	0	0	3	2	6	1	0	0	1	0	1	0	0	0	0	0
8:30:00	208	39	441	67	0	0	3	0	7	1	0	0	1	0	1	0	0	0	0	0
8:45:00	223	15	508	67	0	0	3	0	8	1	0	0	1	0	1	0	0	0	0	0
9:00:00	245	22	566	58	0	0	4	1	9	1	0	0	2	1	1	0	0	0	0	0
9:00:12	245	0	569	3	0	0	4	0	9	0	0	0	2	0	1	0	0	0	0	0
11:00:00	248	3	581	12	0	0	6	2	9	0	0	0	2	0	1	0	0	0	0	0
11:15:00	266	18	611	30	0	0	8	2	10	1	0	0	2	0	1	0	0	0	0	0
11:30:00	278	12	649	38	0	0	9	1	10	0	0	0	3	1	3	2	0	0	0	0
11:45:00	298	20	688	39	0	0	9	0	11	1	0	0	3	0	3	0	0	0	0	0
12:00:00	313	15	721	33	0	0	9	0	11	0	0	0	3	0	3	0	0	0	0	0
12:15:00	331	18	751	30	0	0	10	1	11	0	0	0	3	0	3	0	0	0	0	0
12:30:00	352	21	775	24	0	0	13	3	11	0	0	0	3	0	3	0	0	0	0	0
12:45:00	364	12	808	33	0	0	13	0	11	0	0	0	3	0	4	1	0	0	0	0
13:00:00	380	16	841	33	0	0	14	1	11	0	0	0	4	1	6	2	0	0	0	0
13:15:00	393	13	883	42	0	0	14	0	11	0	0	0	4	0	7	1	0	0	0	0
13:30:00	402	9	911	28	0	0	14	0	13	2	0	0	4	0	7	0	0	0	0	0
13:45:00	413	11	952	41	0	0	15	1	13	0	0	0	4	0	7	0	0	0	0	0
14:00:00	431	18	979	27	0	0	15	0	13	0	0	0	4	0	7	0	0	0	0	0
14:00:16	435	4	980	1	0	0	15	0	13	0	0	0	4	0	7	0	0	0	0	0
15:00:00	439	4	985	5	0	0	15	0	13	0	0	0	4	0	7	0	0	0	0	0
15:15:00	467	28	1016	31	0	0	15	0	15	2	0	0	4	0	9	2	0	0	0	0
15:30:00	495	28	1043	27	0	0	17	2	15	0	0	0	4	0	9	0	0	0	0	0
15:45:00	513	18	1085	42	0	0	17	0	17	2	0	0	4	0	12	3	0	0	0	0
16:00:00	528	15	1128	43	0	0	18	1	17	0	0	0	4	0	13	1	0	0	0	0
16:15:00	547	19	1172	44	0	0	18	0	21	4	0	0	4	0	18	5	0	0	0	0
16:30:00	576	29	1222	50	0	0	19	1	21	0	0	0	4	0	20	2	0	0	0	0
16:45:00	596	20	1256	34	0	0	19	0	23	2	0	0	6	2	20	0	0	0	0	0
17:00:00	610	14	1297	41	0	0	19	0	26	3	0	0	6	0	21	1	0	0	0	0
17:15:00	624	14	1336	39	0	0	19	0	26	0	0	0	6	0	21	0	0	0	0	0
17:30:00	650	26	1373	37	0	0	19	0	27	1	0	0	8	2	24	3	0	0	0	0
17:45:00	670	20	1425	52	0	0	19	0	27	0	0	0	8	0	27	3	0	0	0	0
18:00:00	695	25	1470	45	0	0	19	0	27	0	0	0	8	0	27	0	0	0	0	0
18:00:13	695	0	1475	5	0	0	19	0	27	0	0	0	8	0	27	0	0	0	0	0

Appendix D

Existing Conditions – Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	132	856	136	49	479	180	23	220	121	433	258	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3382		1626	3343	1468	1421	3406	1538	3303	3343	1538
Flt Permitted	0.44	1.00		0.19	1.00	1.00	0.58	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	795	3382		329	3343	1468	867	3406	1538	3303	3343	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	930	148	53	521	196	25	239	132	471	280	153
RTOR Reduction (vph)	0	7	0	0	0	89	0	0	75	0	0	99
Lane Group Flow (vph)	143	1071	0	53	521	107	25	239	57	471	280	54
Heavy Vehicles (%)	5%	4%	8%	11%	8%	10%	27%	6%	5%	6%	8%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	65.5	65.5		65.5	65.5	65.5	12.8	12.8	12.8	21.7	39.5	39.5
Effective Green, g (s)	65.5	65.5		65.5	65.5	65.5	12.8	12.8	12.8	21.7	39.5	39.5
Actuated g/C Ratio	0.55	0.55		0.55	0.55	0.55	0.11	0.11	0.11	0.18	0.33	0.33
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	433	1846		179	1824	801	92	363	164	597	1100	506
v/s Ratio Prot		c0.32			0.16			c0.07		c0.14	0.08	
v/s Ratio Perm	0.18			0.16		0.07	0.03		0.04			0.04
v/c Ratio	0.33	0.58		0.30	0.29	0.13	0.27	0.66	0.35	0.79	0.25	0.11
Uniform Delay, d1	15.1	18.1		14.8	14.7	13.3	49.3	51.5	49.7	47.0	29.5	28.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	1.3		4.2	0.4	0.3	0.6	3.3	0.5	6.3	0.0	0.0
Delay (s)	17.1	19.4		18.9	15.1	13.7	49.9	54.8	50.2	53.3	29.5	28.0
Level of Service	B	B		B	B	B	D	D	D	D	C	C
Approach Delay (s)		19.2			15.0			52.9			41.7	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	85	37	11	239	289	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1570	1380	1421	1776	1697	
Flt Permitted	0.95	1.00	0.54	1.00	1.00	
Satd. Flow (perm)	1570	1380	808	1776	1697	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	40	12	257	311	61
RTOR Reduction (vph)	0	36	0	0	5	0
Lane Group Flow (vph)	91	4	12	257	367	0
Heavy Vehicles (%)	15%	17%	27%	7%	7%	22%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.5	10.5	75.5	75.5	75.5	
Effective Green, g (s)	10.5	10.5	75.5	75.5	75.5	
Actuated g/C Ratio	0.10	0.10	0.76	0.76	0.76	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	164	144	610	1340	1281	
v/s Ratio Prot	c0.06			0.14	c0.22	
v/s Ratio Perm		0.00	0.01			
v/c Ratio	0.55	0.03	0.02	0.19	0.29	
Uniform Delay, d1	42.5	40.2	3.0	3.5	3.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.0	0.1	0.1	0.3	0.6	
Delay (s)	46.6	40.3	3.1	3.8	4.4	
Level of Service	D	D	A	A	A	
Approach Delay (s)	44.6			3.8	4.4	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	154	325	82	33	215	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1792	1122	1656	1538
Flt Permitted	0.70	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1307	1863	1792	1122	1656	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	160	339	85	34	224	71
RTOR Reduction (vph)	0	0	0	11	0	58
Lane Group Flow (vph)	160	339	85	23	224	13
Heavy Vehicles (%)	2%	2%	6%	44%	9%	5%
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	60.5	60.5	60.5	60.5	16.5	16.5
Effective Green, g (s)	60.5	60.5	60.5	60.5	16.5	16.5
Actuated g/C Ratio	0.67	0.67	0.67	0.67	0.18	0.18
Clearance Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	878	1252	1204	754	303	281
v/s Ratio Prot		c0.18	0.05		c0.14	
v/s Ratio Perm	0.12			0.02		0.01
v/c Ratio	0.18	0.27	0.07	0.03	0.74	0.05
Uniform Delay, d1	5.5	5.9	5.1	4.9	34.7	30.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.5	0.1	0.1	7.9	0.0
Delay (s)	6.0	6.4	5.2	5.0	42.6	30.3
Level of Service	A	A	A	A	D	C
Approach Delay (s)		6.3	5.1		39.6	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	132	856	49	479	180	23	220	121	433	258	141
Lane Group Flow (vph)	143	1078	53	521	196	25	239	132	471	280	153
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	2	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	28.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	30.0	30.0	30.0	19.0	48.0	48.0
Total Split (s)	48.0	48.0	48.0	48.0	48.0	30.0	30.0	30.0	42.0	72.0	72.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	7.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?						Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	0.33	0.58	0.30	0.29	0.22	0.27	0.66	0.55	0.79	0.25	0.25
Control Delay	19.7	20.6	23.5	16.2	3.0	55.6	60.2	29.3	56.7	29.0	5.3
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	19.7	20.6	23.5	16.2	3.0	55.6	60.2	29.3	56.7	29.0	5.3
Queue Length 50th (m)	18.8	88.3	6.8	35.0	0.0	5.8	30.4	11.2	58.0	26.6	1.0
Queue Length 95th (m)	40.7	130.3	20.4	55.1	12.9	14.7	43.0	30.9	72.8	33.4	14.0
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	434	1852	179	1825	890	159	624	350	1018	1782	888
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	0.58	0.30	0.29	0.22	0.16	0.38	0.38	0.46	0.16	0.17

Intersection Summary

Cycle Length: 120

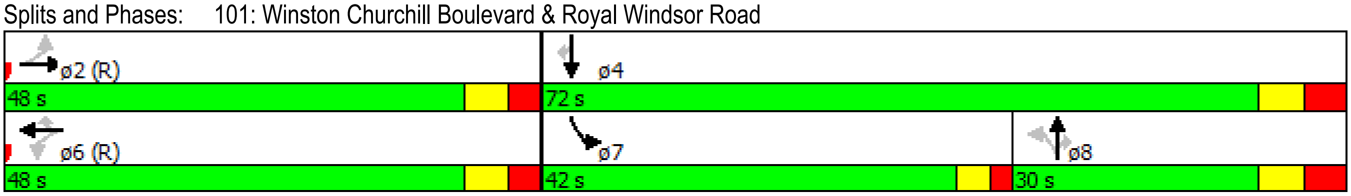
Actuated Cycle Length: 120

Offset: 54 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road

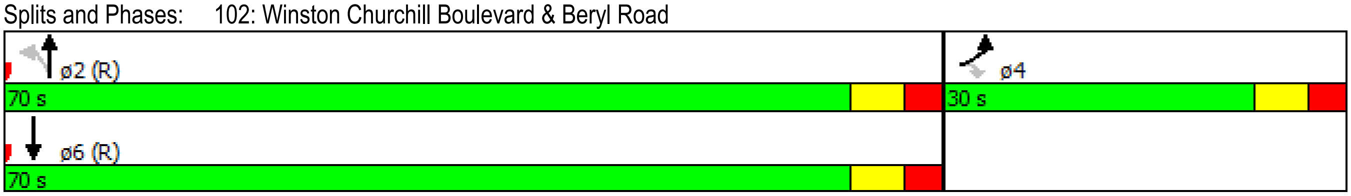


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	85	37	11	239	289
Lane Group Flow (vph)	91	40	12	257	372
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	26.0	26.0	26.0
Total Split (s)	30.0	30.0	70.0	70.0	70.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.48	0.20	0.02	0.18	0.28
Control Delay	48.4	13.9	4.7	4.6	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	13.9	4.7	4.6	5.0
Queue Length 50th (m)	17.8	0.0	0.5	12.8	18.9
Queue Length 95th (m)	31.2	9.0	2.6	28.5	41.3
Internal Link Dist (m)	204.4			1693.4	215.9
Turn Bay Length (m)	52.0		101.0		
Base Capacity (vph)	361	348	633	1391	1334
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.11	0.02	0.18	0.28

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 94 (94%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

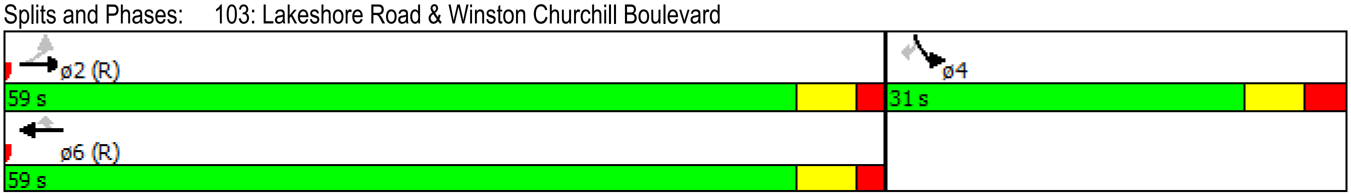
Splits and Phases: 102: Winston Churchill Boulevard & Beryl Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	154	325	82	33	215	68
Lane Group Flow (vph)	160	339	85	34	224	71
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	27.0	27.0
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.18	0.27	0.07	0.04	0.74	0.21
Control Delay	7.1	7.4	6.4	2.6	48.9	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	7.4	6.4	2.6	48.9	8.7
Queue Length 50th (m)	9.5	21.7	4.7	0.0	38.9	0.0
Queue Length 95th (m)	21.9	42.8	11.9	3.6	58.6	10.3
Internal Link Dist (m)		251.9	285.9		1693.4	
Turn Bay Length (m)	52.0			72.0	91.0	
Base Capacity (vph)	879	1252	1205	765	441	462
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.27	0.07	0.04	0.51	0.15

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 103: Lakeshore Road & Winston Churchill Boulevard



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	519	21	101	806	418	103	325	72	366	268	194
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3418		1752	3505	1599	1736	3539	1599	3400	3505	1553
Flt Permitted	0.17	1.00		0.42	1.00	1.00	0.56	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	313	3418		768	3505	1599	1031	3539	1599	3400	3505	1553
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	214	597	24	116	926	480	118	374	83	421	308	223
RTOR Reduction (vph)	0	2	0	0	0	292	0	0	70	0	0	142
Lane Group Flow (vph)	214	619	0	116	926	188	118	374	13	421	308	81
Heavy Vehicles (%)	1%	4%	30%	3%	3%	1%	4%	2%	1%	3%	3%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	62.8	62.8		47.1	47.1	47.1	18.7	18.7	18.7	18.5	42.2	42.2
Effective Green, g (s)	62.8	62.8		47.1	47.1	47.1	18.7	18.7	18.7	18.5	42.2	42.2
Actuated g/C Ratio	0.52	0.52		0.39	0.39	0.39	0.16	0.16	0.16	0.15	0.35	0.35
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	3.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	319	1788		301	1375	627	160	551	249	524	1232	546
v/s Ratio Prot	c0.07	0.18			0.26			0.11		c0.12	0.09	
v/s Ratio Perm	c0.28			0.15		0.12	c0.11		0.01			0.05
v/c Ratio	0.67	0.35		0.39	0.67	0.30	0.74	0.68	0.05	0.80	0.25	0.15
Uniform Delay, d1	19.0	16.6		26.1	30.1	25.1	48.3	47.8	43.1	49.0	27.7	26.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.5		3.7	2.7	1.2	14.1	2.6	0.0	8.2	0.0	0.0
Delay (s)	24.5	17.2		29.8	32.8	26.3	62.4	50.4	43.1	57.2	27.7	26.7
Level of Service	C	B		C	C	C	E	D	D	E	C	C
Approach Delay (s)		19.0			30.5			51.8			40.5	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	120	18	17	324	287	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1736	1615	1703	1827	1749	
Flt Permitted	0.95	1.00	0.51	1.00	1.00	
Satd. Flow (perm)	1736	1615	908	1827	1749	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	20	18	352	312	110
RTOR Reduction (vph)	0	17	0	0	9	0
Lane Group Flow (vph)	130	3	18	352	413	0
Heavy Vehicles (%)	4%	0%	6%	4%	4%	7%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.1	13.1	72.9	72.9	72.9	
Effective Green, g (s)	13.1	13.1	72.9	72.9	72.9	
Actuated g/C Ratio	0.13	0.13	0.73	0.73	0.73	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	227	211	661	1331	1275	
v/s Ratio Prot	c0.07			0.19	c0.24	
v/s Ratio Perm		0.00	0.02			
v/c Ratio	0.57	0.01	0.03	0.26	0.32	
Uniform Delay, d1	40.8	37.8	3.7	4.5	4.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.5	0.0	0.1	0.5	0.7	
Delay (s)	44.3	37.8	3.8	5.0	5.5	
Level of Service	D	D	A	A	A	
Approach Delay (s)	43.4			5.0	5.5	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	79	187	309	196	56	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1863	1881	1524	1517	1615
Flt Permitted	0.57	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1075	1863	1881	1524	1517	1615
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	82	195	322	204	58	188
RTOR Reduction (vph)	0	0	0	50	0	169
Lane Group Flow (vph)	82	195	322	154	58	19
Heavy Vehicles (%)	0%	2%	1%	6%	19%	0%
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	68.0	68.0	68.0	68.0	9.0	9.0
Effective Green, g (s)	68.0	68.0	68.0	68.0	9.0	9.0
Actuated g/C Ratio	0.76	0.76	0.76	0.76	0.10	0.10
Clearance Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	812	1407	1421	1151	151	161
v/s Ratio Prot		0.10	c0.17		c0.04	
v/s Ratio Perm	0.08			0.10		0.01
v/c Ratio	0.10	0.14	0.23	0.13	0.38	0.12
Uniform Delay, d1	2.9	3.0	3.2	3.0	37.9	36.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.4	0.2	0.6	0.1
Delay (s)	3.2	3.2	3.6	3.2	38.5	37.0
Level of Service	A	A	A	A	D	D
Approach Delay (s)		3.2	3.5		37.4	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	186	519	101	806	418	103	325	72	366	268	194
Lane Group Flow (vph)	214	621	116	926	480	118	374	83	421	308	223
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	5	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	5.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.0	36.0	36.0	36.0	36.0	29.0	29.0	29.0	19.0	48.0	48.0
Total Split (s)	12.0	60.0	48.0	48.0	48.0	34.0	34.0	34.0	26.0	60.0	60.0
Total Split (%)	10.0%	50.0%	40.0%	40.0%	40.0%	28.3%	28.3%	28.3%	21.7%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	3.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	0.65	0.35	0.39	0.67	0.52	0.74	0.68	0.24	0.80	0.25	0.32
Control Delay	27.3	18.5	33.4	34.4	4.8	73.3	53.7	5.2	61.3	27.1	4.3
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	27.3	18.5	33.4	34.4	4.8	73.3	53.7	5.2	61.3	27.1	4.3
Queue Length 50th (m)	25.5	45.1	21.2	102.6	0.0	28.4	46.9	0.0	52.2	28.3	0.7
Queue Length 95th (m)	#58.1	66.5	39.6	127.0	19.0	45.0	56.7	7.0	66.4	33.2	13.5
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	329	1791	301	1377	920	223	766	431	595	1518	797
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	0.65	0.35	0.39	0.67	0.52	0.53	0.49	0.19	0.71	0.20	0.28

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

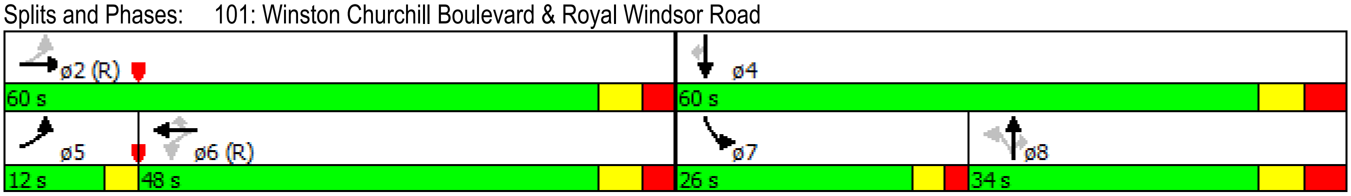
Offset: 92 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

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

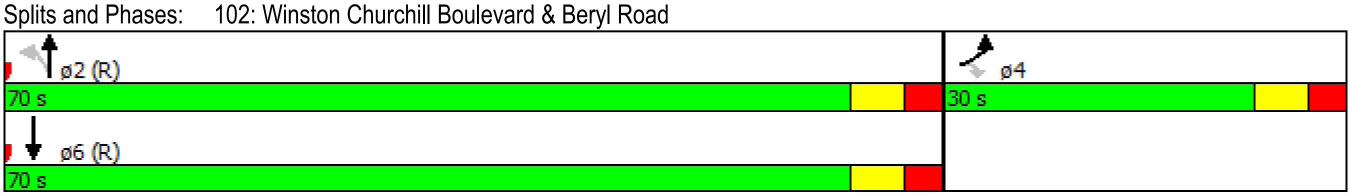
Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	120	18	17	324	287
Lane Group Flow (vph)	130	20	18	352	422
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	26.0	26.0	26.0
Total Split (s)	30.0	30.0	70.0	70.0	70.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.58	0.09	0.03	0.26	0.33
Control Delay	50.2	15.2	4.9	5.6	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	15.2	4.9	5.6	5.7
Queue Length 50th (m)	25.4	0.0	0.9	20.2	23.1
Queue Length 95th (m)	41.7	6.5	3.4	39.5	46.3
Internal Link Dist (m)	204.4			1693.4	215.9
Turn Bay Length (m)	52.0		101.0		
Base Capacity (vph)	399	386	663	1332	1285
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.05	0.03	0.26	0.33

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 94 (94%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

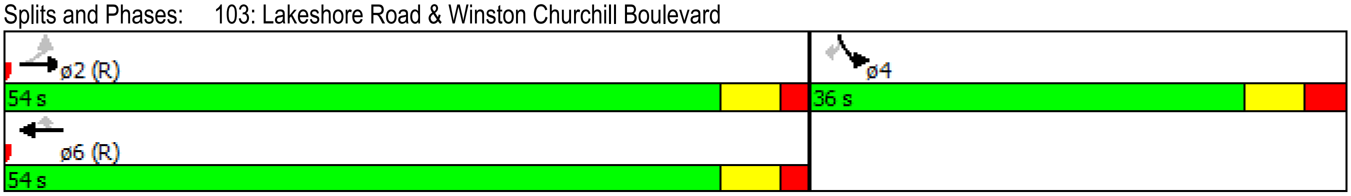
Splits and Phases: 102: Winston Churchill Boulevard & Beryl Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	79	187	309	196	56	180
Lane Group Flow (vph)	82	195	322	204	58	188
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	27.0	27.0
Total Split (s)	54.0	54.0	54.0	54.0	36.0	36.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.10	0.14	0.23	0.17	0.39	0.57
Control Delay	3.5	3.4	3.8	0.9	45.2	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	3.4	3.8	0.9	45.2	13.2
Queue Length 50th (m)	3.0	7.3	13.0	0.0	10.2	0.0
Queue Length 95th (m)	7.7	15.1	24.9	5.1	21.6	19.0
Internal Link Dist (m)		251.9	285.9		1693.4	
Turn Bay Length (m)	52.0			72.0	91.0	
Base Capacity (vph)	812	1408	1422	1202	488	647
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.14	0.23	0.17	0.12	0.29

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 89 (99%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 103: Lakeshore Road & Winston Churchill Boulevard



Appendix E

2020 Future Background Conditions – Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	945	232	84	528	199	53	274	143	478	381	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3343		1626	3343	1468	1421	3406	1538	3303	3343	1538
Flt Permitted	0.40	1.00		0.12	1.00	1.00	0.51	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	726	3343		200	3343	1468	762	3406	1538	3303	3343	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	1027	252	91	574	216	58	298	155	520	414	170
RTOR Reduction (vph)	0	13	0	0	0	106	0	0	71	0	0	75
Lane Group Flow (vph)	159	1266	0	91	574	110	58	298	84	520	414	95
Heavy Vehicles (%)	5%	4%	8%	11%	8%	10%	27%	6%	5%	6%	8%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	61.1	61.1		61.1	61.1	61.1	15.4	15.4	15.4	23.5	43.9	43.9
Effective Green, g (s)	61.1	61.1		61.1	61.1	61.1	15.4	15.4	15.4	23.5	43.9	43.9
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.13	0.13	0.13	0.20	0.37	0.37
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	369	1702		101	1702	747	97	437	197	646	1222	562
v/s Ratio Prot		0.38			0.17			c0.09		c0.16	0.12	
v/s Ratio Perm	0.22			c0.46		0.07	0.08		0.05			0.06
v/c Ratio	0.43	0.74		0.90	0.34	0.15	0.60	0.68	0.42	0.80	0.34	0.17
Uniform Delay, d1	18.5	23.3		26.7	17.5	15.6	49.4	50.0	48.2	46.1	27.5	25.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.6	3.0		65.6	0.5	0.4	6.4	3.5	0.5	6.8	0.1	0.1
Delay (s)	22.2	26.3		92.3	18.0	16.0	55.8	53.4	48.7	52.9	27.6	25.8
Level of Service	C	C		F	B	B	E	D	D	D	C	C
Approach Delay (s)		25.8			25.2			52.3			39.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	94	41	13	334	527	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1570	1380	1421	1776	1724	
Flt Permitted	0.95	1.00	0.39	1.00	1.00	
Satd. Flow (perm)	1570	1380	579	1776	1724	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.92
Adj. Flow (vph)	101	44	14	359	567	68
RTOR Reduction (vph)	0	39	0	0	3	0
Lane Group Flow (vph)	101	5	14	359	632	0
Heavy Vehicles (%)	15%	17%	27%	7%	7%	22%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.8	10.8	75.2	75.2	75.2	
Effective Green, g (s)	10.8	10.8	75.2	75.2	75.2	
Actuated g/C Ratio	0.11	0.11	0.75	0.75	0.75	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	169	149	435	1335	1296	
v/s Ratio Prot	c0.06			0.20	c0.37	
v/s Ratio Perm		0.00	0.02			
v/c Ratio	0.60	0.03	0.03	0.27	0.49	
Uniform Delay, d1	42.5	39.9	3.2	3.9	4.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.6	0.1	0.1	0.5	1.3	
Delay (s)	48.1	40.0	3.3	4.3	6.2	
Level of Service	D	D	A	A	A	
Approach Delay (s)	45.7			4.3	6.2	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	179	358	92	37	238	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1792	1122	1656	1538
Flt Permitted	0.69	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1294	1863	1792	1122	1656	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	186	373	96	39	248	79
RTOR Reduction (vph)	0	0	0	13	0	63
Lane Group Flow (vph)	186	373	96	26	248	16
Heavy Vehicles (%)	2%	2%	6%	44%	9%	5%
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	59.3	59.3	59.3	59.3	17.7	17.7
Effective Green, g (s)	59.3	59.3	59.3	59.3	17.7	17.7
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.20	0.20
Clearance Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	852	1227	1180	739	325	302
v/s Ratio Prot		c0.20	0.05		c0.15	
v/s Ratio Perm	0.14			0.02		0.01
v/c Ratio	0.22	0.30	0.08	0.03	0.76	0.05
Uniform Delay, d1	6.1	6.5	5.5	5.4	34.2	29.3
Progression Factor	1.00	1.00	1.00	1.00	0.87	1.45
Incremental Delay, d2	0.6	0.6	0.1	0.1	8.0	0.0
Delay (s)	6.7	7.2	5.7	5.4	37.6	42.4
Level of Service	A	A	A	A	D	D
Approach Delay (s)		7.0	5.6		38.8	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	1	0	70	0	207	9	208	361	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					7.0			6.0			6.0	
Lane Util. Factor					1.00			1.00			1.00	
Frt					0.87			0.99			1.00	
Flt Protected					1.00			1.00			0.98	
Satd. Flow (prot)					1613			1851			1829	
Flt Permitted					1.00			1.00			0.78	
Satd. Flow (perm)					1607			1851			1457	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	1	0	76	0	225	10	226	392	0
RTOR Reduction (vph)	0	0	0	0	70	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	7	0	0	234	0	0	618	0
Turn Type				Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)					6.7			70.3			70.3	
Effective Green, g (s)					6.7			70.3			70.3	
Actuated g/C Ratio					0.07			0.78			0.78	
Clearance Time (s)					7.0			6.0			6.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					119			1445			1138	
v/s Ratio Prot								0.13				
v/s Ratio Perm					c0.00						c0.42	
v/c Ratio					0.06			0.16			0.54	
Uniform Delay, d1					38.7			2.5			3.7	
Progression Factor					1.00			0.94			1.00	
Incremental Delay, d2					0.2			0.2			1.9	
Delay (s)					38.9			2.5			5.6	
Level of Service					D			A			A	
Approach Delay (s)		0.0			38.9			2.5			5.6	
Approach LOS		A			D			A			A	

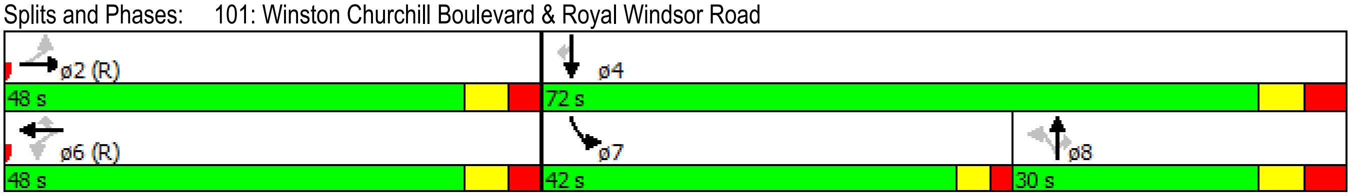
Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	146	945	84	528	199	53	274	143	478	381	156
Lane Group Flow (vph)	159	1279	91	574	216	58	298	155	520	414	170
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	2	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	28.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	30.0	30.0	30.0	19.0	48.0	48.0
Total Split (s)	48.0	48.0	48.0	48.0	48.0	30.0	30.0	30.0	42.0	72.0	72.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	7.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?						Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	0.43	0.75	0.90	0.34	0.25	0.60	0.68	0.58	0.80	0.34	0.27
Control Delay	25.9	27.8	99.5	19.6	3.6	72.8	57.6	31.7	56.0	27.3	8.7
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	25.9	27.8	99.5	19.6	3.6	72.8	57.6	31.7	56.0	27.3	8.7
Queue Length 50th (m)	23.7	123.7	19.4	42.4	0.0	13.8	37.8	16.9	64.0	39.1	8.5
Queue Length 95th (m)	53.8	#201.8	#61.0	68.6	15.0	27.5	50.2	37.1	78.9	43.4	19.9
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	369	1714	101	1702	853	139	624	348	1018	1782	875
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	0.75	0.90	0.34	0.25	0.42	0.48	0.45	0.51	0.23	0.19

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 54 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road

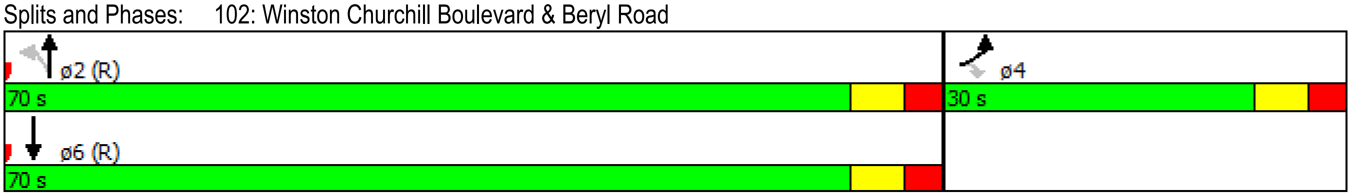


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	94	41	13	334	527
Lane Group Flow (vph)	101	44	14	359	635
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	26.0	26.0	26.0
Total Split (s)	30.0	30.0	70.0	70.0	70.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.52	0.21	0.03	0.26	0.47
Control Delay	49.4	13.4	5.0	5.2	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	13.4	5.0	5.2	7.0
Queue Length 50th (m)	19.7	0.0	0.6	19.8	42.8
Queue Length 95th (m)	33.9	9.4	3.0	40.8	87.1
Internal Link Dist (m)	204.4			520.3	215.9
Turn Bay Length (m)	52.0		101.0		
Base Capacity (vph)	361	351	451	1384	1347
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.13	0.03	0.26	0.47

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 94 (94%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 102: Winston Churchill Boulevard & Beryl Road

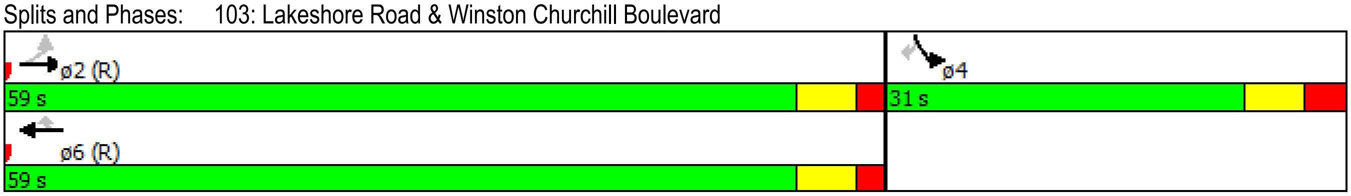


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	179	358	92	37	238	76
Lane Group Flow (vph)	186	373	96	39	248	79
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	27.0	27.0
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.22	0.30	0.08	0.05	0.76	0.22
Control Delay	7.9	8.2	6.8	2.8	42.6	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.9	8.2	6.8	2.8	42.6	10.9
Queue Length 50th (m)	12.0	25.8	5.6	0.0	43.0	3.7
Queue Length 95th (m)	26.4	49.4	13.6	4.0	63.8	m13.6
Internal Link Dist (m)		251.9	285.9		1149.2	
Turn Bay Length (m)	52.0			72.0	91.0	
Base Capacity (vph)	853	1228	1181	753	441	468
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.30	0.08	0.05	0.56	0.17

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 103: Lakeshore Road & Winston Churchill Boulevard



Lane Group	WBL	WBT	NBT	SBL	SBT	ø4
Lane Configurations						
Volume (vph)	1	0	207	208	361	
Lane Group Flow (vph)	0	77	235	0	618	
Turn Type	Perm	NA	NA	Perm	NA	
Protected Phases		8	2		6	4
Permitted Phases	8			6		
Detector Phase	8	8	2	6	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	24.0	24.0	24.0	25.0
Total Split (s)	28.0	28.0	62.0	62.0	62.0	28.0
Total Split (%)	31.1%	31.1%	68.9%	68.9%	68.9%	31%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	
Total Lost Time (s)		7.0	6.0		6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio		0.35	0.16		0.52	
Control Delay		14.6	2.8		6.0	
Queue Delay		0.0	0.0		0.0	
Total Delay		14.6	2.8		6.0	
Queue Length 50th (m)		0.2	8.8		35.9	
Queue Length 95th (m)		13.0	14.5		63.6	
Internal Link Dist (m)		405.4	1149.2		520.3	
Turn Bay Length (m)						
Base Capacity (vph)		433	1501		1180	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.18	0.16		0.52	

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 104: Winston Churchill Boulevard

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	206	573	59	124	890	462	197	455	110	404	337	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3344		1752	3505	1599	1736	3539	1599	3400	3505	1553
Flt Permitted	0.09	1.00		0.38	1.00	1.00	0.52	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	171	3344		692	3505	1599	955	3539	1599	3400	3505	1553
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	237	659	68	143	1023	531	226	523	126	464	387	246
RTOR Reduction (vph)	0	7	0	0	0	289	0	0	90	0	0	120
Lane Group Flow (vph)	237	720	0	143	1023	242	226	523	36	464	387	126
Heavy Vehicles (%)	1%	4%	30%	3%	3%	1%	4%	2%	1%	3%	3%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	53.0	53.0		41.0	41.0	41.0	27.6	27.6	27.6	19.4	52.0	52.0
Effective Green, g (s)	53.0	53.0		41.0	41.0	41.0	27.6	27.6	27.6	19.4	52.0	52.0
Actuated g/C Ratio	0.44	0.44		0.34	0.34	0.34	0.23	0.23	0.23	0.16	0.43	0.43
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	3.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	196	1476		236	1197	546	219	813	367	549	1518	672
v/s Ratio Prot	c0.09	0.22			0.29			0.15		c0.14	0.11	
v/s Ratio Perm	c0.44			0.21		0.15	c0.24		0.02			0.08
v/c Ratio	1.21	0.49		0.61	0.85	0.44	1.03	0.64	0.10	0.85	0.25	0.19
Uniform Delay, d1	30.3	23.8		32.8	36.7	30.6	46.2	41.8	36.4	48.8	21.7	21.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	132.0	1.2		11.0	7.9	2.6	69.4	1.3	0.0	11.0	0.0	0.0
Delay (s)	162.3	25.0		43.8	44.6	33.2	115.6	43.1	36.4	59.8	21.7	21.0
Level of Service	F	C		D	D	C	F	D	D	E	C	C
Approach Delay (s)		58.8			41.0			60.8			37.7	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	47.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	132	20	18	568	407	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1736	1615	1703	1827	1763	
Flt Permitted	0.95	1.00	0.42	1.00	1.00	
Satd. Flow (perm)	1736	1615	750	1827	1763	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	22	20	617	442	121
RTOR Reduction (vph)	0	19	0	0	7	0
Lane Group Flow (vph)	143	3	20	617	556	0
Heavy Vehicles (%)	4%	0%	6%	4%	4%	7%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.6	13.6	72.4	72.4	72.4	
Effective Green, g (s)	13.6	13.6	72.4	72.4	72.4	
Actuated g/C Ratio	0.14	0.14	0.72	0.72	0.72	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	219	543	1322	1276	
v/s Ratio Prot	c0.08			c0.34	0.32	
v/s Ratio Perm		0.00	0.03			
v/c Ratio	0.61	0.01	0.04	0.47	0.44	
Uniform Delay, d1	40.7	37.4	3.9	5.8	5.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	0.0	0.1	1.2	1.1	
Delay (s)	45.0	37.4	4.0	6.9	6.6	
Level of Service	D	D	A	A	A	
Approach Delay (s)	44.0			6.8	6.6	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	91	207	345	216	62	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1863	1881	1524	1517	1615
Flt Permitted	0.55	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1039	1863	1881	1524	1517	1615
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	95	216	359	225	65	211
RTOR Reduction (vph)	0	0	0	56	0	189
Lane Group Flow (vph)	95	216	359	170	65	22
Heavy Vehicles (%)	0%	2%	1%	6%	19%	0%
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	67.8	67.8	67.8	67.8	9.2	9.2
Effective Green, g (s)	67.8	67.8	67.8	67.8	9.2	9.2
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.10	0.10
Clearance Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	782	1403	1417	1148	155	165
v/s Ratio Prot		0.12	c0.19		c0.04	
v/s Ratio Perm	0.09			0.11		0.01
v/c Ratio	0.12	0.15	0.25	0.15	0.42	0.13
Uniform Delay, d1	3.0	3.1	3.4	3.1	37.9	36.8
Progression Factor	1.00	1.00	1.00	1.00	1.35	2.81
Incremental Delay, d2	0.3	0.2	0.4	0.3	0.6	0.1
Delay (s)	3.3	3.3	3.8	3.4	51.8	103.5
Level of Service	A	A	A	A	D	F
Approach Delay (s)		3.3	3.6		91.3	
Approach LOS		A	A		F	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	4	0	211	0	303	4	90	337	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					7.0			6.0			6.0	
Lane Util. Factor					1.00			1.00			1.00	
Frt					0.87			1.00			1.00	
Flt Protected					1.00			1.00			0.99	
Satd. Flow (prot)					1646			1897			1880	
Flt Permitted					0.99			1.00			0.86	
Satd. Flow (perm)					1638			1897			1625	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	4	0	229	0	329	4	98	366	0
RTOR Reduction (vph)	0	0	0	0	205	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	28	0	0	333	0	0	464	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type				Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)					9.3			67.7			67.7	
Effective Green, g (s)					9.3			67.7			67.7	
Actuated g/C Ratio					0.10			0.75			0.75	
Clearance Time (s)					7.0			6.0			6.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					169			1426			1222	
v/s Ratio Prot								0.18				
v/s Ratio Perm					c0.02						c0.29	
v/c Ratio					0.16			0.23			0.38	
Uniform Delay, d1					36.8			3.4			3.9	
Progression Factor					1.00			1.36			1.00	
Incremental Delay, d2					0.5			0.4			0.9	
Delay (s)					37.3			4.9			4.8	
Level of Service					D			A			A	
Approach Delay (s)		0.0			37.3			4.9			4.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

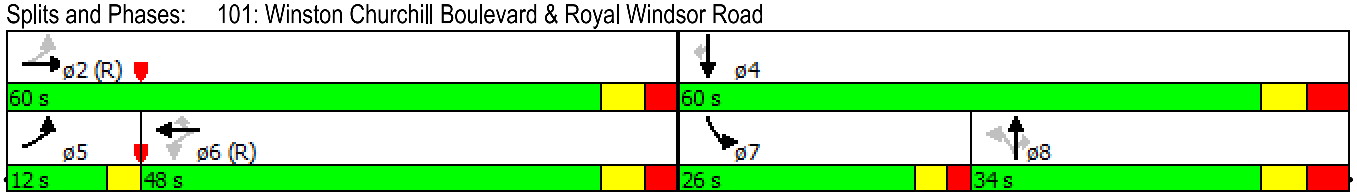
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	206	573	124	890	462	197	455	110	404	337	214
Lane Group Flow (vph)	237	727	143	1023	531	226	523	126	464	387	246
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	5	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	5.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.0	36.0	36.0	36.0	36.0	29.0	29.0	29.0	19.0	48.0	48.0
Total Split (s)	12.0	60.0	48.0	48.0	48.0	34.0	34.0	34.0	26.0	60.0	60.0
Total Split (%)	10.0%	50.0%	40.0%	40.0%	40.0%	28.3%	28.3%	28.3%	21.7%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	3.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	1.17	0.49	0.61	0.85	0.64	1.03	0.64	0.28	0.85	0.25	0.31
Control Delay	144.5	24.8	45.6	45.1	9.9	115.3	46.4	9.9	63.6	22.2	5.5
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	144.5	24.8	45.6	45.1	9.9	115.3	46.4	9.9	63.6	22.2	5.5
Queue Length 50th (m)	~52.1	65.1	29.3	123.3	15.9	~62.6	63.0	1.8	57.4	31.5	4.9
Queue Length 95th (m)	#99.3	79.2	51.7	144.4	45.6	#108.6	79.5	16.5	73.2	41.3	18.9
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	202	1483	236	1197	835	219	814	458	595	1518	792
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	1.17	0.49	0.61	0.85	0.64	1.03	0.64	0.28	0.78	0.25	0.31

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 92 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
~ 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.

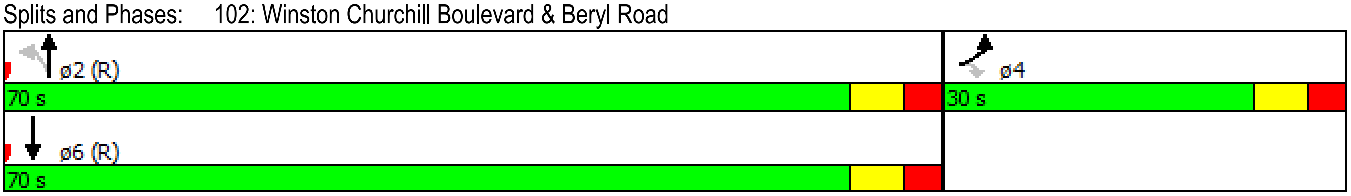
Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	132	20	18	568	407
Lane Group Flow (vph)	143	22	20	617	563
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	26.0	26.0	26.0
Total Split (s)	30.0	30.0	70.0	70.0	70.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.61	0.09	0.04	0.47	0.44
Control Delay	51.0	14.8	5.1	7.7	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	14.8	5.1	7.7	7.1
Queue Length 50th (m)	27.9	0.0	1.0	44.6	37.1
Queue Length 95th (m)	45.3	6.7	3.8	81.0	69.2
Internal Link Dist (m)	204.4			489.4	215.9
Turn Bay Length (m)	52.0		101.0		
Base Capacity (vph)	399	388	542	1323	1284
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.06	0.04	0.47	0.44

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 94 (94%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 102: Winston Churchill Boulevard & Beryl Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	91	207	345	216	62	203
Lane Group Flow (vph)	95	216	359	225	65	211
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	27.0	27.0
Total Split (s)	54.0	54.0	54.0	54.0	36.0	36.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.12	0.15	0.25	0.19	0.42	0.60
Control Delay	3.7	3.6	4.1	0.9	58.6	23.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	3.6	4.1	0.9	58.6	23.1
Queue Length 50th (m)	3.5	8.2	15.1	0.0	11.6	6.3
Queue Length 95th (m)	9.0	17.2	29.0	5.4	25.7	33.0
Internal Link Dist (m)		251.9	285.9		1180.1	
Turn Bay Length (m)	52.0			72.0	91.0	
Base Capacity (vph)	782	1402	1416	1202	488	663
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.15	0.25	0.19	0.13	0.32

Intersection Summary

Cycle Length: 90

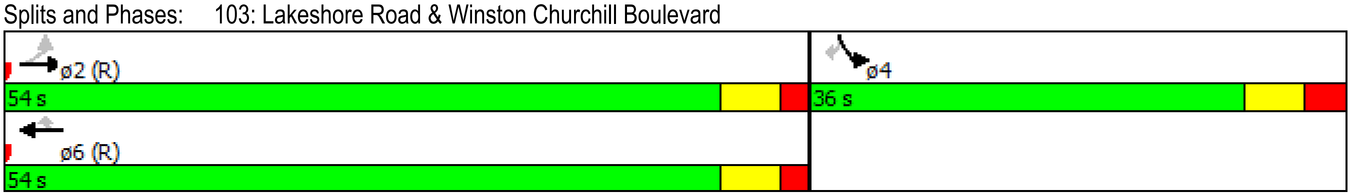
Actuated Cycle Length: 90

Offset: 89 (99%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

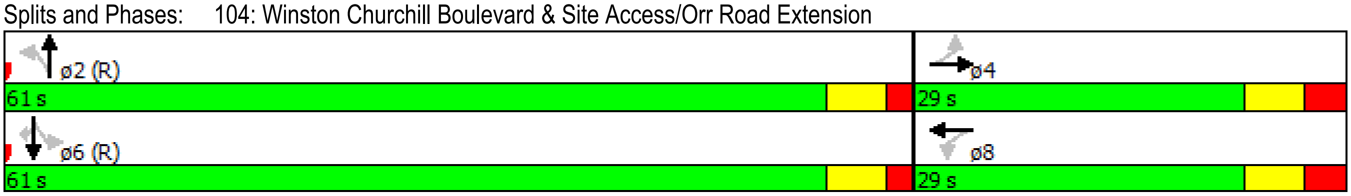
Splits and Phases: 103: Lakeshore Road & Winston Churchill Boulevard



Lane Group	WBL	WBT	NBT	SBL	SBT	ø4
Lane Configurations						
Volume (vph)	4	0	303	90	337	
Lane Group Flow (vph)	0	233	333	0	464	
Turn Type	Perm	NA	NA	Perm	NA	
Protected Phases		8	2		6	4
Permitted Phases	8			6		
Detector Phase	8	8	2	6	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	24.0	24.0	24.0	25.0
Total Split (s)	29.0	29.0	61.0	61.0	61.0	29.0
Total Split (%)	32.2%	32.2%	67.8%	67.8%	67.8%	32%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)		0.0	0.0		0.0	
Total Lost Time (s)		7.0	6.0		6.0	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio		0.62	0.23		0.38	
Control Delay		13.5	5.3		5.2	
Queue Delay		0.0	0.0		0.0	
Total Delay		13.5	5.3		5.2	
Queue Length 50th (m)		0.7	13.5		21.6	
Queue Length 95th (m)		21.1	43.7		45.3	
Internal Link Dist (m)		407.7	1180.1		489.4	
Turn Bay Length (m)						
Base Capacity (vph)		573	1427		1223	
Starvation Cap Reductn		0	0		0	
Spillback Cap Reductn		0	0		0	
Storage Cap Reductn		0	0		0	
Reduced v/c Ratio		0.41	0.23		0.38	

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 104: Winston Churchill Boulevard & Site Access/Orr Road Extension



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	206	573	59	124	890	462	197	455	110	404	337	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3344		1752	3505	1599	1736	3539	1599	3400	3505	1553
Flt Permitted	0.10	1.00		0.38	1.00	1.00	0.52	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	183	3344		692	3505	1599	955	3539	1599	3400	3505	1553
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	237	659	68	143	1023	531	226	523	126	464	387	246
RTOR Reduction (vph)	0	7	0	0	0	253	0	0	88	0	0	141
Lane Group Flow (vph)	237	720	0	143	1023	278	226	523	38	464	387	105
Heavy Vehicles (%)	1%	4%	30%	3%	3%	1%	4%	2%	1%	3%	3%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	53.7	53.7		38.1	38.1	38.1	29.3	29.3	29.3	17.0	51.3	51.3
Effective Green, g (s)	53.7	53.7		38.1	38.1	38.1	29.3	29.3	29.3	17.0	51.3	51.3
Actuated g/C Ratio	0.45	0.45		0.32	0.32	0.32	0.24	0.24	0.24	0.14	0.43	0.43
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	3.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	250	1496		219	1112	507	233	864	390	481	1498	663
v/s Ratio Prot	c0.10	0.22			0.29			0.15		c0.14	0.11	
v/s Ratio Perm	c0.32			0.21		0.17	c0.24		0.02			0.07
v/c Ratio	0.95	0.48		0.65	0.92	0.55	0.97	0.61	0.10	0.96	0.26	0.16
Uniform Delay, d1	32.8	23.3		35.3	39.5	33.8	44.9	40.2	35.1	51.2	22.1	21.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.3	1.1		14.2	13.5	4.2	49.6	0.8	0.0	31.7	0.0	0.0
Delay (s)	75.1	24.5		49.4	53.0	38.0	94.5	41.0	35.1	82.9	22.1	21.1
Level of Service	E	C		D	D	D	F	D	D	F	C	C
Approach Delay (s)		36.9			48.0			54.0			47.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	206	573	124	890	462	197	455	110	404	337	214
Lane Group Flow (vph)	237	727	143	1023	531	226	523	126	464	387	246
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	5	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	5.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.0	36.0	36.0	36.0	36.0	29.0	29.0	29.0	19.0	48.0	48.0
Total Split (s)	15.0	60.0	45.0	45.0	45.0	38.0	38.0	38.0	22.0	60.0	60.0
Total Split (%)	12.5%	50.0%	37.5%	37.5%	37.5%	31.7%	31.7%	31.7%	18.3%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	3.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	0.93	0.48	0.65	0.92	0.70	0.97	0.61	0.26	0.96	0.26	0.31
Control Delay	69.8	24.5	51.2	53.5	15.8	97.7	43.5	9.1	84.6	22.5	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	69.8	24.5	51.2	53.5	15.8	97.7	43.5	9.1	84.6	22.5	3.6
Queue Length 50th (m)	41.0	65.1	30.5	128.4	33.1	55.3	60.3	1.7	59.7	31.5	0.0
Queue Length 95th (m)	#87.5	79.2	53.8	#159.1	68.7	#100.4	75.8	15.7	#88.0	41.3	13.3
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	255	1502	219	1111	760	238	884	487	481	1518	812
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	0.48	0.65	0.92	0.70	0.95	0.59	0.26	0.96	0.25	0.30

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

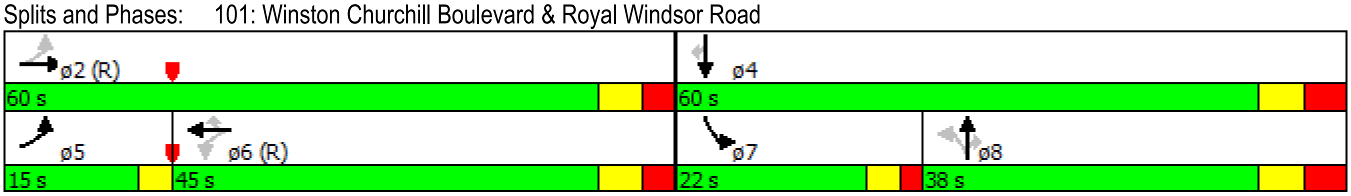
Offset: 92 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

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

Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road



Appendix F

2020 Future Total Conditions – Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	945	240	87	528	199	54	279	146	478	395	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3340		1626	3343	1468	1421	3406	1538	3303	3343	1538
Flt Permitted	0.40	1.00		0.11	1.00	1.00	0.50	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	725	3340		194	3343	1468	751	3406	1538	3303	3343	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	159	1027	261	95	574	216	59	303	159	520	429	170
RTOR Reduction (vph)	0	14	0	0	0	107	0	0	71	0	0	75
Lane Group Flow (vph)	159	1274	0	95	574	109	59	303	88	520	429	95
Heavy Vehicles (%)	5%	4%	8%	11%	8%	10%	27%	6%	5%	6%	8%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	60.8	60.8		60.8	60.8	60.8	15.7	15.7	15.7	23.5	44.2	44.2
Effective Green, g (s)	60.8	60.8		60.8	60.8	60.8	15.7	15.7	15.7	23.5	44.2	44.2
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.13	0.13	0.13	0.20	0.37	0.37
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	367	1692		98	1693	743	98	445	201	646	1231	566
v/s Ratio Prot		0.38			0.17			c0.09		c0.16	0.13	
v/s Ratio Perm	0.22			c0.49		0.07	0.08		0.06			0.06
v/c Ratio	0.43	0.75		0.97	0.34	0.15	0.60	0.68	0.44	0.80	0.35	0.17
Uniform Delay, d1	18.7	23.6		28.7	17.6	15.8	49.2	49.8	48.1	46.1	27.5	25.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	3.2		82.9	0.5	0.4	7.0	3.4	0.6	6.8	0.1	0.1
Delay (s)	22.4	26.8		111.6	18.2	16.2	56.2	53.2	48.6	52.9	27.5	25.6
Level of Service	C	C		F	B	B	E	D	D	D	C	C
Approach Delay (s)		26.3			27.7			52.1			39.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	33.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	94	44	13	342	551	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1570	1380	1421	1776	1726	
Flt Permitted	0.95	1.00	0.37	1.00	1.00	
Satd. Flow (perm)	1570	1380	559	1776	1726	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.92
Adj. Flow (vph)	101	47	14	368	592	68
RTOR Reduction (vph)	0	42	0	0	3	0
Lane Group Flow (vph)	101	5	14	368	657	0
Heavy Vehicles (%)	15%	17%	27%	7%	7%	22%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.8	10.8	75.2	75.2	75.2	
Effective Green, g (s)	10.8	10.8	75.2	75.2	75.2	
Actuated g/C Ratio	0.11	0.11	0.75	0.75	0.75	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	169	149	420	1335	1297	
v/s Ratio Prot	c0.06			0.21	c0.38	
v/s Ratio Perm		0.00	0.03			
v/c Ratio	0.60	0.03	0.03	0.28	0.51	
Uniform Delay, d1	42.5	39.9	3.2	3.9	5.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.6	0.1	0.1	0.5	1.4	
Delay (s)	48.1	40.0	3.3	4.4	6.4	
Level of Service	D	D	A	A	A	
Approach Delay (s)	45.5			4.4	6.4	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	186	358	92	38	240	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1863	1792	1122	1656	1538
Flt Permitted	0.69	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1294	1863	1792	1122	1656	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	194	373	96	40	250	79
RTOR Reduction (vph)	0	0	0	14	0	63
Lane Group Flow (vph)	194	373	96	26	250	16
Heavy Vehicles (%)	2%	2%	6%	44%	9%	5%
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	59.3	59.3	59.3	59.3	17.7	17.7
Effective Green, g (s)	59.3	59.3	59.3	59.3	17.7	17.7
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.20	0.20
Clearance Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	852	1227	1180	739	325	302
v/s Ratio Prot		c0.20	0.05		c0.15	
v/s Ratio Perm	0.15			0.02		0.01
v/c Ratio	0.23	0.30	0.08	0.04	0.77	0.05
Uniform Delay, d1	6.2	6.5	5.5	5.4	34.2	29.3
Progression Factor	1.00	1.00	1.00	1.00	0.87	1.34
Incremental Delay, d2	0.6	0.6	0.1	0.1	8.3	0.0
Delay (s)	6.8	7.2	5.7	5.5	38.0	39.4
Level of Service	A	A	A	A	D	D
Approach Delay (s)		7.0	5.6		38.3	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	0	3	1	0	70	9	207	9	208	361	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0			6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frt		0.97			0.87		1.00	0.99			1.00	0.85
Flt Protected		0.96			1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)		1735			1613		1770	1851			1829	1583
Flt Permitted		0.85			0.99		0.40	1.00			0.78	1.00
Satd. Flow (perm)		1522			1606		753	1851			1457	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	9	0	3	1	0	76	10	225	10	226	392	29
RTOR Reduction (vph)	0	11	0	0	70	0	0	1	0	0	0	6
Lane Group Flow (vph)	0	1	0	0	7	0	10	234	0	0	618	23
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		6.7			6.7		70.3	70.3			70.3	70.3
Effective Green, g (s)		6.7			6.7		70.3	70.3			70.3	70.3
Actuated g/C Ratio		0.07			0.07		0.78	0.78			0.78	0.78
Clearance Time (s)		7.0			7.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		113			119		588	1445			1138	1236
v/s Ratio Prot								0.13				
v/s Ratio Perm		0.00			c0.00		0.01				c0.42	0.01
v/c Ratio		0.01			0.06		0.02	0.16			0.54	0.02
Uniform Delay, d1		38.6			38.7		2.2	2.5			3.7	2.2
Progression Factor		1.00			1.00		0.98	0.89			1.00	1.00
Incremental Delay, d2		0.0			0.2		0.1	0.2			1.9	0.0
Delay (s)		38.6			38.9		2.2	2.4			5.6	2.2
Level of Service		D			D		A	A			A	A
Approach Delay (s)		38.6			38.9			2.4			5.5	
Approach LOS		D			D			A			A	

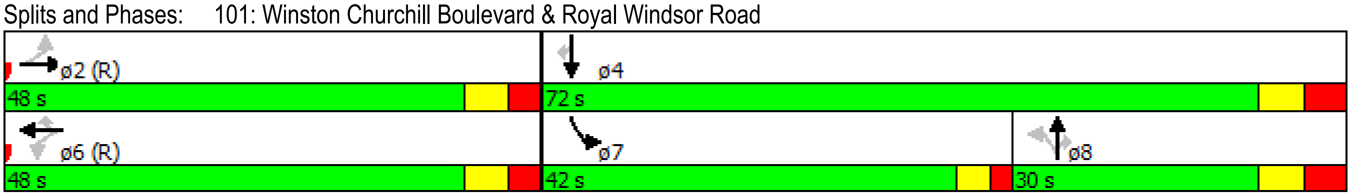
Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	146	945	87	528	199	54	279	146	478	395	156
Lane Group Flow (vph)	159	1288	95	574	216	59	303	159	520	429	170
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	2	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	28.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	36.0	36.0	36.0	36.0	36.0	30.0	30.0	30.0	19.0	48.0	48.0
Total Split (s)	48.0	48.0	48.0	48.0	48.0	30.0	30.0	30.0	42.0	72.0	72.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	7.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?						Yes	Yes	Yes	Yes		
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	0.43	0.75	0.98	0.34	0.25	0.60	0.68	0.58	0.80	0.35	0.27
Control Delay	26.2	28.2	120.3	19.8	3.6	73.2	57.2	32.2	56.0	27.3	8.6
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	26.2	28.2	120.3	19.8	3.6	73.2	57.2	32.2	56.0	27.3	8.6
Queue Length 50th (m)	23.8	125.5	21.9	42.5	0.0	14.1	38.5	17.9	64.0	40.5	8.4
Queue Length 95th (m)	54.2	#205.9	#65.0	69.2	15.1	27.7	50.6	38.6	78.9	44.6	19.7
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	367	1707	97	1693	850	137	625	349	1018	1782	875
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	0.75	0.98	0.34	0.25	0.43	0.48	0.46	0.51	0.24	0.19

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 54 (45%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

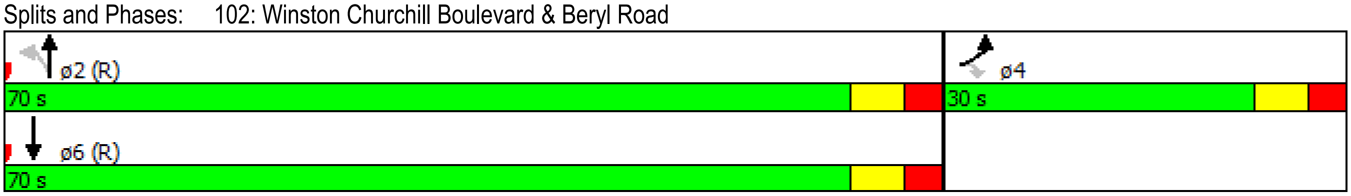
Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	94	44	13	342	551
Lane Group Flow (vph)	101	47	14	368	660
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	26.0	26.0	26.0
Total Split (s)	30.0	30.0	70.0	70.0	70.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.52	0.22	0.03	0.27	0.49
Control Delay	49.4	13.3	5.0	5.2	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	49.4	13.3	5.0	5.2	7.3
Queue Length 50th (m)	19.7	0.0	0.6	20.4	45.8
Queue Length 95th (m)	33.9	9.9	3.0	41.9	92.9
Internal Link Dist (m)	204.4			520.3	215.9
Turn Bay Length (m)	52.0		101.0		
Base Capacity (vph)	361	353	436	1384	1348
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.28	0.13	0.03	0.27	0.49

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 94 (94%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 102: Winston Churchill Boulevard & Beryl Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	186	358	92	38	240	76
Lane Group Flow (vph)	194	373	96	40	250	79
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	27.0	27.0
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.23	0.30	0.08	0.05	0.77	0.22
Control Delay	8.0	8.2	6.9	2.7	42.9	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	8.2	6.9	2.7	42.9	10.2
Queue Length 50th (m)	12.7	25.8	5.6	0.0	43.4	3.7
Queue Length 95th (m)	27.5	49.4	13.6	4.0	64.4	m13.5
Internal Link Dist (m)		251.9	285.9		1149.2	
Turn Bay Length (m)	52.0			72.0	91.0	
Base Capacity (vph)	852	1226	1179	752	441	468
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.30	0.08	0.05	0.57	0.17

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

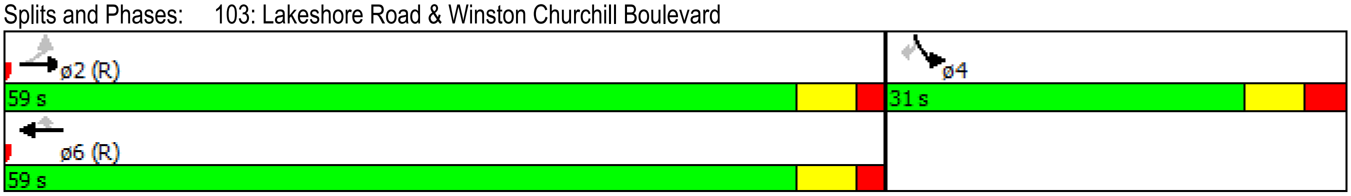
Offset: 41 (46%), Referenced to phase 2:EBTL and 6:WBT, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

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

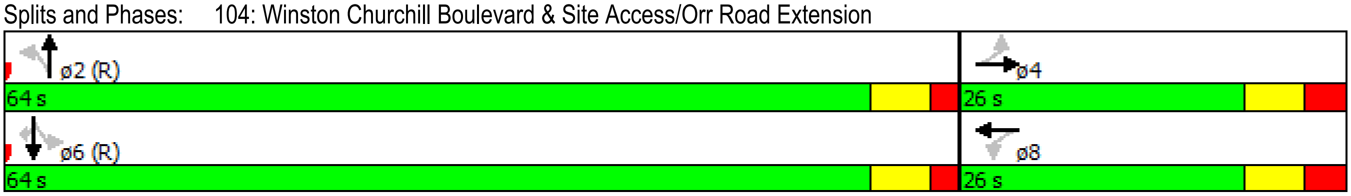
Splits and Phases: 103: Lakeshore Road & Winston Churchill Boulevard



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	8	0	1	0	9	207	208	361	27
Lane Group Flow (vph)	0	12	0	77	10	235	0	618	29
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	26.0	26.0	64.0	64.0	64.0	64.0	64.0
Total Split (%)	28.9%	28.9%	28.9%	28.9%	71.1%	71.1%	71.1%	71.1%	71.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0		7.0	6.0	6.0		6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.07		0.35	0.02	0.16		0.52	0.02
Control Delay		2.6		14.6	2.8	2.6		6.0	0.5
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay		2.6		14.6	2.8	2.6		6.0	0.5
Queue Length 50th (m)		0.0		0.2	0.3	8.5		35.9	0.0
Queue Length 95th (m)		1.2		13.0	1.5	13.2		63.6	1.1
Internal Link Dist (m)		212.1		405.4		1149.2		520.3	
Turn Bay Length (m)					30.0				45.0
Base Capacity (vph)		349		399	609	1501		1180	1290
Starvation Cap Reductn		0		0	0	0		0	0
Spillback Cap Reductn		0		0	0	0		0	0
Storage Cap Reductn		0		0	0	0		0	0
Reduced v/c Ratio		0.03		0.19	0.02	0.16		0.52	0.02

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 104: Winston Churchill Boulevard & Site Access/Orr Road Extension



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	206	573	60	126	890	462	203	472	114	404	344	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3343		1752	3505	1599	1736	3539	1599	3400	3505	1553
Flt Permitted	0.09	1.00		0.38	1.00	1.00	0.52	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	171	3343		692	3505	1599	948	3539	1599	3400	3505	1553
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	237	659	69	145	1023	531	233	543	131	464	395	246
RTOR Reduction (vph)	0	7	0	0	0	288	0	0	90	0	0	120
Lane Group Flow (vph)	237	721	0	145	1023	243	233	543	41	464	395	126
Heavy Vehicles (%)	1%	4%	30%	3%	3%	1%	4%	2%	1%	3%	3%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	53.0	53.0		41.0	41.0	41.0	27.6	27.6	27.6	19.4	52.0	52.0
Effective Green, g (s)	53.0	53.0		41.0	41.0	41.0	27.6	27.6	27.6	19.4	52.0	52.0
Actuated g/C Ratio	0.44	0.44		0.34	0.34	0.34	0.23	0.23	0.23	0.16	0.43	0.43
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	3.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	196	1476		236	1197	546	218	813	367	549	1518	672
v/s Ratio Prot	c0.09	0.22			0.29			0.15		c0.14	0.11	
v/s Ratio Perm	c0.44			0.21		0.15	c0.25		0.03			0.08
v/c Ratio	1.21	0.49		0.61	0.85	0.45	1.07	0.67	0.11	0.85	0.26	0.19
Uniform Delay, d1	30.3	23.9		32.9	36.7	30.7	46.2	42.0	36.5	48.8	21.7	21.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	132.0	1.2		11.4	7.9	2.6	80.4	1.6	0.0	11.0	0.0	0.0
Delay (s)	162.3	25.0		44.3	44.6	33.3	126.6	43.7	36.6	59.8	21.7	21.0
Level of Service	F	C		D	D	C	F	D	D	E	C	C
Approach Delay (s)		58.7			41.1			63.9			37.6	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	48.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	132	20	20	595	416	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1736	1615	1703	1827	1764	
Flt Permitted	0.95	1.00	0.41	1.00	1.00	
Satd. Flow (perm)	1736	1615	739	1827	1764	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	143	22	22	647	452	121
RTOR Reduction (vph)	0	19	0	0	7	0
Lane Group Flow (vph)	143	3	22	647	566	0
Heavy Vehicles (%)	4%	0%	6%	4%	4%	7%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	13.6	13.6	72.4	72.4	72.4	
Effective Green, g (s)	13.6	13.6	72.4	72.4	72.4	
Actuated g/C Ratio	0.14	0.14	0.72	0.72	0.72	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	219	535	1322	1277	
v/s Ratio Prot	c0.08			c0.35	0.32	
v/s Ratio Perm		0.00	0.03			
v/c Ratio	0.61	0.01	0.04	0.49	0.44	
Uniform Delay, d1	40.7	37.4	3.9	5.9	5.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	0.0	0.1	1.3	1.1	
Delay (s)	45.0	37.4	4.1	7.2	6.7	
Level of Service	D	D	A	A	A	
Approach Delay (s)	44.0			7.1	6.7	
Approach LOS	D			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	92	207	345	218	64	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1805	1863	1881	1524	1517	1615
Flt Permitted	0.55	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1039	1863	1881	1524	1517	1615
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	96	216	359	227	67	219
RTOR Reduction (vph)	0	0	0	56	0	196
Lane Group Flow (vph)	96	216	359	171	67	23
Heavy Vehicles (%)	0%	2%	1%	6%	19%	0%
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Actuated Green, G (s)	67.7	67.7	67.7	67.7	9.3	9.3
Effective Green, g (s)	67.7	67.7	67.7	67.7	9.3	9.3
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.10	0.10
Clearance Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	781	1401	1414	1146	156	166
v/s Ratio Prot		0.12	c0.19		c0.04	
v/s Ratio Perm	0.09			0.11		0.01
v/c Ratio	0.12	0.15	0.25	0.15	0.43	0.14
Uniform Delay, d1	3.0	3.1	3.4	3.1	37.9	36.7
Progression Factor	1.00	1.00	1.00	1.00	1.23	2.21
Incremental Delay, d2	0.3	0.2	0.4	0.3	0.7	0.1
Delay (s)	3.4	3.4	3.8	3.4	47.3	81.2
Level of Service	A	A	A	A	D	F
Approach Delay (s)		3.4	3.7		73.3	
Approach LOS		A	A		E	

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	0	9	4	0	211	3	303	4	90	337	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		6.0	6.0			6.0	6.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frt		0.97			0.87		1.00	1.00			1.00	0.85
Flt Protected		0.96			1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)		1770			1646		1805	1897			1880	1615
Flt Permitted		0.38			0.99		0.48	1.00			0.86	1.00
Satd. Flow (perm)		691			1636		919	1897			1625	1615
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	0	10	4	0	229	3	329	4	98	366	11
RTOR Reduction (vph)	0	32	0	0	205	0	0	0	0	0	0	3
Lane Group Flow (vph)	0	8	0	0	28	0	3	333	0	0	464	8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)		9.3			9.3		67.7	67.7			67.7	67.7
Effective Green, g (s)		9.3			9.3		67.7	67.7			67.7	67.7
Actuated g/C Ratio		0.10			0.10		0.75	0.75			0.75	0.75
Clearance Time (s)		7.0			7.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		71			169		691	1426			1222	1214
v/s Ratio Prot								0.18				
v/s Ratio Perm		0.01			c0.02		0.00				c0.29	0.01
v/c Ratio		0.11			0.16		0.00	0.23			0.38	0.01
Uniform Delay, d1		36.6			36.8		2.8	3.4			3.9	2.8
Progression Factor		1.00			1.00		1.82	1.50			1.00	1.00
Incremental Delay, d2		0.7			0.5		0.0	0.4			0.9	0.0
Delay (s)		37.3			37.3		5.1	5.4			4.8	2.8
Level of Service		D			D		A	A			A	A
Approach Delay (s)		37.3			37.3			5.4			4.7	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	206	573	126	890	462	203	472	114	404	344	214
Lane Group Flow (vph)	237	728	145	1023	531	233	543	131	464	395	246
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	5	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	5.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.0	36.0	36.0	36.0	36.0	29.0	29.0	29.0	19.0	48.0	48.0
Total Split (s)	12.0	60.0	48.0	48.0	48.0	34.0	34.0	34.0	26.0	60.0	60.0
Total Split (%)	10.0%	50.0%	40.0%	40.0%	40.0%	28.3%	28.3%	28.3%	21.7%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	3.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	1.17	0.49	0.61	0.85	0.64	1.07	0.67	0.29	0.85	0.26	0.31
Control Delay	144.5	24.8	46.1	45.1	10.0	125.6	47.1	10.7	63.6	22.3	5.5
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	144.5	24.8	46.1	45.1	10.0	125.6	47.1	10.7	63.6	22.3	5.5
Queue Length 50th (m)	~52.1	65.2	29.8	123.3	16.2	~66.6	65.7	2.8	57.4	32.2	4.9
Queue Length 95th (m)	#99.3	79.4	52.3	144.4	46.3	#113.6	82.6	18.0	73.2	42.1	18.9
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	202	1483	236	1197	834	218	814	458	595	1518	792
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	1.17	0.49	0.61	0.85	0.64	1.07	0.67	0.29	0.78	0.26	0.31

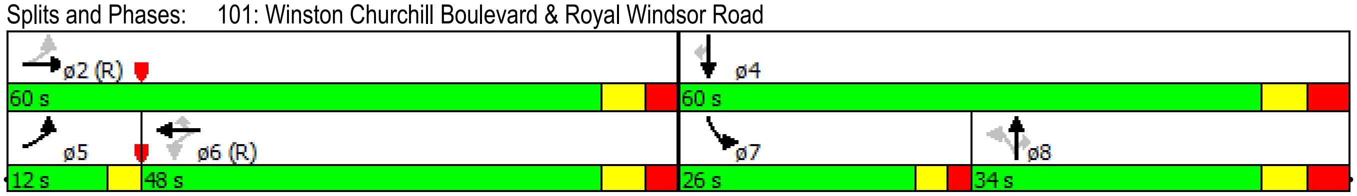
Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 92 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated

~ 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.

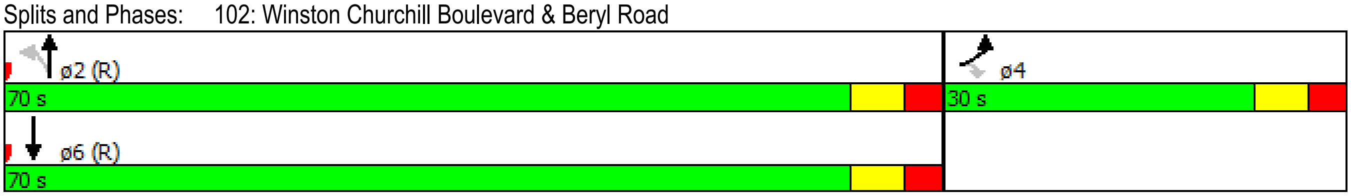
Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road



Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	132	20	20	595	416
Lane Group Flow (vph)	143	22	22	647	573
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	26.0	26.0	26.0
Total Split (s)	30.0	30.0	70.0	70.0	70.0
Total Split (%)	30.0%	30.0%	70.0%	70.0%	70.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	C-Max	C-Max	C-Max
v/c Ratio	0.61	0.09	0.04	0.49	0.45
Control Delay	51.0	14.8	5.2	8.0	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	14.8	5.2	8.0	7.2
Queue Length 50th (m)	27.9	0.0	1.1	48.0	38.2
Queue Length 95th (m)	45.3	6.7	4.0	87.0	71.2
Internal Link Dist (m)	204.4			489.4	215.9
Turn Bay Length (m)	52.0		101.0		
Base Capacity (vph)	399	388	534	1323	1283
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.36	0.06	0.04	0.49	0.45

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 94 (94%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

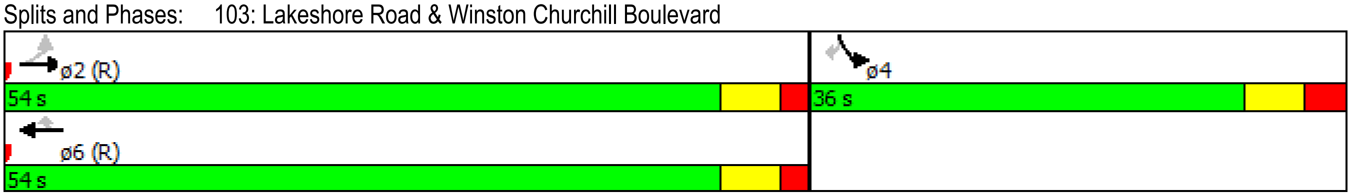
Splits and Phases: 102: Winston Churchill Boulevard & Beryl Road



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	92	207	345	218	64	210
Lane Group Flow (vph)	96	216	359	227	67	219
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		2	6		4	
Permitted Phases	2			6		4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	20.0	20.0	20.0	20.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	27.0	27.0
Total Split (s)	54.0	54.0	54.0	54.0	36.0	36.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None
v/c Ratio	0.12	0.15	0.25	0.19	0.43	0.60
Control Delay	3.8	3.6	4.1	0.9	54.2	19.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	3.6	4.1	0.9	54.2	19.3
Queue Length 50th (m)	3.6	8.4	15.2	0.0	10.9	3.7
Queue Length 95th (m)	9.2	17.3	29.3	5.5	24.5	29.9
Internal Link Dist (m)		251.9	285.9		1180.1	
Turn Bay Length (m)	52.0			72.0	91.0	
Base Capacity (vph)	780	1400	1414	1202	488	668
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.15	0.25	0.19	0.14	0.33

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 89 (99%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 103: Lakeshore Road & Winston Churchill Boulevard

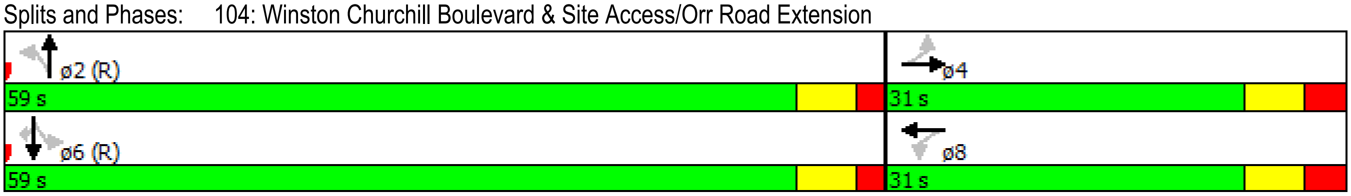


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Volume (vph)	28	0	4	0	3	303	90	337	10
Lane Group Flow (vph)	0	40	0	233	3	333	0	464	11
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	24.0	24.0	24.0	24.0	24.0
Total Split (s)	31.0	31.0	31.0	31.0	59.0	59.0	59.0	59.0	59.0
Total Split (%)	34.4%	34.4%	34.4%	34.4%	65.6%	65.6%	65.6%	65.6%	65.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0		7.0	6.0	6.0		6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
v/c Ratio		0.39		0.62	0.00	0.23		0.38	0.01
Control Delay		25.2		13.5	6.0	5.8		5.2	0.0
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay		25.2		13.5	6.0	5.8		5.2	0.0
Queue Length 50th (m)		0.7		0.7	0.1	13.5		21.6	0.0
Queue Length 95th (m)		10.2		21.1	m1.3	45.7		45.3	0.0
Internal Link Dist (m)		187.9		407.7		1180.1		489.4	
Turn Bay Length (m)					30.0				45.0
Base Capacity (vph)		210		604	692	1427		1223	1227
Starvation Cap Reductn		0		0	0	0		0	0
Spillback Cap Reductn		0		0	0	0		0	0
Storage Cap Reductn		0		0	0	0		0	0
Reduced v/c Ratio		0.19		0.39	0.00	0.23		0.38	0.01

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 104: Winston Churchill Boulevard & Site Access/Orr Road Extension



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	206	573	60	126	890	462	203	472	114	404	344	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1787	3343		1752	3505	1599	1736	3539	1599	3400	3505	1553
Flt Permitted	0.10	1.00		0.38	1.00	1.00	0.52	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	184	3343		692	3505	1599	948	3539	1599	3400	3505	1553
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	237	659	69	145	1023	531	233	543	131	464	395	246
RTOR Reduction (vph)	0	7	0	0	0	251	0	0	88	0	0	139
Lane Group Flow (vph)	237	721	0	145	1023	280	233	543	43	464	395	107
Heavy Vehicles (%)	1%	4%	30%	3%	3%	1%	4%	2%	1%	3%	3%	4%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2			6		6	8		8			4
Actuated Green, G (s)	53.0	53.0		38.0	38.0	38.0	30.0	30.0	30.0	17.0	52.0	52.0
Effective Green, g (s)	53.0	53.0		38.0	38.0	38.0	30.0	30.0	30.0	17.0	52.0	52.0
Actuated g/C Ratio	0.44	0.44		0.32	0.32	0.32	0.25	0.25	0.25	0.14	0.43	0.43
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Vehicle Extension (s)	3.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	241	1476		219	1109	506	237	884	399	481	1518	672
v/s Ratio Prot	c0.10	0.22			0.29			0.15		c0.14	0.11	
v/s Ratio Perm	c0.34			0.21		0.17	c0.25		0.03			0.07
v/c Ratio	0.98	0.49		0.66	0.92	0.55	0.98	0.61	0.11	0.96	0.26	0.16
Uniform Delay, d1	33.3	23.9		35.4	39.6	34.0	44.7	39.9	34.7	51.2	21.7	20.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	53.0	1.2		14.7	13.8	4.3	53.2	0.9	0.0	31.7	0.0	0.0
Delay (s)	86.2	25.0		50.1	53.4	38.3	98.0	40.8	34.7	82.9	21.7	20.7
Level of Service	F	C		D	D	D	F	D	C	F	C	C
Approach Delay (s)		40.0			48.4			54.6			47.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	23.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

101: Winston Churchill Boulevard & Royal Windsor Road

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	206	573	126	890	462	203	472	114	404	344	214
Lane Group Flow (vph)	237	728	145	1023	531	233	543	131	464	395	246
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		6			8		7	4	
Permitted Phases	2		6		6	8		8			4
Detector Phase	5	2	6	6	6	8	8	8	7	4	4
Switch Phase											
Minimum Initial (s)	5.0	28.0	28.0	28.0	28.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.0	36.0	36.0	36.0	36.0	29.0	29.0	29.0	19.0	48.0	48.0
Total Split (s)	15.0	60.0	45.0	45.0	45.0	38.0	38.0	38.0	22.0	60.0	60.0
Total Split (%)	12.5%	50.0%	37.5%	37.5%	37.5%	31.7%	31.7%	31.7%	18.3%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	4.0	4.0	4.0	2.0	4.0	4.0
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)	3.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0	5.0	8.0	8.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Min	Min	Min	None	Min	Min
v/c Ratio	0.96	0.49	0.66	0.92	0.70	0.98	0.61	0.27	0.96	0.26	0.30
Control Delay	76.9	24.8	52.0	53.8	16.1	100.0	43.4	9.7	84.6	22.3	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	76.9	24.8	52.0	53.8	16.1	100.0	43.4	9.7	84.6	22.3	3.6
Queue Length 50th (m)	40.7	65.2	31.0	128.4	34.0	57.7	63.0	2.7	59.7	32.2	0.0
Queue Length 95th (m)	#87.1	79.4	#54.9	#159.1	69.5	#105.5	78.9	17.2	#88.0	42.1	13.3
Internal Link Dist (m)		204.9		169.4			80.4			214.2	
Turn Bay Length (m)	128.0		81.0		197.0	84.0		58.0	105.0		84.0
Base Capacity (vph)	247	1483	219	1109	757	237	884	487	481	1518	812
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	0.96	0.49	0.66	0.92	0.70	0.98	0.61	0.27	0.96	0.26	0.30

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

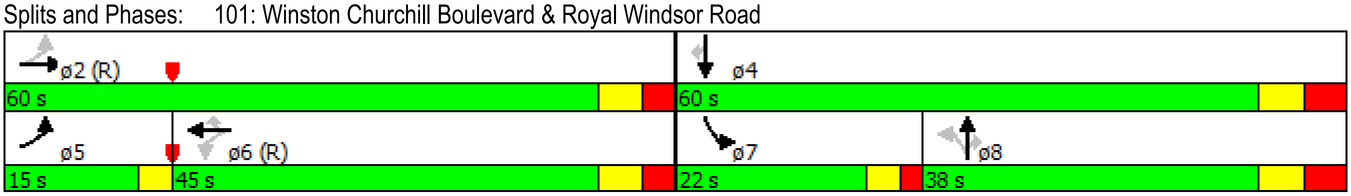
Offset: 92 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

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

Splits and Phases: 101: Winston Churchill Boulevard & Royal Windsor Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	8	0	3	1	0	70	9	207	9	208	361	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	0	3	1	0	76	10	225	10	226	392	29
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	1165	1099	392	1097	1123	230	422			235		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1165	1099	392	1097	1123	230	422			235		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	100	100	99	100	91	99			83		
cM capacity (veh/h)	134	175	656	164	169	809	1137			1333		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	12	77	10	235	618	29
Volume Left	9	1	10	0	226	0
Volume Right	3	76	0	10	0	29
cSH	171	767	1137	1700	1333	1700
Volume to Capacity	0.07	0.10	0.01	0.14	0.17	0.02
Queue Length 95th (m)	1.8	2.7	0.2	0.0	4.9	0.0
Control Delay (s)	27.6	10.2	8.2	0.0	4.2	0.0
Lane LOS	D	B	A		A	
Approach Delay (s)	27.6	10.2	0.3		4.0	
Approach LOS	D	B				

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

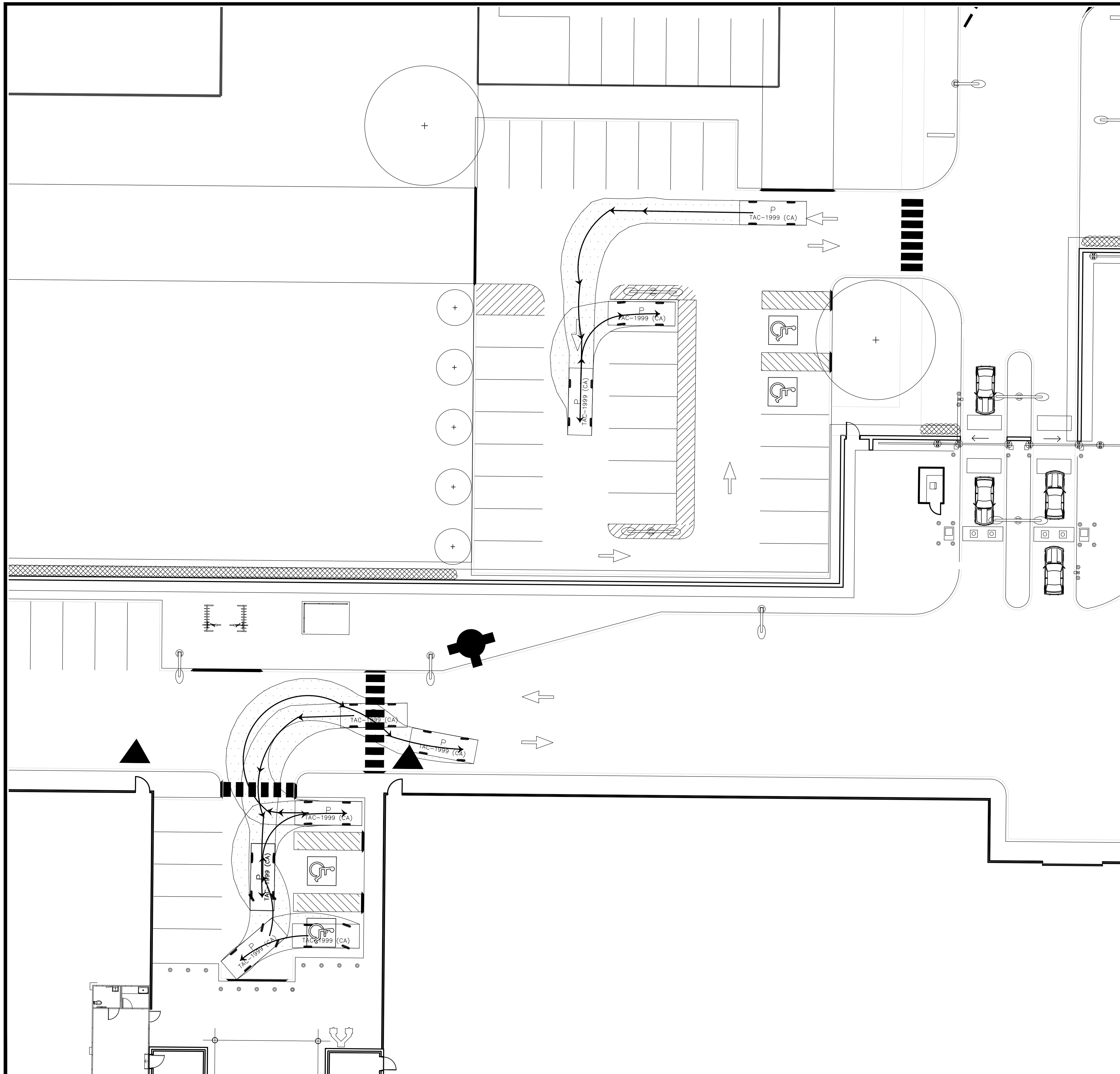
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	28	0	9	4	0	211	3	303	4	90	337	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	30	0	10	4	0	229	3	329	4	98	366	11
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	1127	902	366	910	911	332	377			334		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1127	902	366	910	911	332	377			334		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	74	100	99	98	100	68	100			92		
cM capacity (veh/h)	117	257	683	238	254	715	1192			1237		

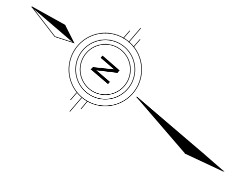
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	40	234	3	334	464	11
Volume Left	30	4	3	0	98	0
Volume Right	10	229	0	4	0	11
cSH	146	689	1192	1700	1237	1700
Volume to Capacity	0.28	0.34	0.00	0.20	0.08	0.01
Queue Length 95th (m)	8.4	12.0	0.1	0.0	2.1	0.0
Control Delay (s)	38.7	12.9	8.0	0.0	2.4	0.0
Lane LOS	E	B	A		A	
Approach Delay (s)	38.7	12.9	0.1		2.3	
Approach LOS	E	B				

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	68.6%	ICU Level of Service		C
Analysis Period (min)	15			

Appendix G

Swept-Path Analysis

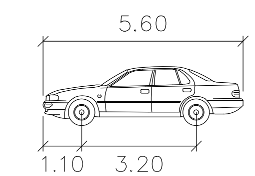




Not To Scale

NOTES

DETAILS OF DEVELOPMENT



P	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 36.2

IBI

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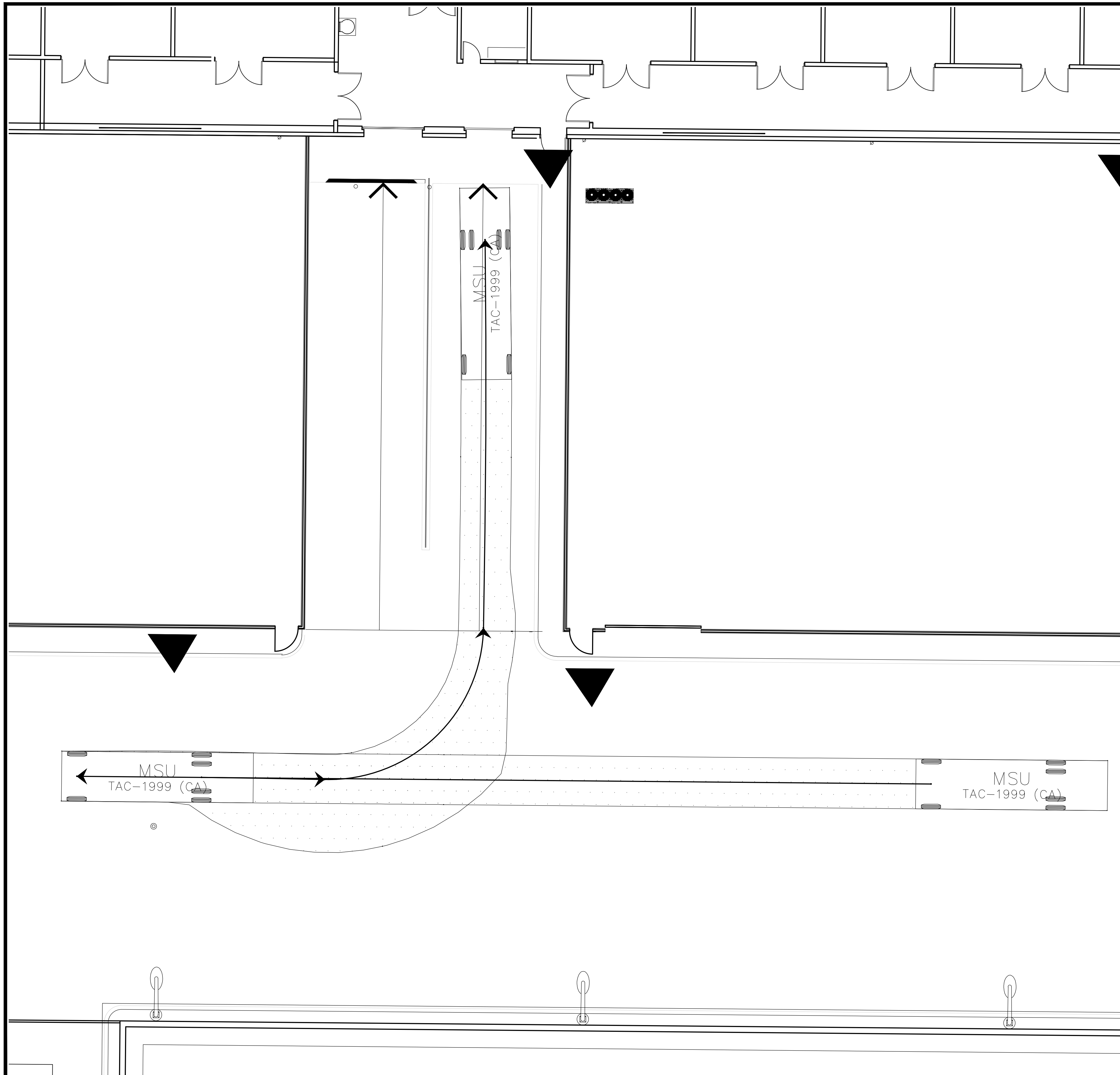
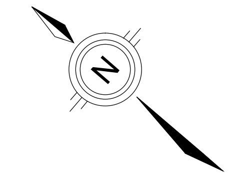
ibigroup.com

AUTOTURN #1

772 WINSTON CHURCHILL BLVD
OAKVILLE, ON

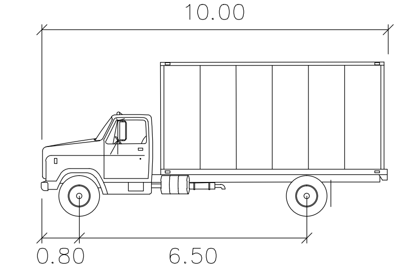
SCALE: N.T.S.
DATE: 2015 11 20
IBI FILE #: 39329





Not To Scale

DETAILS OF DEVELOPMENT



MSU meters

Width : 2.60
Track : 2.60
Lock to Lock Time : 6.0
Steering Angle : 40.1

NOTES

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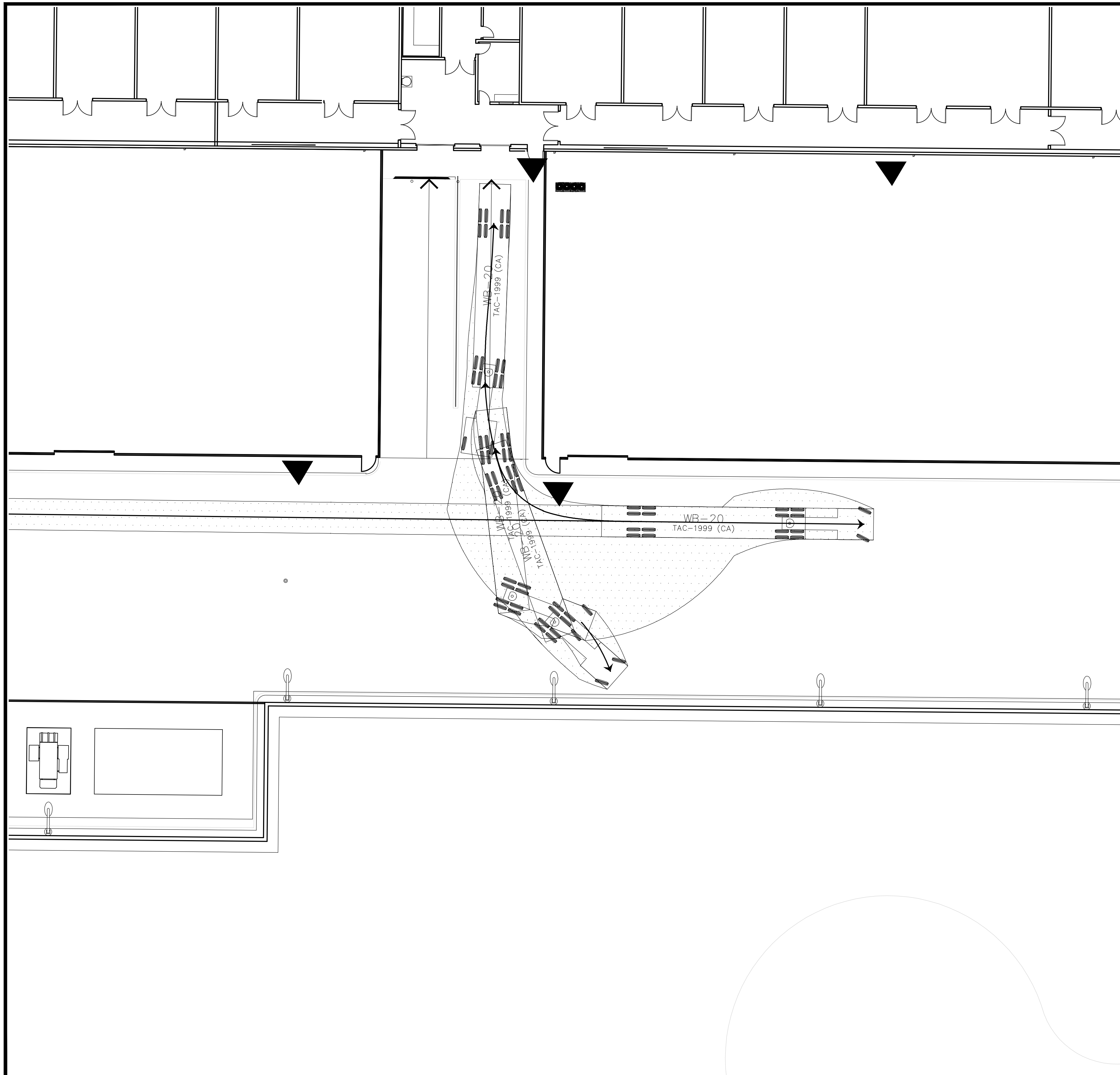
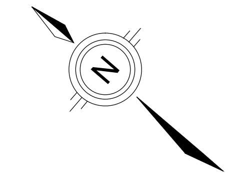
AUTOTURN #2

772 WINSTON CHURCHILL BLVD
OAKVILLE, ON

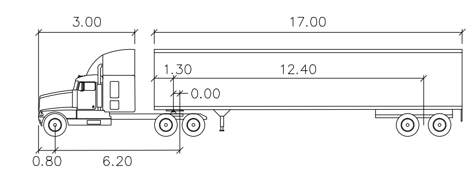
SCALE: N.T.S.
DATE: 2015 11 20
IBI FILE #: 39329





Not To Scale

DETAILS OF DEVELOPMENT



WB-20 meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.3
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

NOTES

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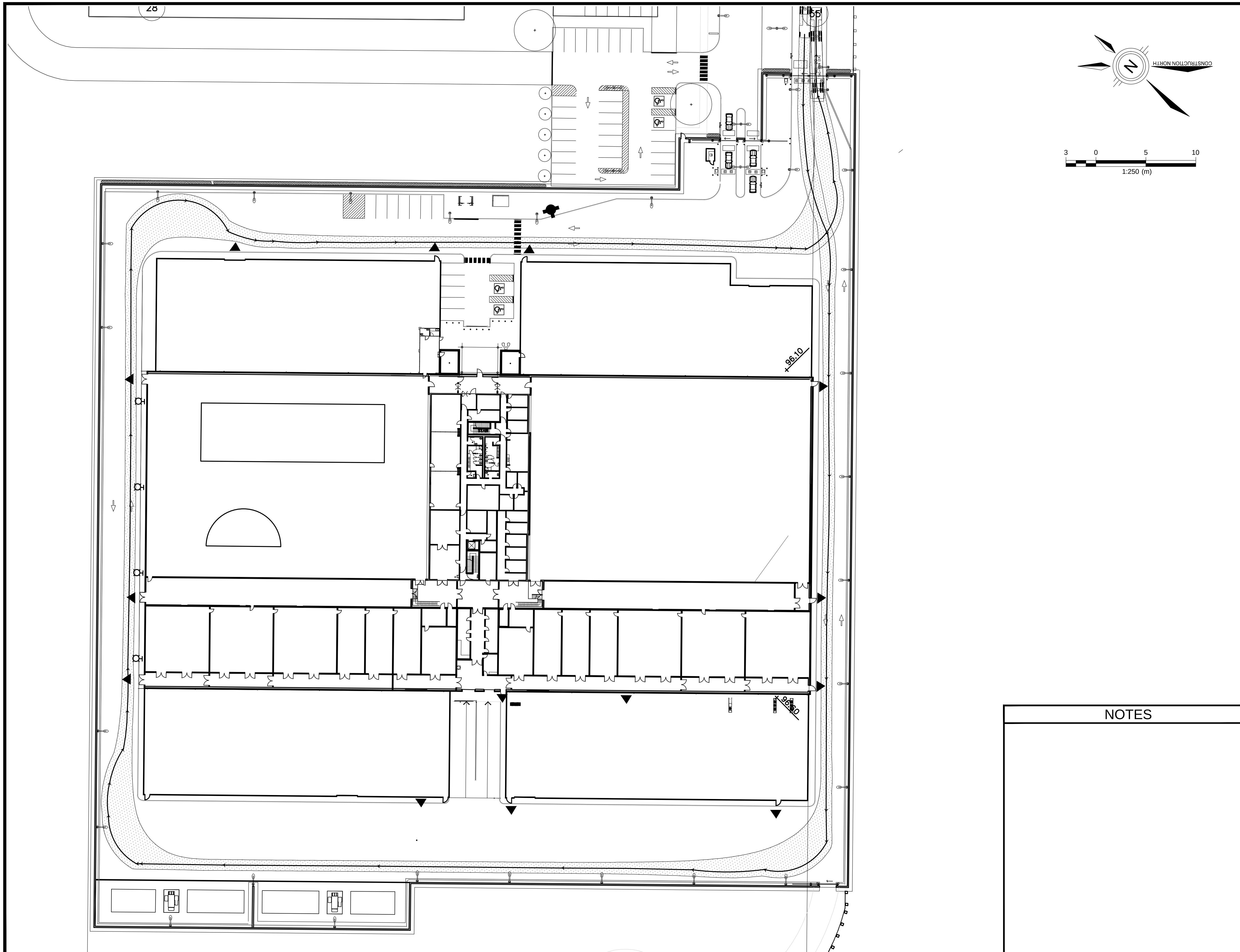
ibigroup.com

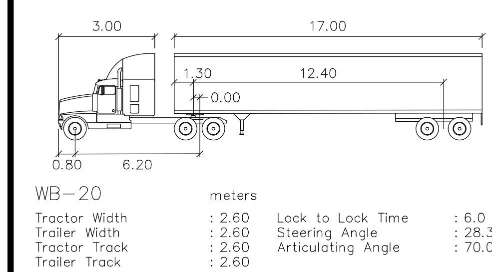
AUTOTURN #3

772 WINSTON CHURCHILL BLVD
OAKVILLE, ON

SCALE: N.T.S.
DATE: 2015 11 20
IBI FILE #: 39329



DETAILS OF DEVELOPMENT



NOTES

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AUTOTURN #5

772 WINSTON CHURCHILL BLVD
OAKVILLE, ON

SCALE: N.T.S.
DATE: 2015
IBI FILE #: 39329

Appendix B

Scope of Investigation

From:	Razao, Ricardo
To:	Andrae Griffith
Cc:	Jeff Pascua; Hamdani, Hashim; Barnes, Catherine
Subject:	RE: Traffic comments - Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard
Date:	Thursday, September 24, 2020 10:47:40 AM

Hi Andrae,

The Halton planner on file for the above-noted application is Anne Gariscsak (Anne.Gariscsak@halton.ca).

Thanks,
Ricardo

From: Barnes, Catherine <catherine.barnes@peelregion.ca>
Sent: September 24, 2020 10:18 AM
To: Andrae Griffith <andrae.griffith@ibigroup.com>; Razao, Ricardo <ricardo.razao@peelregion.ca>
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>; Hamdani, Hashim <hashimali.hamdani@peelregion.ca>
Subject: RE: Traffic comments - Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard

Hi Andrae,

We generally contact our planner – Ricardo Razao – who would then reach out to the planner in Halton. I have cc'd Ricardo as I believe he is our planner on the file or he will tell us who is assigned to this file. With that information the planner can reach out to the equivalent planner in Halton. Hope that helps.

Thank you,

Catherine Barnes
Region of Peel
Technical Analyst
Traffic Development & Permits
10 Peel Centre Drive Suite B, 4th Floor
Brampton, ON L6T 4B9
905-791-7800 x 7569
(Cell) 1 905-460-4206

From: Andrae Griffith <andrae.griffith@ibigroup.com>
Sent: September 24, 2020 9:53 AM
To: Barnes, Catherine <catherine.barnes@peelregion.ca>
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>; Hamdani, Hashim <hashimali.hamdani@peelregion.ca>
Subject: RE: Traffic comments - Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard

Hi Catherine,

Thank you for your comments. We look forward to your eventual review of our submission.

Do you have a contact for the appropriate staff at Halton Region to discuss our future scenarios?

Thank you,

Andrae Griffith
Pronouns: he, him, his

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Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

From: Barnes, Catherine <catherine.barnes@peelregion.ca>
Sent: Thursday, September 24, 2020 9:32 AM
To: Andrae Griffith <andrae.griffith@ibigroup.com>
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>; Hamdani, Hashim <hashimali.hamdani@peelregion.ca>
Subject: Traffic comments - Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard

Hi Andrae,

The Region has reviewed the scope of work for 772 Winston Churchill Blvd and find it to be satisfactory. Please see the traffic comments below in red and the link here for the detailed Region of Peel TIS formatting and contact information for background traffic (growth rated, AADT, signal timing, etc).

Please contact Transportation to confirm growth rates along the subject Regional road(s).

- Please contact Damian Jamroz, Traffic Operations, to obtain the most recent TMCs and/or average annual daily traffic (AADT).
- Please contact Rick Laing, Supervisor of Traffic Signals and Streetlighting, to obtain traffic signal timing parameters and ensure that the information includes the appropriate walk/don't walk splits, recall modes and offsets.
- Please contact Development Services Planning staff (Ricardo Razao) to obtain details on surrounding developments in the area that would affect traffic capacity in the planning horizon year(s).

Please do not hesitate to contact me if you have any further questions of concerns. I trust this to be satisfactory.

Catherine Barnes
Region of Peel
Technical Analyst
Traffic Development & Permits
10 Peel Centre Drive Suite B, 4th Floor
Brampton, ON L6T 4B9
905-791-7800 x 7569
(Cell) 1 905-460-4206

From: Andrae Griffith <andrae.griffith@ibigroup.com>
Sent: September 16, 2020 12:20 PM
To: Barnes, Catherine <catherine.barnes@peelregion.ca>
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>
Subject: Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard

Dear Ms. Barnes,

In 2015, IBI Group submitted a transportation impact study for a proposed commercial development at

772 Winston Churchill Boulevard on the City of Mississauga / Town of Oakville border (attached for your reference). As the original 2015 concept was ultimately not constructed, we have been retained to update this study to reflect a new development concept consisting of an approximate 68,256 m^2 of warehouse uses. Based on this, the following provides our proposed scope of work for this transportation impact study update:

1. **Analysis Time Periods and Intersections:** Based on the proposed commercial development's nature and size, we plan to analyze the weekday AM peak period (7:00 a.m. – 9:00 a.m.) and weekday PM peak period (4:00 p.m. – 6:00 p.m.). The following intersections will be included in this analysis: AGREE

    1. Winston Churchill Boulevard & Royal Windsor Drive;
    2. Winston Churchill Boulevard & Beryl Road;
    3. Winston Churchill Boulevard & Lakeshore Road East / Lakeshore Road West;
    4. Winston Churchill Boulevard & Proposed North Site Access; and
    5. Winston Churchill Boulevard & Proposed South Site Access.

2. **2020 Existing Conditions:** The 2020 existing traffic operations will be analyzed using the software program Synchro (version 11) for the weekday AM and weekday PM peak periods, for the intersections listed above. We have budgeted for the acquisition of turning movement count data at the existing study area intersections. It should be noted that we have identified traffic counts collected in 2017 as being representative of pre-COVID-19 conditions. Given the circumstances, we propose to grow these counts to estimate 2020 conditions based on growth rates provided by the review agencies and / or other traffic data sources reflective of pre-COVID-19 conditions. AGREE

3. **2026 Background Traffic Conditions:** The 2026 background traffic volumes will be determined for the study area intersections, which coincides with five years from an assumed 2021 opening day of the development. We will identify an applicable background traffic growth rate and other area developments which may introduce traffic into the study area, based on discussions with the review agencies. Any future road network or intersection changes proposed by these entities, or outlined in their respective capital works programs, will be taken into consideration. PLEASE FIND THE CONTACTS IN THE LINK AND NOTES ABOVE.

    The 2026 background traffic analysis will identify and determine the impacts of the adjacent developments without the proposed site traffic under existing and future roadway conditions.

4. **Site Traffic Generation and Trip Distribution:** The trip generation for the proposed development will be based on the information presented in the Institute of Transportation Engineers ("ITE") publication, *Trip Generation, 10th Edition*. A review of the modal split will also be undertaken to account for the trips being made by non-auto modes of travel. The municipal Transportation Master Plans will be used as references for this review.

    The trip distribution for the site will be based on a review of existing travel patterns, the 2016 Transportation Tomorrow Survey (TTS), and the available road network. The forecast site traffic for the development will be added to the road network based on the trip distribution, and assigned to the network based on logical travel routes and available traffic capacity. AGREE

5. **2026 Total Traffic Conditions**: The estimated site traffic volumes will be combined with the 2026 background traffic volumes to determine the 2026 total traffic volumes for the study area intersections, and intersection operations analysis will be undertaken for the weekday AM and weekday PM peak periods. Any necessary road improvements required to accommodate total traffic volumes will be identified if necessary, such as additional turning lanes, storage length modifications, and / or traffic control signals. AGREE

6. **Access Location Analysis:** IBI Group will compare the available sightlines at the location of

the proposed accesses to Winston Churchill Boulevard against the applicable standards [i.e., Transportation Association of Canada Geometric Design Guide for Canadian Roads (2017)]. Approaching stopping sight distance and departure sight distances along Winston Churchill will be measured in the field, and mitigation measures to address sightline deficiencies will be discussed, as appropriate. AGREE

Site Plan Review:

High level review of the site plan (access location, site geometrics, parking lot layout, loading/refuse access) -Property requirements to be included as they will have an impact on the site.

We are aware of two previous submissions for traffic studies for the development site, with comments being provided by Halton Region, the Region of Peel, and the Town of Oakville. These comments have included the need to provide for a future signalized access opposing Orr Road, and also the provision of an exclusive northbound left-turn lane and southbound right-turn lane at this future signalized intersection. Our study update will have regard for these comments.

If you have any questions about the proposed scope of work for the 772 Winston Churchill Boulevard development, please do not hesitate to contact me. As Winston Churchill is a boundary road, please let me know if Halton Region staff are better suited to respond to this request. (Halton Region could be contacted for further information regarding background developments etc.)

Sincerely,

Andrae Griffith
Pronouns: he, him, his

A Message from IBI Group's CEO on COVID-19: https://www.ibigroup.com/covid19-response

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From:	Andrae Griffith
To:	"Robert.Clackett@halton.ca"
Subject:	FW: Traffic comments - Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard
Date:	Thursday, September 24, 2020 12:47:00 PM

Dear Mr. Clackett,

Ricardo Razao at the Region of Peel had identified Ms. Gariscsak as the planner on file for 772 Winston Churchill Boulevard. As per instructions her retirement announcement, please see our request below.

Sincerely,

Andrae Griffith
Pronouns: he, him, his

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Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

From: Andrae Griffith
Sent: Thursday, September 24, 2020 12:41 PM
To: Anne.Gariscsak@halton.ca
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>
Subject: FW: Traffic comments - Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard

Dear Ms. Gariscsak,

In 2015, IBI Group submitted a transportation impact study for a proposed commercial development at 772 Winston Churchill Boulevard on the City of Mississauga / Town of Oakville border. As the original 2015 concept was ultimately not constructed, we have been retained to update this study to reflect a new development concept consisting of an approximate 68,256 m^2 of warehouse uses.

In order to inform our future transportation scenarios, could you please assist me in identifying growth rates and anticipated developments which may impact traffic volumes within our study area outlined below?

Please let me know if you have any questions or require any clarification regarding this request. Thank you for your time, and we trust that the Regional Municipality of Halton concurs with Peel Region’s assessment of our transportation study scope of work.

Sincerely,

Andrae Griffith
Pronouns: he, him, his

IBI GROUP
7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

From: Barnes, Catherine <catherine.barnes@peelregion.ca>

Sent: Thursday, September 24, 2020 9:32 AM
To: Andrae Griffith <andrae.griffith@ibigroup.com>
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>; Hamdani, Hashim <hashimali.hamdani@peelregion.ca>
Subject: Traffic comments - Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard

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Catherine Barnes
Region of Peel
Technical Analyst
Traffic Development & Permits
10 Peel Centre Drive Suite B, 4th Floor
Brampton, ON L6T 4B9
905-791-7800 x 7569
(Cell) 1 905-460-4206
Region of Peel
working with you

From: Andrae Griffith <andrae.griffith@ibigroup.com>
Sent: September 16, 2020 12:20 PM
To: Barnes, Catherine <catherine.barnes@peelregion.ca>
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>
Subject: Transportation Impact Study Scope of Work - 772 Winston Churchill Boulevard

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Dear Ms. Barnes,

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    2. Winston Churchill Boulevard & Beryl Road;
    3. Winston Churchill Boulevard & Lakeshore Road East / Lakeshore Road West;
    4. Winston Churchill Boulevard & Proposed North Site Access; and
    5. Winston Churchill Boulevard & Proposed South Site Access.
2. **2020 Existing Conditions:** The 2020 existing traffic operations will be analyzed using the software program Synchro (version 11) for the weekday AM and weekday PM peak periods, for the intersections listed above. We have budgeted for the acquisition of turning movement count data at the existing study area intersections. It should be noted that we have identified traffic counts collected in 2017 as being representative of pre-COVID-19 conditions. Given the circumstances, we propose to grow these counts to estimate 2020 conditions based on growth rates provided by the review agencies and / or other traffic data sources reflective of pre-COVID-19 conditions. AGREE
3. **2026 Background Traffic Conditions:** The 2026 background traffic volumes will be determined for the study area intersections, which coincides with five years from an assumed 2021 opening day of the development. We will identify an applicable background traffic growth rate and other area developments which may introduce traffic into the study area, based on discussions with the review agencies. Any future road network or intersection changes proposed by these entities, or outlined in their respective capital works programs, will be taken into consideration. PLEASE FIND THE CONTACTS IN THE LINK AND NOTES ABOVE.

    The 2026 background traffic analysis will identify and determine the impacts of the adjacent developments without the proposed site traffic under existing and future roadway conditions.
4. **Site Traffic Generation and Trip Distribution:** The trip generation for the proposed development will be based on the information presented in the Institute of Transportation

Engineers ("ITE") publication, *Trip Generation, 10th Edition*. A review of the modal split will also be undertaken to account for the trips being made by non-auto modes of travel. The municipal Transportation Master Plans will be used as references for this review.

The trip distribution for the site will be based on a review of existing travel patterns, the 2016 Transportation Tomorrow Survey (TTS), and the available road network. The forecast site traffic for the development will be added to the road network based on the trip distribution, and assigned to the network based on logical travel routes and available traffic capacity. AGREE

5. **2026 Total Traffic Conditions**: The estimated site traffic volumes will be combined with the 2026 background traffic volumes to determine the 2026 total traffic volumes for the study area intersections, and intersection operations analysis will be undertaken for the weekday AM and weekday PM peak periods. Any necessary road improvements required to accommodate total traffic volumes will be identified if necessary, such as additional turning lanes, storage length modifications, and / or traffic control signals. AGREE

6. **Access Location Analysis:** IBI Group will compare the available sightlines at the location of the proposed accesses to Winston Churchill Boulevard against the applicable standards [i.e., Transportation Association of Canada Geometric Design Guide for Canadian Roads (2017)]. Approaching stopping sight distance and departure sight distances along Winston Churchill will be measured in the field, and mitigation measures to address sightline deficiencies will be discussed, as appropriate. AGREE

Site Plan Review:

High level review of the site plan (access location, site geometrics, parking lot layout, loading/refuse access) -Property requirements to be included as they will have an impact on the site.

We are aware of two previous submissions for traffic studies for the development site, with comments being provided by Halton Region, the Region of Peel, and the Town of Oakville. These comments have included the need to provide for a future signalized access opposing Orr Road, and also the provision of an exclusive northbound left-turn lane and southbound right-turn lane at this future signalized intersection. Our study update will have regard for these comments.

If you have any questions about the proposed scope of work for the 772 Winston Churchill Boulevard development, please do not hesitate to contact me. As Winston Churchill is a boundary road, please let me know if Halton Region staff are better suited to respond to this request. (Halton Region could be contacted for further information regarding background developments etc.)

Sincerely,

Andrae Griffith
Pronouns: he, him, his

A Message from IBI Group's CEO on COVID-19: https://www.ibigroup.com/covid19-response

IBI GROUP
7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

From:	Andrae Griffith
To:	"Kuczynski, Roman"
Subject:	RE: Traffic Growth Rate Request - Winston Churchill Blvd, Lakeshore to Royal Windsor
Date:	Monday, October 5, 2020 2:45:00 PM

Hi Roman,

The we were able to identify background developments along the Winston Churchill corridor on the Halton side, but have not been able to identify a background growth rate. As this is an update of a previous TIS, we propose to maintain the same growth rate (2% compounded) as was previously provided in 2015. We expect that this will be conservative, as the AADT from Peel Open Data suggests that traffic growth has been largely flat over the last 10 years.

Sincerely,

Andrae Griffith
Pronouns: he, him, his

IBI GROUP
7th Floor - 55 St. Clair Avenue West
Toronto ON M4V 2Y7 Canada
tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

From: Kuczynski, Roman <roman.kuczynski@peelregion.ca>
Sent: Wednesday, September 16, 2020 11:18 AM
To: Andrae Griffith <andrae.griffith@ibigroup.com>
Subject: RE: Traffic Growth Rate Request - Winston Churchill Blvd, Lakeshore to Royal Windsor

Hi Andrae,

This section of Winston Churchill Boulevard is a boundary road. On the Peel side we have an older employment area that it is not expected to undergo any significant change in the near future. On the Halton/Oakville side there are more residential uses. However, we do not have more detailed data to provide you with reliable growth rates for the location you specified. I would suggest to reach out either to the Region of Halton or the Town of Oakville to see if they can assist you. If they cannot assist, we can try to see what can be done to assist you.
So please try first with Halton or/and Oakville, and then let me know if you still need our help.

Regards.

Roman

Roman Kuczynski, MA, MCIP, RPP
Supervisor, Transportation System Planning
Region of Peel
Public Works Services

Transportation Division
10 Peel Centre Drive, Suite B, 4th Floor
Brampton, Ontario L6T 4B9
Tel. (905) 791-7800 ext. 4381
Cell (289) 541-8156
Fax: (905) 791-1442
E-Mail: roman.kuczynski@peelregion.ca

From: Andrae Griffith <andrae.griffith@ibigroup.com>
Sent: September 15, 2020 12:40 PM
To: Kuczynski, Roman <roman.kuczynski@peelregion.ca>
Cc: Jeff Pascua <jeff.pascua@ibigroup.com>
Subject: Traffic Growth Rate Request - Winston Churchill Blvd, Lakeshore to Royal Windsor

Hi Roman,

IBI Group has been retained to prepare a Transportation Impact Study for a client who is seeking to construct a commercial development at 772 Winston Churchill Boulevard on the City of Mississauga / Town of Oakville border. In order to inform our future traffic scenarios, could you please assist me in obtaining growth rates for Winston Churchill Boulevard between Lakeshore Road West and Royal Windsor Drive?

Our existing conditions scenario is 2020 and our future horizon year is 2026. In addition, due to the effects of COVID-19, if you can provide advice on growth rates from 2017 to 2020 it would be greatly appreciated.

Thank you for your time, and please let me know if you have any questions or require further clarification. As Winston Churchill is a boundary road, please indicate if Halton Region is better suited to provide growth rate advice.

Sincerely,

Andrae Griffith
Pronouns: he, him, his

A Message from IBI Group's CEO on COVID-19: https://www.ibigroup.com/covid19-response

IBI GROUP

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tel +1 416 596 1930 ext 61450 fax +1 416 596 0644

Draft Site Plan Comments Report

Date:	2021-08-30	
To:	**Ashley Minns**, IBI Group	**Ashley.minns@ibigroup.com**
cc:	**Jamie Bunston**, 772 Winston Churchill Ltd. Partnership	**jbunston@oneproperties.com**
From:	**Leigh Musson**, Acting Manager East District, Planning Services	
Contact Info:	T: 905-845-6601 ext. 3371 F: 905-338-4414 E: leigh.musson@oakville.ca	
Re:	**Site Plan Circulation Comments (1st submission)**	
Application:	IBI Group	
Description:	Two Industrial/Warehouse Buildings – 32,490 m^2 and 28,972 m^2	
Address:	700 and 750 Winston Churchill Blvd. (772 Winston Churchill Blvd.)	
Site Plan File #:	**SP.1601.029/01**	

The above-noted site plan application has been circulated to various municipal departments and external agencies for review. Comments which have been received with respect to the site plan application are included below. Please be aware that comments from some departments and/or agencies may still be pending.

Please contact the staff member responsible for each set of comments, as listed below, in order to resolve any outstanding site plan approval issues. Kindly request the responsible staff member to send me an email/fax of all correspondence for our records.

Revised and coordinated plans and documents which fully address the attached comments must be submitted according to the process outlined in the **Step by Step Digital Submissions Guide** on the Town's website. Digital materials must be named in an organized and descriptive manner according to format outlined in Planning's **Digital Submission Naming Conventions** document.

You are also required to submit the following items (forming a complete resubmission package):

- **a cover letter describing how each comment within this report has been addressed.**
- a transmittal provided in .doc (Word) format listing the materials submitted, with their revision number and date and the titles and information presented in the format as provided at the end of this report

Furthermore, all reports, documents and drawings submitted must:

- be presented in metric measure that can be accurately scaled,
- be prepared, stamped and signed by a qualified professional architect (for site plan and architectural drawings), engineer (for site plan and engineering drawings/reports), or landscape architect (for landscape and tree protection drawings/reports)

Circulation Comments:

PLANNING SERVICES

1 Current Planning
Leigh Musson ext. 3371

2021-07-23 – Circulation 1

- Oakville Transportation comments to follow once received.
- Issues identified as part of the submission are included within this report
- Applicant is to hold a "Neighbourhood Meeting", please confirm date
- Other issues may be identified through future reviews
- Applicant to enter into negotiations with the Town and be responsible for all costs for any external servicing requirements that require the use of Town land

Conditions of Final Site Plan Approval

- *Securities* – That the owner deposit securities with the Finance Department, in a form meeting the Finance Department's requirements **(as a certified cheque or letter of credit, not a standard cheque)**, in the lump-sum amount of **$XXX,XXX.XX (planning to calculate)**

  For your application, the lump-sum amount was calculated as follows:

  - **RES (low) - $20,000 + itemized essential elements = $XXX,XXX.XX**
  - **RES (mid & hi) and MU- $75,000 * ha + $500 * m = $XXX,XXX.XX**
  - **All others - $50,000 * ha + $500 * m = $XXX,XXX.XX**

- *Site Plan Agreement* – That the owner enter into a Site Plan Agreement with the Town, to be registered on title, containing clauses suitable to the Director of Planning, Director of Development Engineering and the Town Solicitor.

- *Final Plans* – That the owner submits a full set of coordinated, digital drawings in PDF format, to the satisfaction of the Planning Services Department.

Re-Circulation Fee

- A re-circulation fee of 15% of the in-effect application fee will be required after the 3rd submission and every resubmission thereafter (per fee by-law 2020-131, Schedule 'A' Section 10).

File Naming

Future submission materials must be named according to the following format:
- **File Number _ Condensed Name _ Version Number _ Date (with no spaces)**

For example, your set of files should look like the following list:
- 00_CoverLetter_v1_2020-02-28
- 01_Aerial_v1_2020-02-14

- 02_Survey_v1_2020-02-23
- 03_SitePlan_v1_2020-02-23
- 04_SitePlanDetails_v1_2020-02-23
- 05_FloorPlan_v1_2020-02-23
- 06_Landscape_v1_2020-02-18
- 07_LandscapeDetails_v1_2020-02-18
- 08_Servicing_v1_2020-02-15
- 09_Grading_v1_2020-02-15
- 10_SWM_v1_2020-01-30
- 11_TIS_TruckTurning_v1_2020-02-20
- 12_NoiseVibration_v1_2020-02-20
- 13_ESSQ_v1_2020-02-28
- 14_ESS1_v1_2020-02-28

Requirements:
- NO spaces in the file name.
- NO special characters within the file name (i.e. @ # $ % & * / \ |).
- ONLY Letters, Numbers, Dashes, Underscores and Periods are permitted in the file name.

Final Note:
- All submission of plans and/or studies must be clearly labelled and in a larger font size in the title block as the next submission by number, corresponding to the version number and date in the file name

2 Heritage Planner
Carolyn Van Sligtenhorst ext. 3875

2021-07-13 – Circulation 1

No Heritage Concerns

3 Urban Design
Philip Wiersma ext. 3795

2021-07-28 – Circulation 1

The following comments are based on materials circulated July 2, 2021 [Circ 1]

Comments

Development and public realm improvements shall be evaluated in accordance with the urban design direction provided in the Livable by Design Manual, as amended, to ascertain conformity with the urban design policies of Livable Oakville, the towns official plan. If not done previously, please review online Livable Oakville policies and the related standards contained in Livable by Design Manual (Part A & C).

Landscape (comment provided by Philip Wiersma)

1. [Circ 1] As done for Building A, all parking spaces adjacent to Building B should have an abutting walkway providing pedestrian access to a main entrance. Walkway should be at least 1.8m where abutting parking stalls, at least 1.5m in all other areas.

2. [Circ 1] Canopy cover target for this site is 20%. (as stated in the cover letter and calculation chart provided) Currently the canopy cover plan only proposes 10% coverage. Plans should be revised to provide the 20% canopy cover as necessary.

   It is my understanding that the town will not be taking the open space channel as a dedication. (as alluded to in the cover letter) As a result, the existing canopy cover contained within the open space channel should be factored into the canopy calculation. Since much of the plant material within the channel is recently planted, existing tree canopy cover can be projected as if it were proposed tree planting.

3. [Circ 1] With regards to the canopy cover plan, it is fine to group planting areas together; however, the tree groupings must be within the same continuous planting area. Revise canopy cover chart as necessary. Refer to the towns development application guidelines / terms of reference for additional information if needed.

4. [Circ 1] All pedestrian routes should be barrier free, including pedestrian crossings of internal drive aisles. Revise plans, including the grading plan, as necessary.

5. [Circ 1] Retaining walls in proximity to pedestrian areas should be provided with guard railings. Note location of guard railings on the plans and provide construction detail for how the railing will be constructed on/beside the retaining wall.

6. [Circ 1] No more than 10% of the proposed trees should be of the same genus. Revise planting as necessary.

7. [Circ 1] Along the Winston Churchill Boulevard frontage shrub planting (or hedge, berm, low wall / decorative fence, or combination thereof) should form a continuous screening element with a height of 750 – 1000mm above the parking area grade. Revise planting plan as necessary.

8. [Circ 1] Along the side yard abutting the railway corridor, one deciduous or coniferous tree planting should be provided for every 4.5m of abutting land, with a minimum 80% of the trees within the buffer strip as coniferous species; and a hedge, fence, berm or combination thereof, forming a continuous screening element with a minimum height of 1.8m.

9. [Circ 1] Regarding the lighting plan, fixture W4A or W4B are not acceptable due to the potential for light to be directed up into the sky. Revise type of fixture as necessary.

10. [Circ 1] Provide a note on the drawing stating: "All lighting devices shall be full cut off and night sky friendly, and shall be mitigated at the source so that no light (0.0 fc) will be directly projected onto adjacent properties."

11. [Circ 1] Applicant indicates on the site plan that snow will be removed from the site. See condition.

Built Form (comments provided by Nada Almasri)

12. [Circ 1] Consider projecting the office components on the frontage of Building A to create a sense of enclosure along Winston Churchil streetscape.

13. [Circ 1] For building façades greater than 30.0m in length, divide the horizontal dimension of the building by incorporating significant modulations (projections/recesses) in the massing and variety in architectural detailing. Design façades of longer buildings to give the appearance of a collection of finer grain structures.

14. [Circ 1] Design principal building entrances to the office components to be easily identifiable to the public.

15. [Circ 1] Screen rooftop mechanical equipment completely from view from the public realm using compatible building materials as used on the main building or integrate them into the overall design of the building. Reflect on the relative drawings.

16. [Circ 1] For rooftop equipment and enclosures taller than 2.0m in height, incorporate a minimum setback of 5.0m from all edges of the roof to reduce their visibility from the public realm. Reflect on the relative drawings.

Conclusion/Conditions

The following should be satisfied prior to final site plan approval:

- **Site Plan Agreement –** That the owner enter into a Site Plan Agreement with the Town, to be registered on title, containing clauses suitable to the Director of Planning, Director of Development Engineering, and the Town Solicitor, including but not limited to the following:

  That the owner and tenants / future purchasers will maintain a minimum tree canopy cover or potential canopy cover of 20% over the site area. Any tree removals granted by way of Town permits will require the replanting of trees so as to maintain this minimum tree canopy cover target to the satisfaction of the Town.

  That all owners and tenants / future purchasers are required to maintain all access ramps and driveways, parking and loading areas, and walkways, unobstructed to ensure safe operations within this private development, and as there is insufficient on site snow storage, all snow cleared from the access ramps and driveways, parking and loading areas, and walkways shall *be removed from the site. In no circumstance shall snow cleared from the site be placed in a manner that might damage private or public landscaping, fences, or impinge on adjacent properties or open space. The contracting for private snow removal from the site shall remain the sole responsibility of the owners and tenants / future purchasers.*

- **Urban Design**: That the owner submit and obtains final approval for the following to the satisfaction of the Planning Services Department:

a) Revised and final Site Plan
b) Revised and final Building Elevations
c) Revised and final Landscape Plan
d) Revised and final Grading Plan
e) Revised and final Lighting Plan
f) Revised and final Tree Canopy Plan and Canopy Calculation Chart

- **Additional comments may be provided after review of subsequently submitted revised materials.**

Circulation Comment Chronology

4 Development Engineering

George Golding George.golding@oakville.ca

2021-08-09 – Circulation 1

Technical Review

Material Reviewed:

Document	**Type**	**From**	**Dated**	**Received**
Stormwater Management Report – 772 Winston Churchill Boulevard	Report	A.M. Candaras Associates Inc.	April 2021	NA
Functional Servicing Report – 772 Winston Churchill Boulevard	Report	A.M. Candaras Associates Inc.	April 2021	NA
Drawings G1- Grading and SWM East Site Area Drawings G2- Grading and SWM West Site Area Drawings G3- Site Servicing and SWM East Site Area Drawings G4- Site Servicing and SWM East Site Area	Dwg	A.M. Candaras Associates Inc.	April 2021	NA

Drawing ESC-1 - Stage 1 ESC Plan Drawing ESC-2 - Stage 2 ESC Plan				

Background Information

Based on the circulation memo, the proponent wishes to complete the following:

- Construct two warehouse building and asphalt/paved areas within the subject property.
- Clearview Creek channel corridor was previously realigned to facilitate development within the subject property.
- Note: The subject property ultimately drains to the main branch of Clearview Creek. Review and comments to be coordinated with CVC staff.

Review of Stormwater Management Report

A Stormwater Management Report completed by A.M Candaras Associates Inc. (dated April 9, 2021) is support of the proposed development.
Note: The provided report was marked as final and was signed and sealed by a licensed professional engineer.

SWM Criteria:
SWM criteria appear to have been based on the previously approved Clearview Creek Subwatershed Study (completed by McCormick, Rankin Corporation (MRC), dated 2007).
Based on details provided within the SWM Report, the following SWM criteria have been used is support of the proposed SWM strategy for the site:

i. Post to pre-development controls for quantity controls onsite. The 100-year post to 2-year pre-development control is based on CVC's SWM Guideline. 100-year post to 2-year pre-development controls are being proposed as part of the overall SWM strategy for the subject site.
ii. Enhanced water quality control (Level 1) is required onsite.
iii. Per CVC's SWM Guidelines, onsite erosion controls will be required as part of the overall SWM strategy onsite.

Note: The outfall noted within the SWM report drains to a regulated watercourse (Clearview Creek). The regional floodplain has been established within this section of Clearview Creek.

Review of SWM Strategy:

- Report further states that SWM facilities are to be located outside of the regional floodplain.
- Based on details provided within the SWM report, the overall impervious coverage within the site under proposed conditions is approximately 84% and includes the Clearview Creek channel corridor.

Water Quality Control

- The SWM strategy is proposing enhanced water quality through three (3) OGS units onsite (Jellyfish type OGS unit), in parallel. Based on details provided within the SWM report, the

Jellyfish OGS unit was designed to provide 85% TSS removal and exceeds the minimum 80% TSS removal to meet enhanced (Level 1) water quality controls.

- The proposed units are situated directly downstream of the proposed quality and quantity control orifices within MH 4 OCS.
- Enhanced water quality controls appear to have been achieved. No further comment.

Erosion Control

Based on details provided within the SWM report, erosion controls are provided through 48-hr drawdown for the 25 mm storm event. This criteria is in accordance with CVC's SWM Guideline and MECP SWM manual and is appropriate. No further comment.

Water Quantity Control

Based on details provided within the SWM Report, water quantity controls are be proposed through a series or controls included:

- Underground SWM facility sized to provide 3,506 m^3 of storage.
- An additional 5100 m^3 of storage is proposed through parking lot storage controls.
- Rooftop controls are being proposed onsite, however; it is unclear whether they were implemented within the quantity controls. Confirmation is required.

Based on details provided within the SWM report and Drawing G-1, the proposed parking lot storage depth during the 100-year storm event is approximately 0.50 m in depth. Further, parking lot storage appears to be proposed as frequent as the 5-year storm event (proposed HWL 5-year is 93.68 m, the top of CB grates are as low as 93.50 m).

Per Section 3.1.3.06 Storm Water Management Implementation Report Requirements:

- Maximum ponding depth in parking areas is not to exceed 250mm, and no ponding shall be located in a fire route. No five-year ponding (nuisance) on pavement: use landscaped areas, roofs or underground structures.

The provided SWM strategy appears to exceed the max ponding depth (250 mm) in parking areas. The SWM strategy also is proposing frequent flooding within the parking lot areas as frequent as the 5-year storm event. This also does not appear to meet Town design standards. A comment will be provided.

Water Balance

Based on review of the Clearview Creek Sub watershed Study, given the industrial nature of the development and the risk of groundwater contamination, a post to pre-development water balance in not required. No further comment.

Proposed Outfall

Based on details provided within the SWM report, a conventional gravity type outfall cannot be achieved given the regional water levels within Clearview Creek, resulting in backwater conditions that would impact the function of the proposed SWM facility. Mechanical pumping is being proposed as opposed to the gravity system. Based on details provided within the SWM report, the design of the pumps and chamber is being completed by "John Brooks and will be included in next submission". The outlet details are required in support of the overall SWM design. A comment will be provided.

SWM Operation and Maintenance

Comments will be made as it related to OMM and routine maintenance of the SWM facility proposed within the subject development.

Review of Erosion and Sediment Control Plan

An ESC monitoring program is being proposed in accordance with recommendations made within the Clearview Creek Subwatershed Study.

- ESC plan is signed and sealed by a professional engineer.
- Heavy duty silt fencing is proposed around the perimeter of the subject property.
- The Stage 2 plans does not provide sufficient detail as it relates to ESC between the grading and servicing stage. Additional details are required.
- Based on details provided within Section 11 of the SWM report, the ESC plan is proposing to utilize and existing sedimentation basin for stage 1 (topsoil stripping and rough grading) of the ESC plan. There is no details related to the sedimentation basin sizing. Further, there is no details related to the temporary outlet structure and spillway. Additional details are required and should be documented within the SWM report and included within the design drawings.
- No construct dewatering was noted within ESC plans. Given the nature of the proposed works (construction of an underground storage facility), dewatering may be required. Confirmation is required. If dewatering is required, a detailed dewatering plan is required and is to be incorporated into the ESC plans.

Site Servicing and Functional Servicing Report

- Sanitary and water servicing for the subject development (772 Winston Churchill Blvd.) and the neighboring properties at 560 Winston Churchill Blvd and 568 Winston Churchill Blvd.
- Servicing was provided to the Region of Halton for review and approval. The preferred servicing plans for both water and sanitary appear to be based on input from Regional staff.
- Target flow rates are being proposed for the neighboring future development at 560 Winston Churchill Blvd. The existing catchment area used within Table 2 (Target Flows for 772 and 560 Winston Churchill) for the 560 Winston Churchill site does not appear to match that previously delineated catchment area presented within the Clearview Creek Subwatershed Study. The proposed development area does not appear to match the existing catchment area and does not appear to be in line with existing topography (based on internal review). A comment will be provided.
- Overland flow routes noted within the grading plans do not appear to be consistent with the SWM strategy proposed within the SWM report completed by A.M. Candaras.

Engineering Comments to Proponent:

Development Engineering has reviewed the submitted storm water management, grading and servicing materials and provides the following comments:

772 Winston Churchill Blvd. Development:

1. The following are comments related to the quantity control measures discussed within the Stormwater Management Report (A.M. Candaras, dated April 2021) in support of the proposed development at 772 Winston Churchill Road:

a. Based on details provided within the SWM report, quantity controls appear to be limited to underground storage (through the proposed underground storage facility) and parking lot storage (located between the two buildings). The SWM report also makes reference to rooftop controls for the two buildings proposed. Please confirm whether rooftop controls are being proposed and implemented within the overall SWM strategy within the subject site.

b. The approved Subwatershed Study contemplated a wet pond to meet the water quality and quantity targets. If another SWM measure is being considered, it should meet the functions of the SWM pond like for like, including the potential risk to private and public property. Please provide additional justification within the SWM report and confirm that the proposed SWM facility does not increase the potential risk to private and public property.

c. The SWM strategy appears to exceed the max ponding depth (250 mm) in parking areas during the 100-year storm event. In accordance with Section 3.1.3.06 within the Town of Oakville's Storm Water Management Implementation Report Requirements, the maximum ponding depth in parking areas is not to exceed 250 mm and no ponding shall be located in a fire route. 100-year ponding depths appear to exceed 0.50 m in areas of the parking lot and does not appear to meet the Town's SWM criteria. Please revise the design to reflect maximum ponding depths.

d. Please confirm that the SWM strategy and the proposed ponding within the subject site considers safe access.

e. The SWM strategy also is proposing frequent flooding within the parking lot areas as frequent as the 5-year storm event. In accordance with Section 3.1.3.06 within the Town of Oakville's Storm Water Management Implementation Report Requirements, no five-year ponding (nuisance) on pavement will be permitted and alternative quantity controls (use landscaped areas, roofs or underground structures) should be used.

f. Please note that as-built conditions and a certification letter (signed and sealed by the design engineer) will be required following construction to confirm that the proposed underground SWM facility and parking lot storage areas were constructed in accordance with the approved design. Please acknowledge this requirement.

g. Based on details provided within the Grading Plans, major overland flows a portion of the proposed parking lot area (fronting onto Winston Churchill Blvd) appears to be bypassing the proposed underground SWM facility and parking lot storage area. This does not appear to be consistent with what is proposed within the Stormwater Management Report. Please confirm.

2. The following are comments related to the proposed outfall and emergency spillway proposed within the subject development:

   a. Based on details provided within the SWM report, the outfall design (specifically the design of the pumps and chamber system) has been deferred to others and will be provided in the next submission. Please provide additional details related to the proposed outfall design.

   b. There is a concern that the proposed pump outfall will not function during a major storm event. Please confirm whether a backup power supply will be provided for the proposed outlet system (dual pumps) in the event of a power failure during a major storm event.

   c. Please provide additional details and cross-section of the emergency spillway within the design drawings. Please provide sizing calculations within the provided SWM report. Please provide additional details related to how the emergency spillway was sized and whether the spillway was design to convey the 100-year storm event in the event the orifice controls become obstructed or the pumping system fails during a major storm event.

3. Please provide an operations and maintenance manual (OMM) in support of the proposed SWM facility as well as the proposed OGS units within the subject property. The owner of the property is to be aware of the OMM and completed routine inspections and maintenance activities in accordance with recommendations made within the manual.

4. Maintenance of the proposed Jellyfish type OGS units is a crucial component to consider ensuring there long-term performance. The owner needs to clearly understand the unique maintenance responsibilities inherent with these types of OGS units, particularly the maintenance costs. The owner should be capable of performing routine and long-term actions to maintain the function of the proposed OGS units. Please confirm.

5. The following are comments related to the ESC plan/strategy as noted within Drawings ESC-1 and ESC-2 completed by A.M. Candaras Associate Inc. dated April 2021:
   a. The ESC plan and all related measures are to be designed in accordance with the ESC Guidelines for Urban Construction (TRCA, 2019). Please acknowledge this and provide additional discussion within the SWM report.

   b. Based on details provided within the SWM report, ESC strategy for the subject property is to utilize the existing sedimentation basin within the property. It is unclear how this basin was design and whether this basin was designed in accordance with the ESC Guidelines for Urban Construction (TRCA, 2019). Please provide supporting sizing analysis and drawdown analysis in support of the proposed temporary sedimentation basin. If the facility does not meet design criteria within the guideline, the existing sedimentation basin is to be retrofitted.

   c. Please provide additional details as to how the temporary sedimentation basin will be decommissioned following stage 1 works and what ESC measures will be provided prior to site servicing (stage 2 works).

   d. Please confirm whether construction dewatering is required to facilitate the construction of the underground infrastructure associated with the proposed development. If dewatering is required/anticipated, please provide a detailed dewatering plan.

Functional Servicing Report for 772, 560 and 568 Winston Churchill Blvd:

6. The following are comments related to the Function Servicing Report (For Industrial Developments 772, 560 and 568 Winston Blvd) completed by A.M. Candaras Associates Inc. dated January 29, 2021:
   a. Table 2 within the FSR proposes target flow rates for the proposed developments at 772 Winston Churchill Blvd and the neighboring 560 Winston Churchill Blvd. The 560 Winston Churchill Blvd target flows uses a contributing catchment area of 8.93 ha. Based on the existing conditions catchment areas for Catchment 5 within the Clearview Clear Subwatershed Study, approximately 3.8 ha of land from the proposed 560 Winston Churchill

Blvd development is contributing to this reach of Clearview Creek under existing drainage conditions. The target flow rates for 560 Winston Churchill Blvd. are to be revised to match existing conditions catchment areas contributing to this reach of Clearview Creek.

b. Please confirm whether agreements are in place with the neighboring properties at 560 and 568 Winston Churchill Blvd for the construction of the proposed 300 mm diam. watermain along Winston Churchill Blvd.

c. Section 2.2 of the FSR makes reference to a 6.0 m wide regional easement within Town lands. Based on the legal plan included within Appendix B of the FSR, an 8.0 m wide easement is shown. Please clarify.

Conditions of Approval

Conditions which must be satisfied prior to final site plan approval:

1) That the owner submits the following information, to the satisfaction of the Development Engineering Department:
   1. Stormwater Management Brief/Letter *(See comments)*
   2. Grading, Drainage and Servicing Plans *(See comments)*
   3. Tree Inventory and Protection Plan *(See comments by Urban Forester)*
   4. Arborists Report *(See comments by Urban Forester)*
   5. Tree Protection Securities: That the applicant deposit tree securities to the Town of Oakville. *(See comments by Urban Forester)*
   6. Boulevard & Road Restoration Details to be provided on civil drawings.
   7. Town of Oakville staff will require a certification letter signed and sealed by a Professional Engineer stating that the permanent Stormwater Management Facility (proposed underground storage facility) is operational and has been built as per approved design. As-built confirmation of the proposed parking lot storage volumes and ponding extent are also required. Should there be discrepancies between the proposed and as-built works; additional engineering and/or on-site works may be required. As-constructed drawings are to be submitted upon the construction of the SWM facility. The following criteria must be met in order for the facility to be considered operational:
      i. The SWM facility must be at final grade.
      ii. Capacity of SWM facility must be confirmed to meet design detention volumes.
      iii. Outlet structures must be constructed and conform to the approved plans.
      iv. The as-built parking lot storage area is to be included within the confirmation letter.

2) That the owner submits the following information, to the satisfaction of the Engineering & Construction Department:
   Note: The applicant is to consult with the Engineering & Construction Department regarding the need and or requirements any further permits and reports.

   a) Reference Plan: That the owner is required to provide the appropriate reference plan / survey information as part of any dedication

5 Development Engineering, Forestry

Michelle Drmanic ext. 3982

2021-07-28 – Circulation 1

Urban Forestry has reviewed the first Site Plan circulation and has the following comments:

1. Table 1 on page 6 of the arborist report indicates that trees #1011 & 1012 are to be removed due to condition (severe lean) and construction impacts, however, the tree protection plan shows these trees to be retained, with tree protection barrier to be installed. Please confirm whether these trees are to be removed or preserved, and update the arborist report/tree protection plan accordingly.

2. The arborist report and tree protection plan propose removal of trees #1000-1010. As these trees are situated on the adjacent property, they cannot be removed unless written consent is obtained from the neighbouring property owner. If the neighbor agrees to removal of these trees, please submit a copy of the consent letter.

3. Tree protection barriers must be installed prior to obtaining final Site Plan approval. The tree protection barriers are to be installed at minimum TPZ distance, as per town standards/arborist report recommendations, and Development Services is to be notified for inspection and approval. The tree protection barriers must be constructed of mesh fence with 2x4” wood frame, to maintain sight lines/visibility.

4. Note: If any trees are to be removed, no trees can be cut until after final site plan approval.

6 Engineering and Construction, Transportation

Aquisha Khan 905-845-6601

Date – Circulation 1

Pending

INTERNAL DEPARTMENTS

7 Building Services, Building Code

Louisa He ext. 3142

2021-07-21 – Circulation 1

I had no comments on this submission.

8 Building Services, Fire Prevention

Jonathan O'Neil ext. 3183

2021-08-05 – Circulation 1

1. Submit a fire route application package with fee that meets the Town By-law requirements for drawing specification and be acceptable for inclusion onto the Town's By-law. The application package can be obtained from the Building Department or the Town's website at www.oakville.ca.

2. Received information related to storm water retention on the site. The area of water retention covers portions of the proposed designated fire route. Standing water causes access issues with vehicle control due to weight distribution and size of the fire apparatus.

9 Building Services, Zoning

Peter Kozelj ext. 3174

2021-08-17 – Circulation 1

Section 4.14 a) On lands subject to this By-law south of Dundas Street, no *building* may be erected or enlarged unless the land is serviced by municipal water and sewage systems. **Confirm.**

10 Engineering and Construction, Municipal Addressing

Sharon Coyne ext. 3323

2021-08-11 – Circulation 1

Addresses for the 2 new buildings.

Building A – 700 Winston Churchill Blvd.

Building B- 750 Winston Churchill Blvd.

11 Legal, Realty Services

Jim Knighton ext. 3022

2021-07-06 – Circulation 1

Subject to the Regions servicing recommendations, the applicant is required to enter into negotiations with the Town and be responsible for all costs associated with any external servicing requirements, including any easement and related costs.

The owner is to enter into satisfactory arrangements with the Town related to the payment of cash in lieu of parkland in accordance Section 42 of the Planning Act and the Town By-law 2008-105 and contact the Towns

Manager of Realty Services no later than 90 days prior to their intended date to draw the first building permit for the proposed development or redevelopment, to arrange coordination of the necessary appraisal

12 Parks and Open Space

Janis Olbina ext. 3148

2021-07-12 – Circulation 1

Based on the attached drawing (emailed August 10) that Leigh provided I have done a very quick markup to show where we (parks) think the 8m corridor should be placed….as far east as possible with edge of easement at bottom of berm slope. As much as this drawing shows a good number of trees, it doesn't differentiate between a newly planted tree, and one with more maturity. Before any final drawing/alignment is agreed to, the applicant(s) will need to prepare an updated, and detailed tree inventory/arborist report. They can probably start with Forestry's GIS records and update/amend as required.

Also, regarding the actual connections back to the Winston Churchill properties, I think there are better alternatives for connecting points. I have sketched a slightly new geometry for the 560 property that may allow for the sewer to avoid a portion of the berm. For 772, the drawing would have to be extended further north, where I think there is a gap in the existing berm – this may also reduce amount of trees needing removal.

We wish the 8m easement to be considered the maximum allowable corridor for both construction and permanent easements. The contractors doing the work will have to find a way to safely excavate/trench/bore without a massive excavation and spoils on either side.

EXTERNAL AGENCIES

13 Bell Canada

Ryan Courville planninganddevelopment@bell.ca

2021-08-17 – Circulation 1

Re: Site Plan Application - 772 Winston Churchill Blvd - File No: 1601.029/01; Your File No. 1601.029/01

Our File No. 91082

Dear Sir/Madam,

We have reviewed the circulation regarding the above noted application. The following paragraphs are to be included as a condition of approval:

"The Owner acknowledges and agrees to convey any easement(s) as deemed necessary by Bell Canada to service this new development. The Owner further agrees and acknowledges to convey such easements at no cost to Bell Canada.

The Owner agrees that should any conflict arise with existing Bell Canada facilities where a current and valid easement exists within the subject area, the Owner shall be responsible for the relocation of any such facilities or easements at their own cost."

The Owner is advised to contact Bell Canada at planninganddevelopment@bell.ca during the detailed utility design stage to confirm the provision of communication/telecommunication infrastructure needed to service the development.

It shall be noted that it is the responsibility of the Owner to provide entrance/service duct(s) from Bell Canada's existing network infrastructure to service this development. In the event that no such network infrastructure exists, in accordance with the Bell Canada Act, the Owner may be required to pay for the extension of such network infrastructure.

If the Owner elects not to pay for the above noted connection, Bell Canada may decide not to provide service to this development.

To ensure that we are able to continue to actively participate in the planning process and provide detailed provisioning comments, we note that we would be pleased to receive circulations on all applications received by the Municipality and/or recirculations.

Please note that WSP operates Bell's development tracking system, which includes the intake of municipal circulations. WSP is mandated to notify Bell when a municipal request for comments or for information, such as a request for clearance, has been received. All responses to these municipal circulations are generated by Bell, but submitted by WSP on Bell's behalf. WSP is not responsible for Bell's responses and for any of the content herein.

If you believe that these comments have been sent to you in error or have questions regarding Bell's protocols for responding to municipal circulations and enquiries, please contact planninganddevelopment@bell.ca

14 Canada Post

Anna Burdz tel. 647-355-3597

2021-07-20 – Circulation 1

Canada Post appreciates the opportunity to comment for the above referenced site plan application.
For this address mail delivery will be provided in the same manner as that provided to the surrounding area.

For mail delivery inquiry please contact Town of Oakville Post office at 905-338-1199

15 CN Rail

Nick Coleman tel. 905-760-5007

Date – Circulation 1

Pending

16 City of Mississauga

Katherine Morton - Katherine.morton@mississauga.ca

2021-08-11 – Circulation 1

Comments from Hugh Lynch – August 11/21
We understand this is a SP application within the current zoning permissions. Accordingly, the City of Mississauga will not be providing comment

17 Credit Valley Conservation

Annie Li tel. 905-670-1615 ext. 380

2021-08-03 – Circulation 1

Credit Valley Conservation
inspired by nature

VIA EMAIL

August 3, 2021

Planning Services
Town of Oakville
1225 Trafalgar Road
Oakville, ON
L6H 0H3

Attention: Leigh Musson – Acting Manager – Planning, Current Planning – East District

Re: Town File No. SP 1601.029/01 – 1st Submission
CVC File No. SP 21/029
IBI Group
772 Winston Churchill Blvd
Part of Lot 1, Concession 3 SDS
Town of Oakville

Credit Valley Conservation (CVC) staff have reviewed the subject application and offer comments based on the following roles and responsibilities:

1. Watershed Based Resource Management Agency and Public (commenting) Body under the Planning Act - providing comments based on CVC's Board approved policies;
2. Planning Advisory Services - providing environmental planning and technical advice/comments based on service agreements or memorandum of understanding;
3. Delegated Responsibilities – providing comments representing the provincial interest regarding natural hazards (except forest fires) as identified in Section 3.1 of the Provincial Policy Statement (2020);
4. Regulatory Responsibilities – providing comments to ensure the coordination of requirements under the Conservation Authorities Act Section 28 regulation, to eliminate unnecessary delay or duplication in process;
5. Source Protection Agency – providing advisory comments to assist with the implementation of the CTC Source Protection Plan under the Clean Water Act, as applicable.

The following plans and reports for the above noted application were reviewed:

- Survey prepared by KRCMAR dated February 3, 2015
- Architectural Drawings prepared by Baldassarra Architects: Site Plan (A-1.0); Elevation Drawings for Building A (A-3.0 & A3.1); and Elevation Drawings for Building B (A-3.0 & A3.1) last revision dated April 9, 2021
- Landscape Plans prepared by Insite Landscape Architects: Overall Landscape Plan (L-1); Landscape Plan Top Site Portion (L-2); Landscape Plan Lower Site Portion (L-3); Notes & Details (L-4) last revision dated April 7, 2021

August 3, 2021
Re: CVC File No. SP 21/029 (Town File No. 1601.29/01 IBI Group)
772 Winston Churchill Blvd
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- Tree Protection Details (TPP-2) prepared by IBI Group dated May 31, 2021
- Arborist Report prepared by IBI Group dated May 31, 2021
- Functional Servicing Report prepared by A.M.Candaras Associates Inc. dated January 29, 2021
- Stormwater Management Report and Functional Servicing Report prepared by A.M.Candaras Associates Inc. dated April 9, 2021
- Grading Plans prepared by A.M.Candaras Associates Inc.: Grading and SWM Plan East Site Area (G-1); Grading and SWM Plan West Site Area (G-2); Site Servicing and SWM Plan East Site Area (G-3); & Site Servicing and SWM Plan West Site Area (G-4) last revision dated April 9, 2021
- Erosion and Sediment Control (ESC) Plans: Erosion and Sediment Control Plan (ESC-1); & Erosion and Sediment Control Plan – Stage 2 (ESC-2) prepared by A.M.Candaras last revision dated April 9, 2021

SITE CHARACTERISTICS:
The subject property is traversed by Clearview Creek and its associated Regulatory Floodplain and erosion hazard. The section of Clearview Creek on the subject property was previously re-aligned and engineered. It is the policy of CVC and the Province of Ontario to conserve and protect the significant physical, hydrological and biological features associated with the functions of the above noted characteristics and to recommend that no development be permitted which would adversely affect the natural features or ecological functions of these areas.

ONTARIO REGULATION 160/06:
This subject property is located within the Authority's regulated area. As such, the property is subject to the Development, Interference with Wetlands, and Alterations to Shorelines & Watercourses Regulation (Ontario Regulation 160/06). This regulation prohibits altering a watercourse, wetland or shoreline and prohibits development in areas adjacent to the Lake Ontario shoreline, river and stream valleys, hazardous lands and wetlands, without the prior written approval of Credit Valley Conservation (CVC) (i.e. the issuance of a permit).

PROPOSAL:
CVC staff understands that the purpose of this Site Plan application is to permit the construction of two industrial/warehouse buildings (32,490 m^2 and 28,972 m^2).

COMMENTS:
CVC staff have had an opportunity to review the current submission and provide the following comments to be addressed by the proponent.

General

1. Please provide a response matrix/letter in the next submission outlining how all of the below comments have been addressed.

2. The updated Regulatory Floodplain (see engineering comment 4 below for additional details) is to be delineated on the engineering and site plan drawings. Based on the review of the current drawings, it appears that the main access to the site would be located within the Regulatory Floodplain. Safe access to the site in accordance with CVC's policies is to be provided to the site. As such, in addition to the Regulatory Floodplain elevation delineation, please also provide a delineation of where the

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floodplain depths at the proposed driveway and parking locations would be 0.3m in height (i.e. the Regulatory Floodplain elevation minus 0.3m) on the grading plans for our review and comment.

Engineering

3. The provided Site Servicing Plan does not show the hazards within and around the study area. Hazards (slope, erosion, etc.) and all the previously established development limits are to be clearly identified on the plans.

4. CVC has updated floodplain mapping for the subject property (attached). Please complete a formal data request for the hydraulic model that will provide the up to date and relevant water surface elevations. The water surface elevations as listed in the FSR/SWM Report must be updated to reflect the most current information.

5. CVC typically looks for proposed infrastructure to be located outside of the 100-year local erosion hazard. Provide a clear representation of the location of any proposed infrastructure as compared to the 100-year erosion hazard corridor and meander belt width delineations (associated with the regulated watercourse).

6. Confirmation from the proponent is required to ensure that routine maintenance of the proposed Stormtech and Jellyfish features will be completed to ensure long term functionality of the proposed systems.

7. The provided SWM report did not provide any analysis supporting how the proposed catchment area parameters were derived (soils, slopes, etc.). Additional analysis is required.

8. MH3 on Plan G-3 indicates 5 invert elevations for the pipes / sewers that connect to this maintenance hole. There is an arrow from MH3 to MH2. Please clarify whether this is a proposed sewer connection and if so, whether there is a concern that the flow will bypass the JellyFish units and therefore ultimately not achieve the intended 80% TSS Removal.

9. Please note that the CVC Stormwater Management Guideline (August 2012), link: https://cvc.ca/wp-content/uploads/2014/09/cvc-swm-criteria-appendices-Aug12-D-july14.pdf requires that a 24-hr SCS Type II storm is to be routed through the proposed SWM facilities to ensure that there is sufficient storage capacity.

10. Please ensure that the regional storm event for the post-development scenario is modelled as appropriate.

11. The proposed outfall to Clearview Creek is located at an elevation of 93.55m, which is above the 100-year elevation. The invert elevation of the stormtech chamber system is 90.23m, which is lower than the creek bed elevation. There is a concern of backwater in the case of an emergency and non-functioning pump during regional storm event. The storm sewer system relies on the pump, provide further detail on the impacts of a failed pumping system could have, particularly on the regional storm flows.

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a. As previously noted, CVC will provide the most up to date floodplain information to ensure that the appropriate water surface elevations are used for the specified cross sections (adjacent to the outfall) for all storm events.

12. The storm sewer headwall is located at the top of the slope associated with the Clearview Creek corridor. The headwall appears to be cutting into the top of the slope to allow for construction of the outlets. Please confirm whether there is an opportunity to extend the headwall to be prevent cutting within the top of slope.

13. Please confirm that the rip rap at the outfall is sized appropriately based on the velocities and shear stresses of the target flow rates.

14. Section 11.1 of the Functional Servicing and SWM Report references a SWM pond (presumably within the post-development condition) but this has not been shown anywhere else in the submission.

15. The proponent is to demonstrate how major overland flows within the site will be directed to the proposed onsite SWM facilities. With regards to the subsurface water quantity controls (Stormtech systems) proposed within the site, please demonstrate how flows will be directed to Clearview Creek in the event of clogged outlets and/or the storage capacity is exceeded. Please provide supporting analysis and additional details.

    b. There is limited information and analysis within the report demonstrating overland flow routes and whether the provided routes can convey the 100-year storm event to the proposed stormtech chamber without bypassing.

16. No instream work is permitted as part of the outfall construction.

Erosion and Sediment Control

17. Please note that all ESC controls measures within the proposed development are to adhere to design criteria established within the *Erosion and Sediment Control Guidelines for Urban Construction (2019)*, link here: https://cvc.ca/wp-content/uploads/2020/03/rpt_ESCGuideforUrbanConstruction_f_2019.pdf

18. There are existing sediment basins that are being utilized for the Stage 1 ESC. Please demonstrate that these sediment basins meet the design criteria within the *Erosion and Sediment Control Guidelines for Urban Construction (2019)*. Provide additional design details including but not limited to the following:

    a. Sediment forebays, turbidity curtains, emergency spillways, drainage areas, drawdown times.

    b. Please provide supporting sizing analysis for the temporary sediment basins and sediment traps proposed onsite. Please confirm whether the temporary outlets meet the ESC Guidelines for Urban Construction criteria.

c. Velocities calculations must be submitted to ensure that settling velocities are achieved.

d. Given the potential for soil contamination onsite, the temporary sediment basin is to be lined prior to accepting flows.

19. There is no discussion relating to the temporary outlet structures meeting the ESC criteria as established within the *Erosion and Sediment Control Guidelines for Urban Construction (2019)*. Additional details area required.

20. Plan ESC-1 makes reference to a temporary by-pass pumping of creek flows as well as infiltration trenches under the ESC Staging Notes. There is no indication on the drawings or report that the pumping of creek flows or infiltration trenches are proposed. Please provide additional clarity and update as required.

    a. If by-pass pumping is proposed, a detailed dewatering plan will be required.

21. Please include the following on the provided ESC plans for the following stages of the project:

    a. ESC plans are to address potential dewatering requirements during construction of the Stormtech systems. A hydrogeologist should be involved with the dewatering strategy for the site and facilities.

    b. ESC plans are to discuss how downstream water features are to be protected from sediment and sediment-laden runoff during active construction.

    c. ESC plans for topsoil stripping, as well as pre and post servicing staging is required.

Ecology

22. The subject property contains natural heritage features including a regulated watercourse. All development should be outside of this feature and set back a sufficient distance to afford the feature protection.

    a. To protect the feature gateless fencing should be installed along the creek corridor limit to deter encroachment.

23. The functional Servicing Report indicates stormwater will be discharged to Clearview Creek through outfall infrastructure. It is unclear if environmental impacts to this area have been assessed. Please confirm and describe any anticipated impacts to the watercourse as a result of the proposal and ensure that impacts are mitigated.

24. There is a pond on the site which is not proposed for retention. This feature should be investigated for the presence of wetland, fish habitat, turtle habitat and amphibian habitat. A site visit with CVC staff can be arranged to help assess this feature. The following comments apply to minimize the impact of the work. These notes should be included on the site plan.

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b. Fish Capture and Wildlife Capture collection permits must be acquired from the Ministry of Natural Resources and Forestry prior to any works.

c. A qualified professional with a valid collectors permit should be on site to complete the fish and wildlife rescue.

d. Ideally the works would occur between April 15 – September 30 of any given year. These works are not to be completed in the winter months.

25. The landscaping plans should be updated to ensure that, in regulated areas (i.e. adjacent to the creek corridor), only species listed in the CVC Plant Selection Guideline, link here: https://cvc.ca/wp-content/uploads/2018/04/Plant-Selection-Guideline-FINAL-APRIL-24th-2018.pdf are to be used. Several species proposed adjacent to the riparian area are not on this approved list. Please update the landscaping plans accordingly.

e. It is strongly recommended that Butternut be removed from the landscaping plans as this is a regulated Species at Risk, unless it is part of an approved compensation plan with the Ministry of Environment Conservation and Parks (MECP).

f. The soils on site may not be of adequate quality to support long term vegetation growth. Please review the CVC Heathy Soils Guideline, link here: https://cvc.ca/wp-content/uploads/2017/09/CVC-Healthy-Soils-Guidelines-NHS-Web-V5.pdf and implement the recommendations as necessary. Any soil management requirements are to be listed on the site plan.

26. According to the Arborist Report, trees will be removed as a result of this proposal. The trees on site have potential to provide habitat for breeding birds and bats. To avoid contravention of the *Migratory Bird Convention Act* and the *Fish and Wildlife Conservation Act* vegetation clearing should not occur from April 1 to October 31 of any given year. This timing window should be factored into project scheduling and be listed on the site plan.

27. Given that the works are proposed in or near water (e.g. SWM outfall, removal of open water feature/pond), it is the responsibility of the proponent to ensure that works, undertakings or activities do not cause the death of fish or cause the harmful alteration, disruption or destruction under the *Fisheries Act*. Please review the complete list of measures to avoid harm here: https://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures-eng.html and implement those that are applicable to the proposed work. If it is not possible to avoid or mitigate impacts, proponents can submit a request for review from their region's Fish and Fish Habitat Protection Program office (contact info: fisheriesprotection@dfo-mpo.gc.ca or 1-855-852-8320). Please refer to the Fisheries and Oceans Canada (DFO) website for additional information.

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CONCLUSION:

We trust that these comments are sufficient. Please do not hesitate to contact the undersigned at 905-670-1615 (ext. 380) should you have any further questions or concerns.

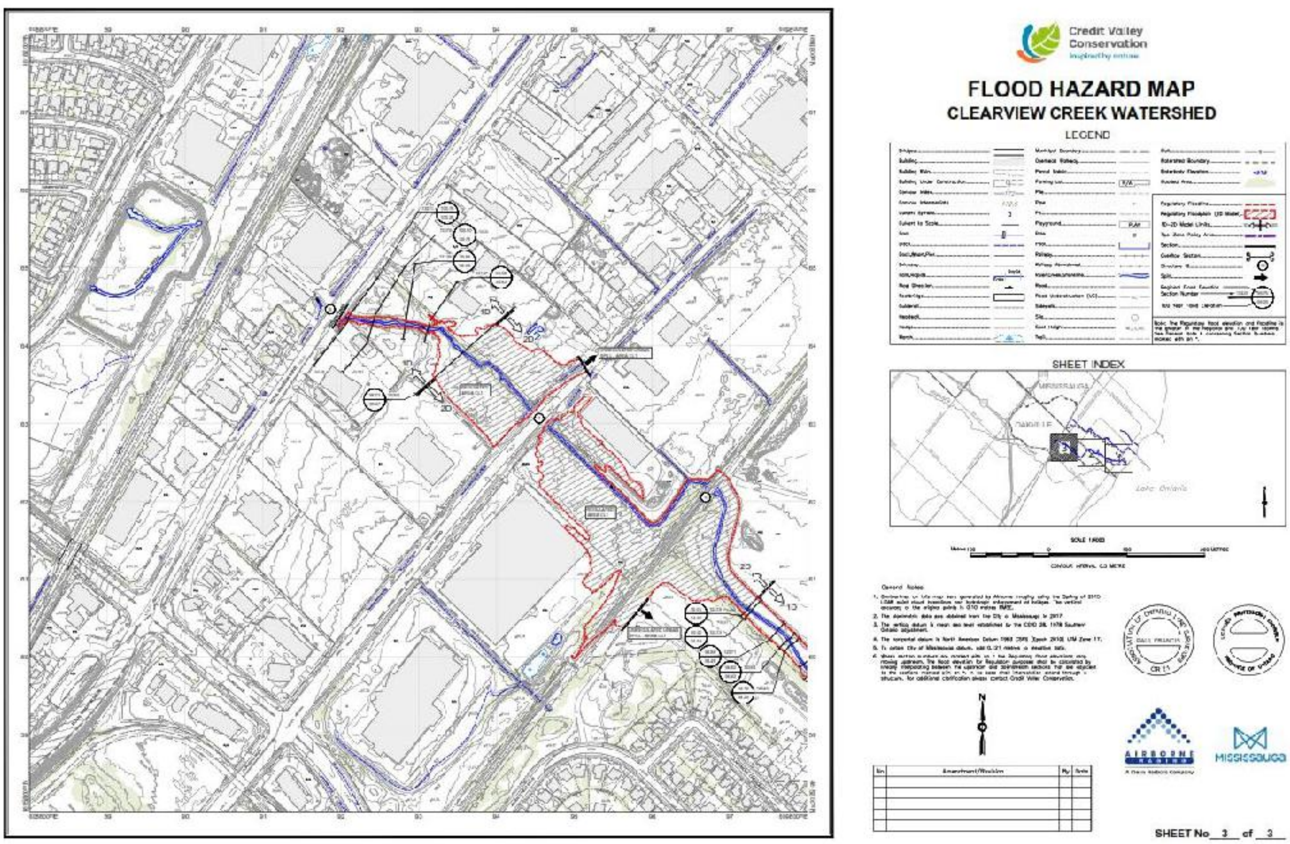
Please circulate CVC any future correspondence regarding this application.

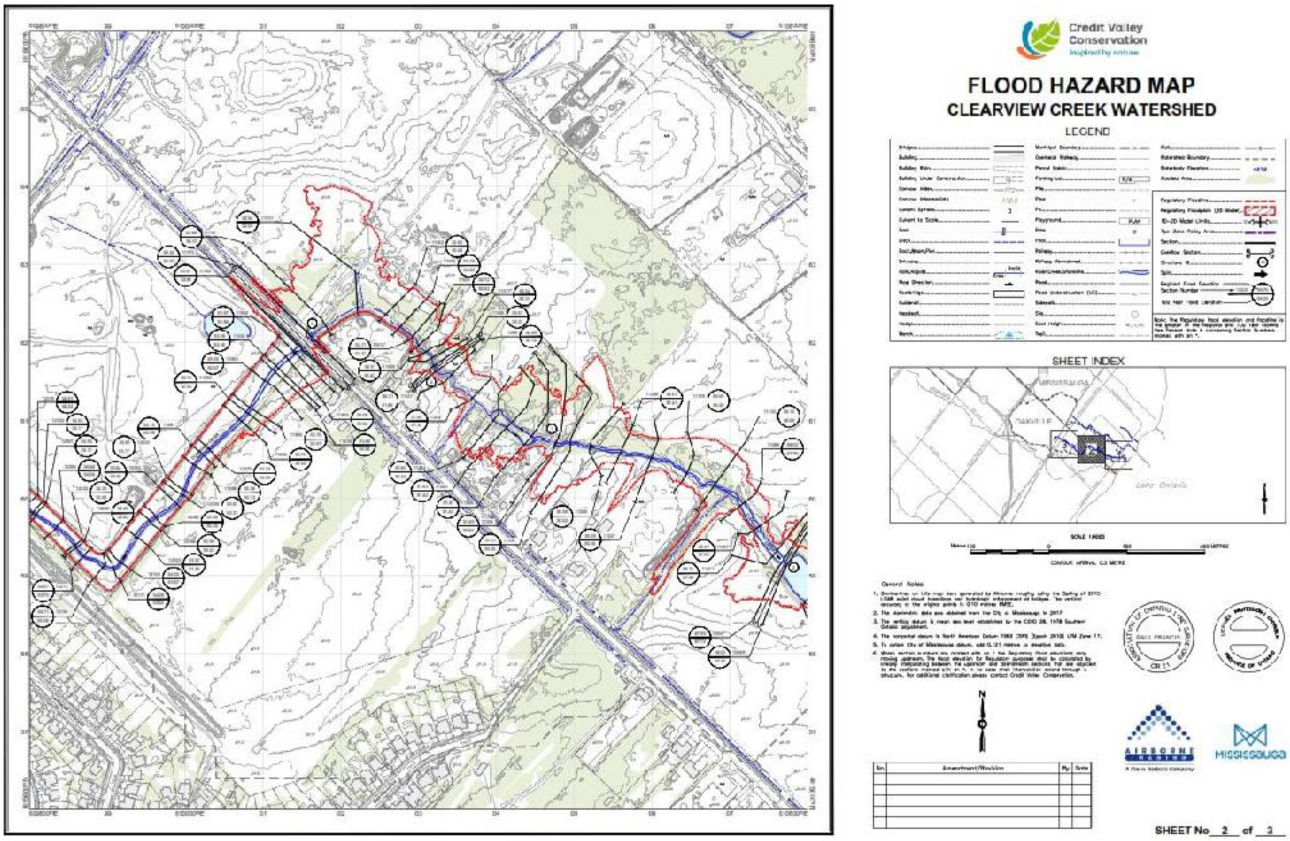
Sincerely,

Annie Lu
Planner, Planning & Development Services

cc IBI Group c/o Ashely Minns

Attachments – CVC Flood Hazard Map Clearview Creek Watershed – Sheets 2 & 3





18 Enbridge Gas Pipelines Inc. Eastern Region

Bradley Davis tel. 289-649-2030 ext. 5213017

2021-07-28 – Circulation 1

This site does not currently have access to gas. A gas main extension would be required to service this property with gas. I suggest the developer reach out to Enbridge to begin servicing discussions.

19 Hydro One Network, Real Estate Services

Dolly Shetty dolly.shetty@hydroone.com

2021-07-14 – Circulation 1

We are in receipt of Application 1601 029-01 dated July 5, 2021. We have reviewed the documents concerning the noted Plan and have no comments or concerns at this time. **Our preliminary review considers issues affecting Hydro One's 'High Voltage Facilities and Corridor Lands' only.**

For proposals affecting 'Low Voltage Distribution Facilities' please consult your local area Distribution Supplier.

To confirm if Hydro One is your local distributor please follow the following link:
http://www.hydroone.com/StormCenter3/

20 Ministry of Transportation - Ontario

Mario Panza Mario.panza@ontario.ca

2021-07-05 – Circulation 1

This site is outside of MTO's permit control area therefore we have no comments

21 Metrolinx

Tony To tel. 416-202-0809

Date – Circulation 1

Pending

22 Oakville Hydro, Engineering Dept

Dan Steele tel. 905-825-9400

2021-07-14 – Circulation 1

Three phase power is available from the distribution system located on: Winston Churchill Blvd. Space on the property is required to locate a pad-mounted transformer(s). An easement, registered in the name of "Oakville Hydro Electricity Distribution Inc.", is required for the transformer(s) and associated primary cable/duct bank. An electrical room with direct outside access and Stanley Canada Corporation locks is required per Oakville Hydro's "Conditions of Service". Please contact Oakville Hydro Engineering with service size, voltage requirement, and anticipated demand load as soon as information is available. At that time, a servicing cost will be prepared, to be borne by the applicant. Oakville Hydro will supply the transformer. Please note that transformer deliveries are approximately 16 weeks.

Any required pole relocations on Winston Churchill Blvd to be completed by Oakville Hydro at the expense of the owner/applicant.

23 Region of Halton, Planning & Public Works Dept

Quadri Adebayo tel. 905-825-6000 ext. 3105

2021-08-19 – Circulation 1

Regional Planning staff has completed the review of the above-referenced Site Plan application received March 8, 2021 that proposes a permit the construction of two industrial warehouse buildings on the subject property with ancillary parking spaces, and two access points from Winston Churchill Boulevard.

In order to inform the Town of Oakville decision, Regional staff have considered this submission from a Provincial and Regional policy perspective, and offer the following comments.

MATTERS OF PROVINCIAL & REGIONAL PLANNING INTEREST

Provincial Policy

The 2020 Provincial Policy Statement (PPS) and 2020 Growth Plan (GP) promote within settlement areas, development that will include commercial, industrial, and manufacturing uses that create employment and serve the operational function and economic viability of the planned uses within employment areas.

Once in receipt of revised site plan submission that satisfactorily addresses other technical comments/concerns identified in this letter, we would consider the application to be consistent with the PPS and conform to the GP, as it relates to the technical matters raised in the Region's comments.

Regional Policy

The subject lands are designated as 'Urban Area' within the 2009 Regional Official Plan (ROP). The Urban Area policies of the ROP provide that the range of permitted uses and the creation of new lots within the Urban Area will be in accordance with Local Official Plans and Zoning By-laws.

The subject lands also carry an "Employment Area" overlay within the ROP. The related policies within the ROP contemplates a balance of employment uses within urban areas that include industrial and commercial uses to meet long-term needs.

Land Use Compatibility (LUC)

According to the Part IV policies of the ROP (Healthy Communities Policies), the goal for environmental quality is to achieve a high-quality environment for the future generations that will maintain health and improve the quality of living. Section 143(10) of the ROP requires the Region to develop, in consultation with the Local Municipalities, the Province, Federal Government and railway agencies, Land Use Compatibility Guidelines to minimize the adverse effects of noise, vibration, odour, and air pollution from industrial, transportation and utility sources on sensitive land uses, including the application of separation distance between these non-compatible uses.

The Region has implemented LUC Guidelines to support the implementation of the ROP policies. The LUC Guideline as provided for under Section 192(5.1) of the ROP, can be accessed at https://www.halton.ca/Repository/Land-Use-Compatibility-Guidelines

The proposed development is in proximity to residential uses (sensitive land uses). Regional staff acknowledge receipt of the Preliminary Environmental Noise Report (by Jade Acoustics – June 25, 2021). The report primarily focused on analyzing sources of noise, receptors and noise mitigation measures (berms and acoustic fencing) using MECP guidelines for Class 1 Area exclusion limits for stationary and transportation noise sources (i.e. non-refrigerated truck activities, impulses associated with operations, and rooftop mechanical equipment).

The report also concludes that the Town/Region/MECP sound level limits are predicted to be met at the existing noise sensitive receptors with the incorporation of mitigation measure options (subject to future details about the building plans and tenants of the proposed development, including their mode of operations). Adding that further studies would be required when future details about the development become available.

In Regional staff opinion, the Site Plan application review stage is a development implementation stage where the finer-details of the built form is finalized. As such, a speculative location of rooftop mechanicals and other development installation will not suffice to assist staff to properly review the proposed development. Also, the proposed development did not account for the MECP's industrial 'class' system (D-6 Guidelines) in its assessment, on the basis of potential area of influence, and minimum separation distance that applies; within the context of noise, vibration, odour, and air pollution effects.

Therefore, it is recommended that the context of the environment assessment be expanded in the form a LUC report, in order to provide better clarity about the likely impact of the proposed industrial warehouse development on the surrounding sensitive land uses, how the proposal is in accordance with the D-6 guidelines, and any potential mitigation measures.

This LUC report request is also consistent with the review-requirements for the adjacent lands at 560-580 Winston Churchill Boulevard. The Region will be able to determine if the policies of the ROP are met when we receive an LUC report.

<u>Please Note</u>: The Region may require a peer review of any report by an appropriate agency or professional consultant retained by the Region at the proponent's expense.

<u>Environmental Planning</u>

A watercourse (Clearview Creek) that is within the Credit Valley Conservation (CVC) Authority's regulatory area traverses the subject lands. CVC staff provides environmental advisory services to the Region and Town in relation to the protection of certain natural heritage features and natural hazard land management.

Halton Region is in receipt of CVC review comments on August 3, 2021. Regional staff request that CVC comments and recommendations be considered and implemented with respect to any watercourse, floodplain, and/or natural hazard feature concerns, to CVC's satisfaction in a subsequent site plan application submission.

<u>Archaeological Resources</u>

In accordance with Section 167(6) of the ROP, the subject lands has Archaeological potential. An Archeological Assessment was reviewed by the Region for the proposed development at 560-580 Winston Churchill Boulevard.

Therefore, for consistency, prior to any site alteration, an Archaeological Assessment must be undertaken for the subject lands in accordance with the Ontario Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI) standards. A confirmation of acceptance and filing of reports at the MHSTCI will also be required.

<u>Potential Contamination</u>

Section 147(17) of the Regional Official Plan requires the proponent of a development proposal to determine whether there is any potential contamination on the site they wish to develop, and if there is, to undertake the steps necessary to bring the site to a condition suitable for its intended use. The Region further expects that the proponent will follow the processes outlined in O. Reg. 153/04 in the preparation of supporting documentation.

Circulated with the subject application was an Environmental Site Screening Questionnaire (ESSQ), as well as a due diligence Phase II Environmental Site Assessment (ESA) was prepared by EXP (April 22, 2020).

Regional staff have reviewed the material and note the report was done in accordance to CSA Z769-00. Given that further work is required to delineate contamination in soil and sediment on site, staff kindly request a Phase II ESA report in accordance with O.Reg 153/04 requirements and incorporating existing work be submitted prior to site alteration. The report should also be accompanied with the borehole logs of existing groundwater monitoring wells.

Summary:

Regional Staff has considered the proposed development from a Regional Official Plan perspective, and the Region is currently not in a position to provide a favourable recommendation and/or conditions of site plan approval at this time as the requirements of LUC report, a Phase II ESA, an archaeological assessment, and favourable CVC recommendation for the subject lands are still outstanding.

In addition, the following technical matters related to site servicing and transportation need to be regarded.

OTHER MATTERS OF REGIONAL INTEREST

Municipal Servicing Infrastructure

Section 89(3) of the ROP requires that all new developments within the Urban Area be on the basis of connection to Halton's municipal water and waste water system.

Existing Servicing

- Road: The property abuts a Regional Road.
- Water main: There is no water main located adjacent to the property. Please note that the applicant should undertake their own fire flow testing in the area in order to confirm the design requirements for domestic water supply and fire protection.
- Sanitary Sewer: There is no sanitary sewer located adjacent to the property.

Prior to submission of this site plan application, the Owner had provided an updated Functional Servicing Report (FSR) - by A. M. Candaras Associates Inc. (August 31, 2020). This FSR was a comprehensive study that addressed the servicing at 772, 560/570/580 and 658 Winston Churchill Boulevard (WCB).

Regional staff has reviewed this report. The FSR indicated that the preferred servicing option to service this site is to construct a gravity sanitary sewer through the Town of Oakville's open space block to the west of the property (at Acacia Court), and to extend a new water main on Winston Churchill Boulevard (from Beryl Road to Deer Run Avenue). This is also the Region's preferred servicing option.

1. Servicing Installation through Town of Oakville Lands: The Owner will be responsible for the cost to arrange and transfer any access easements, license agreements, encroachment agreements and/or other arrangements required by the Town (e.g. construction, design and compensation works).
   The Region's servicing conditions (to be provided once other matters are addressed) reflect the above-noted FSR servicing strategy. However, for the sanitary sewer servicing, the conditions are based on the assumption that a Regional easement can be obtained from the Town of Oakville over their open space block, etc. Should the Town not allow a Regional easement over these lands, then the proposed servicing of this site will have to be re-evaluated and another servicing alternative selected.

2. Servicing Option for 658 WCB (addressed as 568 WCB in the FSR): The Region originally had concerns about servicing the property located at 658 WCB, since the sanitary sewer servicing of the subject lands will be through the Town of Oakville's open space block, and the property at 658 WCB will not have access to the proposed sewer.

   The FSR addressed this issue by recommending a private sanitary sewer force main to be extended from 658 WCB through the property at 560 WCB. This private force main would be located in a private easement on the subject lands and the necessary mutual servicing agreement for this would also have to be in place to ensure the force main is accessible for maintenance purposes by the owners at 658 WCB. The Region accepts the proposed method to service the property at 658 WCB.

3. Static Water Pressure: The FSR notes that the proposed static water pressures in this area are estimated to be at 44 psi. This proposed static pressure value is within the Regional standards, but it is on the lower end of the pressure range.

   This is a concern since the Region will require that backflow prevention devices to be installed in the proposed buildings within this development which can result in a pressure reduction at the building. This, along with other friction losses in the water system for this development, could result in the water pressure falling below what is allowed by the Building Code in the proposed buildings on this site. Due to this, there may be a need for a private pressure boosting pumps to be installed in the buildings as part of the plumbing system for this development.

4. Extension of Water main on WCB: The extension of the water main on Winston Churchill Boulevard will require crossing under the existing Canadian National Railway line located north of the site.

   The Owner shall be responsible for the design, construction, coordination, approval from Canadian National Railway and funding of all works required to work in the vicinity of the Canadian National Railway's lands and track system.

5. Storm Water Management: The review and approval of any storm water management report (SWM) should be collaboratively submitted through Halton's Development Project Manager & Peel Region respectively. Please note that both Halton Region and Peel Region will require pre and post development storm water flows from the site to the existing drainage system on Winston Churchill Boulevard (Regional Road 19) to be maintained both during and after construction, such that there are no adverse impacts to the existing drainage system on Winston Churchill Boulevard (Regional Road 19).

Summary:

In summary, we will be able to recommend Regional conditions related to municipal servicing once other technical requirements associated with the subject lands have been satisfactorily addressed.

Regional Transportation

Winston Churchill Boulevard is a boundary road between Halton and Peel Regions, and is operated and maintained by Peel Region. Peel Region's review and approval will also be required for any development application (including but not limited to: transportation study, access, right-of-way, etc.). As per the

Halton/Peel maintenance agreement, Halton Region's comments are provided for the consideration of Peel Region.

Based Section 173(8) of the ROP, the following Region of Halton staff offer the following transportation planning review comments:

<u>Traffic Impact Study</u>:

A Transportation Impact Study (TIS) prepared by IBI Group (April 2021) was reviewed by Regional staff. The TIS must be updated to include the following:

- Redistributed site trips based on the North Access comments (restricted to right-in/right-out), IF this access is supported by the Region of Peel;
- A function design plan with preliminary road improvements and design features must be provided prior to the approval of the transportation study (and with the study resubmission). This is required in order to ensure the feasibility of the required road improvements. This includes the traffic signal design, recommended northbound left turn and southbound right-turn lane (storage plus tapers) at the South Access, as well as a southbound right-turn lane (storage plus taper) at the North access (including access restriction measures); and
- A comprehensive holistic review of the entire corridor regarding access, from the railway tracks to the north, to Deer Run to the south and including all accesses proposed for 560 Winston Churchill Boulevard. This corridor review must also include all existing accesses on both sides of Winston Churchill Boulevard.

<u>Access</u>:

The TIS outlined the following:

(i.) That the Proposed North Site Access is to intersect Winston Churchill Boulevard at approximately 180 metres south from the north property line. This full-movement, un-signalized access is proposed to consist of one lane per direction."

(ii.) That the Proposed South Site Access is to intersect Winston Churchill Boulevard at approximately 56 metres north from the south property line and is approximately 180 metres south of the Proposed North Site Access. The intersection of Winston Churchill Boulevard and the Proposed South Site Access is proposed to be signalized and located opposite of Orr Road, located east of the development site, as described in further detail in Section 3.1.4.

Based on the above road access information, Regional staff offer the following comments:

(i.) The North access is shown in the transportation study as a full movement access. Halton Region cannot support this proposed access as a full movement access due to inadequate spacing from the full movement signalized intersection.

- The North access, with spacing of approximately 185-metres north of the South access, can be supported as a right-in/right-out access. There will be the requirement for a physical restriction (example: centre median, final approval by Region of Peel) and turn restriction signage for entering & exiting vehicles. Peel Region must also support the North access as a restricted right-in/ right-out access.

- The North access (restricted to right-in/right-out movements), will require a northbound right-turn lane (to remove turning vehicles/trucks from the single northbound through lane on Winston Churchill Boulevard).

(ii.) The South access will be a full movement signalized intersection with left and right-turn lanes. Due to the existing features on Winston Churchill Boulevard, such as the hydro poles/lines along both sides and the guardrail in the area of the south access (full movement, signalized), the developer will be required to design the accesses to the site based on acceptable infrastructure relocations.

(iii.) Final access/intersection approvals are subject to the review and approval of a transportation impact study. Access to a Regional road must comply with the Region's By-law No. 32-17, a By-law to prohibit, restrict and regulate access to the Regional road system and the Region's Access Management Guideline (2015). Peel Region must also support and approve the accesses to the site, specifically the north access.

(iv.) A functional design plan for the North and South accesses, with preliminary road improvements and design features, must be provided prior to the approval of the transportation study. This is required in order to ensure the feasibility of the required road improvements. Additionally, the requirement for a comprehensive holistic review of the entire corridor regarding access, from the railway tracks to the north to Deer Run to the south and including all accesses proposed for 560 Winston Churchill Boulevard. This corridor review must also include all existing accesses on both sides of Winston Churchill Boulevard.

Please note: Peel Region shall review and confirm the above-noted access requirements as part of their review.

Right-of-Way (ROW):

The Owner should note the following technical items prior to receiving conditions of site plan approval thus:

- Any lands within 20.75-metres of the centre line of the original 66ft right-of-way of Winston Churchill Boulevard (Regional Road 19) starting at the daylight triangle (at Future Orr Road) and tapering to 18-metres for a distance of 245-metres northerly (measured from the centreline) that are part of the subject property shall be dedicated to the Region of Peel for the purpose of road right-of-way widening and future road improvements.
- For the remaining frontage, any lands within 18-metres of the centre line of the original 66ft right-of-way of Winston Churchill Boulevard (Regional Road 19) that are part of the subject property shall be dedicated to the Region of Peel for the purpose of road right-of-way widening and future road improvements.
- A daylight triangle measuring 15m along Winston Churchill Boulevard (Regional Road 19) and 15m along the development south access (northwest and southwest corners) shall be dedicated to the Region of Peel for the purpose of road right-of-way widening and future road improvements.

- A 0.3m reserve is required across the entire frontage of the development property along Winston Churchill Boulevard (Regional Road 19), including the daylight triangle but excluding the approved entrance location, to the satisfaction of Peel Region.
- All lands to be dedicated to Peel Region shall be dedicated with clear title (free and clear of encumbrances or potential contamination) and a Certificate of title shall be provided, in a form satisfactory to the Director of Legal Services or his designate.

Please note: The applicant is to provide a survey sketch confirming the widening requirement is reflected on the site plan in accordance with the above.

Servicing Agreement

- The Owner must enter into a Servicing Agreement (with Peel Region) for the completion of required Works (road improvements) and all associated development construction processes and impacts. Road improvements will be determined after the review and approval of the final transportation impact study.
- The owner is responsible for all costs associated with the improvements detailed as part of the works and must submit for approval detail design drawings and cost estimates.
- The detailed design drawings are required for review and approval, by Halton Region and Peel Region, for all proposed/approved intersection/access road improvements, based on the approved Transportation Impact Study.

Setbacks & Zero Lot Lines

With respect to the development frontages, we request that setbacks be implemented/maintained from roadway right-of-way limits (i.e. Winston Churchill Blvd) based on Town of Oakville requirements.

Additionally, the applicant will be required to demonstrate that construction of any underground/above ground development infrastructure (underground parking, SWM tanks, buildings, etc.,) will not impact or encroach upon the Regional right of way (i.e.: temporary or permanent infrastructure including structural tiebacks will not be permitted within the Regional Right of Way).

The location of development infrastructure (including but not limited to - underground/above ground parking structure, building, SWM storage tank, etc.,) 0.0-metres from the property line would limit or potentially preclude the Region's ability to locate infrastructure, such as utilities, AND will limit any future Regional Capital Project's grading flexibility, within the Regional right-of-way in close proximity to the right-of-way limit, i.e. within the zone of influence.

Please note: Transportation Planning does not support setbacks of 0.0-metres from property line.

Construction Activities

- For construction methods - shoring/tiebacks, open excavation, etc., a detailed submission of construction methods is required for internal review by various Regional groups prior to proceeding with plans for construction through the Servicing Agreement/detailed design drawings.
- For construction – crane swings, if it is determined that the construction crane swing will impact the Region's right-of-way, the applicant must enter into the Encroachment Agreement and/or

submit a Municipal Consent application, with Engineering Drawings, for review and approval, which would go through Halton's internal review process to various staff & departments. There will be specific requirements for the Agreement/Municipal Consent, including fees, security deposit, etc., (to be determined by staff as part of the review process), and a due date for completion.

- For construction – access, construction access, traffic management plan and any proposed use of the Regional right-of-way, is subject to review and approval from Halton Region.

Summary:

Regional conditions related to Transportation Planning matters on this site plan will be provided after the Owner provides a revised TIS, a revised site plan and an updated survey sketch reflective of Transportation comments herein.

Waste Management

Based on the Region's Development Design Guidelines for Source Separation of Solid Waste, the Region will not provide the site waste collection services. The Owner must be on private waste collection.

Finance

1. The Owner will be required to pay all applicable Regional development charges in accordance with the Region of Halton Development Charge By-law(s), as amended.

2. To obtain the most current information which is subject to change, please visit our website at https://www.halton.ca/The-Region/Finance-and-Transparency/Financing-Growth/Development-Charges-Front-ending-Recovery-Payment

CONCLUSION

In conclusion, Regional Planning staff is unable to provide conditional site plan approval at this time. We will be in a position to provide our conditions in relation to this site plan application once:

- A satisfactory Land Use Compatibility report has been provided.
- An updated TIS, a revised survey sketch, and site plan are provided to the satisfaction of Transportation Planning, confirming the widening and access requirements of the Region.
- A satisfactory Archaeological Assessment has been provided.
- Supportive comments have been received from the Credit Valley Conservation.

Note: The applicant is advised that some of the comments and provided in this letter may impact the layout and other design elements of the plan.

Should you have any questions or concerns about the above comments, please contact me at (905) 825-6000 ext. 3105 or Quadri.Adebayo@halton.ca. **Please send a copy of the Town's decision on this application.**

24 Region of Peel, Development Services

Diana Guida tel. diana.guida@peelregion.ca

2021-07-28 – Circulation 1

Region of Peel
working with you

Public Works

10 Peel Centre Dr.
Suite B
Brampton, ON
L6T 4B9
tel: 905-791-7800

peelregion.ca

July 28, 2021

Leigh Musson
Planning Services
Town of Oakville
1225 Trafalgar Road
Oakville, ON
L6H 0H3

RE: Site Plan Application
772 Winston Churchill Bouvard
Town of Oakville
City File: 1601.029/01
Region File: SP-1601.029/01

Dear L. Musson,

Region of Peel staff have reviewed the above-noted site plan application and offer the following comments below.

Development Servicing and Engineering

Water Servicing & Sanitary Sewer Servicing

- Please be advised that connection to Region of Peel infrastructure is not permitted.

Regional Roads & Storm Water Requirements

- The Region of Peel has an Environmental Compliance Approval (9582-B9TRLW) for the Regional Municipality of Peel Stormwater Management System. Therefore, it is the Region's mandate that no additional flows are permitted and no new connections are made to Regional Roads.
- Development flows are to be directed to the Local Municipality's storm sewer system or watercourses, to the satisfaction of the Region of Peel, the local Conservation Authority and all concerned departments and agencies. Alternatively, flows can be mitigated using Low Impact Development Technologies. Developers are required to demonstrate how this will be achieved through a Stormwater Management Report.
- Prior to Site Plan Approval, the Region will require a satisfactory Stormwater Management Report.
  - We have received the SWMR dated 2021-04-09 and prepared by AM Candaras/A.M Candaras P.Eng. The Report will be assigned and comments will be provided to the Engineering Consultant.
- Please refer to the Region's Storm Water Management Report Criteria within the Functional Servicing and Stormwater Management Report document found online.
- Prior to Site Plan Approval, the non-refundable Report Fee of $515 is required as per the current Fees By-law 6-2021 (https://www.peelregion.ca/council/bylaws/bl-6-2021/). Due to the current circumstances, the Region of Peel is now taking payment

Region of Peel
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Public Works

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L6T 4B9
tel: 905-791-7800

peelregion.ca

in the form of Electronic Funds Transfer (EFT). Please contact Iwona Frandsen at iwona.frandsen@peelregion.ca for EFT setup instructions.

- Prior to Site Plan Approval, a copy of the draft reference plan satisfactory to Traffic and Legal will be required.

General Servicing Comments

- All our design criteria, standards, specifications, procedures and report and submission requirements are found online at https://www.peelregion.ca/public-works/design-standards/#procedures
- If you have questions regarding the Site Servicing Application Submission Requirements, please contact Servicing Connections at siteplanservicing@peelregion.ca

Traffic Engineering

Access/Study Requirements

- A Traffic Impact Study (TIS) will be required; terms of reference has been received and found to be satisfactory.
- The Region is in support of the central right-in/right-out access. The access will need to be physically restricted by a centre median, finer details will be dealt with through next submissions and the Engineering Submission.
- The right-in/right-out access will need to be equipped with a right turn lane. The Region requests that a functional design be included as part of the next submission which addresses auxiliary turn lane requirements and geometrics for all accesses proposed off of Winston Churchill Boulevard, including all dimensions.
- The Region is in support of the southerly full moves access across from the future Orr Road, the Owner's consultant is to work with the developer across the road and the City to ensure the proper alignment of the access. Finer details will be dealt with through the next submissions and the Engineering Submission.

Property Requirements

- The Region requests the gratuitous dedication of lands to meet the Regional Official Plan requirement for Regional Road 19 (Winston Churchill Boulevard) which has a right of way of 41.5 metres, 20.75 metres from the centreline of the road allowance, within 245 metres of intersections to protect for the provision of but not limited to: utilities, sidewalks, multiuse pathways and transit bay/shelters.
- The Region will require the gratuitous dedication of a 15 x 15 metre daylight triangle at the intersection of Winston Churchill Boulevard and the future Orr Road, on either side of the access.
- The Region will require the gratuitous dedication of a 0.3 metre reserve along the frontage Regional Road 19 (Winston Churchill Boulevard) behind the property line and daylight triangles except at any approved access points.
- The applicant is required to gratuitously dedicate these lands to the Region, free and clear of all encumbrances. All costs associated with the transfer are the responsibility of the applicant. The applicant must provide the Region with the necessary title documents and reference plan(s) to confirm the Regions right-of-way.
- A draft reference plan will be required for our review and approval prior to the plans being deposited. All costs associated with preparation of plans and the transfer of the lands will be solely at the expense of the applicant.

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Public Works

10 Peel Centre Dr.
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Landscaping/Encroachments

- Landscaping, signs, fences, cranes, gateway features or any other encroachments are not permitted within the Region's easements and/or Right of Way limits.

Engineering Requirements

- A detailed engineering submission of road and access works will be required for our review and comment, designed, stamped and signed by a Licensed Ontario Professional Engineer. The engineering submission **MUST** include the removals, new construction and grading, typical sections and pavement markings and signing drawings. All works within Region of Peel's right of way must be designed in accordance to the Public Works, "Design Criteria and Development Procedures Manual" and "Material Specifications and Standard Drawings Manual".
- The Owner shall submit to the Region a detailed cost estimate, stamped and signed by a Licensed Ontario Professional Engineer, of the proposed road and access works within the Regional right of way.
- Securities shall be submitted in the form of either a letter of credit or certified cheque, in the amount of 100% of the approved estimated cost of road and access works along Regional Road 19 (Winston Churchill Boulevard).
- A 8.91% engineering and inspection fee shall be paid to the Region based on the approved estimated cost of road and access works (minimum $1,724.41).
- The Owner will be required to submit the following prior to commencement of works within the Region's right-of-way:
  - Completed Road Occupancy Permit and a permit fee as per the Region's user fees and charges By-law;
  - Completed Notice to Commence Work ;
  - Provide proof of insurance with the Region of Peel added to the certificate as an additional insured with $5 million minimum from the Contractor;
  - Please note that any proposed construction within the Region of Peel's right of way is pending PUCC approval (minimum six week process). Please note that PUCC circulation requirements have recently changed. We require PDF version of the full drawing set it is to be sent via email, and cannot exceed 10MB per email.
- All costs associated with the design and construction of road and access works will be 100% paid by the Owner.

Waste Management

- This property is within the vicinity of St. Lawrence Cement landfill site. It is an inactive, private landfill located between Winston Churchill and Southdown Rd, at Lakeshore Blvd. The exact boundaries are unknown. No further information is available.
- Waste collection will be required through a private waste hauler.

Region of Peel
working with you

If you have any questions or concerns, please contact the undersigned at diana.guida@peelregion.ca

Yours truly,

Diana Guida
Junior Planner
Development Services

25	**Rogers** Monica LaPointe tel. 416-913-0693

2021-07-05 – Circulation 1

ROGERS

July 5, 2021

Town of Oakville
Planning Department

Attention:	Leigh Musson
APPLICATION NO	1601.029/01 IBI Group -
APPLICATION TYPE	Site Plan Application
ADDRESS	772 Winston Churchill Boulevard
GENERAL LOCATION	Winston Churchill and Canadian Rail Company
DESCRIPTION	Two industrial/warehouse buildings
Rogers Reference Number	M213023

Rogers Communications ("**Rogers**") has reviewed the application for the above Site Plan and has determined that it intends to provide cable and telecommunications services. Accordingly, we request that municipal approval be granted subject to the following conditions:

1. Prior to Site Plan approval, the Developer/Owner will, at its own cost, grant all necessary easements and maintenance agreements required by those CRTC-licensed telephone companies and broadcasting distribution companies intending to serve the Site Plan (collectively, the "**Communications Service Providers**"). Immediately following registration of the Site Plan , the Developer/Owner will cause these documents to be registered on title.

2. Prior to Site Plan approval, the Developer/Owner will, with consultation with the applicable utilities and Communications Service Providers, prepare an overall utility distribution plan that shows the locations of all utility infrastructure for the Site Plan, as well as the timing and phasing of installation.

In addition, we kindly request to, where possible, receive copies of the following documents:
(1) the comments received from any of the Communications Service Providers during circulation;
(2) the proposed conditions of draft approval as prepared by municipal planners prior to their consideration by Council or any of its committees; and
(3) the planners' report recommending draft approval before it goes to Council or any of its committees.

Should you require further information or have any questions, please do not hesitate to contact me at gtaw.newarea@rci.rogers.com.

Yours truly

Monica LaPointe

Monica LaPointe
Coordinator
gtaw.newarea@rci.rogers.com
Rogers Communications, Wireline Access Network
3573 Wolfedale Rd, Mississauga Ontario

Resubmission Chart:

Please fill out this chart when preparing a resubmission and submit in WORD format.

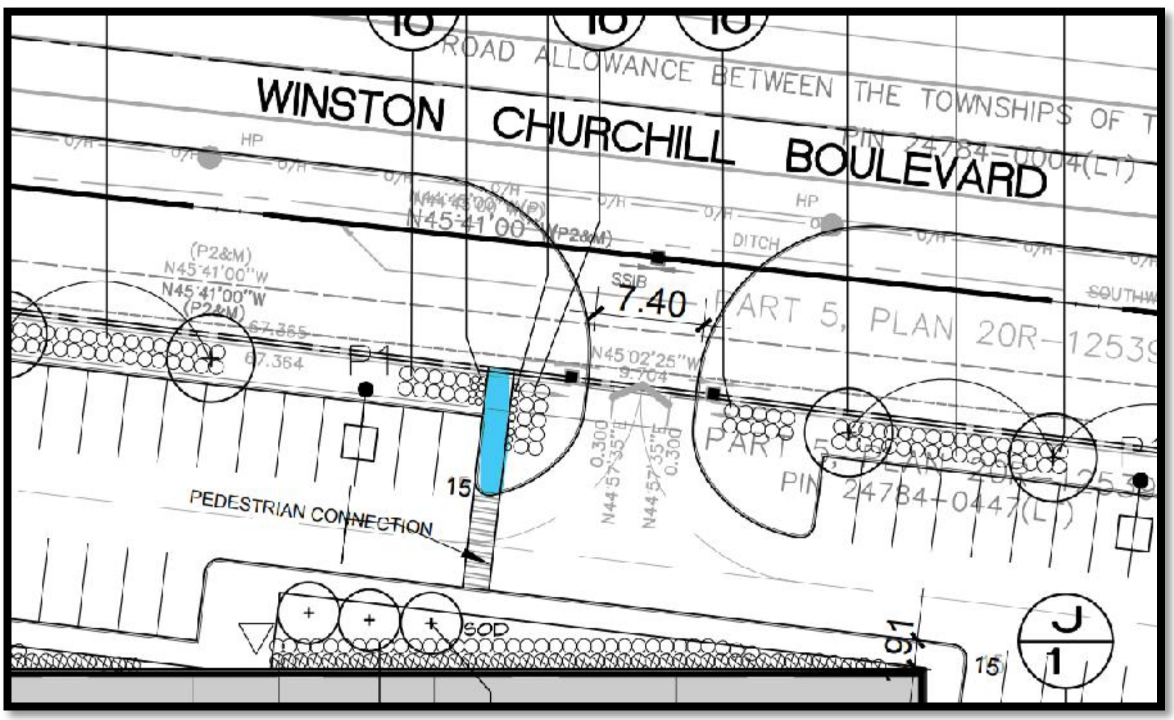
Drawings:	Drawing # /Doc #:	Rev. # & Date:		Consultant:
Reports and Studies:				
Documents:				

Site Plan Circulation Review –
Transportation Comments

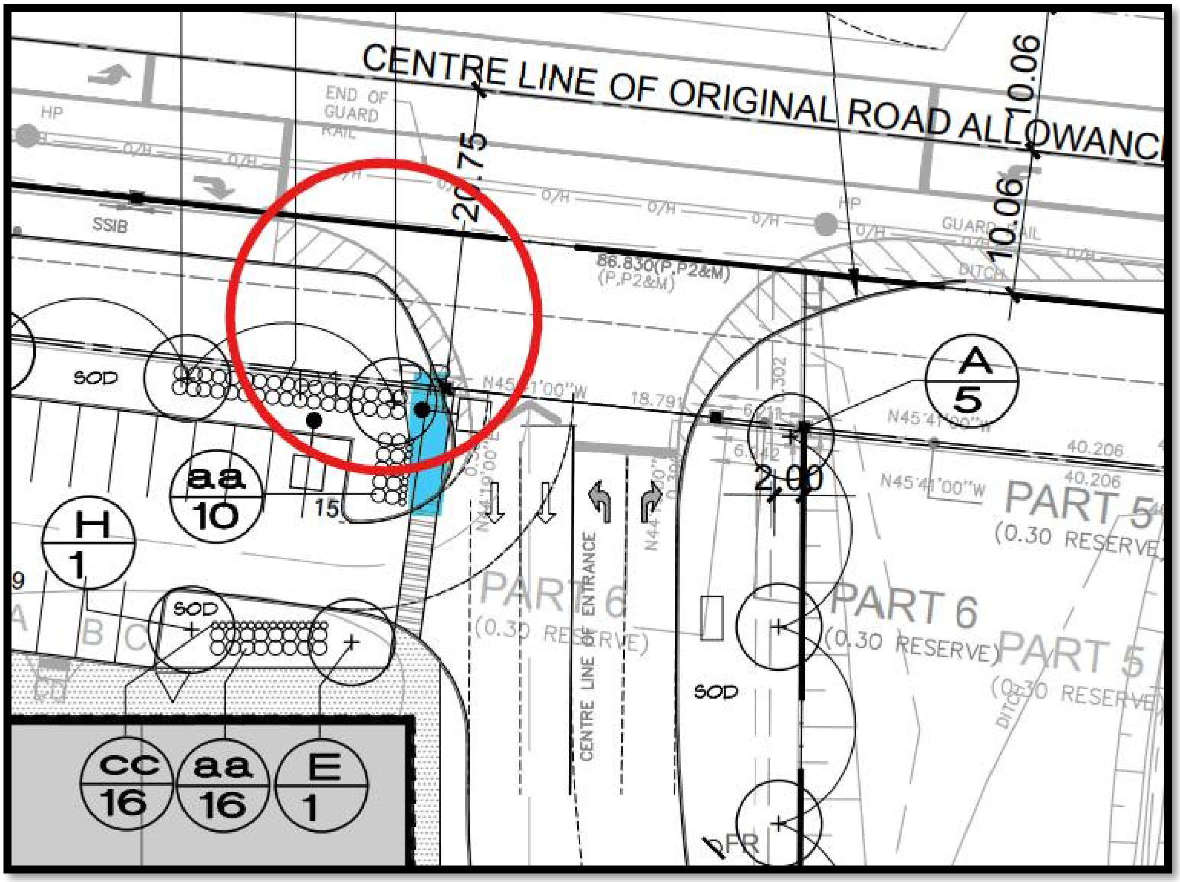
Date:	2021-07-23
To:	Leigh Musson
From:	Asad Yousfani/Aquisha Khan
File #:	1601.029/01
Address:	772 Winston Churchill Boulevard
Circulation Number	1

<u>Sustainable Transportation</u>

1. [Circ. 1] Can the applicant confirm these pedestrian connections will connect to the future pedestrian facility within the Region of Peel's road widening please?



This one below at the driveway should also take the future signal into consideration.



<u>Oakville Transit</u>

1. [Circ. 1] Oakville Transit provides door-to-door specialized transit service called care-A-van for persons with disabilities. Service is provided by low-floor, fully accessible 26ft buses supplemented in partnership with local taxi providers. Drivers will leave the vehicle and escort the customer to the first accessible public entrance. The vehicle will occupy part of the drive aisle for the duration of loading, unloading and securing mobility devices onboard.
2. [Circ. 1] Conventional transit service on Winston Churchill Boulevard is provided rush hour only by Miway (Mississauga Transit). All day conventional transit service to and from the Clarkson GO station provided by Oakville Transit and Miway is available at the intersection of Royal Windsor Drive and Winston Churchill Boulevard, approximately 600m from the site.

<u>Transportation</u>

[Circ. 1] Refer to the TIS – section 3.1.3 Background growth developments.

1. In addition to 560 WCB, the report needs to consider other developments for traffic analysis purposes. The link below has all of the Development Applications:

https://eos.oakville.ca/mobileOakville/index.html?viewer=EOS_Planning_and_Development.htmPlanDev

Other developments such as 2175 Cornwall and 2395 Cornwall road need to be considered. The traffic generated from these developments will be heading eastward or Cornwall, making a left on WCB and heading north. Therefore, the analyses at major intersection(s) need to be documented.

Aquisha Khan, P. Eng.
Transportation Engineer, Engineering & Construction
aquisha.khan@oakville.ca
(905) 845-6601

Appendix C

Signal Timing Plans

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	**September 15, 2020**	**Prepared Date**	**September 15, 2020**
Database Rev	**iNet**	**Completed By**	**BL**
Timing Card / Field rev	**-**	**Checked By**	**TF**

Location: **Winston Churchill Boulevard @ Royal Windsor Drive**

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
1	Royal Windsor Drive - EB P.P LT	5	0	0	3	0	0	10	14
2	Royal Windsor Drive - EB/WB	8	11	17	4.0	3.0	56	44	56
3	Winston Churchill Boulevard - SB Prot. LT	8	0	0	3.0	2.0	49	32	31
4	Winston Churchill Boulevard - NB/SB	8	14	23	4.0	3.3	35	34	39
5	Not in use	-	-	-	-	-	-	-	-
6	Not in use	-	-	-	-	-	-	-	-
7	Not in use	-	-	-	-	-	-	-	-
8	Not in use	-	-	-	-	-	-	-	-

System Control
Yes

Semi-Actuated Mode
Yes

TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
06:00 - 09:30	AM	140	108
09:30 - 15:00 19:30 - 00:00	OFF	120	2
15:00 - 19:30	PM	140	104

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	**September 15, 2020**		**Prepared Date**	**September 15, 2020**
Database Rev	**iNet**		**Completed By**	**BL**
Timing Card / Field rev	**-**		**Checked By**	**TF**

Location — **Winston Churchill Boulevard @ Beryl Road**

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
1	Not in use	-	-	-	-	-	-	-	-
2	Winston Churchill Boulevard - SB	12	7	11	4.0	2.1	31	31	31
3	Not in use	-	-	-	-	-	-	-	-
4	Computer Phase	8	7	12	4.0	2.3	29	29	29
5	Not in use	-	-	-	-	-	-	-	-
6	Winston Churchill Boulevard - NB	12	7	11	4.0	2.1	31	31	31
7	Not in use	-	-	-	-	-	-	-	-
8	Beryl Road - EB	8	7	12	4.0	2.3	29	29	29

System Control
Yes

Semi-Actuated Mode
Yes

TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
06:00 - 09:30	AM	60	5
09:30 - 15:00 19:30 - 03:00	OFF	60	13
15:00 - 19:30	PM	60	35

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	**September 15, 2020**		**Prepared Date**	**September 15, 2020**
Database Rev	**iNet**		**Completed By**	**BL**
Timing Card / Field rev	**-**		**Checked By**	**TF**

Location: **Winston Churchill Boulevard @ Lakeshore Road**

Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
1	Not in use	-	-	-	-	-	-	-	-
2	Lakeshore Road - EB/WB	8	7	12	4.0	2.0	59	51	54
3	Not in use	-	-	-	-	-	-	-	-
4	Winston Churchill Boulevard - SB	8	7	10	4.0	2.2	31	34	36
5	Not in use	-	-	-	-	-	-	-	-
6	Not in use	-	-	-	-	-	-	-	-
7	Not in use	-	-	-	-	-	-	-	-
8	Not in use	-	-	-	-	-	-	-	-

System Control
Yes

Semi-Actuated Mode
Yes

TIME (M-F)	PEAK	CYCLE LENGTH (s)	OFFSET (s)
06:45 - 09:15	AM	90	41
09:15 - 15:30 18:30 - 22:00	OFF	85	54
15:30 - 18:30	PM	90	89

Appendix D

Turning Movement Counts

Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & ROYAL WINDSOR DR
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Turning Movement Count (3 . WINSTON CHURCHILL BLVD & ROYAL WINDSOR DR) CustID: 01902061 MioID: 380805

Start Time	Southbound WINSTON CHURCHILL BLVD						Westbound ROYAL WINDSOR DR						Northbound WINSTON CHURCHILL BLVD						Eastbound ROYAL WINDSOR DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
07:00:00	55	24	19	0	0	98	4	72	30	0	0	106	10	16	17	0	0	43	13	160	23	0	0	196	443
07:15:00	80	33	18	0	1	131	4	71	21	0	0	96	7	24	18	0	0	49	9	224	16	1	1	250	526
07:30:00	84	35	32	0	0	151	7	99	34	0	1	140	10	28	17	0	0	55	17	205	18	0	0	240	586
07:45:00	137	63	51	0	0	251	9	106	35	0	0	150	7	26	27	0	0	60	19	186	23	0	0	228	689
Hourly	356	155	120	0	1	631	24	348	120	0	1	492	34	94	79	0	0	207	58	775	80	1	1	914	2244
08:00:00	91	38	37	0	0	166	10	139	39	0	0	188	3	29	24	0	0	56	31	196	18	0	0	245	655
08:15:00	154	77	60	0	1	291	6	116	34	0	0	156	5	35	28	0	0	68	35	170	21	0	1	226	741
08:30:00	80	68	51	0	0	199	7	122	46	0	0	175	8	31	26	0	0	65	35	155	29	0	0	219	658
08:45:00	96	56	44	0	0	196	12	92	42	1	2	147	8	35	23	0	1	66	25	167	14	0	0	206	615
Hourly	421	239	192	0	1	852	35	469	161	1	2	666	24	130	101	0	1	255	126	688	82	0	1	896	2669
BREAK																									
11:00:00	38	20	21	0	0	79	11	85	40	0	0	136	11	30	14	0	0	55	27	94	5	0	0	126	396
11:15:00	54	20	8	0	0	82	16	83	67	0	0	166	8	25	15	0	0	48	23	106	9	0	0	138	434
11:30:00	41	23	28	0	0	92	7	83	57	0	0	147	10	37	18	0	0	65	28	83	12	0	1	123	427
11:45:00	62	25	33	0	0	120	14	116	64	0	0	194	10	37	6	0	0	53	23	85	7	0	0	115	482
Hourly	195	88	90	0	0	373	48	367	228	0	0	643	39	129	53	0	0	221	101	368	33	0	1	502	1739
12:00:00	56	20	28	0	0	104	13	97	78	0	0	188	14	35	10	0	0	59	29	79	16	0	0	124	475
12:15:00	57	23	28	0	2	108	9	89	62	0	0	160	13	31	7	0	0	51	30	92	12	1	0	135	454
12:30:00	42	35	22	0	0	99	10	94	64	1	0	169	14	22	14	0	0	50	40	90	14	0	0	144	462
12:45:00	67	42	36	0	0	145	16	96	67	0	0	179	15	27	13	0	0	55	24	111	17	0	0	152	531
Hourly	222	120	114	0	2	456	48	376	271	1	0	696	56	115	44	0	0	215	123	372	59	1	0	555	1922
13:00:00	55	28	14	0	0	97	20	122	69	0	0	211	20	30	14	0	2	64	17	96	12	0	1	125	497
13:15:00	40	31	37	0	0	108	8	93	56	0	1	157	12	36	20	0	0	68	26	96	8	0	0	130	463
13:30:00	29	24	24	0	0	77	7	85	62	0	0	154	7	17	14	0	0	38	19	75	13	0	0	107	376
13:45:00	83	33	17	0	0	133	6	130	52	0	1	188	21	27	5	0	1	53	21	106	8	0	0	135	509
Hourly	207	116	92	0	0	415	41	430	239	0	2	710	60	110	53	0	3	223	83	373	41	0	1	497	1845
BREAK																									
15:00:00	51	31	34	0	0	116	9	111	82	0	0	202	35	33	14	0	0	82	32	85	16	0	0	133	533
15:15:00	37	33	30	0	0	100	18	128	74	0	0	220	27	34	18	0	0	79	37	105	16	0	0	158	557
15:30:00	37	36	32	0	2	105	10	136	57	1	1	204	29	40	21	0	0	90	47	111	11	0	1	169	568
15:45:00	52	48	35	0	0	135	16	137	80	0	1	233	24	54	17	0	1	95	35	96	7	0	1	138	601
Hourly	177	148	131	0	2	456	53	512	293	1	2	859	115	161	70	0	1	346	151	397	50	0	2	598	2259
16:00:00	38	23	27	0	2	88	13	170	93	0	0	276	31	42	16	0	0	89	34	116	15	0	4	165	618
16:15:00	38	45	39	0	1	122	18	178	106	0	1	302	21	42	15	0	0	78	43	131	9	0	0	183	685
16:30:00	52	58	37	0	1	147	14	172	91	0	3	277	30	69	9	0	0	108	31	115	15	0	0	161	693
16:45:00	55	45	44	0	0	144	21	196	126	0	0	343	26	60	20	0	0	106	36	128	17	0	0	181	774
Hourly	183	171	147	0	4	501	66	716	416	0	4	1198	108	213	60	0	0	381	144	490	56	0	4	690	2770
17:00:00	49	58	44	0	0	151	17	164	134	0	1	315	48	78	12	0	0	138	39	129	13	0	0	181	785
17:15:00	48	42	28	0	0	118	20	196	105	0	0	321	25	59	19	0	1	103	43	163	13	0	0	219	761
17:30:00	54	31	27	0	0	112	23	216	178	0	0	417	15	53	16	0	0	84	36	121	8	0	0	165	778
17:45:00	62	24	31	0	1	117	14	170	129	0	1	313	18	40	8	0	1	66	40	120	3	0	0	163	659
Hourly	213	155	130	0	1	498	74	746	546	0	2	1366	106	230	55	0	2	391	158	533	37	0	0	728	2983
Grand Total	1974	1192	1016	0	11	4182	389	3964	2274	3	13	6630	542	1182	515	0	7	2239	944	3996	438	2	10	5380	**18431**
Approach%	47.2%	28.5%	24.3%	0%		-	5.9%	59.8%	34.3%	0%		-	24.2%	52.8%	23%	0%		-	17.5%	74.3%	8.1%	0%		-	-
Totals %	10.7%	6.5%	5.5%	0%		22.7%	2.1%	21.5%	12.3%	0%		36%	2.9%	6.4%	2.8%	0%		12.1%	5.1%	21.7%	2.4%	0%		29.2%	-

Heavy	80	104	39	0	-	21	296	117	0	-	88	85	44	0	-	37	303	106	1	-	**-**
Heavy %	4.1%	8.7%	3.8%	0%	-	5.4%	7.5%	5.1%	0%	-	16.2%	7.2%	8.5%	0%	-	3.9%	7.6%	24.2%	50%	-	**-**
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**-**

Spectrum

Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & ROYAL WINDSOR DR
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (4 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD						Westbound ROYAL WINDSOR DR						Northbound WINSTON CHURCHILL BLVD						Eastbound ROYAL WINDSOR DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
08:00:00	91	38	37	0	0	166	10	139	39	0	0	188	3	29	24	0	0	56	31	196	18	0	0	245	655
08:15:00	154	77	60	0	1	291	6	116	34	0	0	156	5	35	28	0	0	68	35	170	21	0	1	226	741
08:30:00	80	68	51	0	0	199	7	122	46	0	0	175	8	31	26	0	0	65	35	155	29	0	0	219	658
08:45:00	96	56	44	0	0	196	12	92	42	1	2	147	8	35	23	0	1	66	25	167	14	0	0	206	615
Grand Total	421	239	192	0	1	852	35	469	161	1	2	666	24	130	101	0	1	255	126	688	82	0	1	896	**2669**
Approach%	49.4%	28.1%	22.5%	0%		-	5.3%	70.4%	24.2%	0.2%		-	9.4%	51%	39.6%	0%		-	14.1%	76.8%	9.2%	0%		-	-
Totals %	15.8%	9%	7.2%	0%		31.9%	1.3%	17.6%	6%	0%		25%	0.9%	4.9%	3.8%	0%		9.6%	4.7%	25.8%	3.1%	0%		33.6%	-
PHF	0.68	0.78	0.8	0		0.73	0.73	0.84	0.88	0.25		0.89	0.75	0.93	0.9	0		0.94	0.9	0.88	0.71	0		0.91	-
Heavy	14	18	8	0		40	2	33	14	0		49	8	8	4	0		20	6	33	9	0		48	-
Heavy %	3.3%	7.5%	4.2%	0%		4.7%	5.7%	7%	8.7%	0%		7.4%	33.3%	6.2%	4%	0%		7.8%	4.8%	4.8%	11%	0%		5.4%	-
Lights	407	221	184	0		812	33	436	147	1		617	16	122	97	0		235	120	655	73	0		848	-
Lights %	96.7%	92.5%	95.8%	0%		95.3%	94.3%	93%	91.3%	100%		92.6%	66.7%	93.8%	96%	0%		92.2%	95.2%	95.2%	89%	0%		94.6%	-
Single-Unit Trucks	8	7	6	0		21	2	10	7	0		19	2	4	3	0		9	2	9	5	0		16	-
Single-Unit Trucks %	1.9%	2.9%	3.1%	0%		2.5%	5.7%	2.1%	4.3%	0%		2.9%	8.3%	3.1%	3%	0%		3.5%	1.6%	1.3%	6.1%	0%		1.8%	-
Buses	4	1	1	0		6	0	6	5	0		11	0	2	1	0		3	1	8	0	0		9	-
Buses %	1%	0.4%	0.5%	0%		0.7%	0%	1.3%	3.1%	0%		1.7%	0%	1.5%	1%	0%		1.2%	0.8%	1.2%	0%	0%		1%	-
Articulated Trucks	2	10	1	0		13	0	17	2	0		19	6	2	0	0		8	3	16	4	0		23	-
Articulated Trucks %	0.5%	4.2%	0.5%	0%		1.5%	0%	3.6%	1.2%	0%		2.9%	25%	1.5%	0%	0%		3.1%	2.4%	2.3%	4.9%	0%		2.6%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	20%		-	-	-	-	40%		-	-	-	-	20%		-	-	-	-	20%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & ROYAL WINDSOR DR
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 12:00 PM - 01:00 PM Weather: Light Snow Showers (-3 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD						Westbound ROYAL WINDSOR DR						Northbound WINSTON CHURCHILL BLVD						Eastbound ROYAL WINDSOR DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
12:00:00	56	20	28	0	0	104	13	97	78	0	0	188	14	35	10	0	0	59	29	79	16	0	0	124	475
12:15:00	57	23	28	0	2	108	9	89	62	0	0	160	13	31	7	0	0	51	30	92	12	1	0	135	454
12:30:00	42	35	22	0	0	99	10	94	64	1	0	169	14	22	14	0	0	50	40	90	14	0	0	144	462
12:45:00	67	42	36	0	0	145	16	96	67	0	0	179	15	27	13	0	0	55	24	111	17	0	0	152	531
Grand Total	222	120	114	0	2	456	48	376	271	1	0	696	56	115	44	0	0	215	123	372	59	1	0	555	**1922**
Approach%	48.7%	26.3%	25%	0%		-	6.9%	54%	38.9%	0.1%		-	26%	53.5%	20.5%	0%		-	22.2%	67%	10.6%	0.2%		-	-
Totals %	11.6%	6.2%	5.9%	0%		23.7%	2.5%	19.6%	14.1%	0.1%		36.2%	2.9%	6%	2.3%	0%		11.2%	6.4%	19.4%	3.1%	0.1%		28.9%	-
PHF	0.83	0.71	0.79	0		0.79	0.75	0.97	0.87	0.25		0.93	0.93	0.82	0.79	0		0.91	0.77	0.84	0.87	0.25		0.91	-
Heavy	7	11	9	0		27	3	44	17	0		64	19	10	6	0		35	6	52	21	0		79	-
Heavy %	3.2%	9.2%	7.9%	0%		5.9%	6.3%	11.7%	6.3%	0%		9.2%	33.9%	8.7%	13.6%	0%		16.3%	4.9%	14%	35.6%	0%		14.2%	-
Lights	215	109	105	0		429	45	332	254	1		632	37	105	38	0		180	117	320	38	1		476	-
Lights %	96.8%	90.8%	92.1%	0%		94.1%	93.8%	88.3%	93.7%	100%		90.8%	66.1%	91.3%	86.4%	0%		83.7%	95.1%	86%	64.4%	100%		85.8%	-
Single-Unit Trucks	2	3	1	0		6	2	13	10	0		25	10	5	4	0		19	3	16	13	0		32	-
Single-Unit Trucks %	0.9%	2.5%	0.9%	0%		1.3%	4.2%	3.5%	3.7%	0%		3.6%	17.9%	4.3%	9.1%	0%		8.8%	2.4%	4.3%	22%	0%		5.8%	-
Buses	3	0	0	0		3	0	3	3	0		6	0	0	0	0		0	0	3	0	0		3	-
Buses %	1.4%	0%	0%	0%		0.7%	0%	0.8%	1.1%	0%		0.9%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.5%	-
Articulated Trucks	2	8	8	0		18	1	28	4	0		33	9	5	2	0		16	3	33	8	0		44	-
Articulated Trucks %	0.9%	6.7%	7%	0%		3.9%	2.1%	7.4%	1.5%	0%		4.7%	16.1%	4.3%	4.5%	0%		7.4%	2.4%	8.9%	13.6%	0%		7.9%	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	100%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-

Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & ROYAL WINDSOR DR
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

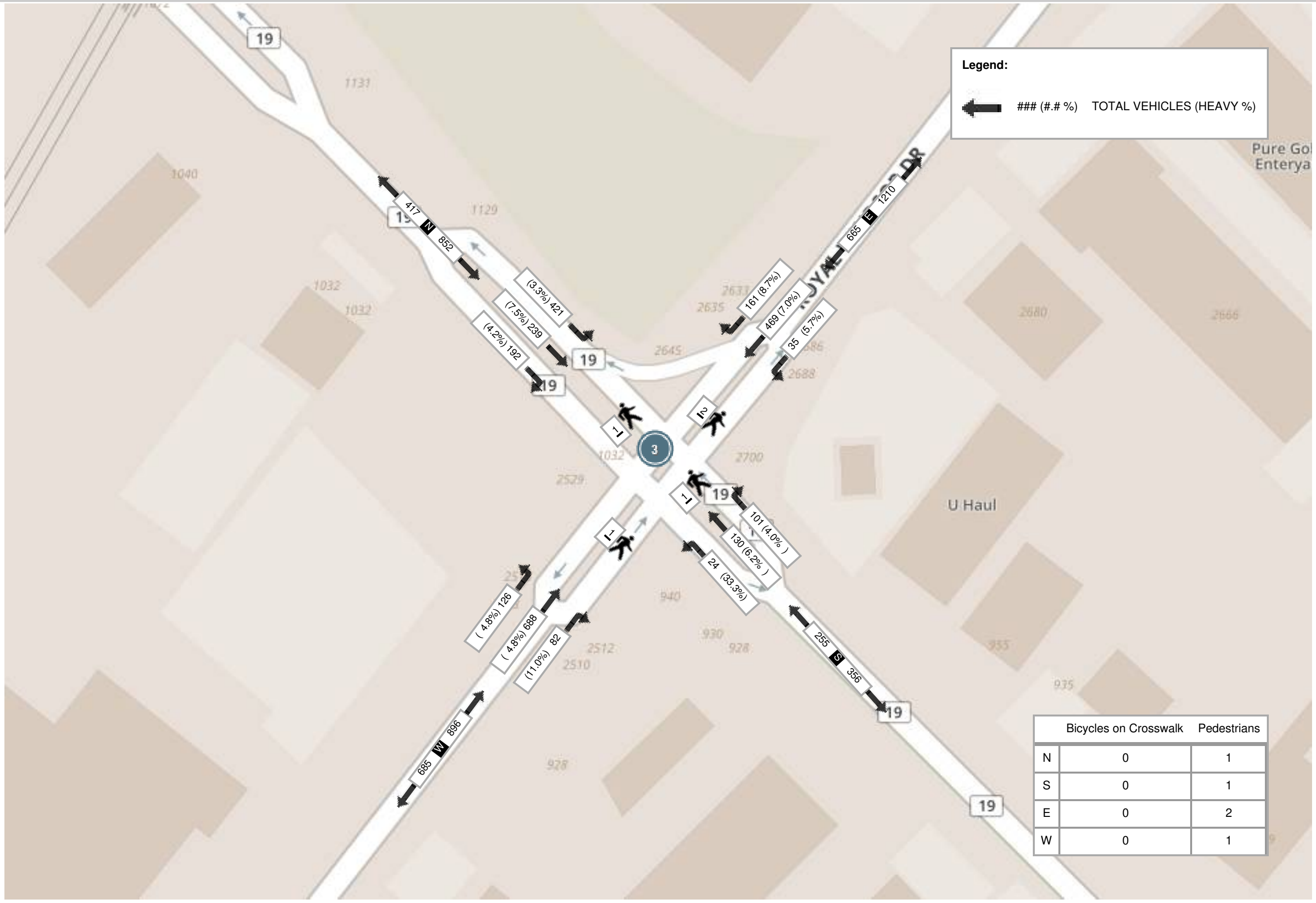
Peak Hour: 05:00 PM - 06:00 PM Weather: Snow (-3 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD						Westbound ROYAL WINDSOR DR						Northbound WINSTON CHURCHILL BLVD						Eastbound ROYAL WINDSOR DR						Int. Total (15 min)
	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	Right	U-Turn	Peds	Approach Total	
17:00:00	49	58	44	0	0	151	17	164	134	0	1	315	48	78	12	0	0	138	39	129	13	0	0	181	785
17:15:00	48	42	28	0	0	118	20	196	105	0	0	321	25	59	19	0	1	103	43	163	13	0	0	219	761
17:30:00	54	31	27	0	0	112	23	216	178	0	0	417	15	53	16	0	0	84	36	121	8	0	0	165	778
17:45:00	62	24	31	0	1	117	14	170	129	0	1	313	18	40	8	0	1	66	40	120	3	0	0	163	659
Grand Total	213	155	130	0	1	498	74	746	546	0	2	1366	106	230	55	0	2	391	158	533	37	0	0	728	**2983**
Approach%	42.8%	31.1%	26.1%	0%		-	5.4%	54.6%	40%	0%		-	27.1%	58.8%	14.1%	0%		-	21.7%	73.2%	5.1%	0%		-	-
Totals %	7.1%	5.2%	4.4%	0%		16.7%	2.5%	25%	18.3%	0%		45.8%	3.6%	7.7%	1.8%	0%		13.1%	5.3%	17.9%	1.2%	0%		24.4%	-
PHF	0.86	0.67	0.74	0		0.82	0.8	0.86	0.77	0		0.82	0.55	0.74	0.72	0		0.71	0.92	0.82	0.71	0		0.83	-
Heavy	7	3	1	0		11	3	19	12	0		34	6	3	2	0		11	1	23	14	0		38	-
Heavy %	3.3%	1.9%	0.8%	0%		2.2%	4.1%	2.5%	2.2%	0%		2.5%	5.7%	1.3%	3.6%	0%		2.8%	0.6%	4.3%	37.8%	0%		5.2%	-
Lights	206	152	129	0		487	71	727	534	0		1332	100	227	53	0		380	157	510	23	0		690	-
Lights %	96.7%	98.1%	99.2%	0%		97.8%	95.9%	97.5%	97.8%	0%		97.5%	94.3%	98.7%	96.4%	0%		97.2%	99.4%	95.7%	62.2%	0%		94.8%	-
Single-Unit Trucks	1	0	1	0		2	1	5	4	0		10	2	3	0	0		5	0	6	4	0		10	-
Single-Unit Trucks %	0.5%	0%	0.8%	0%		0.4%	1.4%	0.7%	0.7%	0%		0.7%	1.9%	1.3%	0%	0%		1.3%	0%	1.1%	10.8%	0%		1.4%	-
Buses	4	0	0	0		4	0	6	5	0		11	0	0	2	0		2	0	6	0	0		6	-
Buses %	1.9%	0%	0%	0%		0.8%	0%	0.8%	0.9%	0%		0.8%	0%	0%	3.6%	0%		0.5%	0%	1.1%	0%	0%		0.8%	-
Articulated Trucks	2	3	0	0		5	2	8	3	0		13	4	0	0	0		4	1	11	10	0		22	-
Articulated Trucks %	0.9%	1.9%	0%	0%		1%	2.7%	1.1%	0.5%	0%		1%	3.8%	0%	0%	0%		1%	0.6%	2.1%	27%	0%		3%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-	-	-	0	-	-
Pedestrians%	-	-	-	-	20%		-	-	-	-	20%		-	-	-	-	40%		-	-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	20%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

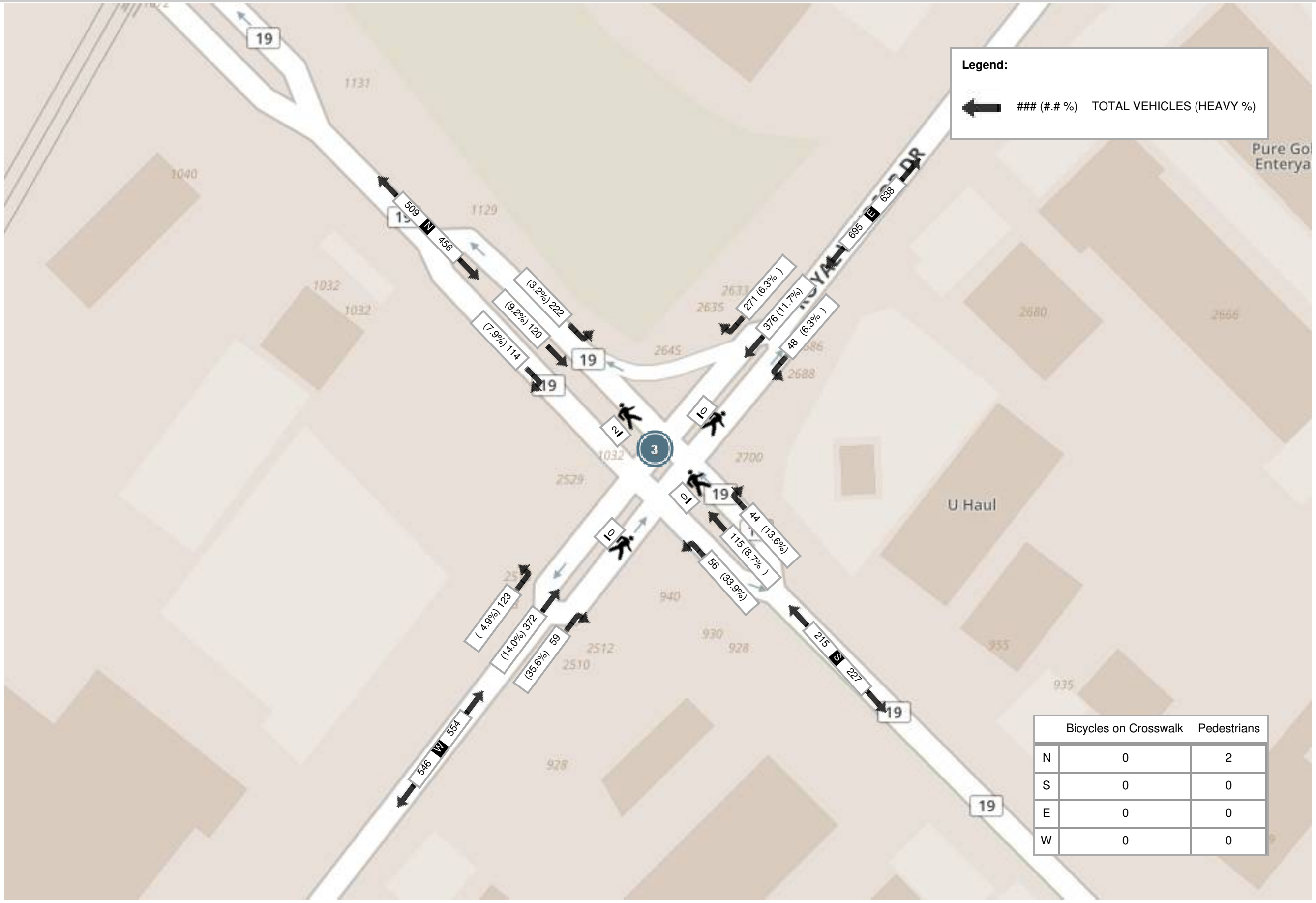
Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & ROYAL WINDSOR DR
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (4 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	1
E	0	2
W	0	1

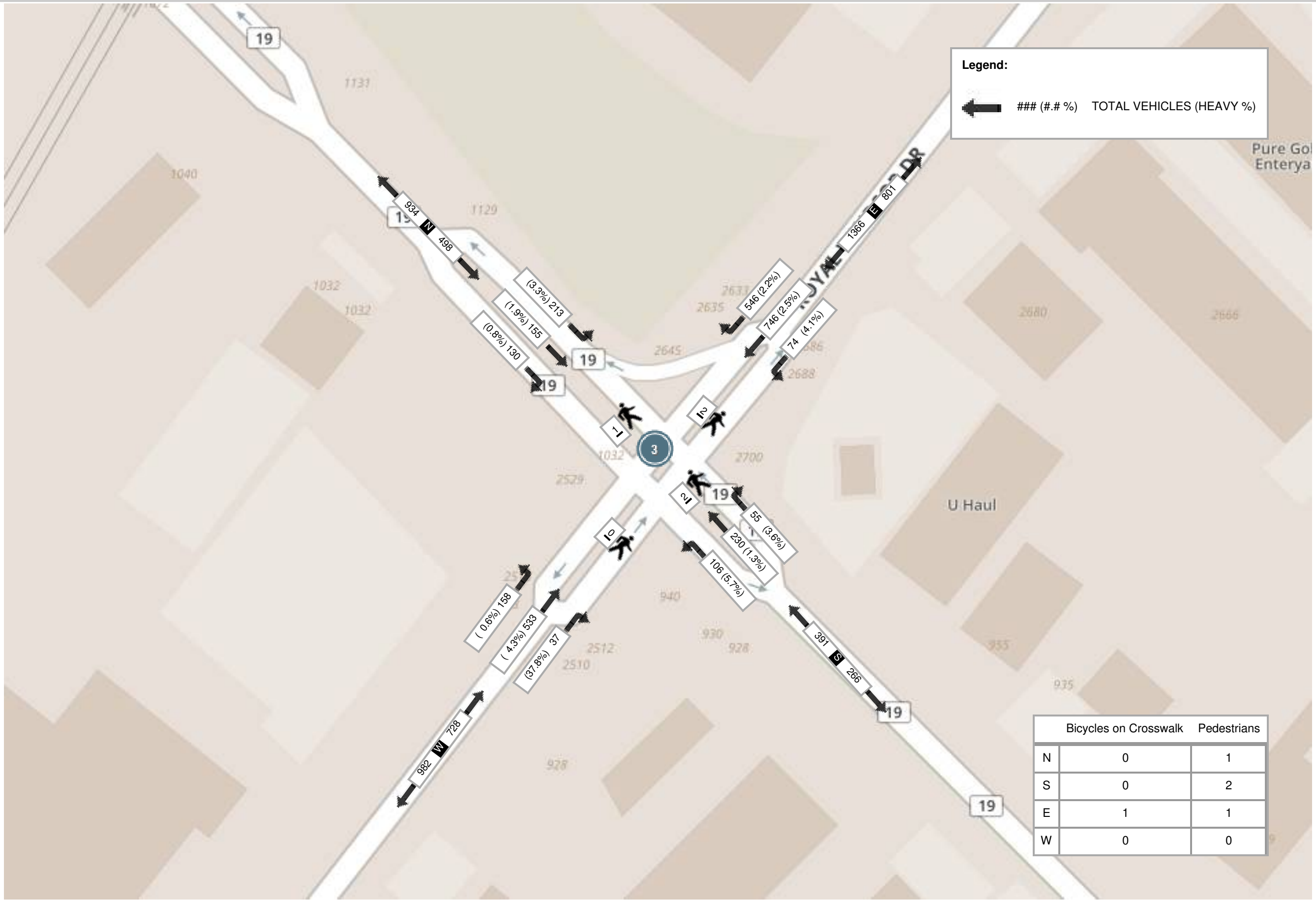
Peak Hour: 12:00 PM - 01:00 PM Weather: Light Snow Showers (-3 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	2
S	0	0
E	0	0
W	0	0

Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & ROYAL WINDSOR DR
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 05:00 PM - 06:00 PM Weather: Snow (-3 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	2
E	1	1
W	0	0

Spectrum

Turning Movement Count (2 . WINSTON CHURCHILL BLVD & BERYL RD) CustID: 01901714 MioID: 380803

Start Time	Southbound WINSTON CHURCHILL BLVD					Northbound WINSTON CHURCHILL BLVD					Eastbound BERYL RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
07:00:00	34	8	0	0	42	1	31	0	0	32	3	10	0	0	13	87
07:15:00	33	5	0	0	38	4	31	0	0	35	9	12	0	0	21	94
07:30:00	51	9	0	0	60	2	32	0	0	34	20	17	0	0	37	131
07:45:00	57	17	0	0	74	3	35	0	0	38	14	9	0	0	23	135
Hourly	175	39	0	0	214	10	129	0	0	139	46	48	0	0	94	447
08:00:00	52	11	0	0	63	3	44	0	0	47	14	16	0	0	30	140
08:15:00	76	13	0	0	89	3	42	0	0	45	19	15	0	0	34	168
08:30:00	73	29	0	0	102	2	40	0	0	42	24	17	0	0	41	185
08:45:00	52	19	0	0	71	4	41	0	0	45	17	13	0	0	30	146
Hourly	253	72	0	0	325	12	167	0	0	179	74	61	0	0	135	639
BREAK																
11:00:00	18	14	0	0	32	3	26	0	0	29	21	2	0	0	23	84
11:15:00	21	20	0	0	41	3	23	0	0	26	15	6	0	0	21	88
11:30:00	29	12	0	0	41	8	33	0	0	41	18	5	0	0	23	105
11:45:00	24	17	0	0	41	7	40	0	0	47	10	6	0	0	16	104
Hourly	92	63	0	0	155	21	122	0	0	143	64	19	0	0	83	381
12:00:00	26	20	0	0	46	9	33	0	0	42	16	5	0	0	21	109
12:15:00	24	15	0	0	39	4	37	0	0	41	11	7	0	0	18	98
12:30:00	32	22	0	0	54	6	32	0	0	38	11	11	0	0	22	114
12:45:00	44	20	0	0	64	4	26	0	0	30	20	7	0	0	27	121
Hourly	126	77	0	0	203	23	128	0	0	151	58	30	0	0	88	442
13:00:00	38	16	0	0	54	5	42	0	0	47	15	4	0	0	19	120
13:15:00	25	16	0	0	41	6	31	0	0	37	16	3	0	0	19	97
13:30:00	35	8	0	0	43	4	26	0	0	30	18	2	0	0	20	93
13:45:00	31	12	0	0	43	6	37	0	0	43	14	3	0	0	17	103
Hourly	129	52	0	0	181	21	136	0	0	157	63	12	0	0	75	413
BREAK																
15:00:00	35	18	0	0	53	13	58	0	0	71	13	8	1	0	22	146
15:15:00	38	15	0	0	53	7	55	0	0	62	19	4	0	0	23	138
15:30:00	42	16	0	0	58	11	50	0	0	61	23	2	0	0	25	144
15:45:00	38	24	0	0	62	10	61	0	0	71	25	9	0	0	34	167
Hourly	153	73	0	0	226	41	224	0	0	265	80	23	1	0	104	595
16:00:00	37	16	0	1	53	9	61	0	0	70	16	7	0	0	23	146
16:15:00	46	31	0	0	77	4	56	0	1	60	23	3	0	0	26	163

16:30:00	52	25	0	0	77	10	75	0	0	85	21	3	0	0	24	186
16:45:00	52	28	0	0	80	7	79	0	0	86	29	5	0	0	34	200
Hourly	187	100	0	1	287	30	271	0	1	301	89	18	0	0	107	695
17:00:00	55	25	0	0	80	11	75	0	0	86	25	8	0	0	33	199
17:15:00	52	22	0	0	74	8	66	0	0	74	31	9	0	0	40	188
17:30:00	44	22	0	1	66	8	53	0	0	61	18	9	0	0	27	154
17:45:00	27	13	0	0	40	5	39	0	0	44	20	2	0	0	22	106
Hourly	178	82	0	1	260	32	233	0	0	265	94	28	0	0	122	647
Grand Total	1293	558	0	2	1851	190	1410	0	1	1600	568	239	1	0	808	**4259**
Approach%	69.9%	30.1%	0%		-	11.9%	88.1%	0%		-	70.3%	29.6%	0.1%		-	**-**
Totals %	30.4%	13.1%	0%		43.5%	4.5%	33.1%	0%		37.6%	13.3%	5.6%	0%		19%	**-**
Heavy	135	67	0		-	39	127	0		-	64	36	0		-	**-**
Heavy %	10.4%	12%	0%		-	20.5%	9%	0%		-	11.3%	15.1%	0%		-	**-**
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**

Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & BERYL RD
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (4 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD					Northbound WINSTON CHURCHILL BLVD					Eastbound BERYL RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
08:00:00	52	11	0	0	63	3	44	0	0	47	14	16	0	0	30	140
08:15:00	76	13	0	0	89	3	42	0	0	45	19	15	0	0	34	168
08:30:00	73	29	0	0	102	2	40	0	0	42	24	17	0	0	41	185
08:45:00	52	19	0	0	71	4	41	0	0	45	17	13	0	0	30	146
Grand Total	253	72	0	0	325	12	167	0	0	179	74	61	0	0	135	**639**
Approach%	77.8%	22.2%	0%		-	6.7%	93.3%	0%		-	54.8%	45.2%	0%		-	-
Totals %	39.6%	11.3%	0%		50.9%	1.9%	26.1%	0%		28%	11.6%	9.5%	0%		21.1%	-
PHF	0.83	0.62	0		0.8	0.75	0.95	0		0.95	0.77	0.9	0		0.82	-
Heavy	17	8	0		25	5	15	0		20	5	10	0		15	-
Heavy %	6.7%	11.1%	0%		7.7%	41.7%	9%	0%		11.2%	6.8%	16.4%	0%		11.1%	-
Lights	236	64	0		300	7	152	0		159	69	51	0		120	-
Lights %	93.3%	88.9%	0%		92.3%	58.3%	91%	0%		88.8%	93.2%	83.6%	0%		88.9%	-
Single-Unit Trucks	13	7	0		20	4	3	0		7	1	9	0		10	-
Single-Unit Trucks %	5.1%	9.7%	0%		6.2%	33.3%	1.8%	0%		3.9%	1.4%	14.8%	0%		7.4%	-
Buses	0	0	0		0	0	2	0		2	2	1	0		3	-
Buses %	0%	0%	0%		0%	0%	1.2%	0%		1.1%	2.7%	1.6%	0%		2.2%	-
Articulated Trucks	4	1	0		5	1	10	0		11	2	0	0		2	-
Articulated Trucks %	1.6%	1.4%	0%		1.5%	8.3%	6%	0%		6.1%	2.7%	0%	0%		1.5%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 12:00 PM - 01:00 PM Weather: Light Snow Showers (-3 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD					Northbound WINSTON CHURCHILL BLVD					Eastbound BERYL RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
12:00:00	26	20	0	0	46	9	33	0	0	42	16	5	0	0	21	109
12:15:00	24	15	0	0	39	4	37	0	0	41	11	7	0	0	18	98
12:30:00	32	22	0	0	54	6	32	0	0	38	11	11	0	0	22	114
12:45:00	44	20	0	0	64	4	26	0	0	30	20	7	0	0	27	121
Grand Total	126	77	0	0	203	23	128	0	0	151	58	30	0	0	88	**442**
Approach%	62.1%	37.9%	0%		-	15.2%	84.8%	0%		-	65.9%	34.1%	0%		-	-
Totals %	28.5%	17.4%	0%		45.9%	5.2%	29%	0%		34.2%	13.1%	6.8%	0%		19.9%	-
PHF	0.72	0.88	0		0.79	0.64	0.86	0		0.9	0.73	0.68	0		0.81	-
Heavy	25	9	0		34	5	19	0		24	10	9	0		19	-
Heavy %	19.8%	11.7%	0%		16.7%	21.7%	14.8%	0%		15.9%	17.2%	30%	0%		21.6%	-
Lights	101	68	0		169	18	109	0		127	48	21	0		69	-
Lights %	80.2%	88.3%	0%		83.3%	78.3%	85.2%	0%		84.1%	82.8%	70%	0%		78.4%	-
Single-Unit Trucks	11	7	0		18	3	10	0		13	7	6	0		13	-
Single-Unit Trucks %	8.7%	9.1%	0%		8.9%	13%	7.8%	0%		8.6%	12.1%	20%	0%		14.8%	-
Buses	0	0	0		0	0	0	0		0	0	0	0		0	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Articulated Trucks	14	2	0		16	2	9	0		11	3	3	0		6	-
Articulated Trucks %	11.1%	2.6%	0%		7.9%	8.7%	7%	0%		7.3%	5.2%	10%	0%		6.8%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

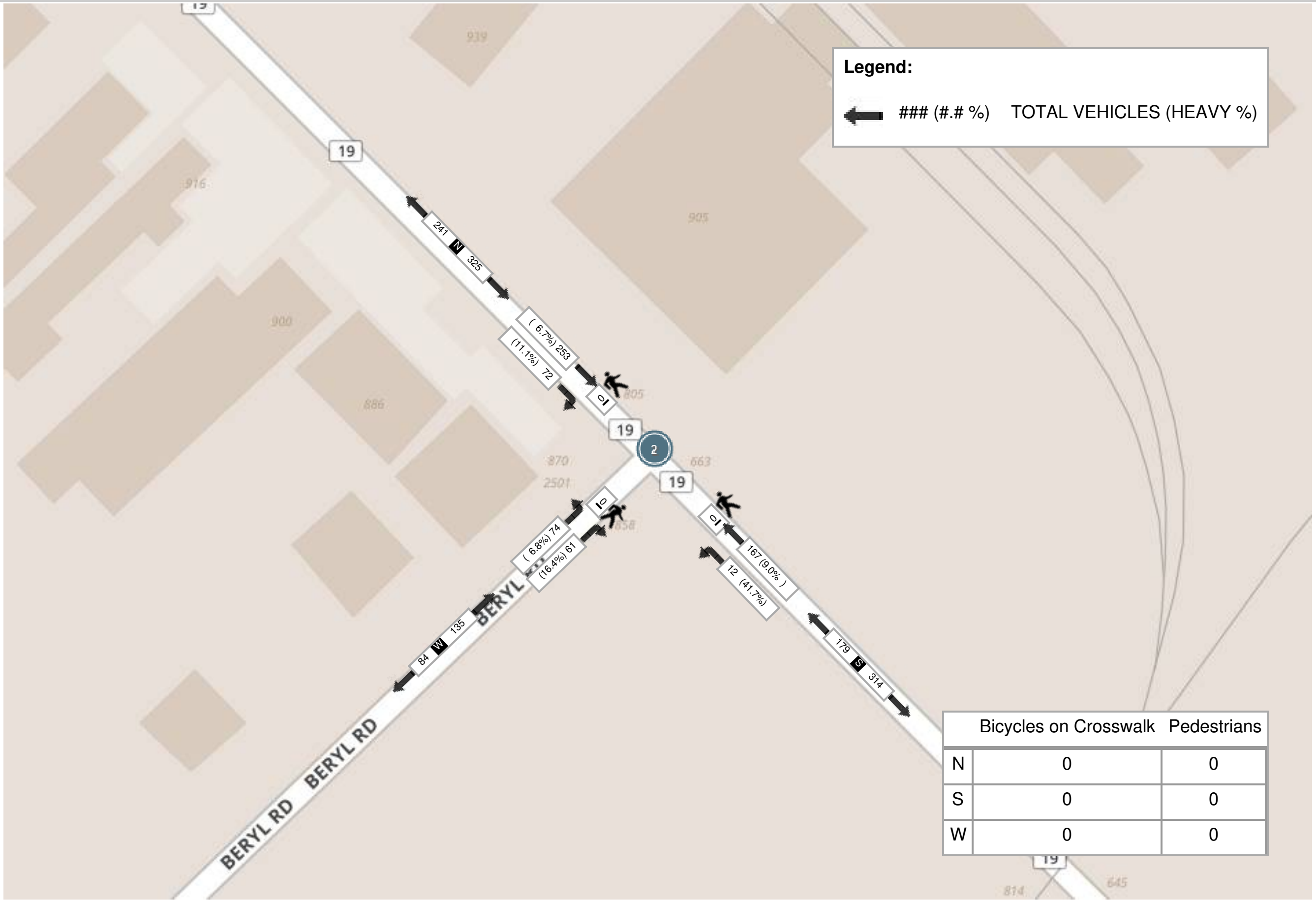
Spectrum

Peak Hour: 04:00 PM - 05:00 PM Weather: Snow (-3 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD					Northbound WINSTON CHURCHILL BLVD					Eastbound BERYL RD					Int. Total (15 min)
	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	Left	Right	U-Turn	Peds	Approach Total	
16:00:00	37	16	0	1	53	9	61	0	0	70	16	7	0	0	23	146
16:15:00	46	31	0	0	77	4	56	0	1	60	23	3	0	0	26	163
16:30:00	52	25	0	0	77	10	75	0	0	85	21	3	0	0	24	186
16:45:00	52	28	0	0	80	7	79	0	0	86	29	5	0	0	34	200
Grand Total	187	100	0	1	287	30	271	0	1	301	89	18	0	0	107	**695**
Approach%	65.2%	34.8%	0%		-	10%	90%	0%		-	83.2%	16.8%	0%		-	-
Totals %	26.9%	14.4%	0%		41.3%	4.3%	39%	0%		43.3%	12.8%	2.6%	0%		15.4%	-
PHF	0.9	0.81	0		0.9	0.75	0.86	0		0.88	0.77	0.64	0		0.79	-
Heavy	14	11	0		25	7	10	0		17	5	3	0		8	-
Heavy %	7.5%	11%	0%		8.7%	23.3%	3.7%	0%		5.6%	5.6%	16.7%	0%		7.5%	-
Lights	173	89	0		262	23	261	0		284	84	15	0		99	-
Lights %	92.5%	89%	0%		91.3%	76.7%	96.3%	0%		94.4%	94.4%	83.3%	0%		92.5%	-
Single-Unit Trucks	4	4	0		8	6	2	0		8	2	3	0		5	-
Single-Unit Trucks %	2.1%	4%	0%		2.8%	20%	0.7%	0%		2.7%	2.2%	16.7%	0%		4.7%	-
Buses	0	3	0		3	1	2	0		3	0	0	0		0	-
Buses %	0%	3%	0%		1%	3.3%	0.7%	0%		1%	0%	0%	0%		0%	-
Articulated Trucks	10	4	0		14	0	6	0		6	3	0	0		3	-
Articulated Trucks %	5.3%	4%	0%		4.9%	0%	2.2%	0%		2%	3.4%	0%	0%		2.8%	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	50%		-	-	-	0%		-
Bicycles on Crosswalk	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	50%		-	-	-	0%		-	-	-	0%		-

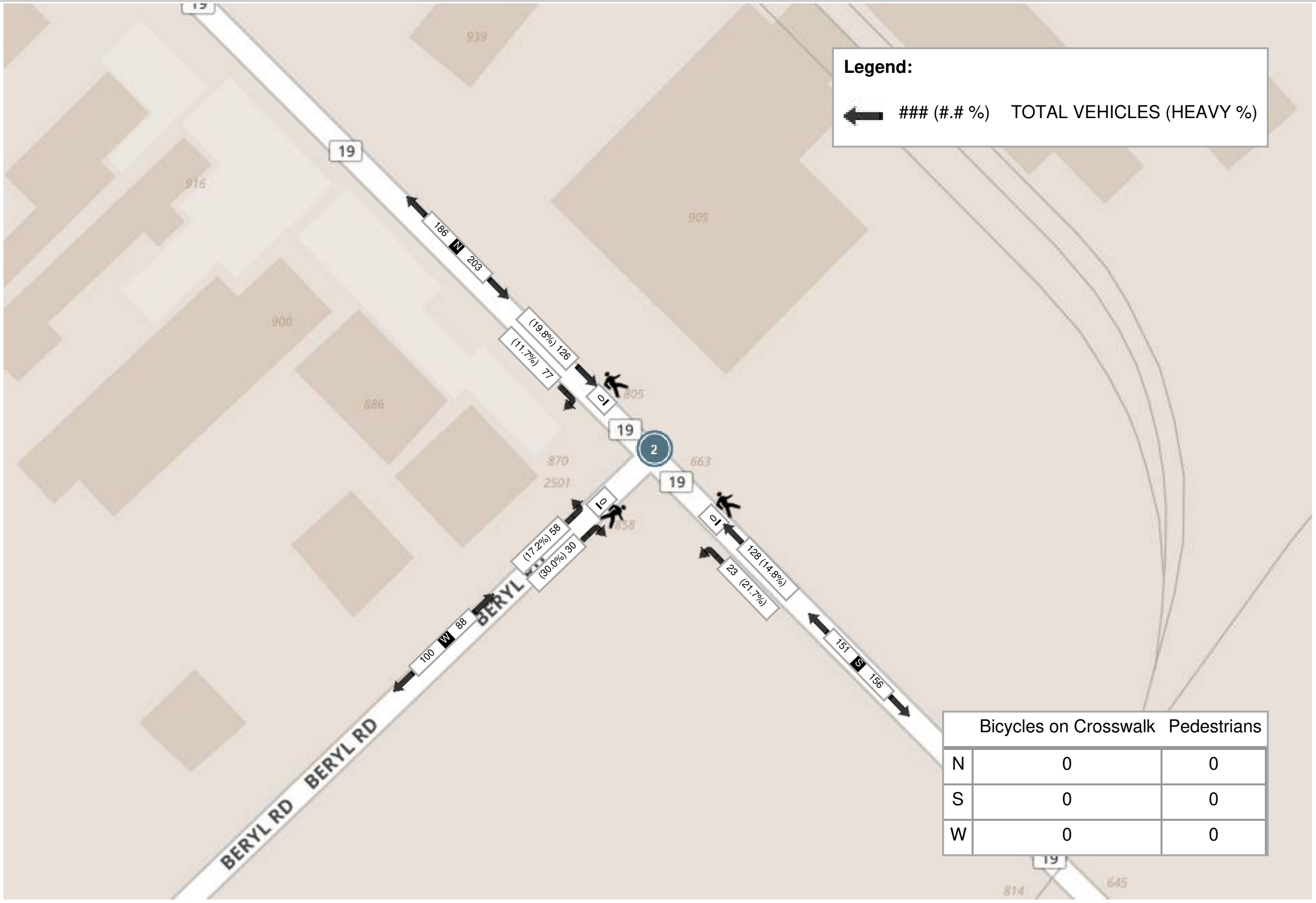
Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & BERYL RD
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (4 °C)



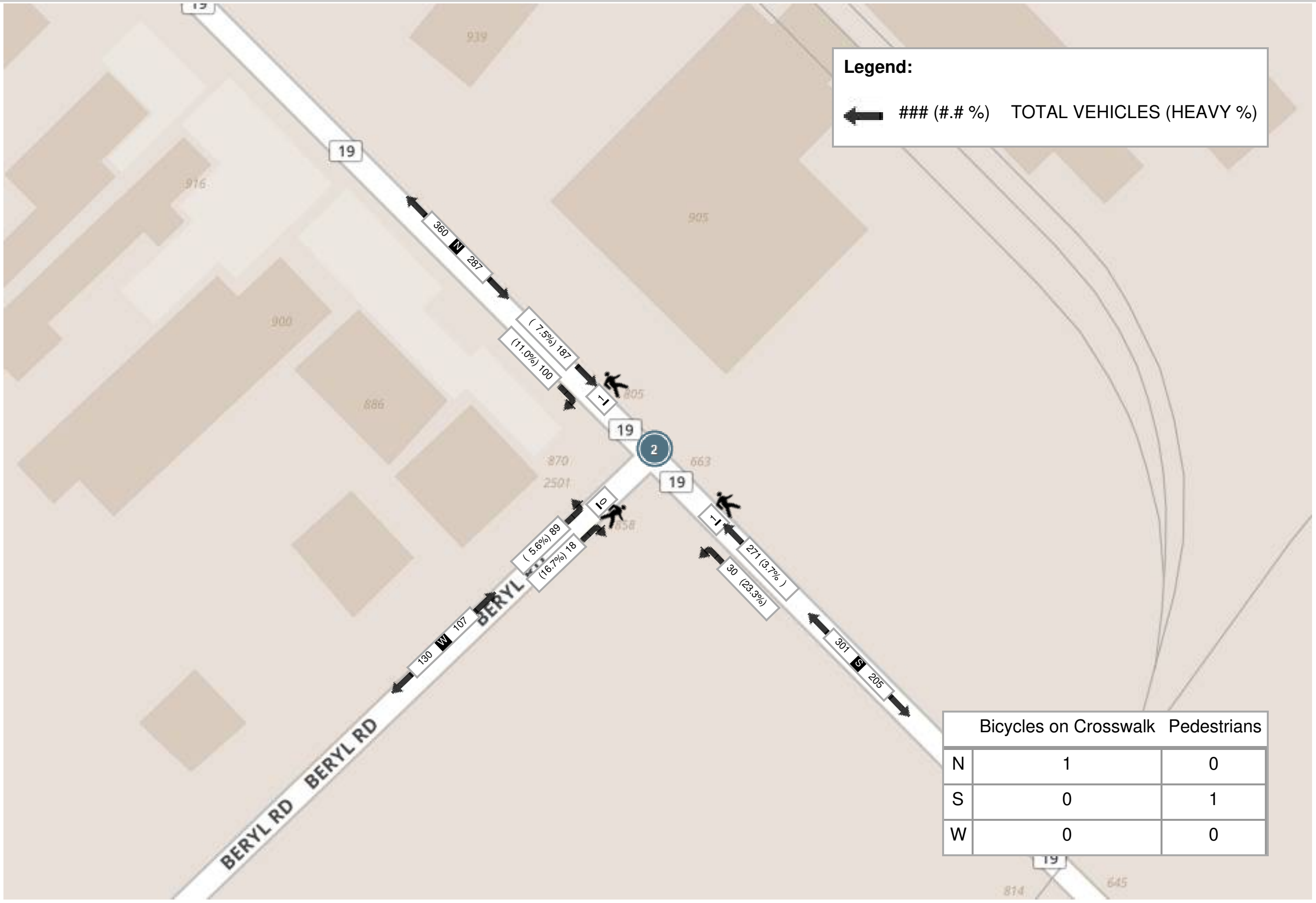
	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
W	0	0

Peak Hour: 12:00 PM - 01:00 PM Weather: Light Snow Showers (-3 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
W	0	0

Peak Hour: 04:00 PM - 05:00 PM Weather: Snow (-3 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	0
S	0	1
W	0	0

Turning Movement Count (1 . WINSTON CHURCHILL BLVD & LAKESHORE RD) CustID: 01900000 MioID: 380801

Start Time	Southbound WINSTON CHURCHILL BLVD					Westbound LAKESHORE RD E					Eastbound LAKESHORE RD W					Int. Total (15 min)
	Left	Right	U-Turn	Peds	Approach Total	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	
07:00:00	26	11	0	0	37	11	11	0	0	22	18	38	0	0	56	115
07:15:00	37	10	0	0	47	14	12	0	0	26	21	72	0	0	93	166
07:30:00	38	15	0	0	53	12	11	0	0	23	30	82	0	0	112	188
07:45:00	46	18	0	0	64	16	9	0	0	25	26	72	0	0	98	187
Hourly	147	54	0	0	201	53	43	0	0	96	95	264	0	0	359	656
08:00:00	59	17	0	0	76	8	4	0	0	12	38	75	0	0	113	201
08:15:00	55	21	0	0	76	29	6	0	0	35	35	45	0	0	80	191
08:30:00	49	40	0	0	89	22	10	0	0	32	29	80	0	0	109	230
08:45:00	37	24	0	0	61	24	8	0	0	32	35	74	0	0	109	202
Hourly	200	102	0	0	302	83	28	0	0	111	137	274	0	0	411	824
BREAK																
11:00:00	8	10	0	0	18	11	12	0	0	23	13	24	0	0	37	78
11:15:00	11	10	0	0	21	16	8	0	0	24	15	24	0	0	39	84
11:30:00	11	21	0	0	32	23	23	0	0	46	17	22	0	0	39	117
11:45:00	7	15	0	0	22	27	23	0	0	50	17	31	0	0	48	120
Hourly	37	56	0	0	93	77	66	0	0	143	62	101	0	0	163	399
12:00:00	17	19	0	0	36	30	28	0	0	58	15	26	0	0	41	135
12:15:00	18	12	0	1	30	22	20	0	0	42	18	24	0	0	42	114
12:30:00	23	11	0	1	34	34	19	0	0	53	16	22	0	0	38	125
12:45:00	25	25	0	0	50	24	21	0	0	45	10	25	0	0	35	130
Hourly	83	67	0	2	150	110	88	0	0	198	59	97	0	0	156	504
13:00:00	29	11	0	0	40	17	23	0	0	40	16	23	0	0	39	119
13:15:00	16	12	0	0	28	22	16	0	0	38	15	15	1	0	31	97
13:30:00	17	15	0	0	32	21	18	0	0	39	13	27	0	0	40	111
13:45:00	14	14	0	0	28	32	30	0	0	62	9	22	0	0	31	121
Hourly	76	52	0	0	128	92	87	0	0	179	53	87	1	0	141	448
BREAK																
15:00:00	16	22	0	0	38	36	52	0	0	88	15	31	0	0	46	172
15:15:00	16	28	0	0	44	35	47	0	1	82	14	22	0	0	36	162
15:30:00	13	26	0	0	39	64	50	0	0	114	13	42	0	0	55	208
15:45:00	10	31	0	0	41	49	45	0	0	94	23	51	0	0	74	209
Hourly	55	107	0	0	162	184	194	0	1	378	65	146	0	0	211	751
16:00:00	11	25	1	0	37	53	42	0	0	95	18	30	0	0	48	180
16:15:00	12	30	0	0	42	48	43	0	0	91	13	46	0	0	59	192

16:30:00	26	34	0	0	60	66	59	0	0	125	21	37	0	0	58	243
16:45:00	18	31	0	0	49	52	56	0	0	108	25	51	0	0	76	233
Hourly	67	120	1	0	188	219	200	0	0	419	77	164	0	0	241	848
17:00:00	23	40	0	0	63	50	62	0	0	112	27	42	0	0	69	244
17:15:00	22	36	0	0	58	46	52	0	0	98	18	42	0	0	60	216
17:30:00	13	39	0	0	52	66	31	0	0	97	24	31	0	0	55	204
17:45:00	6	27	0	0	33	49	29	0	0	78	12	33	1	0	46	157
Hourly	64	142	0	0	206	211	174	0	0	385	81	148	1	0	230	821
Grand Total	729	700	1	2	1430	1029	880	0	1	1909	629	1281	2	0	1912	**5251**
Approach%	51%	49%	0.1%		-	53.9%	46.1%	0%		-	32.9%	67%	0.1%		-	**-**
Totals %	13.9%	13.3%	0%		27.2%	19.6%	16.8%	0%		36.4%	12%	24.4%	0%		36.4%	**-**
Heavy	155	15	0		-	9	139	0		-	16	13	0		-	**-**
Heavy %	21.3%	2.1%	0%		-	0.9%	15.8%	0%		-	2.5%	1%	0%		-	**-**
Bicycles	0	0	0		-	1	0	0		-	0	0	0		-	**-**
Bicycle %	0%	0%	0%		-	0.1%	0%	0%		-	0%	0%	0%		-	**-**

Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & LAKESHORE RD
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (4 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD					Westbound LAKESHORE RD E					Eastbound LAKESHORE RD W					Int. Total (15 min)
	Left	Right	U-Turn	Peds	Approach Total	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	
08:00:00	59	17	0	0	76	8	4	0	0	12	38	75	0	0	113	201
08:15:00	55	21	0	0	76	29	6	0	0	35	35	45	0	0	80	191
08:30:00	49	40	0	0	89	22	10	0	0	32	29	80	0	0	109	230
08:45:00	37	24	0	0	61	24	8	0	0	32	35	74	0	0	109	202
Grand Total	200	102	0	0	302	83	28	0	0	111	137	274	0	0	411	**824**
Approach%	66.2%	33.8%	0%		-	74.8%	25.2%	0%		-	33.3%	66.7%	0%		-	-
Totals %	24.3%	12.4%	0%		36.7%	10.1%	3.4%	0%		13.5%	16.6%	33.3%	0%		49.9%	-
PHF	0.85	0.64	0		0.85	0.72	0.7	0		0.79	0.9	0.86	0		0.91	-
Heavy	28	5	0		33	2	17	0		19	3	2	0		5	-
Heavy %	14%	4.9%	0%		10.9%	2.4%	60.7%	0%		17.1%	2.2%	0.7%	0%		1.2%	-
Lights	172	97	0		269	81	11	0		92	134	272	0		406	-
Lights %	86%	95.1%	0%		89.1%	97.6%	39.3%	0%		82.9%	97.8%	99.3%	0%		98.8%	-
Single-Unit Trucks	10	4	0		14	2	4	0		6	3	2	0		5	-
Single-Unit Trucks %	5%	3.9%	0%		4.6%	2.4%	14.3%	0%		5.4%	2.2%	0.7%	0%		1.2%	-
Buses	0	1	0		1	0	2	0		2	0	0	0		0	-
Buses %	0%	1%	0%		0.3%	0%	7.1%	0%		1.8%	0%	0%	0%		0%	-
Articulated Trucks	18	0	0		18	0	11	0		11	0	0	0		0	-
Articulated Trucks %	9%	0%	0%		6%	0%	39.3%	0%		9.9%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

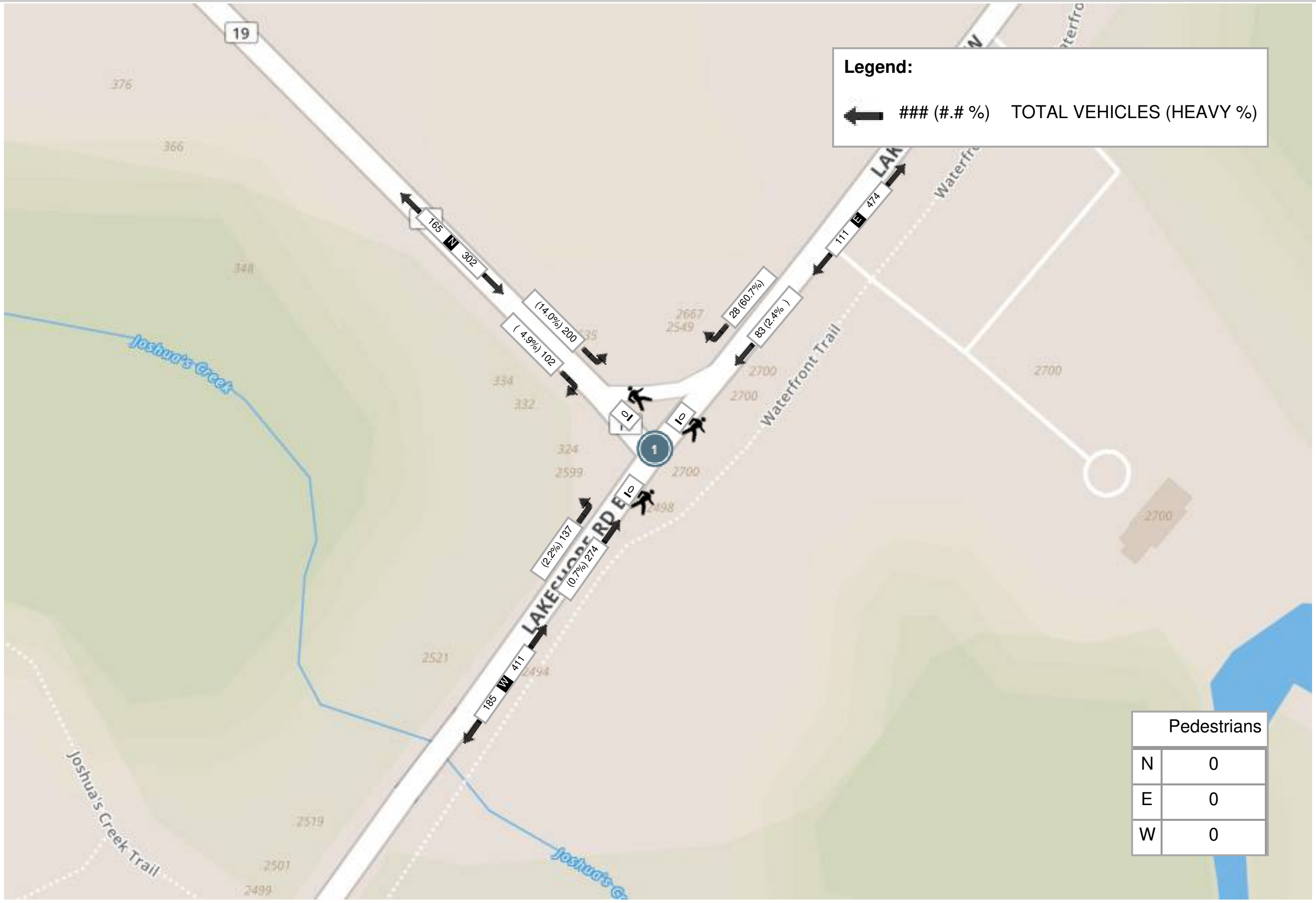
Peak Hour: 12:00 PM - 01:00 PM Weather: Light Snow Showers (-3 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD					Westbound LAKESHORE RD E					Eastbound LAKESHORE RD W					Int. Total (15 min)
	Left	Right	U-Turn	Peds	Approach Total	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	
12:00:00	17	19	0	0	36	30	28	0	0	58	15	26	0	0	41	135
12:15:00	18	12	0	1	30	22	20	0	0	42	18	24	0	0	42	114
12:30:00	23	11	0	1	34	34	19	0	0	53	16	22	0	0	38	125
12:45:00	25	25	0	0	50	24	21	0	0	45	10	25	0	0	35	130
Grand Total	83	67	0	2	150	110	88	0	0	198	59	97	0	0	156	**504**
Approach%	55.3%	44.7%	0%		-	55.6%	44.4%	0%		-	37.8%	62.2%	0%		-	-
Totals %	16.5%	13.3%	0%		29.8%	21.8%	17.5%	0%		39.3%	11.7%	19.2%	0%		31%	-
PHF	0.83	0.67	0		0.75	0.81	0.79	0		0.85	0.82	0.93	0		0.93	-
Heavy	31	1	0		32	1	22	0		23	2	3	0		5	-
Heavy %	37.3%	1.5%	0%		21.3%	0.9%	25%	0%		11.6%	3.4%	3.1%	0%		3.2%	-
Lights	52	66	0		118	109	66	0		175	57	94	0		151	-
Lights %	62.7%	98.5%	0%		78.7%	99.1%	75%	0%		88.4%	96.6%	96.9%	0%		96.8%	-
Single-Unit Trucks	12	1	0		13	1	12	0		13	1	3	0		4	-
Single-Unit Trucks %	14.5%	1.5%	0%		8.7%	0.9%	13.6%	0%		6.6%	1.7%	3.1%	0%		2.6%	-
Buses	0	0	0		0	0	0	0		0	0	0	0		0	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Articulated Trucks	19	0	0		19	0	10	0		10	1	0	0		1	-
Articulated Trucks %	22.9%	0%	0%		12.7%	0%	11.4%	0%		5.1%	1.7%	0%	0%		0.6%	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	100%		-	-	-	0%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

Peak Hour: 04:00 PM - 05:00 PM Weather: Snow (-3 °C)

Start Time	Southbound WINSTON CHURCHILL BLVD					Westbound LAKESHORE RD E					Eastbound LAKESHORE RD W					Int. Total (15 min)
	Left	Right	U-Turn	Peds	Approach Total	Thru	Right	U-Turn	Peds	Approach Total	Left	Thru	U-Turn	Peds	Approach Total	
16:00:00	11	25	1	0	37	53	42	0	0	95	18	30	0	0	48	180
16:15:00	12	30	0	0	42	48	43	0	0	91	13	46	0	0	59	192
16:30:00	26	34	0	0	60	66	59	0	0	125	21	37	0	0	58	243
16:45:00	18	31	0	0	49	52	56	0	0	108	25	51	0	0	76	233
Grand Total	67	120	1	0	188	219	200	0	0	419	77	164	0	0	241	**848**
Approach%	35.6%	63.8%	0.5%		-	52.3%	47.7%	0%		-	32%	68%	0%		-	-
Totals %	7.9%	14.2%	0.1%		22.2%	25.8%	23.6%	0%		49.4%	9.1%	19.3%	0%		28.4%	-
PHF	0.64	0.88	0.25		0.78	0.83	0.85	0		0.84	0.77	0.8	0		0.79	-
Heavy	18	0	0		18	1	13	0		14	3	1	0		4	-
Heavy %	26.9%	0%	0%		9.6%	0.5%	6.5%	0%		3.3%	3.9%	0.6%	0%		1.7%	-
Lights	49	120	1		170	218	187	0		405	74	163	0		237	-
Lights %	73.1%	100%	100%		90.4%	99.5%	93.5%	0%		96.7%	96.1%	99.4%	0%		98.3%	-
Single-Unit Trucks	7	0	0		7	0	6	0		6	2	0	0		2	-
Single-Unit Trucks %	10.4%	0%	0%		3.7%	0%	3%	0%		1.4%	2.6%	0%	0%		0.8%	-
Buses	0	0	0		0	1	2	0		3	1	1	0		2	-
Buses %	0%	0%	0%		0%	0.5%	1%	0%		0.7%	1.3%	0.6%	0%		0.8%	-
Articulated Trucks	11	0	0		11	0	5	0		5	0	0	0		0	-
Articulated Trucks %	16.4%	0%	0%		5.9%	0%	2.5%	0%		1.2%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-
Bicycles on Road	0	0	0	0	-	1	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-

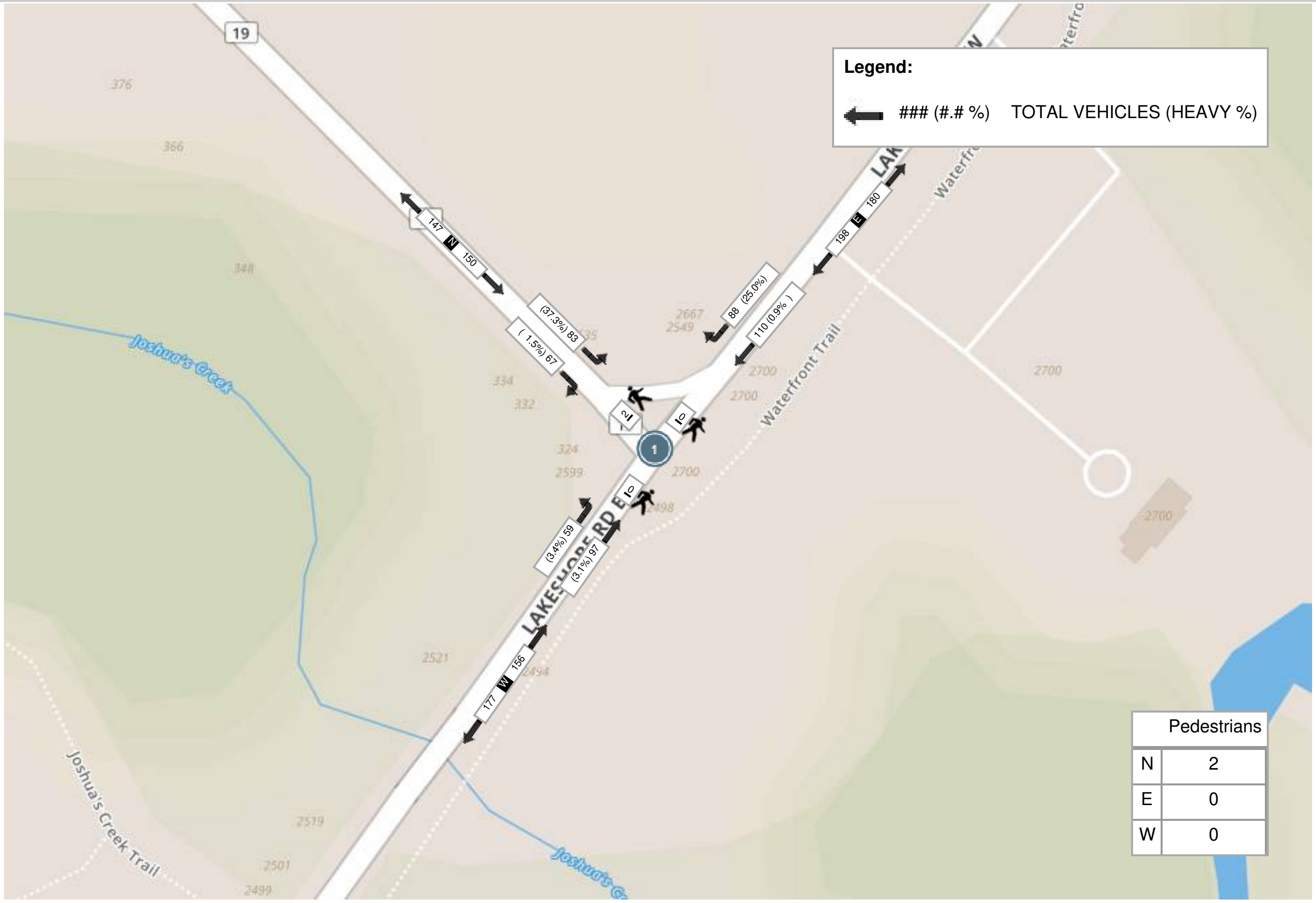
Peak Hour: 08:00 AM - 09:00 AM Weather: Overcast (4 °C)



	Pedestrians
N	0
E	0
W	0

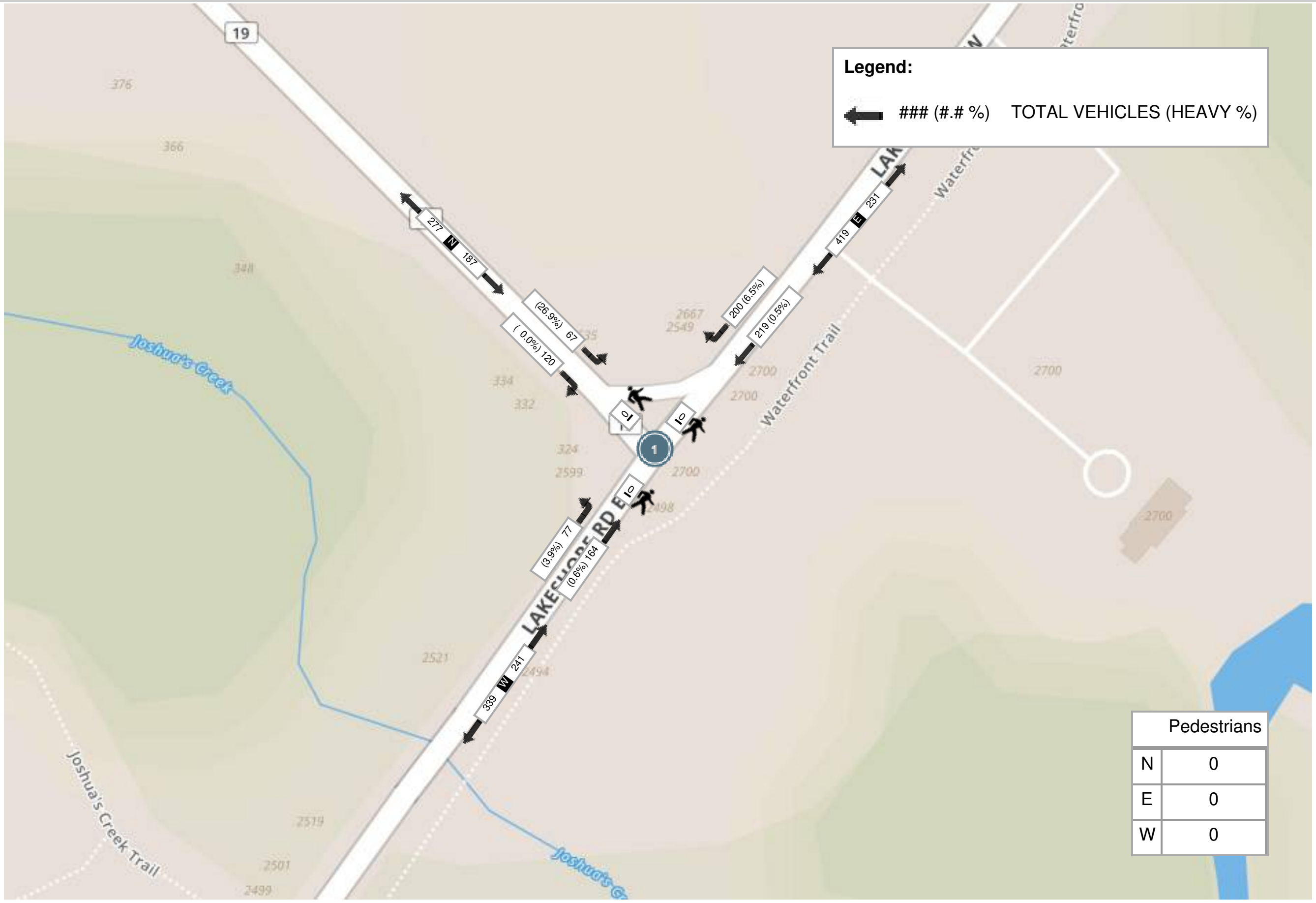
Turning Movement Count
Location Name: WINSTON CHURCHILL BLVD & LAKESHORE RD
Date: Tue, Jan 31, 2017 Deployment Lead: Chris Koukaras

Peak Hour: 12:00 PM - 01:00 PM Weather: Light Snow Showers (-3 °C)



	Pedestrians
N	2
E	0
W	0

Peak Hour: 04:00 PM - 05:00 PM Weather: Snow (-3 °C)



	Pedestrians
N	0
E	0
W	0

Turning Movement Count
Location Name: ROYAL WINDSOR DR & WINSTON CHURCHILL BLVD
Date: Wed, Mar 27, 2019 Deployment Lead: Patrick Filopoulos

Turning Movement Count (1 . ROYAL WINDSOR DR & WINSTON CHURCHILL BLVD) CustID: 01902061 MioID: 636402

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach ROYAL WINDSOR DR						S Approach WINSTON CHURCHILL BLVD						W Approach ROYAL WINDSOR DR						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
07:00:00	13	39	78	0	0	130	38	59	4	0	1	101	17	10	10	0	0	37	17	159	19	0	0	195	463	
07:15:00	29	33	100	0	0	162	25	86	6	0	0	117	22	21	4	0	0	47	11	234	25	0	0	270	596	
07:30:00	39	60	118	0	0	217	40	118	3	0	2	161	14	26	7	0	0	47	26	218	23	0	1	267	692	
07:45:00	48	59	164	0	0	271	48	115	4	0	0	167	25	35	9	0	0	69	25	258	30	0	2	313	820	2571
08:00:00	56	53	138	0	0	247	49	132	8	0	0	189	19	26	5	0	0	50	8	222	35	0	1	265	751	2859
08:15:00	58	64	184	0	0	306	56	120	6	0	0	182	33	45	7	0	0	85	25	229	31	0	0	285	858	3121
08:30:00	51	67	108	0	1	226	47	143	11	0	1	201	31	38	7	0	0	76	24	219	40	0	0	283	786	3215
08:45:00	47	66	122	0	0	235	47	128	12	0	2	187	18	34	8	0	0	60	29	189	28	0	0	246	728	3123
BREAK																										
16:00:00	39	50	59	0	0	148	90	188	16	0	1	294	17	56	23	0	1	96	11	122	32	0	1	165	703	
16:15:00	39	50	54	0	1	143	77	155	9	0	0	241	17	55	26	0	0	98	7	130	43	0	1	180	662	
16:30:00	31	47	49	1	2	128	127	156	18	0	0	301	26	87	34	0	0	147	13	159	37	0	0	209	785	
16:45:00	37	44	55	1	1	137	133	205	21	0	0	359	12	57	27	0	0	96	11	122	35	0	0	168	760	2910
17:00:00	36	50	79	0	1	165	138	186	15	0	2	339	20	78	41	0	0	139	12	136	46	0	1	194	837	3044
17:15:00	28	55	81	0	0	164	109	183	15	0	1	307	27	78	26	0	0	131	21	178	49	0	0	248	850	3232
17:30:00	31	44	75	0	0	150	204	230	23	0	1	457	19	59	27	0	0	105	9	143	40	0	1	192	904	3351
17:45:00	29	37	44	0	1	110	160	221	33	0	1	414	16	53	19	0	1	88	10	157	42	0	1	209	821	3412
18:00:00	33	48	47	0	0	128	136	176	21	0	0	333	13	32	31	0	0	76	16	118	33	1	0	168	705	3280
18:15:00	24	46	45	0	0	115	107	130	21	0	0	258	11	45	16	0	0	72	18	120	34	0	0	172	617	3047
18:30:00	27	34	40	0	0	101	118	185	28	0	1	331	11	22	9	0	0	42	20	103	30	0	0	153	627	2770
18:45:00	17	37	57	0	0	111	84	92	7	0	0	183	10	28	16	0	0	54	9	109	32	0	0	150	498	2447
Grand Total	712	983	1697	2	7	3394	1833	3008	281	0	13	5122	378	885	352	0	2	1615	322	3325	684	1	9	4332	**14463**	-
Approach%	21%	29%	50%	0.1%		-	35.8%	58.7%	5.5%	0%		-	23.4%	54.8%	21.8%	0%		-	7.4%	76.8%	15.8%	0%		-	-	-
Totals %	4.9%	6.8%	11.7%	0%		23.5%	12.7%	20.8%	1.9%	0%		35.4%	2.6%	6.1%	2.4%	0%		11.2%	2.2%	23%	4.7%	0%		30%	-	-
Heavy	12	21	10	0		-	16	75	2	0		-	3	9	29	0		-	28	103	9	0		-	-	-
Heavy %	1.7%	2.1%	0.6%	0%		-	0.9%	2.5%	0.7%	0%		-	0.8%	1%	8.2%	0%		-	8.7%	3.1%	1.3%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Spectrum

Peak Hour: 07:45 AM - 08:45 AM Weather: Broken Clouds (-3.68 °C)

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach ROYAL WINDSOR DR						S Approach WINSTON CHURCHILL BLVD						W Approach ROYAL WINDSOR DR						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
07:45:00	48	59	164	0	0	271	48	115	4	0	0	167	25	35	9	0	0	69	25	258	30	0	2	313	820
08:00:00	56	53	138	0	0	247	49	132	8	0	0	189	19	26	5	0	0	50	8	222	35	0	1	265	751
08:15:00	58	64	184	0	0	306	56	120	6	0	0	182	33	45	7	0	0	85	25	229	31	0	0	285	858
08:30:00	51	67	108	0	1	226	47	143	11	0	1	201	31	38	7	0	0	76	24	219	40	0	0	283	786
Grand Total	213	243	594	0	1	1050	200	510	29	0	1	739	108	144	28	0	0	280	82	928	136	0	3	1146	**3215**
Approach%	20.3%	23.1%	56.6%	0%		-	27.1%	69%	3.9%	0%		-	38.6%	51.4%	10%	0%		-	7.2%	81%	11.9%	0%		-	-
Totals %	6.6%	7.6%	18.5%	0%		32.7%	6.2%	15.9%	0.9%	0%		23%	3.4%	4.5%	0.9%	0%		8.7%	2.6%	28.9%	4.2%	0%		35.6%	-
PHF	0.92	0.91	0.81	0		0.86	0.89	0.89	0.66	0		0.92	0.82	0.8	0.78	0		0.82	0.82	0.9	0.85	0		0.92	-
Heavy	3	5	1	0		9	4	20	0	0		24	1	2	7	0		10	3	9	6	0		18	-
Heavy %	1.4%	2.1%	0.2%	0%		0.9%	2%	3.9%	0%	0%		3.2%	0.9%	1.4%	25%	0%		3.6%	3.7%	1%	4.4%	0%		1.6%	-
Lights	207	227	574	0		1008	180	476	29	0		685	101	138	19	0		258	76	904	129	0		1109	-
Lights %	97.2%	93.4%	96.6%	0%		96%	90%	93.3%	100%	0%		92.7%	93.5%	95.8%	67.9%	0%		92.1%	92.7%	97.4%	94.9%	0%		96.8%	-
Mediums	3	11	19	0		33	16	14	0	0		30	6	4	2	0		12	3	15	1	0		19	-
Mediums %	1.4%	4.5%	3.2%	0%		3.1%	8%	2.7%	0%	0%		4.1%	5.6%	2.8%	7.1%	0%		4.3%	3.7%	1.6%	0.7%	0%		1.7%	-
Articulated Trucks	3	5	1	0		9	4	20	0	0		24	1	2	7	0		10	3	9	6	0		18	-
Articulated Trucks %	1.4%	2.1%	0.2%	0%		0.9%	2%	3.9%	0%	0%		3.2%	0.9%	1.4%	25%	0%		3.6%	3.7%	1%	4.4%	0%		1.6%	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	0%		-	-	-	-	20%		-	-	-	-	0%		-	-	-	-	40%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	20%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	20%		-

Spectrum

Turning Movement Count
Location Name: ROYAL WINDSOR DR & WINSTON CHURCHILL BLVD
Date: Wed, Mar 27, 2019 Deployment Lead: Patrick Filopoulos

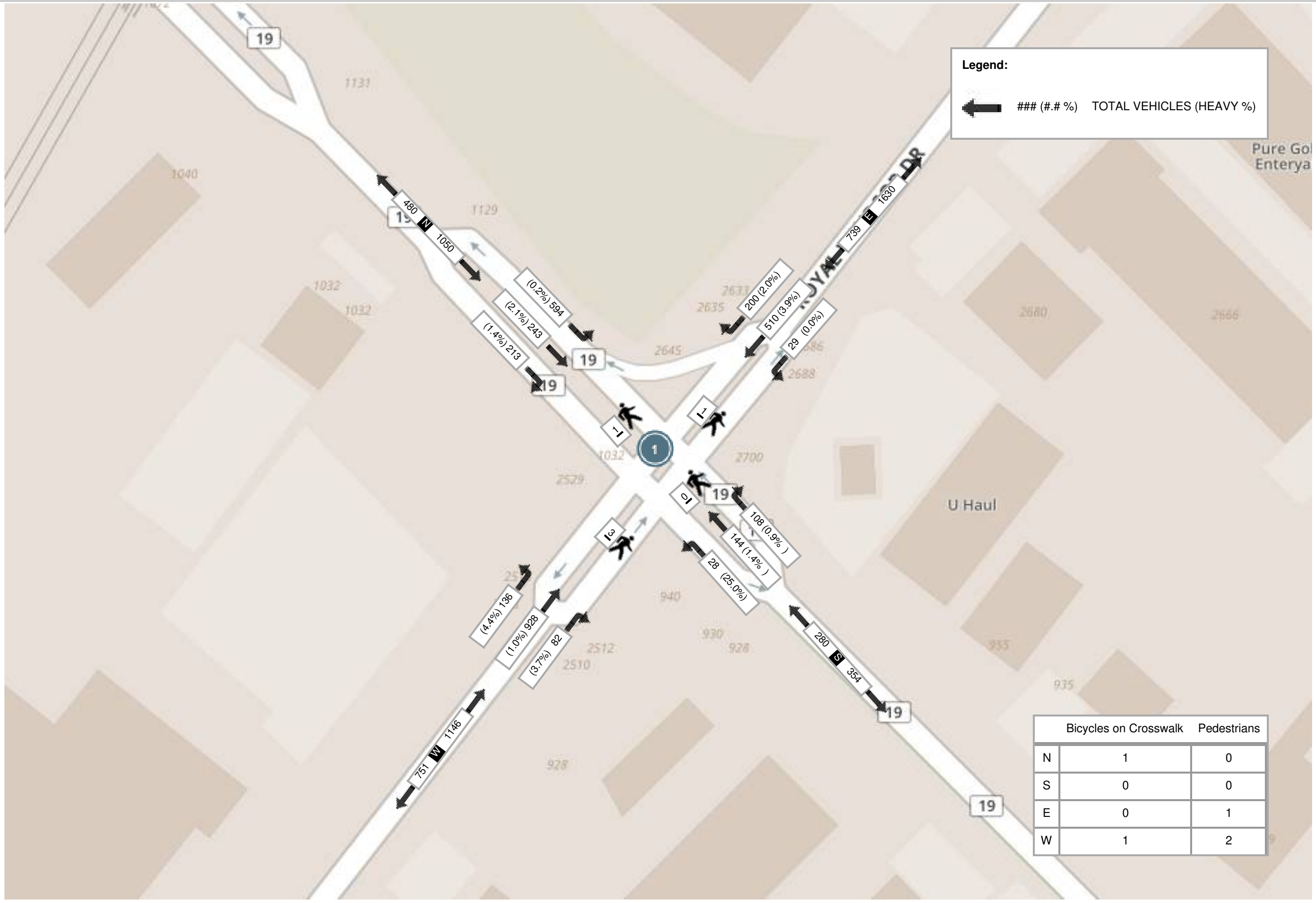
Peak Hour: 05:00 PM - 06:00 PM Weather:

Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach ROYAL WINDSOR DR						S Approach WINSTON CHURCHILL BLVD						W Approach ROYAL WINDSOR DR						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
17:00:00	36	50	79	0	1	165	138	186	15	0	2	339	20	78	41	0	0	139	12	136	46	0	1	194	837
17:15:00	28	55	81	0	0	164	109	183	15	0	1	307	27	78	26	0	0	131	21	178	49	0	0	248	850
17:30:00	31	44	75	0	0	150	204	230	23	0	1	457	19	59	27	0	0	105	9	143	40	0	1	192	904
17:45:00	29	37	44	0	1	110	160	221	33	0	1	414	16	53	19	0	1	88	10	157	42	0	1	209	821
Grand Total	124	186	279	0	2	589	611	820	86	0	5	1517	82	268	113	0	1	463	52	614	177	0	3	843	**3412**
Approach%	21.1%	31.6%	47.4%	0%		-	40.3%	54.1%	5.7%	0%		-	17.7%	57.9%	24.4%	0%		-	6.2%	72.8%	21%	0%		-	-
Totals %	3.6%	5.5%	8.2%	0%		17.3%	17.9%	24%	2.5%	0%		44.5%	2.4%	7.9%	3.3%	0%		13.6%	1.5%	18%	5.2%	0%		24.7%	-
PHF	0.86	0.85	0.86	0		0.89	0.75	0.89	0.65	0		0.83	0.76	0.86	0.69	0		0.83	0.62	0.86	0.9	0		0.85	-
Heavy	0	2	2	0		4	4	10	1	0		15	1	1	4	0		6	7	29	0	0		36	-
Heavy %	0%	1.1%	0.7%	0%		0.7%	0.7%	1.2%	1.2%	0%		1%	1.2%	0.4%	3.5%	0%		1.3%	13.5%	4.7%	0%	0%		4.3%	-
Lights	124	176	268	0		568	592	802	83	0		1477	78	263	105	0		446	38	578	175	0		791	-
Lights %	100%	94.6%	96.1%	0%		96.4%	96.9%	97.8%	96.5%	0%		97.4%	95.1%	98.1%	92.9%	0%		96.3%	73.1%	94.1%	98.9%	0%		93.8%	-
Mediums	0	8	9	0		17	15	8	2	0		25	3	4	4	0		11	7	7	2	0		16	-
Mediums %	0%	4.3%	3.2%	0%		2.9%	2.5%	1%	2.3%	0%		1.6%	3.7%	1.5%	3.5%	0%		2.4%	13.5%	1.1%	1.1%	0%		1.9%	-
Articulated Trucks	0	2	2	0		4	4	10	1	0		15	1	1	4	0		6	7	29	0	0		36	-
Articulated Trucks %	0%	1.1%	0.7%	0%		0.7%	0.7%	1.2%	1.2%	0%		1%	1.2%	0.4%	3.5%	0%		1.3%	13.5%	4.7%	0%	0%		4.3%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	4	-	-	-	-	-	1	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	9.1%		-	-	-	-	36.4%		-	-	-	-	9.1%		-	-	-	-	27.3%		-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	9.1%		-	-	-	-	9.1%		-	-	-	-	0%		-	-	-	-	0%		-

Spectrum

Turning Movement Count
Location Name: ROYAL WINDSOR DR & WINSTON CHURCHILL BLVD
Date: Wed, Mar 27, 2019   Deployment Lead: Patrick Filopoulos

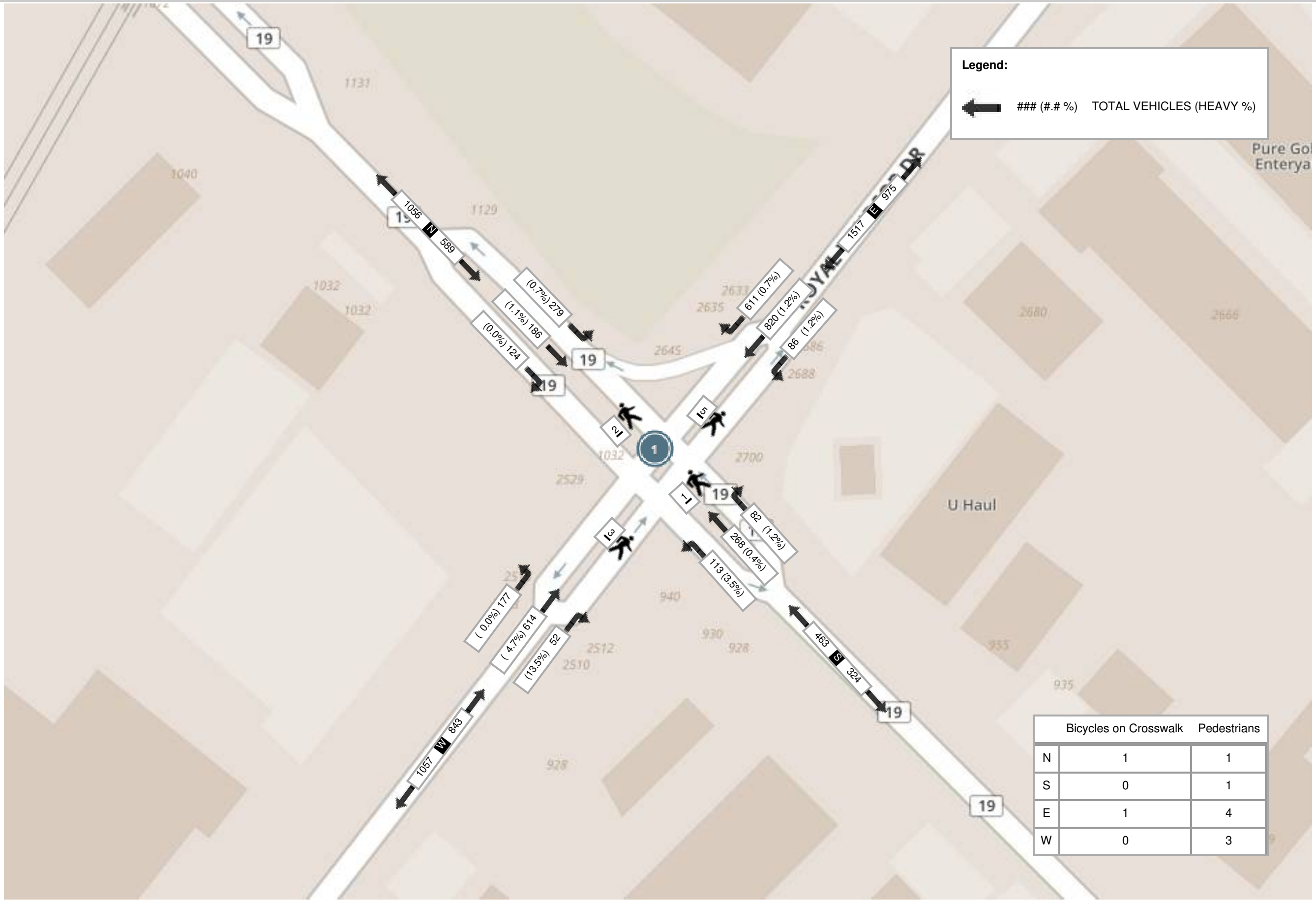
Peak Hour: 07:45 AM - 08:45 AM   Weather: Broken Clouds (-3.68 °C)



	Bicycles on Crosswalk	Pedestrians
N	1	0
S	0	0
E	0	1
W	1	2

Turning Movement Count
Location Name: ROYAL WINDSOR DR & WINSTON CHURCHILL BLVD
Date: Wed, Mar 27, 2019   Deployment Lead: Patrick Filopoulos

Peak Hour: 05:00 PM - 06:00 PM   Weather:



	Bicycles on Crosswalk	Pedestrians
N	1	1
S	0	1
E	1	4
W	0	3

Appendix E

2020 Existing Conditions Synchro Reports

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	126	995	35	549	161	24	150	101	421	327	192
Future Volume (vph)	126	995	35	549	161	24	150	101	421	327	192
Lane Group Flow (vph)	126	1077	35	549	161	24	150	101	421	327	192
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	6	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	56.0	56.0	56.0	56.0	56.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
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)	7.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.56	0.90	0.67	0.46	0.27	0.09	0.13	0.17	0.76	0.18	0.22
Control Delay	48.2	53.7	96.9	36.8	5.6	34.2	32.7	6.9	64.9	16.1	5.6
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	48.2	53.7	96.9	36.8	5.6	34.2	32.7	6.9	64.9	16.1	5.6
Queue Length 50th (m)	28.1	147.5	8.2	61.8	0.0	4.5	14.8	0.0	58.0	23.0	6.9
Queue Length 95th (m)	51.3	#180.8	#28.7	78.7	15.0	12.2	24.5	13.3	72.6	31.3	18.8
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	225	1201	52	1193	607	277	1194	598	1049	1868	871
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	0.56	0.90	0.67	0.46	0.27	0.09	0.13	0.17	0.40	0.18	0.22

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

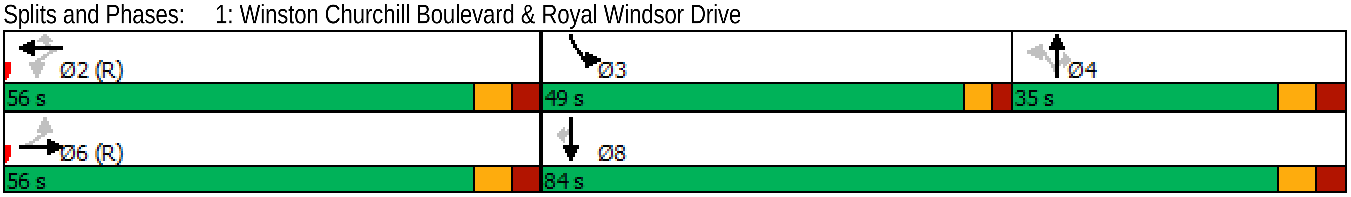
Offset: 108 (77%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

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

Splits and Phases: 1: Winston Churchill Boulevard & Royal Windsor Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	995	82	35	549	161	24	150	101	421	327	192
Future Volume (vph)	126	995	82	35	549	161	24	150	101	421	327	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1737	3418		1722	3411	1437	1371	3444	1537	3340	3411	1478
Flt Permitted	0.35	1.00		0.08	1.00	1.00	0.55	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	644	3418		148	3411	1437	800	3444	1537	3340	3411	1478
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	126	995	82	35	549	161	24	150	101	421	327	192
RTOR Reduction (vph)	0	5	0	0	0	105	0	0	66	0	0	62
Lane Group Flow (vph)	126	1072	0	35	549	56	24	150	35	421	327	130
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Heavy Vehicles (%)	5%	5%	11%	6%	7%	9%	33%	6%	4%	6%	7%	9%
Bus Blockages (#/hr)	0	0	1	0	0	7	0	0	2	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6			2			4		3	8	
Permitted Phases	6			2		2	4		4			8
Actuated Green, G (s)	49.0	49.0		49.0	49.0	49.0	48.5	48.5	48.5	23.2	76.7	76.7
Effective Green, g (s)	49.0	49.0		49.0	49.0	49.0	48.5	48.5	48.5	23.2	76.7	76.7
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35	0.35	0.35	0.35	0.17	0.55	0.55
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
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
Lane Grp Cap (vph)	225	1196		51	1193	502	277	1193	532	553	1868	809
v/s Ratio Prot		c0.31			0.16			0.04		c0.13	c0.10	
v/s Ratio Perm	0.20			0.24		0.04	0.03		0.02			0.09
v/c Ratio	0.56	0.90		0.69	0.46	0.11	0.09	0.13	0.07	0.76	0.18	0.16
Uniform Delay, d1	36.8	43.1		38.9	35.3	30.8	30.8	31.3	30.6	55.8	15.8	15.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.7	10.6		55.4	1.3	0.5	0.6	0.2	0.2	6.1	0.2	0.4
Delay (s)	46.5	53.7		94.4	36.5	31.2	31.4	31.5	30.8	61.9	16.0	16.1
Level of Service	D	D		F	D	C	C	C	C	E	B	B
Approach Delay (s)		53.0			38.1			31.2			36.6	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	101.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	74	61	12	201	372	
Future Volume (vph)	74	61	12	201	372	
Lane Group Flow (vph)	74	61	12	201	444	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.30	0.24	0.02	0.16	0.35	
Control Delay	25.7	9.5	4.5	4.7	5.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.7	9.5	4.5	4.7	5.6	
Queue Length 50th (m)	7.5	0.0	0.4	6.9	17.1	
Queue Length 95th (m)	16.7	8.1	2.0	15.7	35.6	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	645	570	485	1248	1252	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.11	0.11	0.02	0.16	0.35	

Intersection Summary

Cycle Length: 60

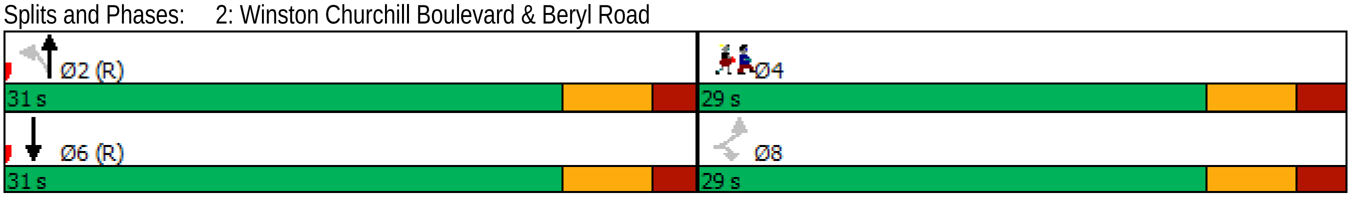
Actuated Cycle Length: 60

Offset: 5 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	74	61	12	201	372	72
Future Volume (vph)	74	61	12	201	372	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1706	1408	1285	1748	1746	
Flt Permitted	0.95	1.00	0.50	1.00	1.00	
Satd. Flow (perm)	1706	1408	679	1748	1746	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	74	61	12	201	372	72
RTOR Reduction (vph)	0	54	0	0	7	0
Lane Group Flow (vph)	74	7	12	201	437	0
Heavy Vehicles (%)	7%	16%	42%	9%	7%	11%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	8	8	2			
Actuated Green, G (s)	7.2	7.2	40.4	40.4	40.4	
Effective Green, g (s)	7.2	7.2	40.4	40.4	40.4	
Actuated g/C Ratio	0.12	0.12	0.67	0.67	0.67	
Clearance Time (s)	6.3	6.3	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	204	168	457	1176	1175	
v/s Ratio Prot				0.11	c0.25	
v/s Ratio Perm	c0.04	0.01	0.02			
v/c Ratio	0.36	0.04	0.03	0.17	0.37	
Uniform Delay, d1	24.3	23.4	3.3	3.6	4.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.1	0.1	0.3	0.9	
Delay (s)	25.4	23.5	3.4	3.9	5.2	
Level of Service	C	C	A	A	A	
Approach Delay (s)	24.5			3.9	5.2	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

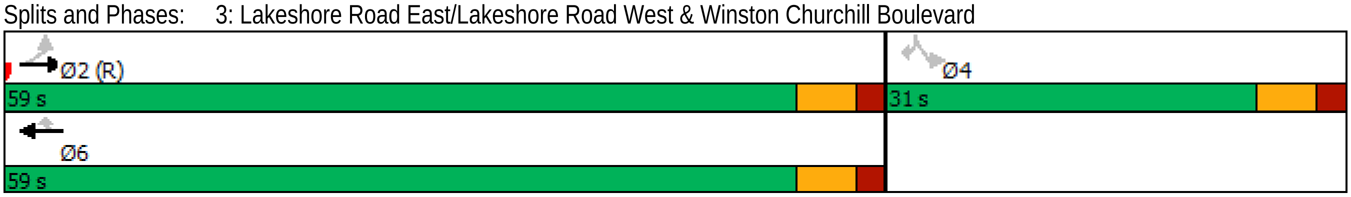
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	177	396	97	36	287	146
Future Volume (vph)	177	396	97	36	287	146
Lane Group Flow (vph)	177	396	97	36	287	146
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.23	0.35	0.09	0.06	0.65	0.27
Control Delay	9.8	10.7	8.3	3.0	36.8	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	10.7	8.3	3.0	36.8	6.0
Queue Length 50th (m)	13.4	32.7	6.7	0.0	43.7	0.0
Queue Length 95th (m)	23.8	49.7	12.9	3.6	70.5	13.2
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	769	1120	1108	611	441	534
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.35	0.09	0.06	0.65	0.27

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	177	396	97	36	287	146
Future Volume (vph)	177	396	97	36	287	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1902	1883	1014	1601	1555
Flt Permitted	0.69	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1308	1902	1883	1014	1601	1555
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	177	396	97	36	287	146
RTOR Reduction (vph)	0	0	0	15	0	106
Lane Group Flow (vph)	177	396	97	21	287	40
Heavy Vehicles (%)	2%	1%	2%	61%	14%	5%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Actuated Green, G (s)	53.0	53.0	53.0	53.0	24.8	24.8
Effective Green, g (s)	53.0	53.0	53.0	53.0	24.8	24.8
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	770	1120	1108	597	441	428
v/s Ratio Prot		c0.21	0.05			
v/s Ratio Perm	0.14			0.02	c0.18	0.03
v/c Ratio	0.23	0.35	0.09	0.04	0.65	0.09
Uniform Delay, d1	8.8	9.6	8.0	7.8	28.8	24.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.9	0.2	0.1	7.3	0.4
Delay (s)	9.5	10.5	8.2	7.9	36.0	24.7
Level of Service	A	B	A	A	D	C
Approach Delay (s)		10.2	8.1		32.2	
Approach LOS		B	A		C	

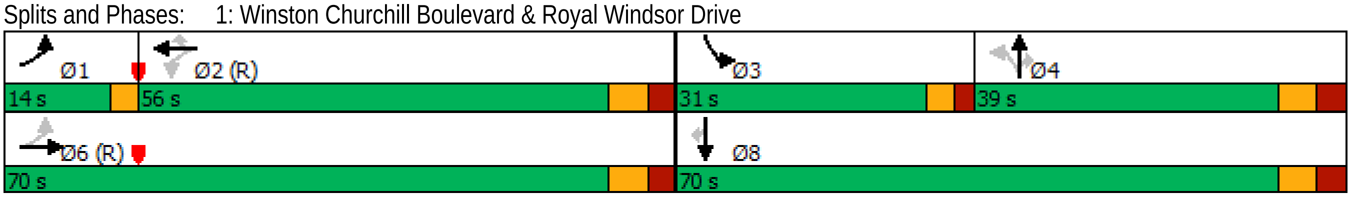
Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	158	702	74	826	546	106	268	55	213	223	130
Future Volume (vph)	158	702	74	826	546	106	268	55	213	223	130
Lane Group Flow (vph)	158	739	74	826	546	106	268	55	213	223	130
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	1	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	44.3	44.3	44.3	44.3	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	14.0	70.0	56.0	56.0	56.0	39.0	39.0	39.0	31.0	70.0	70.0
Total Split (%)	10.0%	50.0%	40.0%	40.0%	40.0%	27.9%	27.9%	27.9%	22.1%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.58	0.48	0.31	0.66	0.60	0.31	0.24	0.10	0.62	0.14	0.17
Control Delay	29.8	28.1	37.7	41.4	5.7	40.7	37.1	1.5	68.2	23.1	4.0
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	29.8	28.1	37.7	41.4	5.7	40.7	37.1	1.5	68.2	23.1	4.0
Queue Length 50th (m)	24.5	73.8	14.9	101.7	0.0	22.4	29.0	0.0	29.6	18.8	0.0
Queue Length 95th (m)	38.6	91.3	29.2	124.2	26.0	40.8	42.4	2.2	41.8	27.1	11.5
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	278	1543	238	1252	903	345	1128	543	638	1602	786
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	0.57	0.48	0.31	0.66	0.60	0.31	0.24	0.10	0.33	0.14	0.17

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 104 (74%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 1: Winston Churchill Boulevard & Royal Windsor Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	702	37	74	826	546	106	268	55	213	223	130
Future Volume (vph)	158	702	37	74	826	546	106	268	55	213	223	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3425		1754	3544	1556	1720	3614	1535	3437	3579	1596
Flt Permitted	0.18	1.00		0.37	1.00	1.00	0.61	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	342	3425		675	3544	1556	1109	3614	1535	3437	3579	1596
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	158	702	37	74	826	546	106	268	55	213	223	130
RTOR Reduction (vph)	0	3	0	0	0	353	0	0	38	0	0	72
Lane Group Flow (vph)	158	736	0	74	826	193	106	268	17	213	223	58
Confl. Peds. (#/hr)			1	1			1		2	2		1
Heavy Vehicles (%)	1%	4%	38%	4%	3%	2%	6%	1%	4%	3%	2%	1%
Bus Blockages (#/hr)	0	0	1	0	0	7	0	0	2	0	0	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	1	6			2			4		3	8	
Permitted Phases	6			2		2	4		4			8
Actuated Green, G (s)	63.0	63.0		49.5	49.5	49.5	43.7	43.7	43.7	14.0	62.7	62.7
Effective Green, g (s)	63.0	63.0		49.5	49.5	49.5	43.7	43.7	43.7	14.0	62.7	62.7
Actuated g/C Ratio	0.45	0.45		0.35	0.35	0.35	0.31	0.31	0.31	0.10	0.45	0.45
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
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
Lane Grp Cap (vph)	263	1541		238	1253	550	346	1128	479	343	1602	714
v/s Ratio Prot	c0.04	0.21			c0.23			0.07		c0.06	0.06	
v/s Ratio Perm	0.22			0.11		0.12	c0.10		0.01			0.04
v/c Ratio	0.60	0.48		0.31	0.66	0.35	0.31	0.24	0.04	0.62	0.14	0.08
Uniform Delay, d1	26.1	27.0		32.9	38.1	33.4	36.6	35.8	33.5	60.5	22.8	22.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	1.1		3.4	2.7	1.8	2.3	0.5	0.1	3.5	0.2	0.2
Delay (s)	29.9	28.0		36.2	40.9	35.2	38.9	36.3	33.6	63.9	22.9	22.4
Level of Service	C	C		D	D	D	D	D	C	E	C	C
Approach Delay (s)		28.4			38.5			36.6			38.2	
Approach LOS		C			D			D			D	

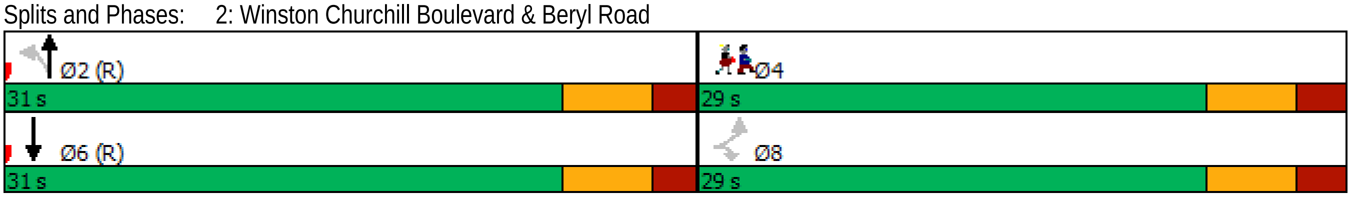
Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.3
Intersection Capacity Utilization	91.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	89	18	30	340	234	
Future Volume (vph)	89	18	30	340	234	
Lane Group Flow (vph)	89	18	30	340	334	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.34	0.08	0.05	0.26	0.28	
Control Delay	26.0	11.2	4.8	5.4	4.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.0	11.2	4.8	5.4	4.9	
Queue Length 50th (m)	9.1	0.0	1.0	13.1	11.0	
Queue Length 95th (m)	18.9	4.4	3.8	27.7	24.6	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	651	539	618	1298	1213	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.14	0.03	0.05	0.26	0.28	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road



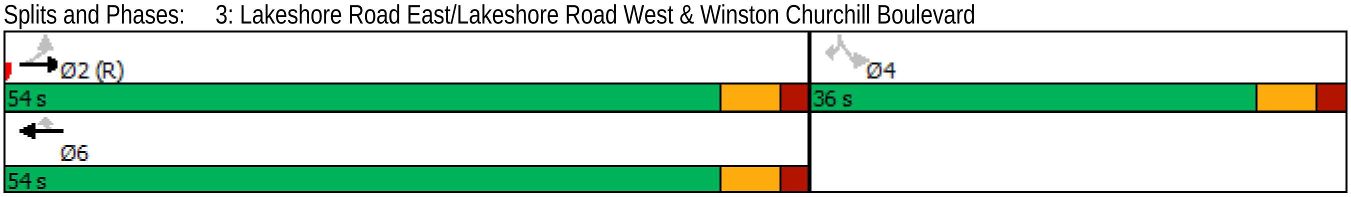
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	18	30	340	234	100
Future Volume (vph)	89	18	30	340	234	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1722	1396	1484	1832	1693	
Flt Permitted	0.95	1.00	0.56	1.00	1.00	
Satd. Flow (perm)	1722	1396	874	1832	1693	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	89	18	30	340	234	100
RTOR Reduction (vph)	0	16	0	0	15	0
Lane Group Flow (vph)	89	2	30	340	319	0
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	6%	17%	23%	4%	7%	11%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	8	8	2			
Actuated Green, G (s)	7.6	7.6	40.0	40.0	40.0	
Effective Green, g (s)	7.6	7.6	40.0	40.0	40.0	
Actuated g/C Ratio	0.13	0.13	0.67	0.67	0.67	
Clearance Time (s)	6.3	6.3	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	218	176	582	1221	1128	
v/s Ratio Prot				0.19	c0.19	
v/s Ratio Perm	c0.05	0.00	0.03			
v/c Ratio	0.41	0.01	0.05	0.28	0.28	
Uniform Delay, d1	24.1	22.9	3.5	4.1	4.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.0	0.2	0.6	0.6	
Delay (s)	25.4	22.9	3.6	4.7	4.7	
Level of Service	C	C	A	A	A	
Approach Delay (s)	25.0			4.6	4.7	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	103	231	233	267	91	161
Future Volume (vph)	103	231	233	267	91	161
Lane Group Flow (vph)	103	231	233	267	91	161
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	54.0	54.0	54.0	54.0	36.0	36.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.17	0.23	0.23	0.29	0.19	0.25
Control Delay	11.7	11.9	11.9	2.3	22.9	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.7	11.9	11.9	2.3	22.9	4.8
Queue Length 50th (m)	8.6	20.0	20.1	0.0	11.1	0.0
Queue Length 95th (m)	17.2	32.6	32.9	10.5	22.2	12.6
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	601	1014	1024	921	479	648
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.23	0.23	0.29	0.19	0.25

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 89 (99%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	103	231	233	267	91	161
Future Volume (vph)	103	231	233	267	91	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1755	1902	1921	1495	1448	1633
Flt Permitted	0.61	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1127	1902	1921	1495	1448	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	103	231	233	267	91	161
RTOR Reduction (vph)	0	0	0	125	0	108
Lane Group Flow (vph)	103	231	233	142	91	53
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	4%	1%	0%	7%	26%	0%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Actuated Green, G (s)	48.0	48.0	48.0	48.0	29.8	29.8
Effective Green, g (s)	48.0	48.0	48.0	48.0	29.8	29.8
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	601	1014	1024	797	479	540
v/s Ratio Prot		c0.12	0.12			
v/s Ratio Perm	0.09			0.10	c0.06	0.03
v/c Ratio	0.17	0.23	0.23	0.18	0.19	0.10
Uniform Delay, d1	10.8	11.2	11.2	10.8	21.5	20.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.5	0.5	0.5	0.9	0.4
Delay (s)	11.4	11.7	11.7	11.3	22.4	21.2
Level of Service	B	B	B	B	C	C
Approach Delay (s)		11.6	11.5		21.6	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Appendix F

ITE Trip Generation Manual Source Data

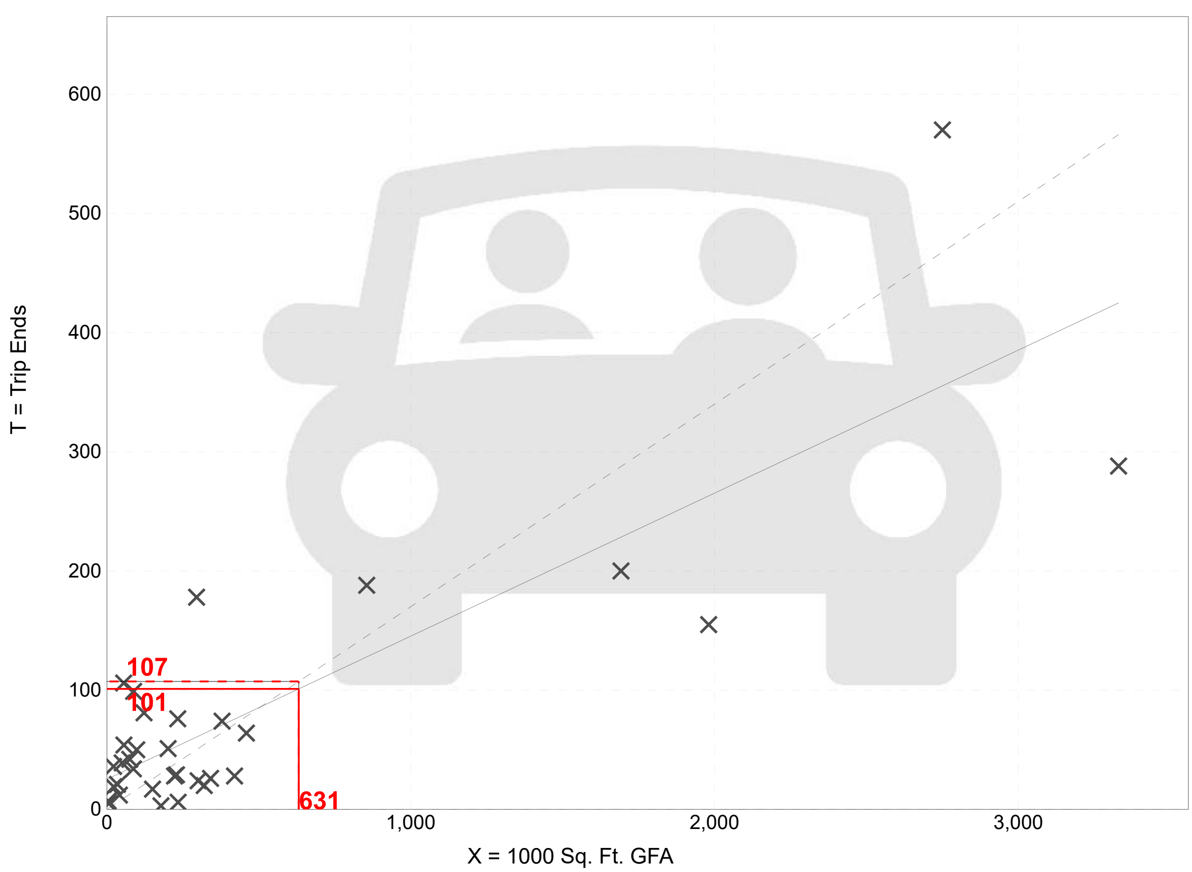
Warehousing
(150)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	34
Avg. 1000 Sq. Ft. GFA:	451
Directional Distribution:	77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.20

Data Plot and Equation



Study Site **Fitted Curve** **Average Rate**

Fitted Curve Equation: T = 0.12(X) + 25.32 **R^2= 0.69**

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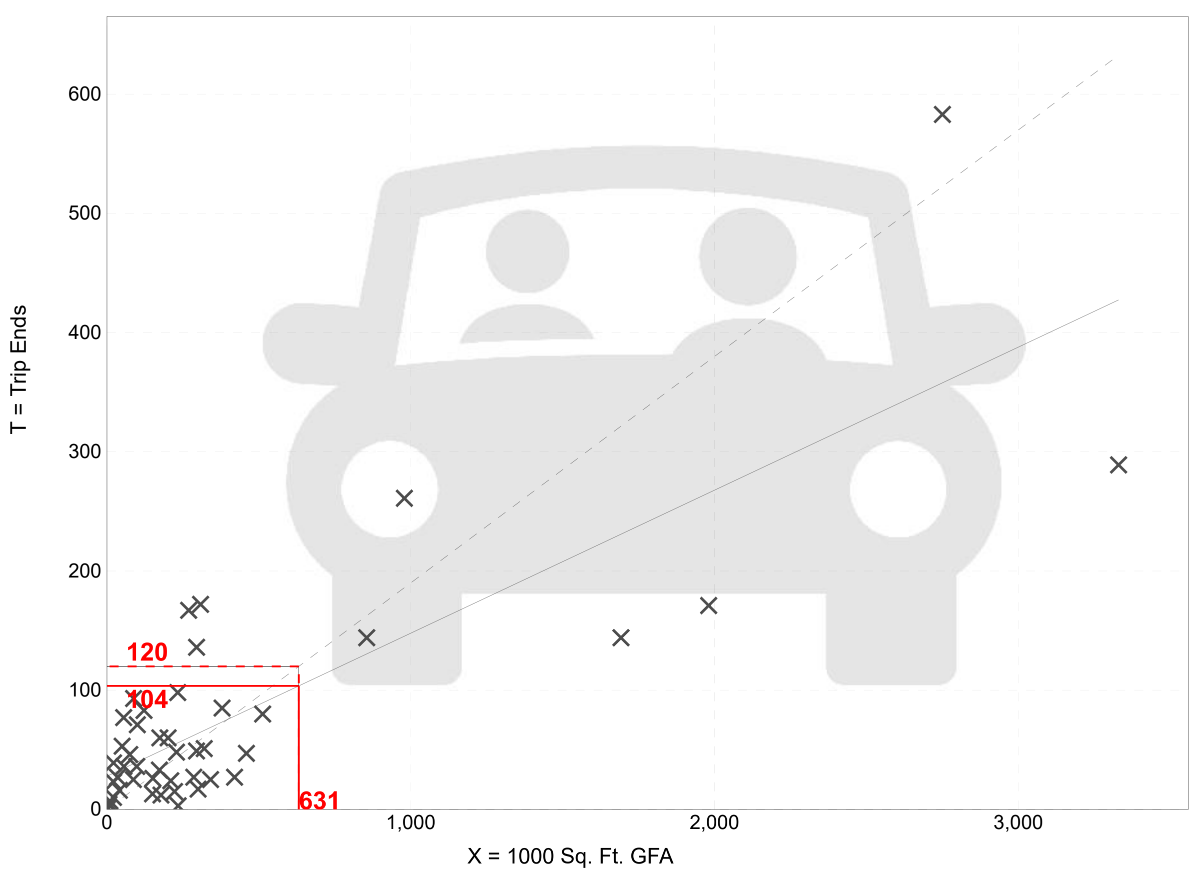
Warehousing
(150)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	47
Avg. 1000 Sq. Ft. GFA:	400
Directional Distribution:	27% entering, 73% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.19	0.01 - 1.80	0.18

Data Plot and Equation



Study Site   Fitted Curve   Average Rate

Fitted Curve Equation: T = 0.12(X) + 27.82   **R^2= 0.65**

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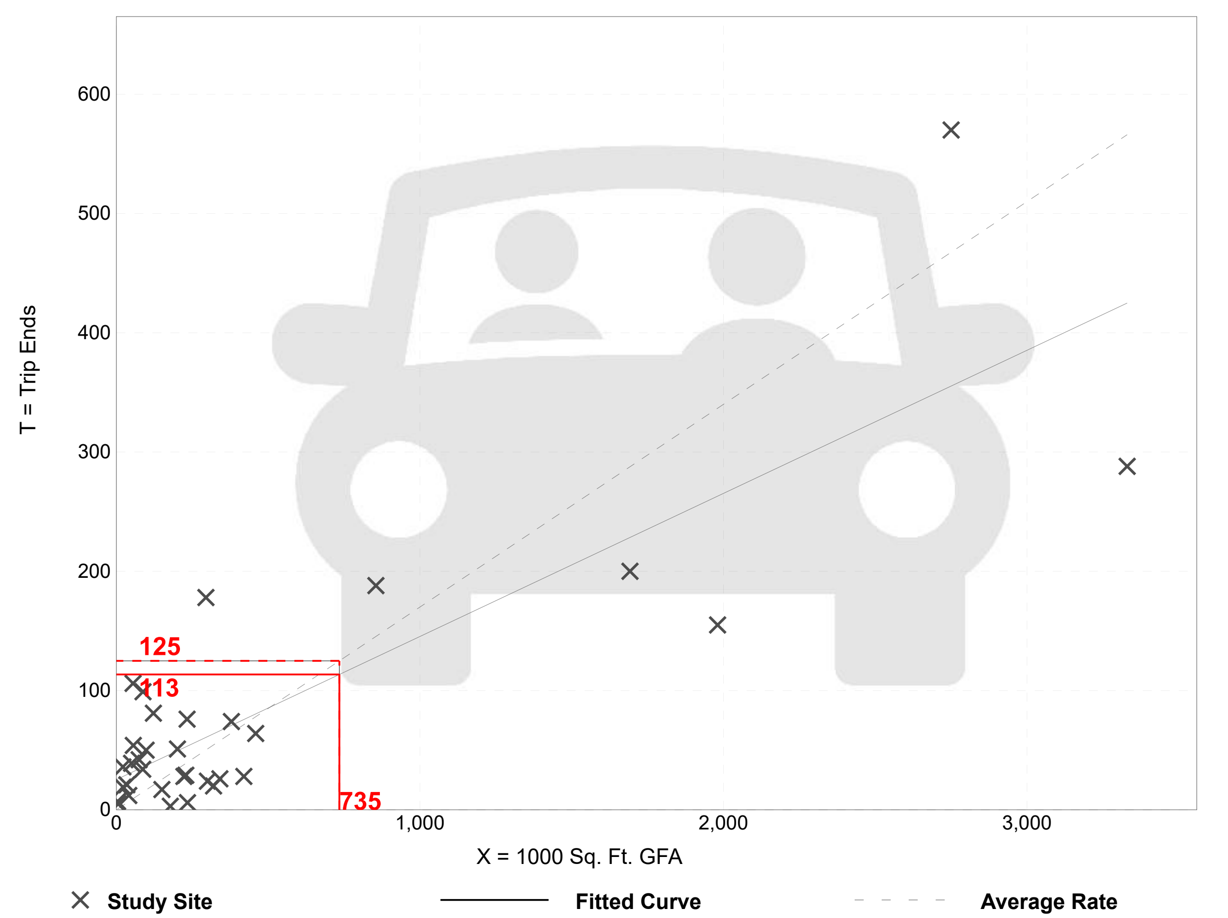
Warehousing
(150)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday, Peak Hour of Adjacent Street Traffic, One Hour Between 7 and 9 a.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	34
Avg. 1000 Sq. Ft. GFA:	451
Directional Distribution:	77% entering, 23% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.17	0.02 - 1.93	0.20

Data Plot and Equation



Fitted Curve Equation: $T = 0.12(X) + 25.32$ **$R^2 = 0.69$**

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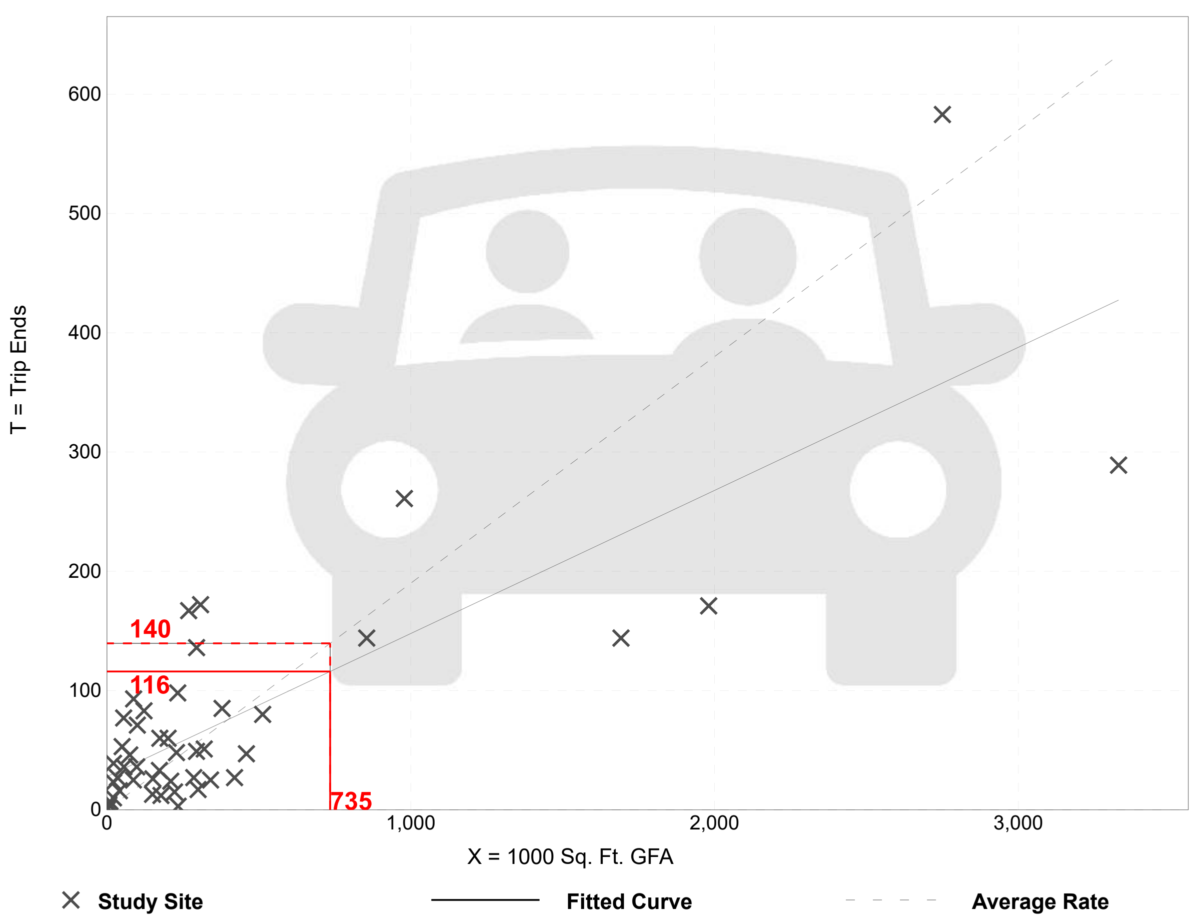
Warehousing
(150)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,** **Peak Hour of Adjacent Street Traffic,** **One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	47
Avg. 1000 Sq. Ft. GFA:	400
Directional Distribution:	27% entering, 73% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.19	0.01 - 1.80	0.18

Data Plot and Equation



Fitted Curve Equation: $T = 0.12(X) + 27.82$

$R^2 = 0.65$

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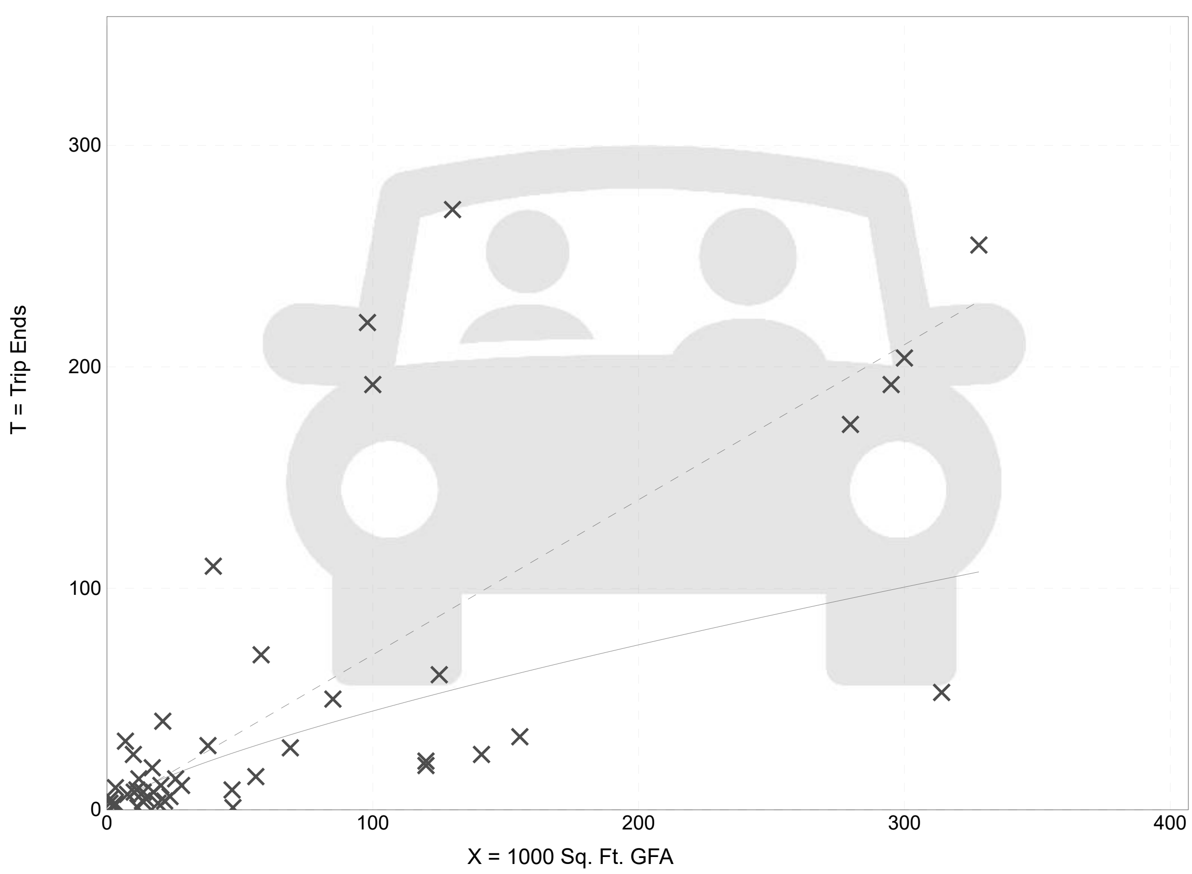
General Light Industrial
(110)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	45
Avg. 1000 Sq. Ft. GFA:	73
Directional Distribution:	88% entering, 12% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.70	0.02 - 4.46	0.65

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.74 Ln(X) + 0.39 **R^2= 0.52**

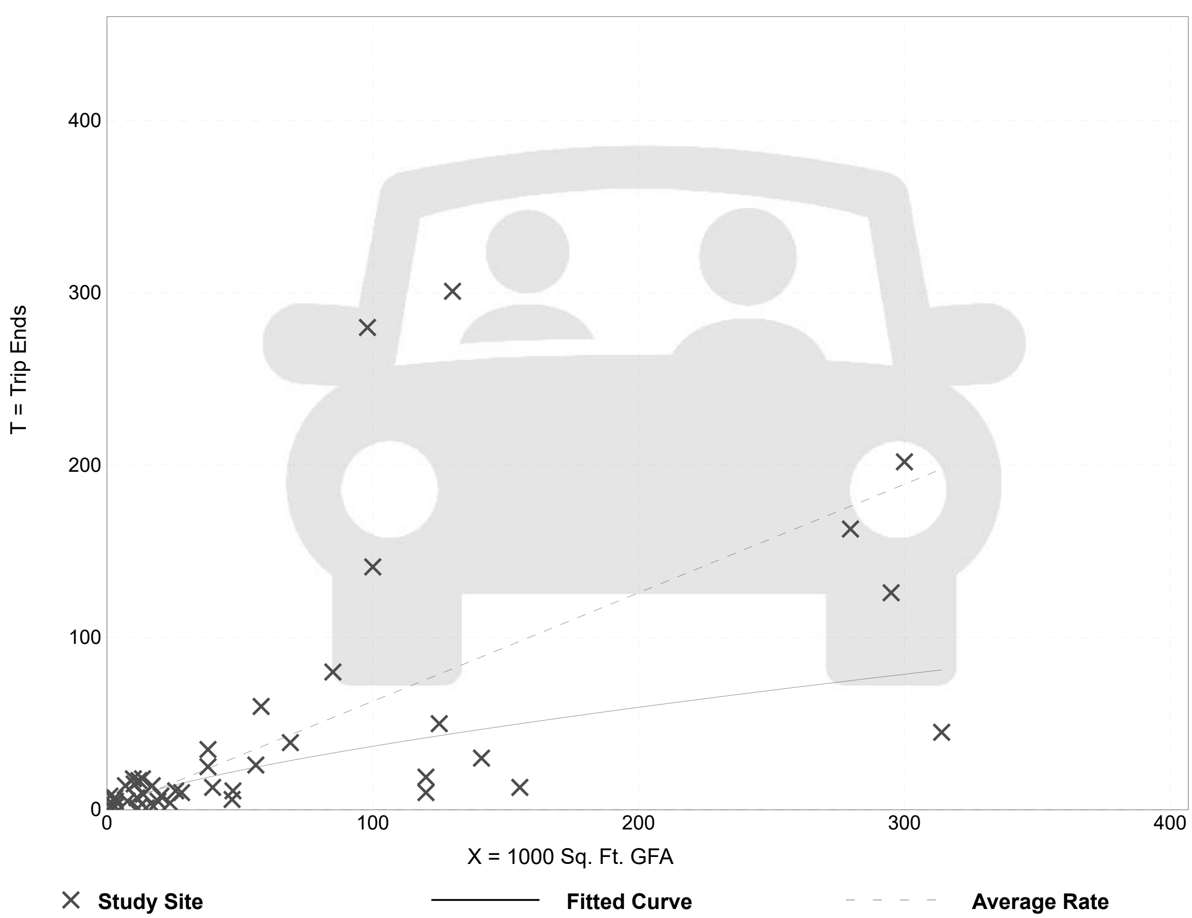
General Light Industrial
(110)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	44
Avg. 1000 Sq. Ft. GFA:	67
Directional Distribution:	13% entering, 87% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.63	0.07 - 7.02	0.68

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.69 Ln(X) + 0.43 **R^2 = 0.52**

Appendix G

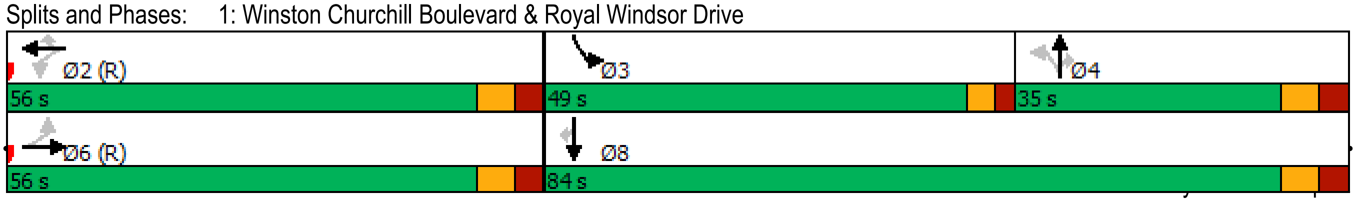
2026 Future Background Conditions Synchro Reports

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	126	1121	39	618	161	25	177	104	421	418	192
Future Volume (vph)	126	1121	39	618	161	25	177	104	421	418	192
Lane Group Flow (vph)	126	1211	39	618	161	25	177	104	421	418	192
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	6	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	56.0	56.0	56.0	56.0	56.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
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)	7.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.64	1.01	0.75	0.52	0.27	0.10	0.15	0.17	0.76	0.22	0.22
Control Delay	55.5	72.7	111.1	38.0	5.6	34.6	32.9	8.3	64.9	16.7	7.9
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	55.5	72.7	111.1	38.0	5.6	34.6	32.9	8.3	64.9	16.7	7.9
Queue Length 50th (m)	29.2	~178.4	9.5	71.3	0.0	4.7	17.7	1.5	58.0	30.3	11.3
Queue Length 95th (m)	#55.8	#226.7	#32.1	89.6	15.0	12.6	28.3	15.0	72.6	39.9	24.2
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	196	1201	52	1193	607	253	1194	595	1049	1868	856
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	0.64	1.01	0.75	0.52	0.27	0.10	0.15	0.17	0.40	0.22	0.22

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 108 (77%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
~ 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: 1: Winston Churchill Boulevard & Royal Windsor Drive

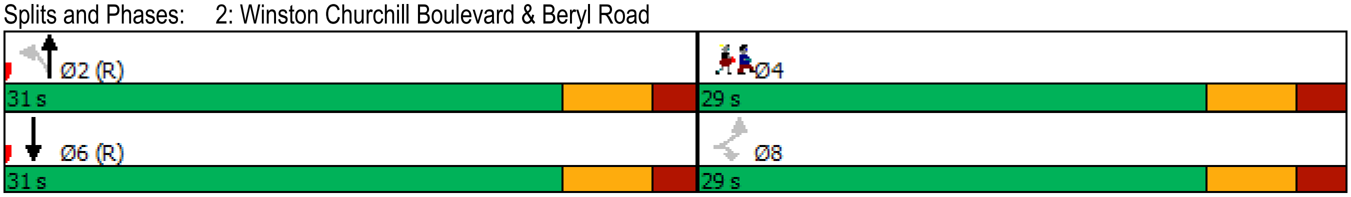


Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	77	67	12	229	462	
Future Volume (vph)	77	67	12	229	462	
Lane Group Flow (vph)	77	67	12	229	547	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.31	0.25	0.03	0.18	0.44	
Control Delay	25.8	9.3	4.7	4.8	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.8	9.3	4.7	4.8	6.5	
Queue Length 50th (m)	7.8	0.0	0.4	8.0	23.0	
Queue Length 95th (m)	17.1	8.4	2.0	17.9	48.2	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	645	574	415	1246	1252	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.12	0.03	0.18	0.44	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 5 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road

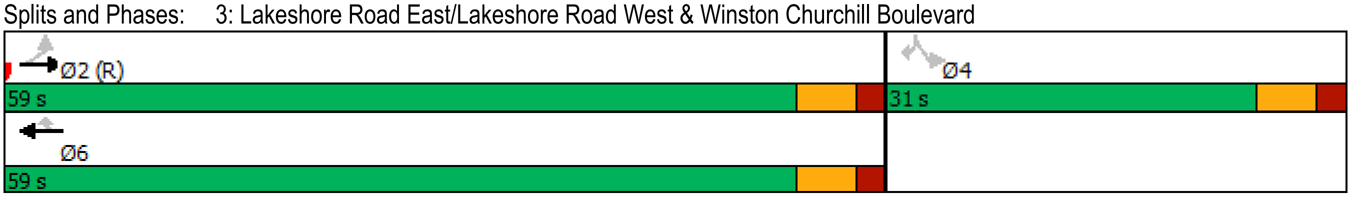


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	212	446	109	43	323	165
Future Volume (vph)	212	446	109	43	323	165
Lane Group Flow (vph)	212	446	109	43	323	165
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.28	0.40	0.10	0.07	0.73	0.30
Control Delay	10.3	11.3	8.4	2.9	41.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	11.3	8.4	2.9	41.0	5.9
Queue Length 50th (m)	16.6	38.2	7.6	0.0	50.6	0.0
Queue Length 95th (m)	28.7	57.4	14.3	4.0	#86.6	14.0
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	762	1120	1108	614	441	548
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.40	0.10	0.07	0.73	0.30

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Lane Group	NBT	SBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	241	529		
Future Volume (vph)	241	529		
Lane Group Flow (vph)	241	529		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	12.0	12.0	8.0	8.0
Minimum Split (s)	24.1	24.1	25.3	25.3
Total Split (s)	31.0	31.0	29.0	29.0
Total Split (%)	51.7%	51.7%	48%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	2.3	2.3
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	6.1	6.1		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	C-Max	None	None
v/c Ratio	0.13	0.28		
Control Delay	0.1	0.3		
Queue Delay	0.0	0.0		
Total Delay	0.1	0.3		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	222.0	147.2		
Turn Bay Length (m)				
Base Capacity (vph)	1883	1883		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.13	0.28		

Intersection Summary

Cycle Length: 60

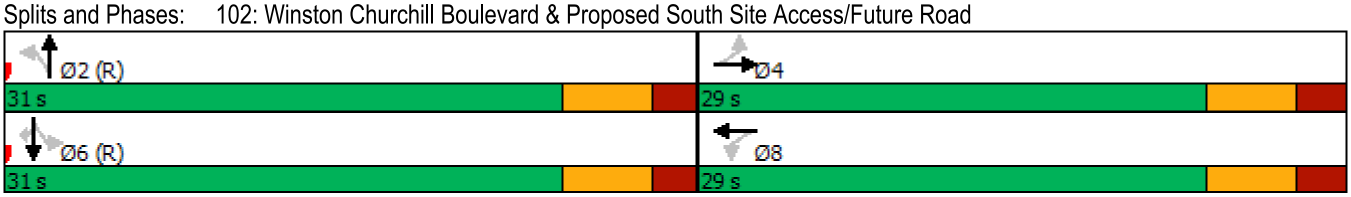
Actuated Cycle Length: 60

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 102: Winston Churchill Boulevard & Proposed South Site Access/Future Road

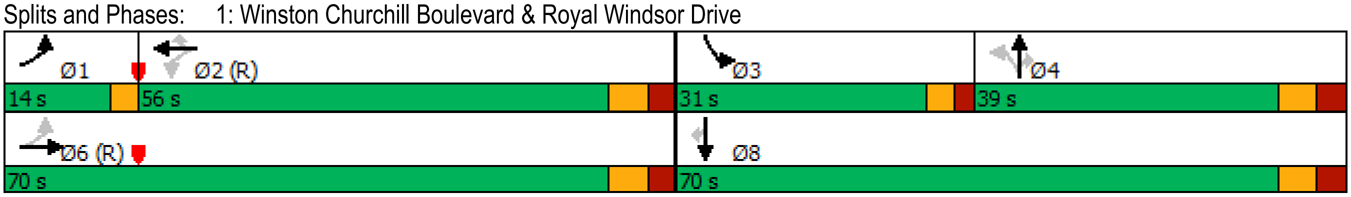


Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	158	791	77	930	546	116	347	60	213	268	130
Future Volume (vph)	158	791	77	930	546	116	347	60	213	268	130
Lane Group Flow (vph)	158	829	77	930	546	116	347	60	213	268	130
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	1	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	44.3	44.3	44.3	44.3	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	14.0	70.0	56.0	56.0	56.0	39.0	39.0	39.0	31.0	70.0	70.0
Total Split (%)	10.0%	50.0%	40.0%	40.0%	40.0%	27.9%	27.9%	27.9%	22.1%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.66	0.54	0.38	0.74	0.62	0.35	0.31	0.11	0.62	0.17	0.17
Control Delay	34.9	29.4	41.0	44.2	7.1	41.9	38.1	2.3	68.2	23.4	4.0
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	34.9	29.4	41.0	44.2	7.1	41.9	38.1	2.3	68.2	23.4	4.0
Queue Length 50th (m)	24.5	85.8	16.0	119.1	5.5	24.8	38.5	0.0	29.6	22.9	0.0
Queue Length 95th (m)	38.6	105.0	31.7	143.9	36.0	44.5	54.0	3.8	41.8	32.2	11.5
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	243	1546	202	1252	883	331	1128	543	638	1602	786
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	0.65	0.54	0.38	0.74	0.62	0.35	0.31	0.11	0.33	0.17	0.17

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 104 (74%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 1: Winston Churchill Boulevard & Royal Windsor Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	791	38	77	930	546	116	347	60	213	268	130
Future Volume (vph)	158	791	38	77	930	546	116	347	60	213	268	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3432		1754	3544	1556	1720	3614	1535	3437	3579	1596
Flt Permitted	0.13	1.00		0.31	1.00	1.00	0.59	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	253	3432		574	3544	1556	1062	3614	1535	3437	3579	1596
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	158	791	38	77	930	546	116	347	60	213	268	130
RTOR Reduction (vph)	0	2	0	0	0	334	0	0	41	0	0	72
Lane Group Flow (vph)	158	827	0	77	930	212	116	347	19	213	268	58
Confl. Peds. (#/hr)			1	1			1		2	2		1
Heavy Vehicles (%)	1%	4%	38%	4%	3%	2%	6%	1%	4%	3%	2%	1%
Bus Blockages (#/hr)	0	0	1	0	0	7	0	0	2	0	0	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	1	6			2			4		3	8	
Permitted Phases	6			2		2	4		4			8
Actuated Green, G (s)	63.0	63.0		49.5	49.5	49.5	43.7	43.7	43.7	14.0	62.7	62.7
Effective Green, g (s)	63.0	63.0		49.5	49.5	49.5	43.7	43.7	43.7	14.0	62.7	62.7
Actuated g/C Ratio	0.45	0.45		0.35	0.35	0.35	0.31	0.31	0.31	0.10	0.45	0.45
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
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
Lane Grp Cap (vph)	230	1544		202	1253	550	331	1128	479	343	1602	714
v/s Ratio Prot	c0.05	0.24			c0.26			0.10		c0.06	0.07	
v/s Ratio Perm	0.26			0.13		0.14	c0.11		0.01			0.04
v/c Ratio	0.69	0.54		0.38	0.74	0.39	0.35	0.31	0.04	0.62	0.17	0.08
Uniform Delay, d1	27.6	27.9		33.8	39.7	33.9	37.2	36.6	33.5	60.5	23.1	22.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	1.3		5.4	4.0	2.0	2.9	0.7	0.2	3.5	0.2	0.2
Delay (s)	35.8	29.2		39.2	43.7	35.9	40.1	37.3	33.7	63.9	23.3	22.4
Level of Service	D	C		D	D	D	D	D	C	E	C	C
Approach Delay (s)		30.3			40.7			37.5			37.3	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.3
Intersection Capacity Utilization	93.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	104	20	33	419	275	
Future Volume (vph)	104	20	33	419	275	
Lane Group Flow (vph)	104	20	33	419	383	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.38	0.08	0.06	0.33	0.32	
Control Delay	26.2	10.6	5.2	6.1	5.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	10.6	5.2	6.1	5.5	
Queue Length 50th (m)	10.5	0.0	1.1	17.7	14.0	
Queue Length 95th (m)	21.1	4.5	4.3	36.5	30.9	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	651	540	586	1286	1204	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.16	0.04	0.06	0.33	0.32	

Intersection Summary

Cycle Length: 60

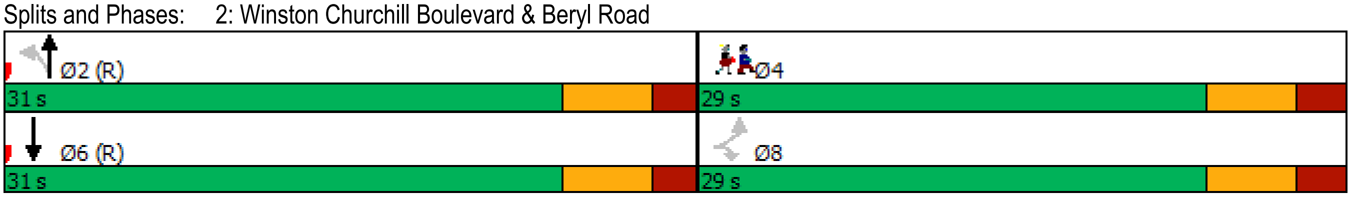
Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	104	20	33	419	275	108
Future Volume (vph)	104	20	33	419	275	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1722	1396	1484	1832	1699	
Flt Permitted	0.95	1.00	0.53	1.00	1.00	
Satd. Flow (perm)	1722	1396	835	1832	1699	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	104	20	33	419	275	108
RTOR Reduction (vph)	0	17	0	0	14	0
Lane Group Flow (vph)	104	3	33	419	369	0
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	6%	17%	23%	4%	7%	11%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	8	8	2			
Actuated Green, G (s)	8.0	8.0	39.6	39.6	39.6	
Effective Green, g (s)	8.0	8.0	39.6	39.6	39.6	
Actuated g/C Ratio	0.13	0.13	0.66	0.66	0.66	
Clearance Time (s)	6.3	6.3	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	229	186	551	1209	1121	
v/s Ratio Prot				c0.23	0.22	
v/s Ratio Perm	c0.06	0.00	0.04			
v/c Ratio	0.45	0.01	0.06	0.35	0.33	
Uniform Delay, d1	24.0	22.6	3.6	4.5	4.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.0	0.2	0.8	0.8	
Delay (s)	25.4	22.6	3.8	5.3	5.2	
Level of Service	C	C	A	A	A	
Approach Delay (s)	25.0			5.2	5.2	
Approach LOS	C			A	A	

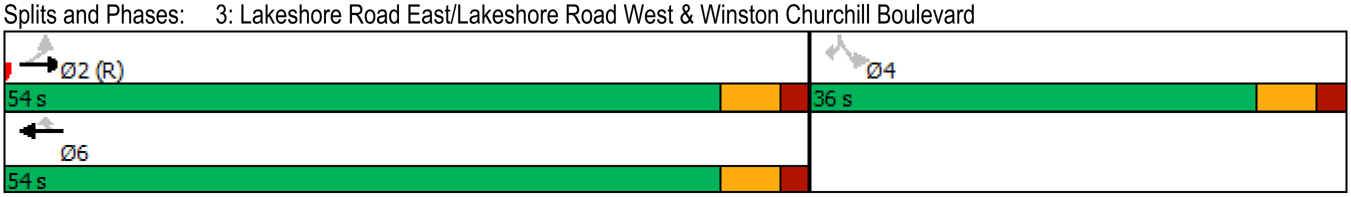
Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	116	260	262	302	112	197
Future Volume (vph)	116	260	262	302	112	197
Lane Group Flow (vph)	116	260	262	302	112	197
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	54.0	54.0	54.0	54.0	36.0	36.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.20	0.26	0.26	0.32	0.23	0.29
Control Delay	12.2	12.2	12.2	2.3	23.5	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	12.2	12.2	2.3	23.5	4.6
Queue Length 50th (m)	9.9	22.9	23.1	0.0	13.9	0.0
Queue Length 95th (m)	19.3	36.7	36.8	11.1	26.6	13.8
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	574	1014	1024	938	479	672
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.26	0.26	0.32	0.23	0.29

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 89 (99%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	116	260	262	302	112	197
Future Volume (vph)	116	260	262	302	112	197
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1755	1902	1921	1495	1448	1633
Flt Permitted	0.58	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1077	1902	1921	1495	1448	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	116	260	262	302	112	197
RTOR Reduction (vph)	0	0	0	141	0	132
Lane Group Flow (vph)	116	260	262	161	112	65
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	4%	1%	0%	7%	26%	0%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Actuated Green, G (s)	48.0	48.0	48.0	48.0	29.8	29.8
Effective Green, g (s)	48.0	48.0	48.0	48.0	29.8	29.8
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	574	1014	1024	797	479	540
v/s Ratio Prot		c0.14	0.14			
v/s Ratio Perm	0.11			0.11	c0.08	0.04
v/c Ratio	0.20	0.26	0.26	0.20	0.23	0.12
Uniform Delay, d1	11.0	11.4	11.3	11.0	21.8	21.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.6	0.6	0.6	1.1	0.5
Delay (s)	11.8	12.0	12.0	11.6	23.0	21.4
Level of Service	B	B	B	B	C	C
Approach Delay (s)		11.9	11.7		22.0	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	452	295	0
Future Volume (Veh/h)	0	0	0	452	295	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	452	295	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				171	343	
pX, platoon unblocked						
vC, conflicting volume	747	295	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	747	295	295			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	381	744	1266			

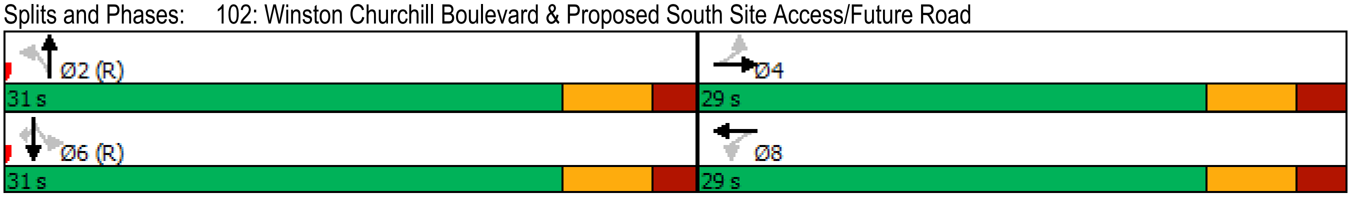
Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	0	452	295	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1266	1700	1700
Volume to Capacity	0.00	0.00	0.17	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBT	SBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	452	295		
Future Volume (vph)	452	295		
Lane Group Flow (vph)	452	295		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	12.0	12.0	8.0	8.0
Minimum Split (s)	24.1	24.1	25.3	25.3
Total Split (s)	31.0	31.0	29.0	29.0
Total Split (%)	51.7%	51.7%	48%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	2.3	2.3
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	6.1	6.1		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	C-Max	None	None
v/c Ratio	0.24	0.16		
Control Delay	0.3	0.2		
Queue Delay	0.0	0.0		
Total Delay	0.3	0.2		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	222.0	147.2		
Turn Bay Length (m)				
Base Capacity (vph)	1883	1883		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.24	0.16		

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 102: Winston Churchill Boulevard & Proposed South Site Access/Future Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	452	0	0	295	0
Future Volume (vph)	0	0	0	0	0	0	0	452	0	0	295	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								6.1			6.1	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1883			1883	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1883			1883	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	452	0	0	295	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	452	0	0	295	0
Turn Type	Perm						Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)								60.0			60.0	
Effective Green, g (s)								60.0			60.0	
Actuated g/C Ratio								1.00			1.00	
Clearance Time (s)								6.1			6.1	
Vehicle Extension (s)								3.0			3.0	
Lane Grp Cap (vph)								1883			1883	
v/s Ratio Prot								c0.24			0.16	
v/s Ratio Perm												
v/c Ratio								0.24			0.16	
Uniform Delay, d1								0.0			0.0	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.3			0.2	
Delay (s)								0.3			0.2	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			0.3			0.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	48	28	14	404	281	14
Future Volume (Veh/h)	48	28	14	404	281	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	48	28	14	404	281	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					246	
pX, platoon unblocked						
vC, conflicting volume	720	288	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	720	288	295			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	96	99			
cM capacity (veh/h)	390	751	1266			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	76	418	295
Volume Left	48	14	0
Volume Right	28	0	14
cSH	474	1266	1700
Volume to Capacity	0.16	0.01	0.17
Queue Length 95th (m)	4.3	0.3	0.0
Control Delay (s)	14.0	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	14.0	0.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	418	309	0
Future Volume (Veh/h)	0	0	0	418	309	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	418	309	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	727	309	309			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	727	309	309			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	391	731	1252			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	418	309
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1252	1700
Volume to Capacity	0.00	0.00	0.18
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix H

2026 Future Total Conditions Synchro Reports

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	126	1121	43	618	161	25	183	108	421	460	192
Future Volume (vph)	126	1121	43	618	161	25	183	108	421	460	192
Lane Group Flow (vph)	126	1221	43	618	161	25	183	108	421	460	192
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	6	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	56.0	56.0	56.0	56.0	56.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	40.0%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
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)	7.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.64	1.02	0.83	0.52	0.27	0.10	0.15	0.18	0.76	0.25	0.22
Control Delay	55.5	75.1	127.4	38.0	5.6	34.8	33.0	9.0	64.9	17.0	7.9
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	55.5	75.1	127.4	38.0	5.6	34.8	33.0	9.0	64.9	17.0	7.9
Queue Length 50th (m)	29.2	~187.2	10.9	71.3	0.0	4.7	18.3	2.2	58.0	33.8	11.3
Queue Length 95th (m)	#55.8	#230.1	#35.6	89.6	15.0	12.6	29.2	16.3	72.6	44.0	24.2
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	196	1199	52	1193	607	243	1194	595	1049	1868	856
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	0.64	1.02	0.83	0.52	0.27	0.10	0.15	0.18	0.40	0.25	0.22

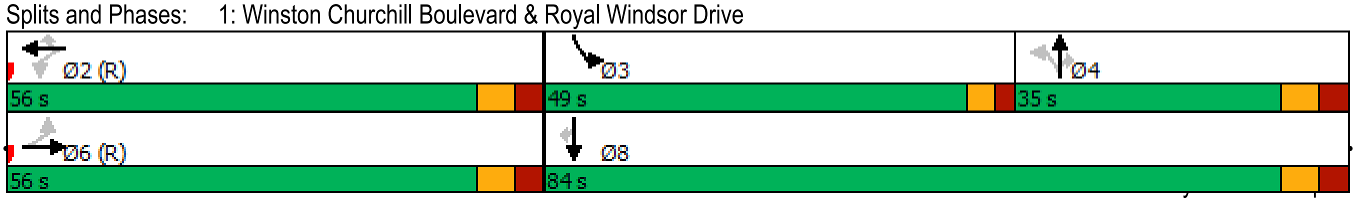
Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 108 (77%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated

~ 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: 1: Winston Churchill Boulevard & Royal Windsor Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	1121	100	43	618	161	25	183	108	421	460	192
Future Volume (vph)	126	1121	100	43	618	161	25	183	108	421	460	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1737	3413		1722	3411	1437	1371	3444	1537	3340	3411	1478
Flt Permitted	0.31	1.00		0.08	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	560	3413		148	3411	1437	703	3444	1537	3340	3411	1478
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	126	1121	100	43	618	161	25	183	108	421	460	192
RTOR Reduction (vph)	0	5	0	0	0	105	0	0	63	0	0	47
Lane Group Flow (vph)	126	1216	0	43	618	56	25	183	45	421	460	145
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Heavy Vehicles (%)	5%	5%	11%	6%	7%	9%	33%	6%	4%	6%	7%	9%
Bus Blockages (#/hr)	0	0	1	0	0	7	0	0	2	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6			2			4		3	8	
Permitted Phases	6			2		2	4		4			8
Actuated Green, G (s)	49.0	49.0		49.0	49.0	49.0	48.5	48.5	48.5	23.2	76.7	76.7
Effective Green, g (s)	49.0	49.0		49.0	49.0	49.0	48.5	48.5	48.5	23.2	76.7	76.7
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35	0.35	0.35	0.35	0.17	0.55	0.55
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
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
Lane Grp Cap (vph)	196	1194		51	1193	502	243	1193	532	553	1868	809
v/s Ratio Prot		c0.36			0.18			0.05		c0.13	c0.13	
v/s Ratio Perm	0.22			0.29		0.04	0.04		0.03			0.10
v/c Ratio	0.64	1.02		0.84	0.52	0.11	0.10	0.15	0.09	0.76	0.25	0.18
Uniform Delay, d1	38.2	45.5		42.0	36.1	30.8	31.0	31.6	30.8	55.8	16.5	15.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.1	30.9		85.7	1.6	0.5	0.8	0.3	0.3	6.1	0.3	0.5
Delay (s)	53.3	76.4		127.6	37.7	31.2	31.9	31.9	31.1	61.9	16.9	16.4
Level of Service	D	E		F	D	C	C	C	C	E	B	B
Approach Delay (s)		74.2			41.2			31.6			34.4	
Approach LOS		E			D			C			C	

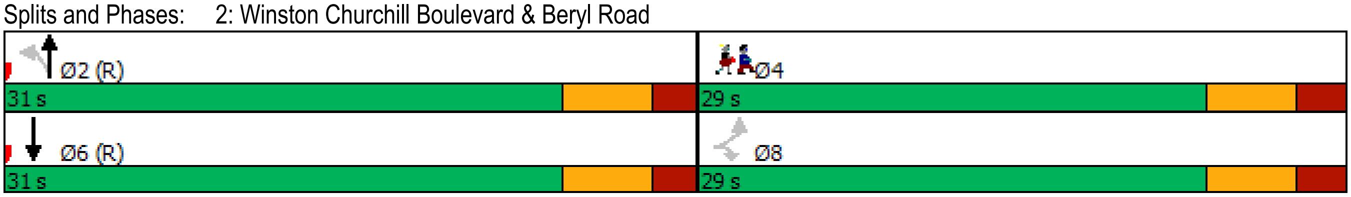
Intersection Summary			
HCM 2000 Control Delay	50.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	77	73	12	239	518	
Future Volume (vph)	77	73	12	239	518	
Lane Group Flow (vph)	77	73	12	239	603	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.31	0.27	0.03	0.19	0.48	
Control Delay	25.8	9.3	4.6	4.6	7.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.8	9.3	4.6	4.6	7.0	
Queue Length 50th (m)	7.8	0.0	0.4	8.0	27.0	
Queue Length 95th (m)	17.1	8.8	2.0	17.7	56.1	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	645	578	380	1246	1254	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.13	0.03	0.19	0.48	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 5 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	77	73	12	239	518	85
Future Volume (vph)	77	73	12	239	518	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1706	1408	1285	1748	1752	
Flt Permitted	0.95	1.00	0.40	1.00	1.00	
Satd. Flow (perm)	1706	1408	535	1748	1752	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	77	73	12	239	518	85
RTOR Reduction (vph)	0	64	0	0	6	0
Lane Group Flow (vph)	77	9	12	239	597	0
Heavy Vehicles (%)	7%	16%	42%	9%	7%	11%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	8	8	2			
Actuated Green, G (s)	7.3	7.3	40.3	40.3	40.3	
Effective Green, g (s)	7.3	7.3	40.3	40.3	40.3	
Actuated g/C Ratio	0.12	0.12	0.67	0.67	0.67	
Clearance Time (s)	6.3	6.3	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	207	171	359	1174	1176	
v/s Ratio Prot				0.14	c0.34	
v/s Ratio Perm	c0.05	0.01	0.02			
v/c Ratio	0.37	0.05	0.03	0.20	0.51	
Uniform Delay, d1	24.2	23.3	3.3	3.7	4.9	
Progression Factor	1.00	1.00	0.97	0.95	1.00	
Incremental Delay, d2	1.1	0.1	0.2	0.4	1.6	
Delay (s)	25.4	23.4	3.4	4.0	6.5	
Level of Service	C	C	A	A	A	
Approach Delay (s)	24.4			3.9	6.5	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		

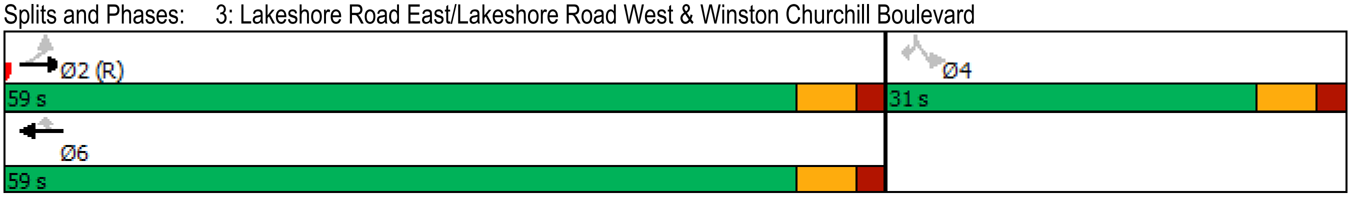
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	233	446	109	47	333	171
Future Volume (vph)	233	446	109	47	333	171
Lane Group Flow (vph)	233	446	109	47	333	171
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.31	0.40	0.10	0.08	0.76	0.31
Control Delay	10.6	11.3	8.4	2.8	42.5	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	11.3	8.4	2.8	42.5	5.9
Queue Length 50th (m)	18.6	38.2	7.6	0.0	52.6	0.0
Queue Length 95th (m)	31.8	57.4	14.3	4.1	#91.0	14.1
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	762	1120	1108	616	441	552
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.40	0.10	0.08	0.76	0.31

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	233	446	109	47	333	171
Future Volume (vph)	233	446	109	47	333	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1902	1883	1014	1601	1555
Flt Permitted	0.69	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1293	1902	1883	1014	1601	1555
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	233	446	109	47	333	171
RTOR Reduction (vph)	0	0	0	19	0	124
Lane Group Flow (vph)	233	446	109	28	333	47
Heavy Vehicles (%)	2%	1%	2%	61%	14%	5%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Actuated Green, G (s)	53.0	53.0	53.0	53.0	24.8	24.8
Effective Green, g (s)	53.0	53.0	53.0	53.0	24.8	24.8
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	761	1120	1108	597	441	428
v/s Ratio Prot		c0.23	0.06			
v/s Ratio Perm	0.18			0.03	c0.21	0.03
v/c Ratio	0.31	0.40	0.10	0.05	0.76	0.11
Uniform Delay, d1	9.3	9.9	8.1	7.8	29.8	24.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.1	0.2	0.1	11.4	0.5
Delay (s)	10.3	11.0	8.3	8.0	41.2	24.9
Level of Service	B	B	A	A	D	C
Approach Delay (s)		10.8	8.2		35.7	
Approach LOS		B	A		D	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	8	0	251	560	31
Future Volume (Veh/h)	0	8	0	251	560	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	8	0	251	560	31
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				171	343	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	811	560	591			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	759	489	522			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	348	538	971			

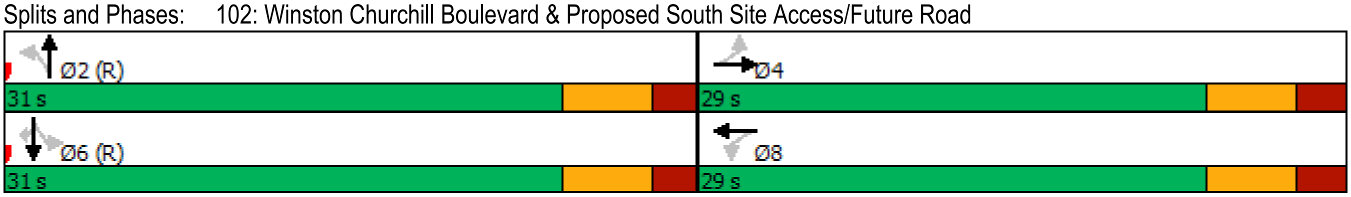
Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	8	251	560	31
Volume Left	0	0	0	0
Volume Right	8	0	0	31
cSH	538	971	1700	1700
Volume to Capacity	0.01	0.00	0.33	0.02
Queue Length 95th (m)	0.3	0.0	0.0	0.0
Control Delay (s)	11.8	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	11.8	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations							
Traffic Volume (vph)	10	0	25	241	537	31	
Future Volume (vph)	10	0	25	241	537	31	
Lane Group Flow (vph)	10	8	25	241	537	31	
Turn Type	Perm	NA	Perm	NA	NA	Perm	
Protected Phases		4		2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	6.1	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
v/c Ratio	0.04	0.02	0.03	0.14	0.31	0.02	
Control Delay	23.2	0.1	2.0	1.6	4.4	2.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.2	0.1	2.0	1.6	4.4	2.1	
Queue Length 50th (m)	1.0	0.0	0.0	0.0	0.0	0.0	
Queue Length 95th (m)	4.5	0.0	2.7	15.2	82.6	m2.1	
Internal Link Dist (m)		66.0		222.0	147.2		
Turn Bay Length (m)			20.0			20.0	
Base Capacity (vph)	712	730	814	1755	1755	1496	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.01	0.03	0.14	0.31	0.02	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Winston Churchill Boulevard & Proposed South Site Access/Future Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	8	0	0	0	25	241	0	0	537	31
Future Volume (vph)	10	0	8	0	0	0	25	241	0	0	537	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3					6.1	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	1.00			1.00	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1789	1601					1789	1883			1883	1601
Flt Permitted	1.00	1.00					0.46	1.00			1.00	1.00
Satd. Flow (perm)	1883	1601					874	1883			1883	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	0	8	0	0	0	25	241	0	0	537	31
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	10	0	0	0	0	0	25	241	0	0	537	24
Turn Type	Perm	NA					Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	1.6	1.6					46.0	46.0			46.0	46.0
Effective Green, g (s)	1.6	1.6					46.0	46.0			46.0	46.0
Actuated g/C Ratio	0.03	0.03					0.77	0.77			0.77	0.77
Clearance Time (s)	6.3	6.3					6.1	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	50	42					670	1443			1443	1227
v/s Ratio Prot		0.00						0.13			c0.29	
v/s Ratio Perm	c0.01						0.03					0.01
v/c Ratio	0.20	0.01					0.04	0.17			0.37	0.02
Uniform Delay, d1	28.6	28.4					1.7	1.9			2.3	1.7
Progression Factor	1.00	1.00					1.00	1.00			2.41	4.11
Incremental Delay, d2	2.0	0.0					0.1	0.2			0.7	0.0
Delay (s)	30.5	28.5					1.8	2.1			6.2	6.8
Level of Service	C	C					A	A			A	A
Approach Delay (s)		29.6			0.0			2.1			6.2	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	14	23	257	490	55
Future Volume (Veh/h)	9	14	23	257	490	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	14	23	257	490	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					246	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	820	518	545			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	439	469			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	98			
cM capacity (veh/h)	336	572	1012			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	280	545
Volume Left	9	23	0
Volume Right	14	0	55
cSH	448	1012	1700
Volume to Capacity	0.05	0.02	0.32
Queue Length 95th (m)	1.2	0.5	0.0
Control Delay (s)	13.5	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	0.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	280	504	0
Future Volume (Veh/h)	0	0	0	280	504	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	280	504	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	784	504	504			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	784	504	504			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	362	568	1061			

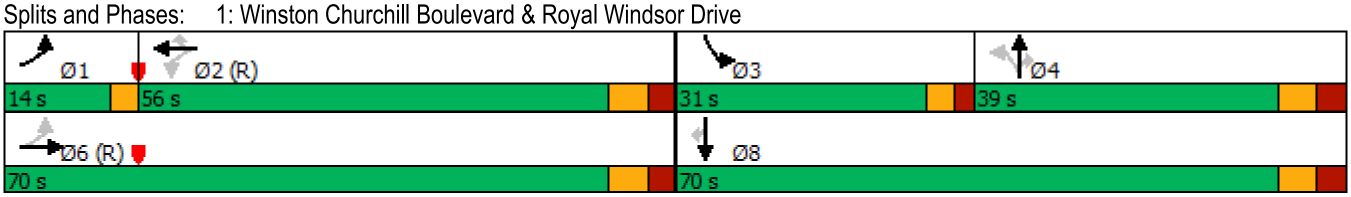
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	280	504
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1061	1700
Volume to Capacity	0.00	0.00	0.30
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	158	791	79	930	546	128	381	66	213	279	130
Future Volume (vph)	158	791	79	930	546	128	381	66	213	279	130
Lane Group Flow (vph)	158	831	79	930	546	128	381	66	213	279	130
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	1	6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	1	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	13.0	44.3	44.3	44.3	44.3	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	14.0	70.0	56.0	56.0	56.0	39.0	39.0	39.0	31.0	70.0	70.0
Total Split (%)	10.0%	50.0%	40.0%	40.0%	40.0%	27.9%	27.9%	27.9%	22.1%	50.0%	50.0%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.66	0.54	0.39	0.74	0.62	0.39	0.34	0.12	0.62	0.17	0.17
Control Delay	34.9	29.3	41.5	44.2	7.6	43.1	38.6	3.2	68.2	23.5	4.0
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	34.9	29.3	41.5	44.2	7.6	43.1	38.6	3.2	68.2	23.5	4.0
Queue Length 50th (m)	24.5	85.9	16.5	119.1	7.8	27.8	42.7	0.0	29.6	24.0	0.0
Queue Length 95th (m)	38.6	105.2	32.7	143.9	40.0	49.1	59.3	5.5	41.8	33.2	11.5
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	243	1545	202	1252	875	327	1128	543	638	1602	786
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	0.65	0.54	0.39	0.74	0.62	0.39	0.34	0.12	0.33	0.17	0.17

Intersection Summary
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 104 (74%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 115
Control Type: Actuated-Coordinated

Splits and Phases: 1: Winston Churchill Boulevard & Royal Windsor Drive



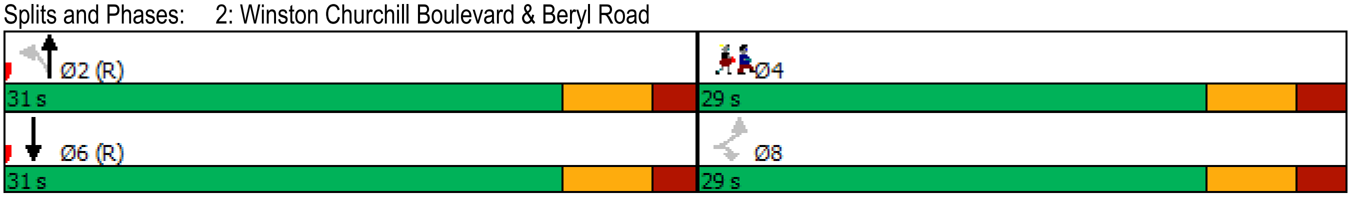
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	791	40	79	930	546	128	381	66	213	279	130
Future Volume (vph)	158	791	40	79	930	546	128	381	66	213	279	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1807	3428		1754	3544	1556	1720	3614	1535	3437	3579	1596
Flt Permitted	0.13	1.00		0.31	1.00	1.00	0.58	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	253	3428		572	3544	1556	1051	3614	1535	3437	3579	1596
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	158	791	40	79	930	546	128	381	66	213	279	130
RTOR Reduction (vph)	0	3	0	0	0	326	0	0	45	0	0	72
Lane Group Flow (vph)	158	828	0	79	930	220	128	381	21	213	279	58
Confl. Peds. (#/hr)			1	1			1		2	2		1
Heavy Vehicles (%)	1%	4%	38%	4%	3%	2%	6%	1%	4%	3%	2%	1%
Bus Blockages (#/hr)	0	0	1	0	0	7	0	0	2	0	0	0
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	1	6			2			4		3	8	
Permitted Phases	6			2		2	4		4			8
Actuated Green, G (s)	63.0	63.0		49.5	49.5	49.5	43.7	43.7	43.7	14.0	62.7	62.7
Effective Green, g (s)	63.0	63.0		49.5	49.5	49.5	43.7	43.7	43.7	14.0	62.7	62.7
Actuated g/C Ratio	0.45	0.45		0.35	0.35	0.35	0.31	0.31	0.31	0.10	0.45	0.45
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
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
Lane Grp Cap (vph)	230	1542		202	1253	550	328	1128	479	343	1602	714
v/s Ratio Prot	c0.05	0.24			c0.26			0.11		c0.06	0.08	
v/s Ratio Perm	0.26			0.14		0.14	c0.12		0.01			0.04
v/c Ratio	0.69	0.54		0.39	0.74	0.40	0.39	0.34	0.04	0.62	0.17	0.08
Uniform Delay, d1	27.6	27.9		33.9	39.7	34.1	37.7	37.0	33.6	60.5	23.1	22.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	1.3		5.6	4.0	2.2	3.5	0.8	0.2	3.5	0.2	0.2
Delay (s)	35.8	29.3		39.6	43.7	36.2	41.2	37.8	33.7	63.9	23.4	22.4
Level of Service	D	C		D	D	D	D	D	C	E	C	C
Approach Delay (s)		30.3			40.8			38.1			37.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.3
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	104	20	37	471	290	
Future Volume (vph)	104	20	37	471	290	
Lane Group Flow (vph)	104	20	37	471	398	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.38	0.08	0.06	0.37	0.33	
Control Delay	26.2	10.6	3.7	6.3	5.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.2	10.6	3.7	6.3	5.7	
Queue Length 50th (m)	10.5	0.0	0.5	30.9	14.9	
Queue Length 95th (m)	21.1	4.5	1.9	57.1	32.7	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	651	540	577	1286	1206	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.16	0.04	0.06	0.37	0.33	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 35 (58%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road



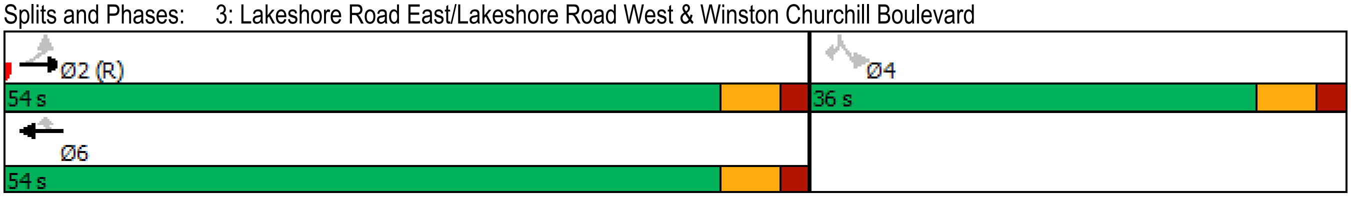
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	104	20	37	471	290	108
Future Volume (vph)	104	20	37	471	290	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1722	1396	1484	1832	1703	
Flt Permitted	0.95	1.00	0.53	1.00	1.00	
Satd. Flow (perm)	1722	1396	824	1832	1703	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	104	20	37	471	290	108
RTOR Reduction (vph)	0	17	0	0	13	0
Lane Group Flow (vph)	104	3	37	471	385	0
Confl. Bikes (#/hr)						1
Heavy Vehicles (%)	6%	17%	23%	4%	7%	11%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	8	8	2			
Actuated Green, G (s)	8.0	8.0	39.6	39.6	39.6	
Effective Green, g (s)	8.0	8.0	39.6	39.6	39.6	
Actuated g/C Ratio	0.13	0.13	0.66	0.66	0.66	
Clearance Time (s)	6.3	6.3	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	229	186	543	1209	1123	
v/s Ratio Prot				c0.26	0.23	
v/s Ratio Perm	c0.06	0.00	0.04			
v/c Ratio	0.45	0.01	0.07	0.39	0.34	
Uniform Delay, d1	24.0	22.6	3.6	4.7	4.5	
Progression Factor	1.00	1.00	0.70	0.99	1.00	
Incremental Delay, d2	1.4	0.0	0.2	0.9	0.8	
Delay (s)	25.4	22.6	2.8	5.6	5.3	
Level of Service	C	C	A	A	A	
Approach Delay (s)	25.0			5.4	5.3	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	120	260	262	314	124	214
Future Volume (vph)	120	260	262	314	124	214
Lane Group Flow (vph)	120	260	262	314	124	214
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	54.0	54.0	54.0	54.0	36.0	36.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.21	0.26	0.26	0.33	0.26	0.31
Control Delay	12.2	12.2	12.2	2.4	23.9	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	12.2	12.2	2.4	23.9	4.6
Queue Length 50th (m)	10.3	22.9	23.1	0.0	15.6	0.0
Queue Length 95th (m)	20.0	36.7	36.8	11.2	29.1	14.2
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	574	1014	1024	943	479	683
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.26	0.26	0.33	0.26	0.31

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 89 (99%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	120	260	262	314	124	214
Future Volume (vph)	120	260	262	314	124	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1755	1902	1921	1495	1448	1633
Flt Permitted	0.58	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1077	1902	1921	1495	1448	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	120	260	262	314	124	214
RTOR Reduction (vph)	0	0	0	147	0	143
Lane Group Flow (vph)	120	260	262	167	124	71
Confl. Bikes (#/hr)				1		
Heavy Vehicles (%)	4%	1%	0%	7%	26%	0%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Actuated Green, G (s)	48.0	48.0	48.0	48.0	29.8	29.8
Effective Green, g (s)	48.0	48.0	48.0	48.0	29.8	29.8
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
Clearance Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	574	1014	1024	797	479	540
v/s Ratio Prot		c0.14	0.14			
v/s Ratio Perm	0.11			0.11	c0.09	0.04
v/c Ratio	0.21	0.26	0.26	0.21	0.26	0.13
Uniform Delay, d1	11.0	11.4	11.3	11.0	22.0	21.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.6	0.6	0.6	1.3	0.5
Delay (s)	11.9	12.0	12.0	11.6	23.3	21.6
Level of Service	B	B	B	B	C	C
Approach Delay (s)		11.9	11.8		22.2	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	14.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.26		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
101: Winston Churchill Boulevard & Proposed North Site Access

PM Peak Period
Future Total Conditions

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	13	0	508	303	7
Future Volume (Veh/h)	0	13	0	508	303	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	13	0	508	303	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				171	343	
pX, platoon unblocked	0.91					
vC, conflicting volume	811	303	310			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	743	303	310			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	348	737	1250			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	13	508	303	7
Volume Left	0	0	0	0
Volume Right	13	0	0	7
cSH	737	1250	1700	1700
Volume to Capacity	0.02	0.00	0.18	0.00
Queue Length 95th (m)	0.4	0.0	0.0	0.0
Control Delay (s)	10.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	10.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	36.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations							
Traffic Volume (vph)	56	0	16	452	308	8	
Future Volume (vph)	56	0	16	452	308	8	
Lane Group Flow (vph)	56	16	16	452	308	8	
Turn Type	Perm	NA	Perm	NA	NA	Perm	
Protected Phases		4		2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	6.1	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
v/c Ratio	0.27	0.03	0.02	0.31	0.21	0.01	
Control Delay	25.9	0.1	4.3	4.7	2.2	0.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.9	0.1	4.3	4.7	2.2	0.0	
Queue Length 50th (m)	5.7	0.0	0.5	18.1	5.1	0.0	
Queue Length 95th (m)	13.7	0.0	2.3	36.2	9.8	m0.0	
Internal Link Dist (m)		66.0		222.0	147.2		
Turn Bay Length (m)			20.0			20.0	
Base Capacity (vph)	539	865	845	1475	1475	1267	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.10	0.02	0.02	0.31	0.21	0.01	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 60

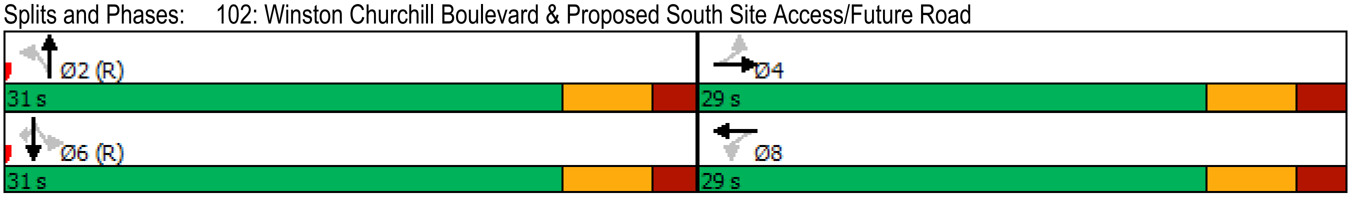
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

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

Splits and Phases: 102: Winston Churchill Boulevard & Proposed South Site Access/Future Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	0	16	0	0	0	16	452	0	0	308	8
Future Volume (vph)	56	0	16	0	0	0	16	452	0	0	308	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3					6.1	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	1.00			1.00	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1789	1601					1789	1883			1883	1601
Flt Permitted	0.76	1.00					0.57	1.00			1.00	1.00
Satd. Flow (perm)	1426	1601					1079	1883			1883	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	56	0	16	0	0	0	16	452	0	0	308	8
RTOR Reduction (vph)	0	15	0	0	0	0	0	0	0	0	0	2
Lane Group Flow (vph)	56	1	0	0	0	0	16	452	0	0	308	6
Turn Type	Perm	NA					Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	5.5	5.5					42.1	42.1			42.1	42.1
Effective Green, g (s)	5.5	5.5					42.1	42.1			42.1	42.1
Actuated g/C Ratio	0.09	0.09					0.70	0.70			0.70	0.70
Clearance Time (s)	6.3	6.3					6.1	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	130	146					757	1321			1321	1123
v/s Ratio Prot		0.00						c0.24			0.16	
v/s Ratio Perm	c0.04						0.01					0.00
v/c Ratio	0.43	0.01					0.02	0.34			0.23	0.00
Uniform Delay, d1	25.8	24.8					2.7	3.5			3.2	2.7
Progression Factor	1.00	1.00					1.00	1.00			0.50	1.00
Incremental Delay, d2	2.3	0.0					0.1	0.7			0.4	0.0
Delay (s)	28.1	24.8					2.8	4.2			2.0	2.7
Level of Service	C	C					A	A			A	A
Approach Delay (s)		27.3			0.0			4.2			2.0	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	48	28	14	420	310	14
Future Volume (Veh/h)	48	28	14	420	310	14
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	48	28	14	420	310	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					246	
pX, platoon unblocked						
vC, conflicting volume	765	317	324			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	765	317	324			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	96	99			
cM capacity (veh/h)	367	724	1236			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	76	434	324
Volume Left	48	14	0
Volume Right	28	0	14
cSH	449	1236	1700
Volume to Capacity	0.17	0.01	0.19
Queue Length 95th (m)	4.6	0.3	0.0
Control Delay (s)	14.7	0.4	0.0
Lane LOS	B	A	
Approach Delay (s)	14.7	0.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	434	338	0
Future Volume (Veh/h)	0	0	0	434	338	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	434	338	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	772	338	338			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	772	338	338			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	368	704	1221			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	434	338
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1221	1700
Volume to Capacity	0.00	0.00	0.20
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix I

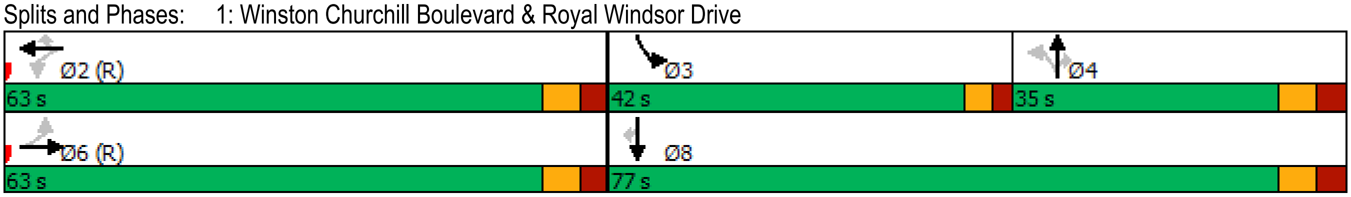
2026 Future Background and 2026 Future Total Conditions (Mitigated) Synchro Reports

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	126	1121	39	618	161	25	177	104	421	418	192
Future Volume (vph)	126	1121	39	618	161	25	177	104	421	418	192
Lane Group Flow (vph)	126	1211	39	618	161	25	177	104	421	418	192
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	6	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	63.0	63.0	63.0	63.0	63.0	35.0	35.0	35.0	42.0	77.0	77.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	45.0%	25.0%	25.0%	25.0%	30.0%	55.0%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
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)	7.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.52	0.88	0.76	0.45	0.24	0.11	0.17	0.21	0.77	0.25	0.24
Control Delay	41.3	47.6	111.8	32.1	4.7	39.9	38.0	16.0	65.5	20.6	6.6
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	41.3	47.6	111.8	32.1	4.7	39.9	38.0	16.0	65.5	20.6	6.6
Queue Length 50th (m)	26.2	161.4	9.2	65.4	0.0	5.0	19.1	6.8	58.1	34.0	7.2
Queue Length 95th (m)	48.4	192.4	#32.3	82.2	13.8	13.5	30.4	22.2	72.8	44.8	20.5
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	242	1372	51	1364	671	218	1026	507	882	1698	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	0.52	0.88	0.76	0.45	0.24	0.11	0.17	0.21	0.48	0.25	0.24

Intersection Summary

Cycle Length: 140
Actuated Cycle Length: 140
Offset: 108 (77%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Winston Churchill Boulevard & Royal Windsor Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	1121	90	39	618	161	25	177	104	421	418	192
Future Volume (vph)	126	1121	90	39	618	161	25	177	104	421	418	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1737	3419		1722	3411	1437	1371	3444	1537	3340	3411	1478
Flt Permitted	0.33	1.00		0.07	1.00	1.00	0.51	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	607	3419		129	3411	1437	733	3444	1537	3340	3411	1478
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	126	1121	90	39	618	161	25	177	104	421	418	192
RTOR Reduction (vph)	0	4	0	0	0	97	0	0	49	0	0	71
Lane Group Flow (vph)	126	1207	0	39	618	64	25	177	55	421	418	121
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Heavy Vehicles (%)	5%	5%	11%	6%	7%	9%	33%	6%	4%	6%	7%	9%
Bus Blockages (#/hr)	0	0	1	0	0	7	0	0	2	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6			2			4		3	8	
Permitted Phases	6			2		2	4		4			8
Actuated Green, G (s)	56.0	56.0		56.0	56.0	56.0	41.7	41.7	41.7	23.0	69.7	69.7
Effective Green, g (s)	56.0	56.0		56.0	56.0	56.0	41.7	41.7	41.7	23.0	69.7	69.7
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.30	0.30	0.30	0.16	0.50	0.50
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
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
Lane Grp Cap (vph)	242	1367		51	1364	574	218	1025	457	548	1698	735
v/s Ratio Prot		c0.35			0.18			0.05		c0.13	c0.12	
v/s Ratio Perm	0.21			0.30		0.04	0.03		0.04			0.08
v/c Ratio	0.52	0.88		0.76	0.45	0.11	0.11	0.17	0.12	0.77	0.25	0.16
Uniform Delay, d1	31.8	39.0		36.3	30.8	26.4	35.7	36.4	35.8	56.0	20.1	19.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	8.5		69.3	1.1	0.4	1.1	0.4	0.5	6.4	0.3	0.5
Delay (s)	39.6	47.5		105.6	31.9	26.8	36.8	36.7	36.3	62.4	20.5	19.7
Level of Service	D	D		F	C	C	D	D	D	E	C	B
Approach Delay (s)		46.8			34.4			36.6			37.4	
Approach LOS		D			C			D			D	

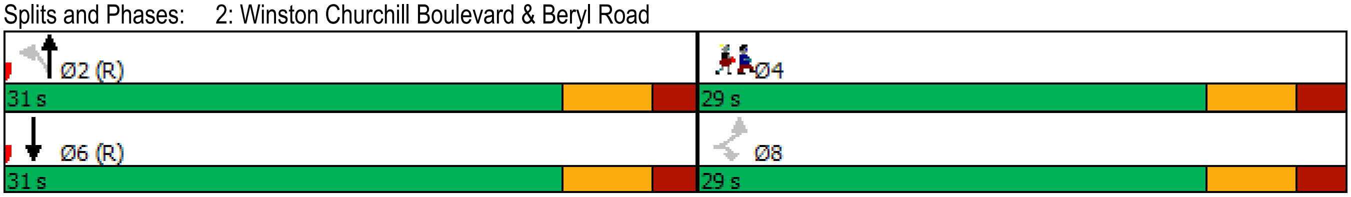
Intersection Summary			
HCM 2000 Control Delay	40.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	105.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	77	67	12	229	462	
Future Volume (vph)	77	67	12	229	462	
Lane Group Flow (vph)	77	67	12	229	547	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.31	0.25	0.03	0.18	0.44	
Control Delay	25.8	9.3	4.7	4.8	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.8	9.3	4.7	4.8	6.5	
Queue Length 50th (m)	7.8	0.0	0.4	8.0	23.0	
Queue Length 95th (m)	17.1	8.4	2.0	17.9	48.2	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	645	574	415	1246	1252	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.12	0.03	0.18	0.44	

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 60
Offset: 5 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	77	67	12	229	462	85
Future Volume (vph)	77	67	12	229	462	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1706	1408	1285	1748	1748	
Flt Permitted	0.95	1.00	0.43	1.00	1.00	
Satd. Flow (perm)	1706	1408	583	1748	1748	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	77	67	12	229	462	85
RTOR Reduction (vph)	0	59	0	0	6	0
Lane Group Flow (vph)	77	8	12	229	541	0
Heavy Vehicles (%)	7%	16%	42%	9%	7%	11%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	8	8	2			
Actuated Green, G (s)	7.3	7.3	40.3	40.3	40.3	
Effective Green, g (s)	7.3	7.3	40.3	40.3	40.3	
Actuated g/C Ratio	0.12	0.12	0.67	0.67	0.67	
Clearance Time (s)	6.3	6.3	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	207	171	391	1174	1174	
v/s Ratio Prot				0.13	c0.31	
v/s Ratio Perm	c0.05	0.01	0.02			
v/c Ratio	0.37	0.05	0.03	0.20	0.46	
Uniform Delay, d1	24.2	23.3	3.3	3.7	4.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.1	0.1	0.4	1.3	
Delay (s)	25.4	23.4	3.4	4.1	6.0	
Level of Service	C	C	A	A	A	
Approach Delay (s)	24.5			4.1	6.0	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

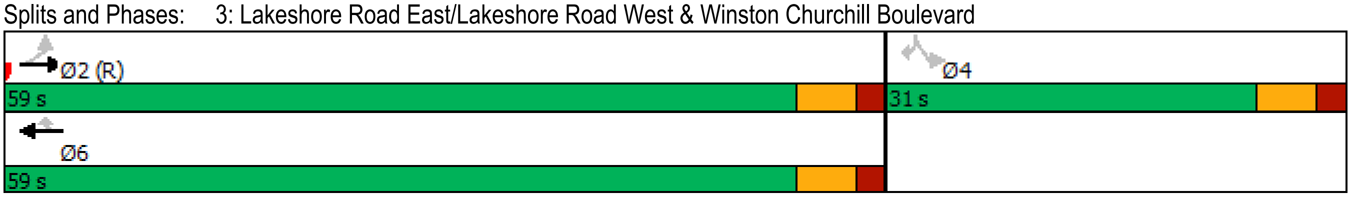
c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	212	446	109	43	323	165
Future Volume (vph)	212	446	109	43	323	165
Lane Group Flow (vph)	212	446	109	43	323	165
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.28	0.40	0.10	0.07	0.73	0.30
Control Delay	10.3	11.3	8.4	2.9	41.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	11.3	8.4	2.9	41.0	5.9
Queue Length 50th (m)	16.6	38.2	7.6	0.0	50.6	0.0
Queue Length 95th (m)	28.7	57.4	14.3	4.0	#86.6	14.0
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	762	1120	1108	614	441	548
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.40	0.10	0.07	0.73	0.30

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 41 (46%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	212	446	109	43	323	165
Future Volume (vph)	212	446	109	43	323	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1902	1883	1014	1601	1555
Flt Permitted	0.69	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1293	1902	1883	1014	1601	1555
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	212	446	109	43	323	165
RTOR Reduction (vph)	0	0	0	18	0	120
Lane Group Flow (vph)	212	446	109	25	323	45
Heavy Vehicles (%)	2%	1%	2%	61%	14%	5%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Actuated Green, G (s)	53.0	53.0	53.0	53.0	24.8	24.8
Effective Green, g (s)	53.0	53.0	53.0	53.0	24.8	24.8
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	761	1120	1108	597	441	428
v/s Ratio Prot		c0.23	0.06			
v/s Ratio Perm	0.16			0.02	c0.20	0.03
v/c Ratio	0.28	0.40	0.10	0.04	0.73	0.11
Uniform Delay, d1	9.1	9.9	8.1	7.8	29.6	24.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.1	0.2	0.1	10.3	0.5
Delay (s)	10.0	11.0	8.3	7.9	39.9	24.8
Level of Service	B	B	A	A	D	C
Approach Delay (s)		10.7	8.2		34.8	
Approach LOS		B	A		C	

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	241	529	0
Future Volume (Veh/h)	0	0	0	241	529	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	241	529	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				171	343	
pX, platoon unblocked	0.95	0.95	0.95			
vC, conflicting volume	770	529	529			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	732	478	478			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	369	558	1030			

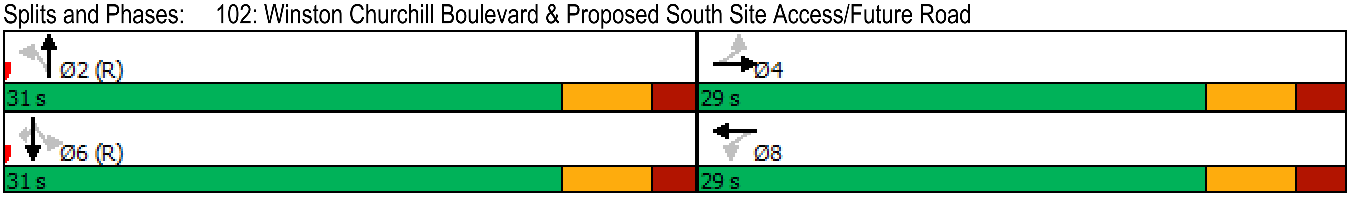
Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	0	241	529	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1030	1700	1700
Volume to Capacity	0.00	0.00	0.31	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS	A			
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS	A			

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	NBT	SBT	Ø4	Ø8
Lane Configurations				
Traffic Volume (vph)	241	529		
Future Volume (vph)	241	529		
Lane Group Flow (vph)	241	529		
Turn Type	NA	NA		
Protected Phases	2	6	4	8
Permitted Phases				
Detector Phase	2	6		
Switch Phase				
Minimum Initial (s)	12.0	12.0	8.0	8.0
Minimum Split (s)	24.1	24.1	25.3	25.3
Total Split (s)	31.0	31.0	29.0	29.0
Total Split (%)	51.7%	51.7%	48%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	2.3	2.3
Lost Time Adjust (s)	0.0	0.0		
Total Lost Time (s)	6.1	6.1		
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	C-Max	C-Max	None	None
v/c Ratio	0.13	0.28		
Control Delay	0.1	0.3		
Queue Delay	0.0	0.0		
Total Delay	0.1	0.3		
Queue Length 50th (m)	0.0	0.0		
Queue Length 95th (m)	0.0	0.0		
Internal Link Dist (m)	222.0	147.2		
Turn Bay Length (m)				
Base Capacity (vph)	1883	1883		
Starvation Cap Reductn	0	0		
Spillback Cap Reductn	0	0		
Storage Cap Reductn	0	0		
Reduced v/c Ratio	0.13	0.28		

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 102: Winston Churchill Boulevard & Proposed South Site Access/Future Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	241	0	0	529	0
Future Volume (vph)	0	0	0	0	0	0	0	241	0	0	529	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								6.1			6.1	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1883			1883	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1883			1883	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	0	0	0	0	241	0	0	529	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	241	0	0	529	0
Turn Type	Perm						Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)								60.0			60.0	
Effective Green, g (s)								60.0			60.0	
Actuated g/C Ratio								1.00			1.00	
Clearance Time (s)								6.1			6.1	
Vehicle Extension (s)								3.0			3.0	
Lane Grp Cap (vph)								1883			1883	
v/s Ratio Prot								0.13			c0.28	
v/s Ratio Perm												
v/c Ratio								0.13			0.28	
Uniform Delay, d1								0.0			0.0	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.3	
Delay (s)								0.1			0.3	
Level of Service								A			A	
Approach Delay (s)		0.0			0.0			0.1			0.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	0.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	32.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	14	23	232	474	55
Future Volume (Veh/h)	9	14	23	232	474	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	14	23	232	474	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					246	
pX, platoon unblocked						
vC, conflicting volume	780	502	529			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	780	502	529			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	98			
cM capacity (veh/h)	356	570	1038			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	255	529
Volume Left	9	23	0
Volume Right	14	0	55
cSH	461	1038	1700
Volume to Capacity	0.05	0.02	0.31
Queue Length 95th (m)	1.2	0.5	0.0
Control Delay (s)	13.2	1.0	0.0
Lane LOS	B	A	
Approach Delay (s)	13.2	1.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	255	488	0
Future Volume (Veh/h)	0	0	0	255	488	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	255	488	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	743	488	488			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	743	488	488			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	383	580	1075			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	255	488
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1075	1700
Volume to Capacity	0.00	0.00	0.29
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations											
Traffic Volume (vph)	126	1121	43	618	161	25	183	108	421	460	192
Future Volume (vph)	126	1121	43	618	161	25	183	108	421	460	192
Lane Group Flow (vph)	126	1221	43	618	161	25	183	108	421	460	192
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6		2			4		3	8	
Permitted Phases	6		2		2	4		4			8
Detector Phase	6	6	2	2	2	4	4	4	3	8	8
Switch Phase											
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	44.3	44.3	44.3	13.0	44.3	44.3
Total Split (s)	63.0	63.0	63.0	63.0	63.0	35.0	35.0	35.0	42.0	77.0	77.0
Total Split (%)	45.0%	45.0%	45.0%	45.0%	45.0%	25.0%	25.0%	25.0%	30.0%	55.0%	55.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	2.0	3.3	3.3
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)	7.0	7.0	7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lead/Lag						Lag	Lag	Lag	Lead		
Lead-Lag Optimize?											
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	None	Max	Max
v/c Ratio	0.52	0.89	0.84	0.45	0.24	0.12	0.18	0.21	0.77	0.27	0.24
Control Delay	41.3	48.3	129.1	32.1	4.7	40.1	38.1	16.8	65.5	20.9	6.6
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	41.3	48.3	129.1	32.1	4.7	40.1	38.1	16.8	65.5	20.9	6.6
Queue Length 50th (m)	26.2	163.6	10.6	65.4	0.0	5.1	19.8	7.6	58.1	38.0	7.2
Queue Length 95th (m)	48.4	195.0	#35.7	82.2	13.8	13.5	31.3	23.7	72.8	49.4	20.5
Internal Link Dist (m)		940.6		1191.3			60.8			610.4	
Turn Bay Length (m)	130.0		105.0		230.0	125.0		65.0	115.0		95.0
Base Capacity (vph)	242	1370	51	1364	671	209	1026	507	882	1698	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	0.52	0.89	0.84	0.45	0.24	0.12	0.18	0.21	0.48	0.27	0.24

Intersection Summary

Cycle Length: 140

Actuated Cycle Length: 140

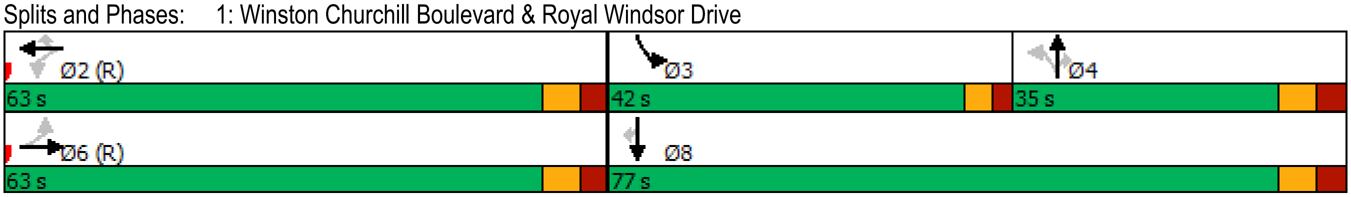
Offset: 108 (77%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

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

Splits and Phases: 1: Winston Churchill Boulevard & Royal Windsor Drive



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	1121	100	43	618	161	25	183	108	421	460	192
Future Volume (vph)	126	1121	100	43	618	161	25	183	108	421	460	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1737	3413		1722	3411	1437	1371	3444	1537	3340	3411	1478
Flt Permitted	0.33	1.00		0.07	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	607	3413		129	3411	1437	703	3444	1537	3340	3411	1478
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	126	1121	100	43	618	161	25	183	108	421	460	192
RTOR Reduction (vph)	0	5	0	0	0	97	0	0	49	0	0	71
Lane Group Flow (vph)	126	1216	0	43	618	64	25	183	59	421	460	121
Confl. Peds. (#/hr)	1		2	2		1	1		1	1		1
Heavy Vehicles (%)	5%	5%	11%	6%	7%	9%	33%	6%	4%	6%	7%	9%
Bus Blockages (#/hr)	0	0	1	0	0	7	0	0	2	0	0	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases		6			2			4		3	8	
Permitted Phases	6			2		2	4		4			8
Actuated Green, G (s)	56.0	56.0		56.0	56.0	56.0	41.7	41.7	41.7	23.0	69.7	69.7
Effective Green, g (s)	56.0	56.0		56.0	56.0	56.0	41.7	41.7	41.7	23.0	69.7	69.7
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.30	0.30	0.30	0.16	0.50	0.50
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	7.3	7.3	7.3	5.0	7.3	7.3
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
Lane Grp Cap (vph)	242	1365		51	1364	574	209	1025	457	548	1698	735
v/s Ratio Prot		c0.36			0.18			0.05		c0.13	c0.13	
v/s Ratio Perm	0.21			0.33		0.04	0.04		0.04			0.08
v/c Ratio	0.52	0.89		0.84	0.45	0.11	0.12	0.18	0.13	0.77	0.27	0.16
Uniform Delay, d1	31.8	39.2		38.0	30.8	26.4	35.8	36.4	35.9	56.0	20.4	19.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	9.1		85.7	1.1	0.4	1.2	0.4	0.6	6.4	0.4	0.5
Delay (s)	39.6	48.2		123.7	31.9	26.8	37.0	36.8	36.5	62.4	20.8	19.7
Level of Service	D	D		F	C	C	D	D	D	E	C	B
Approach Delay (s)		47.4			35.7			36.7			36.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	40.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.3
Intersection Capacity Utilization	105.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations						
Traffic Volume (vph)	77	73	12	239	518	
Future Volume (vph)	77	73	12	239	518	
Lane Group Flow (vph)	77	73	12	239	603	
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	4
Permitted Phases	8	8	2			
Detector Phase	8	8	2	2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	None
v/c Ratio	0.31	0.27	0.03	0.19	0.48	
Control Delay	25.8	9.3	4.6	4.6	7.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	25.8	9.3	4.6	4.6	7.0	
Queue Length 50th (m)	7.8	0.0	0.4	8.0	27.0	
Queue Length 95th (m)	17.1	8.8	2.0	17.7	56.1	
Internal Link Dist (m)	906.5			318.9	243.4	
Turn Bay Length (m)	80.0		115.0			
Base Capacity (vph)	645	578	380	1246	1254	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.12	0.13	0.03	0.19	0.48	

Intersection Summary

Cycle Length: 60

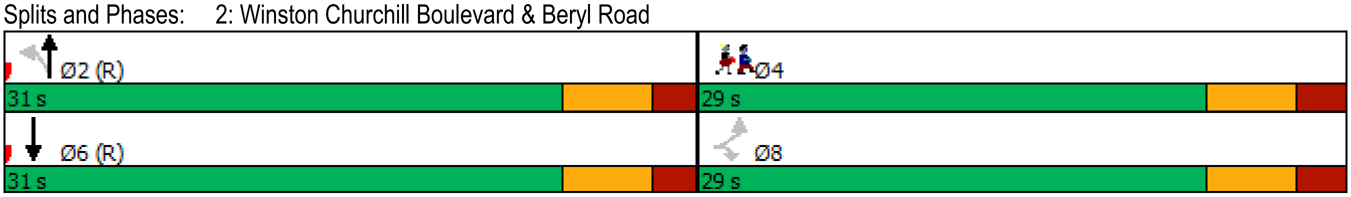
Actuated Cycle Length: 60

Offset: 5 (8%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Winston Churchill Boulevard & Beryl Road



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	77	73	12	239	518	85
Future Volume (vph)	77	73	12	239	518	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.1	6.1	6.1	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1706	1408	1285	1748	1752	
Flt Permitted	0.95	1.00	0.40	1.00	1.00	
Satd. Flow (perm)	1706	1408	535	1748	1752	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	77	73	12	239	518	85
RTOR Reduction (vph)	0	64	0	0	6	0
Lane Group Flow (vph)	77	9	12	239	597	0
Heavy Vehicles (%)	7%	16%	42%	9%	7%	11%
Bus Blockages (#/hr)	0	0	0	2	0	0
Turn Type	Perm	Perm	Perm	NA	NA	
Protected Phases				2	6	
Permitted Phases	8	8	2			
Actuated Green, G (s)	7.3	7.3	40.3	40.3	40.3	
Effective Green, g (s)	7.3	7.3	40.3	40.3	40.3	
Actuated g/C Ratio	0.12	0.12	0.67	0.67	0.67	
Clearance Time (s)	6.3	6.3	6.1	6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	207	171	359	1174	1176	
v/s Ratio Prot				0.14	c0.34	
v/s Ratio Perm	c0.05	0.01	0.02			
v/c Ratio	0.37	0.05	0.03	0.20	0.51	
Uniform Delay, d1	24.2	23.3	3.3	3.7	4.9	
Progression Factor	1.00	1.00	0.97	0.95	1.00	
Incremental Delay, d2	1.1	0.1	0.2	0.4	1.6	
Delay (s)	25.4	23.4	3.4	4.0	6.5	
Level of Service	C	C	A	A	A	
Approach Delay (s)	24.4			3.9	6.5	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	233	446	109	47	333	171
Future Volume (vph)	233	446	109	47	333	171
Lane Group Flow (vph)	233	446	109	47	333	171
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Detector Phase	2	2	6	6	4	4
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	25.0	25.0	25.0	25.0	23.2	23.2
Total Split (s)	59.0	59.0	59.0	59.0	31.0	31.0
Total Split (%)	65.6%	65.6%	65.6%	65.6%	34.4%	34.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.2	2.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.31	0.40	0.10	0.08	0.76	0.31
Control Delay	10.6	11.3	8.4	2.8	42.5	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	11.3	8.4	2.8	42.5	5.9
Queue Length 50th (m)	18.6	38.2	7.6	0.0	52.6	0.0
Queue Length 95th (m)	31.8	57.4	14.3	4.1	#91.0	14.1
Internal Link Dist (m)		154.6	591.9		764.6	
Turn Bay Length (m)	75.0			90.0	125.0	
Base Capacity (vph)	762	1120	1108	616	441	552
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.40	0.10	0.08	0.76	0.31

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

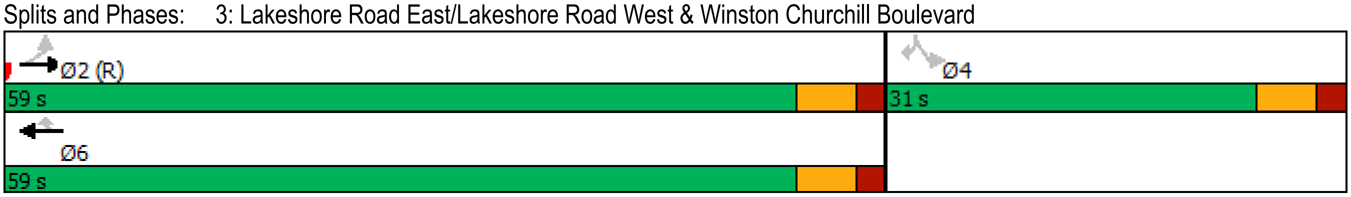
Offset: 41 (46%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

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

Splits and Phases: 3: Lakeshore Road East/Lakeshore Road West & Winston Churchill Boulevard



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	233	446	109	47	333	171
Future Volume (vph)	233	446	109	47	333	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1789	1902	1883	1014	1601	1555
Flt Permitted	0.69	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1293	1902	1883	1014	1601	1555
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	233	446	109	47	333	171
RTOR Reduction (vph)	0	0	0	19	0	124
Lane Group Flow (vph)	233	446	109	28	333	47
Heavy Vehicles (%)	2%	1%	2%	61%	14%	5%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		2	6			
Permitted Phases	2			6	4	4
Actuated Green, G (s)	53.0	53.0	53.0	53.0	24.8	24.8
Effective Green, g (s)	53.0	53.0	53.0	53.0	24.8	24.8
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.28	0.28
Clearance Time (s)	6.0	6.0	6.0	6.0	6.2	6.2
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	761	1120	1108	597	441	428
v/s Ratio Prot		c0.23	0.06			
v/s Ratio Perm	0.18			0.03	c0.21	0.03
v/c Ratio	0.31	0.40	0.10	0.05	0.76	0.11
Uniform Delay, d1	9.3	9.9	8.1	7.8	29.8	24.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.1	0.2	0.1	11.4	0.5
Delay (s)	10.3	11.0	8.3	8.0	41.2	24.9
Level of Service	B	B	A	A	D	C
Approach Delay (s)		10.8	8.2		35.7	
Approach LOS		B	A		D	

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.2
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	8	0	251	560	31
Future Volume (Veh/h)	0	8	0	251	560	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	8	0	251	560	31
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				171	343	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	811	560	591			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	759	489	522			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	348	538	971			

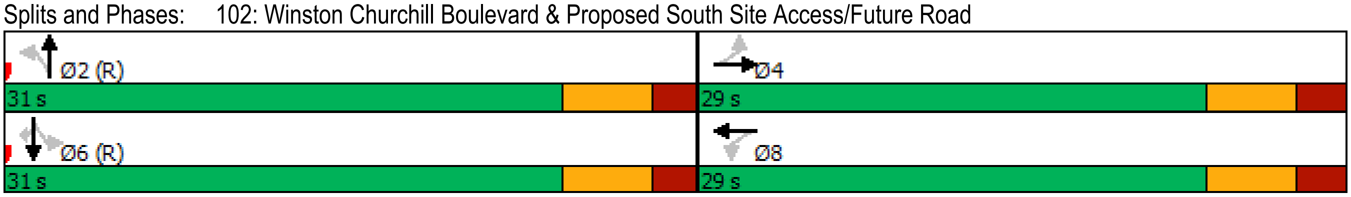
Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	8	251	560	31
Volume Left	0	0	0	0
Volume Right	8	0	0	31
cSH	538	971	1700	1700
Volume to Capacity	0.01	0.00	0.33	0.02
Queue Length 95th (m)	0.3	0.0	0.0	0.0
Control Delay (s)	11.8	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	11.8	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	NBL	NBT	SBT	SBR	Ø8
Lane Configurations							
Traffic Volume (vph)	10	0	25	241	537	31	
Future Volume (vph)	10	0	25	241	537	31	
Lane Group Flow (vph)	10	8	25	241	537	31	
Turn Type	Perm	NA	Perm	NA	NA	Perm	
Protected Phases		4		2	6		8
Permitted Phases	4		2			6	
Detector Phase	4	4	2	2	6	6	
Switch Phase							
Minimum Initial (s)	8.0	8.0	12.0	12.0	12.0	12.0	8.0
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	24.1	25.3
Total Split (s)	29.0	29.0	31.0	31.0	31.0	31.0	29.0
Total Split (%)	48.3%	48.3%	51.7%	51.7%	51.7%	51.7%	48%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	2.1	2.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.3	6.3	6.1	6.1	6.1	6.1	
Lead/Lag							
Lead-Lag Optimize?							
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max	None
v/c Ratio	0.04	0.02	0.03	0.14	0.31	0.02	
Control Delay	23.2	0.1	2.0	1.6	4.4	2.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	23.2	0.1	2.0	1.6	4.4	2.1	
Queue Length 50th (m)	1.0	0.0	0.0	0.0	0.0	0.0	
Queue Length 95th (m)	4.5	0.0	2.7	15.2	82.6	m2.1	
Internal Link Dist (m)		66.0		222.0	147.2		
Turn Bay Length (m)			20.0			20.0	
Base Capacity (vph)	712	730	814	1755	1755	1496	
Starvation Cap Reductn	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	
Reduced v/c Ratio	0.01	0.01	0.03	0.14	0.31	0.02	

Intersection Summary
Cycle Length: 60
Actuated Cycle Length: 60
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Winston Churchill Boulevard & Proposed South Site Access/Future Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	8	0	0	0	25	241	0	0	537	31
Future Volume (vph)	10	0	8	0	0	0	25	241	0	0	537	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3					6.1	6.1			6.1	6.1
Lane Util. Factor	1.00	1.00					1.00	1.00			1.00	1.00
Frt	1.00	0.85					1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1789	1601					1789	1883			1883	1601
Flt Permitted	1.00	1.00					0.46	1.00			1.00	1.00
Satd. Flow (perm)	1883	1601					874	1883			1883	1601
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	0	8	0	0	0	25	241	0	0	537	31
RTOR Reduction (vph)	0	8	0	0	0	0	0	0	0	0	0	7
Lane Group Flow (vph)	10	0	0	0	0	0	25	241	0	0	537	24
Turn Type	Perm	NA					Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	1.6	1.6					46.0	46.0			46.0	46.0
Effective Green, g (s)	1.6	1.6					46.0	46.0			46.0	46.0
Actuated g/C Ratio	0.03	0.03					0.77	0.77			0.77	0.77
Clearance Time (s)	6.3	6.3					6.1	6.1			6.1	6.1
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	50	42					670	1443			1443	1227
v/s Ratio Prot		0.00						0.13			c0.29	
v/s Ratio Perm	c0.01						0.03					0.01
v/c Ratio	0.20	0.01					0.04	0.17			0.37	0.02
Uniform Delay, d1	28.6	28.4					1.7	1.9			2.3	1.7
Progression Factor	1.00	1.00					1.00	1.00			2.41	4.11
Incremental Delay, d2	2.0	0.0					0.1	0.2			0.7	0.0
Delay (s)	30.5	28.5					1.8	2.1			6.2	6.8
Level of Service	C	C					A	A			A	A
Approach Delay (s)		29.6			0.0			2.1			6.2	
Approach LOS		C			A			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.4
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	14	23	257	490	55
Future Volume (Veh/h)	9	14	23	257	490	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	14	23	257	490	55
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)					246	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	820	518	545			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	439	469			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	98	98			
cM capacity (veh/h)	336	572	1012			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	280	545
Volume Left	9	23	0
Volume Right	14	0	55
cSH	448	1012	1700
Volume to Capacity	0.05	0.02	0.32
Queue Length 95th (m)	1.2	0.5	0.0
Control Delay (s)	13.5	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	13.5	0.9	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

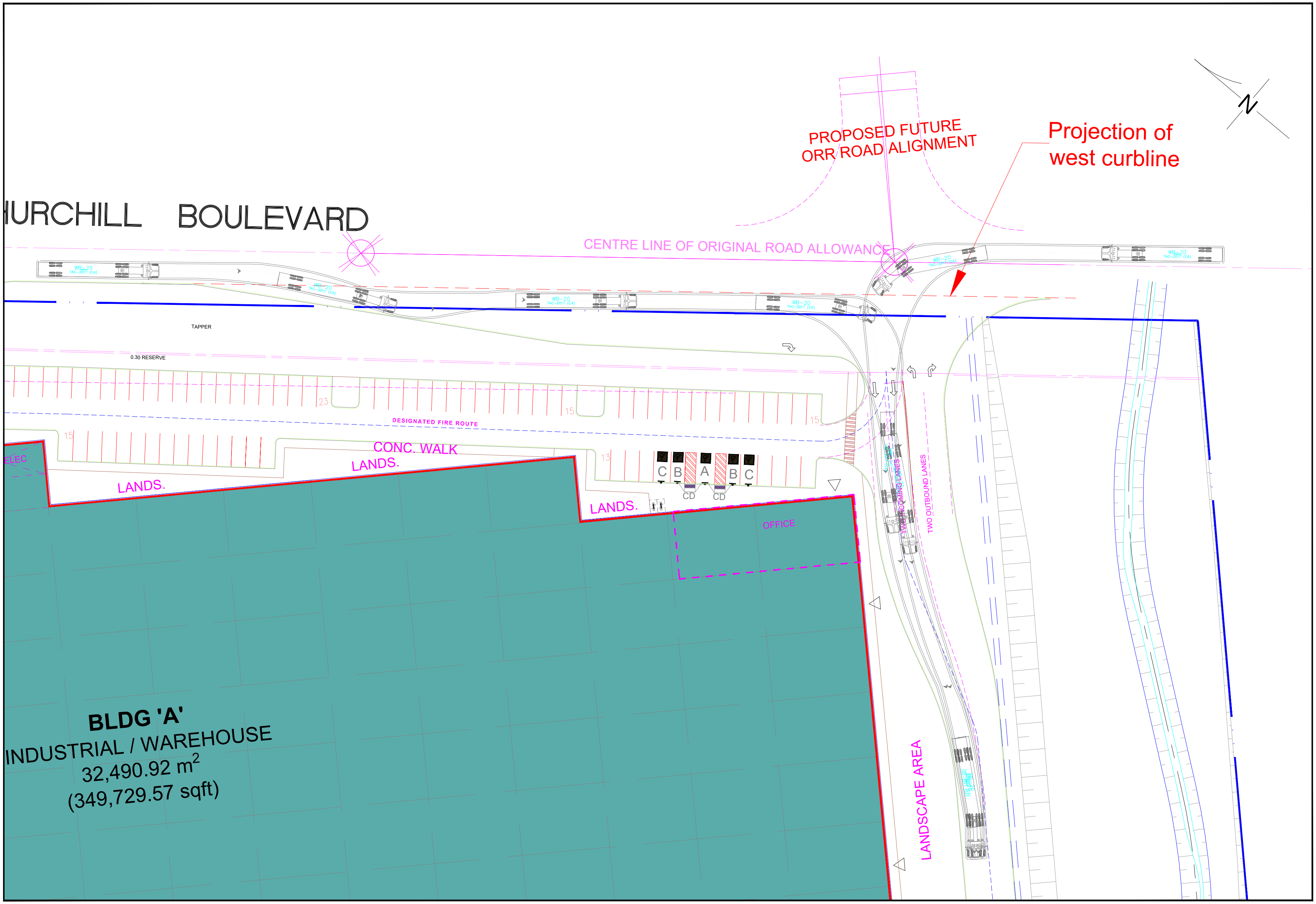
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	0	280	504	0
Future Volume (Veh/h)	0	0	0	280	504	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	0	280	504	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	784	504	504			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	784	504	504			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	362	568	1061			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	280	504
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1061	1700
Volume to Capacity	0.00	0.00	0.30
Queue Length 95th (m)	0.0	0.0	0.0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix J

Vehicle Swept Path Analysis



No.	REVISION	DATE

IBI

WB-20

meters

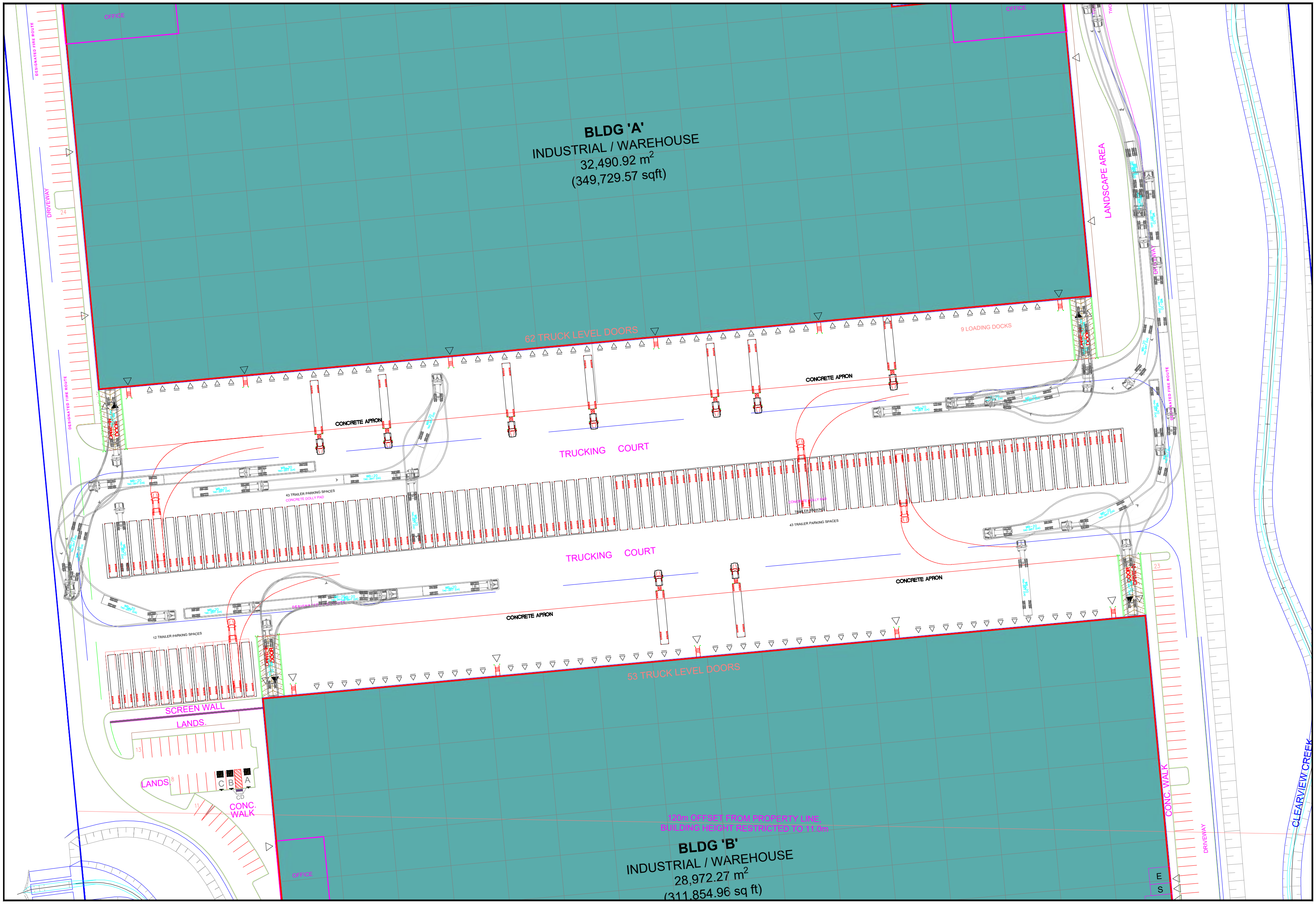
Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD, OAKVILLE

TRACTOR TRAILER

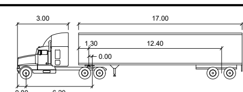
ENTRY FROM PROPOSED SOUTH SITE ACCESS

DRAWN BY: J.P.	DATE: March 3, 2021	DRAWING No. -
DESIGNED BY: -	SCALE: 1:25	SHEET No. -
CHECKED BY: A.G.		
APPROVED BY: -		



No.	REVISION	DATE

IBI



WB-20

meters

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

PROPOSED INDUSTRIAL DEVELOPMENT
772 WINSTON CHURCHILL BOULEVARD, OAKVILLE

TRACTOR TRAILER

PARKING MANEUVERS

DRAWN BY: J.P.	DATE: March 3, 2021	DRAWING No. -
DESIGNED BY: -	SCALE: 1:40	SHEET No. -
CHECKED BY: A.G.		
APPROVED BY: -		

C:\Users\jeff.pascua\IBI Group\133556 772 Winston Churchill Blvd Traffic Study Update - Internal Documents\6.0_Technical\6.23_Traffic\04_Design-Analysis\AutoTurn\TTW_772WCB_AutoTurn_v0.1.dwg (AutoTurn (Truck Parking))