

TRANSPORTATION IMPACT STUDY
560 WINSTON CHURCHILL BOULEVARD

TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON
REGIONAL MUNICIPALITY OF PEEL

PREPARED FOR:
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Executive Summary

Blackwood Partners Inc. retained C.F. Crozier & Associates Inc. (Crozier) to undertake a Transportation Impact Study to support the Site Plan Application (SPA) for the proposed industrial development at 560 Winston Churchill Boulevard (site), in the Town of Oakville, Regional Municipality of Halton (Halton Region). The study aims to assess the impacts of the proposed development on the boundary road network and recommend required mitigation measures if warranted.

Per the Site Plan prepared by Baldassarra Architects Inc., the elements envisioned for this development include three industrial use warehouse buildings with a combined GFA of 59,078 m², 417 at-ground parking spaces, and two accesses from Winston Churchill Boulevard.

Under 2021 existing conditions (with the addition of a 2% COVID factor), all intersections operate with a Level of Service "D" or better during the A.M. peak hour and P.M. peak hour. Notably, the intersection of Winston Churchill Boulevard and Royal Windsor Drive operates at capacity for the eastbound left-turn movement. All other intersections operate below capacity for all movements.

Under future background traffic conditions, the intersection of Ford Drive and Royal Windsor Drive, as well as the intersection of Ford Drive and Cornwall Drive is forecasted to operate with Level of Service "D" or better during the 2022 and 2027 horizon year, and with Level of Service "E" or better for the 2032 horizon year, for both peak periods.

The southbound left-turn movement at both intersections exceeds capacity for both A.M. and P.M. peak periods during the 2032 horizon year. This movement is also expected to have queues exceeding the available storage length during all horizon years.

The intersection of Winston Churchill Boulevard (WCB) and Royal Windsor Drive is expected to operate with a Level of Service "D" or better during the 2022 horizon year, and with a Level of Service "E" or better during the 2027 and 2032 horizon year.

The eastbound left-turn movement is forecasted to exceed capacity during the P.M. peak period for all horizon years. Queuing analysis suggests that the queues for this movement will exceed available storage for both peak periods. All other intersections are expected to operate well under capacity and with acceptable delays.

To forecast the trips generated by the proposed development, the Institute of Transportation Engineers (ITE) 10th edition data was used. The proposed development is expected to generate approximately 86 and 96 total two-way passenger car trips during the weekday A.M. and P.M. peak hours, respectively, and approximately 22 and 25 total two-way heavy truck trips during the weekday A.M. and P.M. peak hours, respectively. These trips have been distributed per existing travel patterns and added to the future background to generate future total trips.

Under future total traffic conditions, there are no notable differences in the forecasted operations at the study intersections in comparison to delays and queues expected for future background traffic conditions. Signal timing measures were recommended to mitigate capacity concerns due to future background traffic. Based on the expected future operations, the development application can be supported from a traffic operations perspective.

The proposed total supply of 417 parking spaces, exceeds the minimum requirement of 410 parking spaces, for warehouses per Town of Oakville's By-Law 2014-014.

The site circulation characteristics for vehicles expected at the site was analyzed via AutoTURN truck turning analysis, and heavy vehicles as well as passenger vehicles are expected to safely maneuver through the site. A 30% functional design for the proposed site accesses is also included within this submission.

Transportation Demand Management (TDM) opportunities were evaluated at the proposed development and recommendations with regards to transit, education and incentives were outlined.

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1.0 Introduction

Blackwood Partners Inc. retained C.F. Crozier & Associates Inc. (Crozier) to undertake a Transportation Impact Study to support the Site Plan Application (SPA) for the proposed industrial development at 560 Winston Churchill Boulevard (site) in the Town of Oakville, Regional Municipality of Halton (Halton Region). The study aims to assess the impacts of the proposed development on the boundary road network and recommend required mitigation measures if warranted.

The study has been completed following the procedures set out in Halton Region's Transportation Impact Study Guidelines (December 2015), Region of Peel's Transportation Impact Study Terms of Reference, and the Development Application Guidelines for Transportation Impact Analysis out by the Town of Oakville.

A Terms of Reference encompassing the scope of the study was circulated to the Town of Oakville (the Town), Halton Region and Peel Region (the Region(s)) on August 16, 2021, and comments were received by August 23, 2021. Correspondence from all relevant agencies is included in Appendix A – Agency Correspondence.

The following horizon timeframes were included in this study:

- Existing (2021) traffic conditions.
- Build-out year (2022) traffic conditions.
- Five-year (2027) and ten-year (2032) year horizon from build-out.

1.1 Development Lands and Proposal

The subject lands cover approximately 13 ha and currently consist of agricultural land with landscaped areas and some residential units. The property, located in a mostly industrial area, is bounded by an open lot to the north, mixed residential and landscaped areas to the south and west and Winston Churchill Boulevard to the east. Clearview Creek flows in an east-west manner to the north of the subject property.

Per the most recent Site Plan prepared by Baldassarra Architects Inc. issued for SPA, the elements envisioned for this development include:

- Three industrial buildings, Building A (16,206 m² total GFA, 1,084 m² office), Building B (12,790 m² total GFA, 1,156 m² office), and Building C (30,082 m² total GFA, 1,072 m² office).
- 417 at-ground parking spaces
- Two site accesses off Winston Churchill Boulevard, one full-moves access to the north for heavy vehicle use only, and one right-in/right-out (RIRO) access to the south for passenger vehicle use only.

The location of the site is included in Figure 1.

2.0 Existing Conditions

Per the Terms of Reference agreed upon with municipal and regional staff, the following intersections were reviewed as part of the study area:

- Winston Churchill Boulevard (WCB) and Royal Windsor Drive
- Winston Churchill Boulevard and Beryl Road
- Ford Drive and Cornwall Drive
- Ford Drive and Royal Windsor Drive
- Lakeshore Road East and Winston Churchill Boulevard
- Winston Churchill Boulevard and Proposed Site Access(es)

The following section describes the study area from a transportation perspective, including (but not limited to) roadway classifications, geometric features, active transportation and transit facilities, and traffic operations.

2.1 Study Roadways

Due to the directional ambiguity of the study roadways in the vicinity of the proposed development, the study roadways have been assigned directions as the following for the purposes of clarity and consistency.

Lakeshore Road East is an east-west roadway and consists of one lane in each direction with a two-way left-turn lane. Lakeshore Road East is classified as a major arterial road under the jurisdiction of the Town of Oakville to the west of WCB, and the City of Mississauga to the east of WCB. The study section of the roadway has a posted speed limit of 60 km/h. There are sidewalks on both sides of the road and no dedicated cyclist facilities in the study area.

Cornwall Road/Beryl Road is an east-west roadway and generally contains two lanes in each direction at the intersection with Ford Drive plus a shared left turn lane in the centre. Approximately 200 meters east of Ford Drive, the lanes on Cornwall Road decrease to one lane in each direction with no two-way left-turn lane; this condition continues for approximately 600 meters until Beryl Road terminates at Winston Churchill Boulevard. Cornwall Road is classified as a multi-purpose arterial road under the jurisdiction of the Town of Oakville. The study section of the roadway has a posted speed limit of 60 km/h and contains sidewalks on the north side of the roadway, and a multi-use path on the south side of the roadway. It should be noted the active transportation facilities on Cornwall/Beryl Road are not present between WCB and approximately 350 meters west of WCB along Beryl Road.

Royal Windsor Drive is an east-west roadway and contains two lanes in each direction, and is classified as a multi-purpose arterial road under the jurisdiction of the Town of Oakville. The study section of the roadway has a posted speed limit of 60 km/h and contains a separated cyclist lane in both directions on the section between Ford Drive and WCB. A signed bicycle route is available to the west of Ford Drive. Parking is restricted along both sides and there are generally no sidewalks on either side of the roadway within the study area.

Winston Churchill Boulevard (WCB) (Regional Road 19) is a north-south roadway and contains 2 lanes in each direction at the intersection with Royal Windsor Drive. South of Royal Windsor Drive, a single through lane is present in each direction. Winston Churchill Boulevard is classified as a Regional Road and major arterial road under the jurisdiction of Peel Region. The roadway within the study area has a posted speed limit of 60 km/h and sidewalks are present on both sides of the roadway north of the intersection with Royal Windsor Drive. However, no sidewalks, only paved shoulders, are present between Royal Windsor Drive and Lakeshore Road East.

Ford Drive (Regional Road 13) is a north-south roadway and contains one lane in each direction. Ford Drive is classified as a major arterial road. Furthermore, the segment of Ford Drive north of Cornwall Road is classified as a Regional Road under the jurisdiction of Halton Region, and the segment of Ford Drive south of Cornwall Road is under the jurisdiction of the Town of Oakville. The roadway within the study area has a posted speed limit of 60 km/h in the study area. Ford Drive has sidewalks on both sides of the road in the vicinity of the proposed development as well as a multi-use path on the west side of the road for the section between Sheridan Garden Drive and Constance Drive.

Deer Run Avenue is an east-west roadway consisting of two lanes in both directions. The roadway is classified as a local road under the jurisdiction of the Town of Oakville. The roadway has a posted speed limit of 40 km/h. It is important to note that Deer Run Avenue is directly adjacent to the site and is only accessible by emergency vehicles from Winston Churchill Boulevard. The Deer Run Avenue intersection with Winston Churchill Boulevard is gated and not open to the public.

2.2 Study Intersections

The intersection of **Ford Drive and Cornwall Road** is a four-legged intersection with signal control. The northbound approach on Ford Drive consists of a left-turn lane, a through lane, and a shared through/right-turn lane. The southbound approach on Ford Drive consists of a single auxiliary left turn lane, a single through lane, and a single left turn lane. The eastbound approach on Cornwall Road consists of two auxiliary left-turn lanes, and a single shared through/right-turn lane. The westbound approach on Cornwall Road consists of a single left-turn lane, a single through lane, and a single shared through/right-turn lane.

The intersection of **Royal Windsor Drive and Ford Drive** is a four-legged intersection with signal control. The southbound approach on Ford Drive consists of an auxiliary left turn lane, two through lanes, and an auxiliary right turn lane. The northbound and westbound approaches each consist of a single auxiliary left turn lane, a single through lane, and a single shared left/right-turn lane. While the eastbound approach has dual left-turn lanes and a single shared-through lane.

The intersection of **Winston Churchill Blvd and Royal Windsor Drive** is a four-legged signalized intersection. The northbound approach on WCB consists of a single auxiliary left turn lane, two through lanes, and an auxiliary right turn lane. The southbound approach on WCB consists of two auxiliary left-turn lanes, two through lanes, and one auxiliary right-turn lane. The eastbound approach on Royal Windsor Drive consists of one auxiliary left-turn lane, one through lane and one shared through/right turn lane. The westbound approach consists of a channelized right-turn lane, two through lanes, and a single auxiliary left-turn lane.

The intersection of **Beryl Road at WCB** is a three-legged signalized intersection. The eastbound approach on Beryl Road consists of a single left-turn lane and a single right-turn lane. The northbound approach on WCB consists of a single through lane, and a single left-turn lane. The southbound approach on WCB consists of a shared through-right lane.

The intersection of **WCB and Lakeshore Road East** is a three-legged signalized intersection. The southbound approach on Lakeshore Road East consists of a single left turn lane and a single right turn lane. The westbound approach on WCB consists of a single through lane and a channelized right turn. The eastbound approach on WCB consists of a single through lane and an auxiliary left-turn lane.

Figure 2 illustrates the study road configurations and the locations of the proposed site accesses.

2.3 Existing Transit

MiWay Route 14 "Lorne Park" operates in the study area, with a stop at 650 Winston Churchill Boulevard, approximately 200 meters from the site. This route operates in a one-way loop between Clarkson GO, westbound along Lakeshore Road via Southdown Road, north along Winston Churchill Boulevard, and back to Clarkson GO via Royal Windsor Drive. The remainder of the route operates from Clarkson GO to Port Credit GO via Truscott Drive and Indian Road.

MiWay Route 14 provides a direct connection to Clarkson GO along the Lakeshore West GO Line, connections to other transit routes in the area, as well as connections to many other service, entertainment, and other service nodes in the Town of Oakville and surrounding municipalities.

2.4 Existing Active Transportation Network

As discussed previously, several pedestrian paths are available in the study area, including Lakeshore Road, Cornwall Road (a distance west of Winston Churchill Boulevard), Winston Churchill Boulevard (north of Royal Windsor Drive), and Ford Drive. It is noted that no sidewalks are currently available along WCB immediately connecting to the site until the intersection with Lakeshore Road or Royal Windsor Drive, however, pedestrians may use the large paved shoulders to connect to transit or the existing pedestrian infrastructure along Lakeshore Road to the south or Beryl Road to the north.

Multi-use paths are available in the study area for cyclists along Cornwall Drive and Ford Drive.

Additionally, Deer Run Avenue may be considered as an informal cyclist route or accommodate pedestrians to the south of Winston Churchill Boulevard.

2.5 Traffic Data

Turning movement counts at the intersections of study were collected by Spectrum Traffic Inc. on August 24, 2021 during the A.M. peak hours of 6:00 A.M. to 10:00 A.M., as well as the P.M. peak hours of 3:00 P.M. to 7:00 P.M. Traffic counts are included in Appendix C – Traffic Counts.

Due to the impacts of the ongoing COVID-19 pandemic, travel patterns on roadways are not consistent with expected pre-pandemic traffic volumes. Following confirmation with the Town and Regions, a growth rate of 2.0% was applied to traffic volumes collected in 2021 to reflect the impacts of traffic reductions due to the pandemic.

2.6 Traffic Modeling

The evaluation of intersections within this report is conducted based on the methodology outlined in the Highway Capacity Manual, using Synchro 11 modelling software. Intersections are assessed using a Level of Service (LOS) metric, with ranges of intersection delays assigned a letter from "A" to "F". For stop-controlled intersections, a Level of Service "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways. Levels of Service "C" through "F" would typically be observed during commuter peak hours when significant vehicle volumes would cause lengthy travel times. The Level of Service definitions for stop-controlled intersections is included in Appendix D – Level of Service Definitions.

Parameters for inputs in Synchro 11 were based on Peel and Halton Region Guidelines. Per Peel Regional Guidelines for Using Synchro Version 7.73 Rev 8, dated December 2010, ideal saturation flows of 1900 vphpl (default) was used for all movement at all intersections. Lane widths were set as 3.7 meters for through lanes, and 3.5 meters for all auxiliary turn lanes. Right turn channelization, notably at WCB and Royal Windsor Drive as well as WCB and Lakeshore Road East was set to "Yield". All storage lane parameters were verified with existing site conditions and input to Synchro accordingly.

Existing signal timing plans received from Halton Region (intersections on Ford Drive) and the Region of Peel (intersections on WCB) were received on August 25, 2021 and were used for analysis of existing conditions. The signal timing plans are included in Appendix E – Signal Timing Plans.

It is noted, the signal timing plans provided by Peel Region included a phase for the eastbound left turn movement for the intersection of WCB and Royal Windsor Drive, however no green time was assigned to this phase within the plans for the A.M. peak period. As such, the signal timing was adjusted within the Synchro inputs for the eastbound left protected phase to provide a reasonable amount of protected left turn green time, such that the v/c ratio would be under capacity. The above assumption is in agreement with the existing signal infrastructure at the intersection, which includes a left-turn signal head on the eastbound left-turn movement.

Furthermore, in consideration that the P.M. peak period eastbound left-turn movement at WCB and Royal Windsor had a volume-to-capacity ratio over 1.00 for existing and consistent signal timing plans corresponding to the counts, a lost time adjustment of 3.0 seconds was allocated to this movement to bring the volume-to-capacity ratio to 1.00 or less to reflect real existing conditions.

2.7 Intersection Operations

The traffic operations at the study intersections were analyzed based on grown traffic volumes (reflecting the impacts of the COVID pandemic) to represent 2021 traffic conditions during the weekday A.M. and P.M. peak hours, as illustrated in Figure 3. Detailed capacity analyses are included in Appendix F – Detailed Capacity Analysis – 2021 Existing. Table 2 summarizes the existing traffic operations within the study area.

Table 1: 2021 Existing Levels of Service

Intersection	Level of Service (Average Delay Per Vehicle(s))		Max V/C Ratio (Approach) > 0.85		95 th %ile Queue Length > Storage Length	
	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak
Ford Drive and Royal Windsor Drive	C (33.0)	D (36.8)	0.79 (EBT)	0.82 (EBT)	None	
Ford Drive and Cornwall Road	C (31.3)	D (31.3)	0.84 (SBL)	0.80 (EBL)	188 m (SBL)	144 m (SBL)
WCB and Royal Windsor Drive	D (39.1)	D (41.9)	0.75 (EBL)	0.98 (EBL)	None	102 m (EBL)
WCB and Lakeshore Road East	B (13.2)	B (11.1)	0.30 (EBT)	0.26 (EBT)	None	
WCB and Beryl Road	A (8.2)	B (11.2)	0.37 (EBL)	0.52 (EBL)	None	

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. Existing Signal Timings provided by Peel Region and Halton Region were used.

Note 2: All v/c ratios greater than 0.85 are highlighted.

The intersection of WCB and Royal Windsor Drive operates with a Level of Service "D" during the weekday A.M. peak period and P.M. peak period. It was observed that the intersection is currently operating near capacity with a volume-to-capacity ratio of 0.98. Although the 95th percentile queues for the eastbound left-turn movement are expected to be exceeded during the P.M. peak period the average queue, represented by 50th percentile queues, are well under the available storage length.

It is recommended that the Town of Oakville monitor the intersection of WCB and Royal Windsor Drive for signalization optimization to improve the operations at the intersection, notably for the eastbound left turn.

Similarly, while 95th percentile queues were observed to exceed available storage at the intersections of Ford Drive and Cornwall Road for the southbound left-turn movement for both peak hours, the 50th percentile queues are well under the available storage length. Furthermore, it is noted that there is no southbound left-turn phase at this intersection. The addition of this phase to the signal timing plan would be recommended to mitigate queue-related concerns associated with this movement.

All other intersections operate with a Level of Service "D" or better during the weekday A.M. and P.M. peak hour, and within capacity. 95th percentile queues were also observed at all intersections, and all other intersections are expected to have sufficient storage lengths.

3.0 Future Background Conditions

3.1 Study Horizons

Per consultation with the Town of Oakville, horizon years corresponding to the anticipated build-out year of 2022, five-years (2027) and ten years (2032) from build-out were used to assess the impacts of the proposed development on the surrounding road network.

Future background traffic volumes for horizon years consist of the following components:

- Background traffic growth from outside the study area.
- Traffic generated within the study area from other proposed developments.

3.2 Traffic Growth Rates

A 2.0% growth rate per annum was applied to all traffic during the weekday peak hours along the roadways of study following confirmation with the Town and Regions.

3.3 Future Transportation Network Improvements

There are no transportation network improvements planned in the vicinity of the proposed development identified following consultation with the Town and Regions.

3.4 Background Developments

Per comments from the Town of Oakville and based on the Town's active development applications database, the following background developments were identified within the vicinity of the proposed development:

1. 2395 Cornwall Road (Reference No. TBD)

For the industrial development of 2395 Cornwall Road, a Traffic Impact Brief has been prepared by Crozier, and is included in Appendix G. The development is anticipated to generate a total of 24 two-way trips (21 inbound and 3 outbound) during the A.M. peak hour and 22 two-way trips (2 inbound and 20 outbound) during the P.M. peak hour. Trips generated at this development were distributed to the study roadways based on the assumptions outlined in the Crozier report.

2. 772 Winston Churchill Boulevard (Reference No. 1601.029)

For the development at 772 Winston Churchill Boulevard, a Transportation Impact Study was prepared by IBI Group dated April 6, 2021. Based on the report, included in Appendix G – Background Development Report Excerpts, the development is forecasted to generate 113 trips in the A.M. peak hour and 116 trips during the P.M. peak hour. The trip assignment presented in the report was used for consistency.

3. 2400 Cornwall Road (Reference No. 1602.013)

Although the development at 2400 Cornwall Road was identified by the Town of Oakville during consultation, no Transportation-Related Reports were available. As such, it is assumed the trips generated by this development have been included in the background growth rate.

A summary of the background development trips are provided in Table 2 below.

Table 2: Background Development Trips

Development	Land Use	GFA	Peak Period	Inbound	Outbound	Total
2395 Cornwall Road	Light Industrial	33,740 SF	A.M.	21	3	24
			P.M.	2	20	22
772 Winston Churchill Boulevard	Warehousing	702,506 SF	A.M.	87	26	113
			P.M.	31	85	116
Total A.M. Peak				108	46	152
Total P.M. Peak				33	105	138

The locations of the background developments are provided in Figure 4 and all trips generated by background developments are illustrated in Figure 5.

3.5 Intersection Operations

Traffic operations at the study intersections were analyzed following addition of volumes from associated growth rates and background developments in the vicinity of the subject development. Volumes anticipated for the future background conditions for the 2022, 2027, and 2032 horizon years are included in Figures 6, 7 and 8, respectively.

Table 3 summarizes the 2022, 2027, and 2032 future background Levels of Service and Table 4 summarizes the queuing analysis for all peak periods and horizon years. Detailed capacity analyses are included in Appendix H – Detailed Capacity Analysis – 2022, 2027, 2032 Future Background.

Table 3: 2022, 2027, 2032 Future Background Levels of Service

Intersection	2022 Horizon Year				2027 Horizon Year				2032 Horizon Year			
	Level of Service (Average Delay Per Vehicle(s))		V/C Ratio (Approach)		Level of Service (Average Delay Per Vehicle(s))		V/C Ratio (Approach)		Level of Service (Average Delay Per Vehicle(s))		V/C Ratio (Approach)	
	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak
Ford Drive and Royal Windsor Drive	C (33.5)	D (37.1)	0.80 (EBT)	0.82 (EBT)	C (34.8)	D (40.0)	0.82 (EBT)	0.93 (SBL)	C (37.0)	E (51.4)	0.85 (SBL)	1.50 (SBL)
Ford Drive and Cornwall Road	C (34.8)	C (31.6)	0.93 (SBL)	0.81 (EBL)	E (47.4)	D (34.5)	1.08 (SBL)	0.87 (SBL)	E (71.9)	D (41.4)	1.29 (SBL)	1.01 (SBL) 0.87 (EBL)
WCB and Royal Windsor Drive	D (39.2)	D (41.5)	0.76 (WBT)	1.00 (EBL)	D (40.3)	D (44.3)	0.80 (WBT)	1.10 (EBL)	D (40.5)	D (48.3)	0.81 (WBT)	1.22 (EBL)
WCB and Lakeshore Road East	B (13.0)	B (11.2)	0.42 (EBT)	0.26 (EBT)	B (13.6)	B (11.3)	0.49 (EBT)	0.36 (EBT)	B (13.7)	B (11.4)	0.51 (EBT)	0.31 (EBT)
WCB and Beryl Road	A (8.3)	B (11.2)	0.36 (EBL)	0.53 (EBL)	A (8.6)	B (11.8)	0.40 (EBL)	0.55 (EBL)	A (8.7)	B (12.3)	0.41 (EBL)	0.58 (EBL)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle.

Existing Signal Timings provided by Peel Region and Halton Region were used.

Note 2: All v/c ratios greater than 0.85 are highlighted.

Table 4: 2022, 2027, 2032 Future Background Queue Analysis

Intersection	95 th %ile Queue Length > Storage Length					
	2022 Horizon Year		2027 Horizon Year		2032 Horizon Year	
	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak
Ford Drive and Royal Windsor Drive	None	80 m (SBL)	90 m (SBL)	105 m (SBL)	120 m (SBL)	55 m (NBL) 130 m (SBL)
Ford Drive and Cornwall Road	215 m (SBL)	155 m (SBL)	255 m (SBL)	180 m (SBL)	300 m (SBL)	205 m (SBL)
WCB and Royal Windsor Drive	None	110 m (EBL)	None	120 m (EBL)	65 m (EBL) 45 m (WBL)	150 m (EBL) 50 m (WBL)
WCB and Lakeshore Road East	None					
WCB and Beryl Road	None					

With respect to future background traffic conditions, the intersection of Ford Drive and Royal Windsor Drive is expected to operate with Level of Service "D" or better during the 2022 and 2027 horizon years, and with Level of Service "E" during the P.M. peak period for the 2032 horizon year. In the 2027 horizon year, the southbound left-turn movement exceeds capacity during the A.M. peak period, and is forecasted to near capacity during the P.M. peak period. For the 2032 horizon year, the southbound left-turn movement exceeds capacity for both peak periods, and the eastbound left-turn movement is expected to near capacity. Queue analysis indicates the 95th percentile queue is expected to exceed the available storage length for the southbound left-turn movement during all peak periods for all horizon years.

Under future background traffic conditions, the intersection of Ford Drive and Cornwall Road is expected to operate with a Level of Service "D" or better for the 2022 horizon year, and Level of Service "E" or better for the 2027 and 2032 horizon year. The southbound left-turn movement is expected to near capacity in the 2022 horizon year during the A.M. peak hour. This movement is expected to exceed capacity during the 2027 horizon year during the A.M. peak hour, and nears capacity during the P.M. peak hour. By the 2032 horizon year, the southbound left-turn movement is expected to exceed capacity during both the A.M. and P.M. peak hours. 95th percentile queues were observed at this intersection, and it is noted that the 95th percentile queues for the southbound left-turn movement are expected to exceed the available storage length during the P.M. period in the 2022 horizon year. The 95th percentile queues are expected to exceed storage length during both the A.M. and P.M. peak periods for the 2027 and 2032 horizon years for the southbound left-turn movement.

The intersection of WCB and Royal Windsor Drive is forecasted to operate with a Level of Service "D" or better during the 2022 horizon year, and with a Level of Service "E" or better during the 2027 and 2032 horizon year under future background traffic conditions. The intersection is forecasted to exceed capacity for the eastbound left-turn movement during the P.M. peak period for all horizon years. The 95th percentile queues were also observed for all movements at the intersection; the 95th percentile queue is expected to be exceeded for the eastbound left-turn movement for all horizon years during the P.M. peak period, and during the A.M. peak period only for the 2032 horizon year. Additionally, the eastbound left-turn movement was also observed to have 95th percentile queues exceeding the available storage during the 2032 A.M. and P.M. peak period. It is of note, in most average cases (represented by the 50th percentile queue), the available storage length would accommodate queues for the eastbound left-turn movement.

The intersections of WCB and Beryl Road as well as the intersection of Lakeshore Road East and WCB are expected to operate with a Level of Service "B" or better and well under capacity for all movements under future background traffic conditions for all horizon years and peak periods. The storage lengths provided at these intersections are anticipated to sufficiently accommodate queues for all approaches.

It is recommended that the Town of Oakville monitor the intersections of WCB and Royal Windsor, Ford Drive and Royal Windsor Drive, as well as Ford Drive and Cornwall Road for signal optimization to further improve the operations at these intersections.

4.0 Development Proposal

The subject lands cover approximately 13 ha and currently consist of agricultural land with landscaped areas and some residential units. The property, located in a mostly industrial area, is bounded by an open lot to the north, mixed residential and landscaped areas to the south and west, and Winston Churchill Boulevard to the east. Clearview Creek flows in an east-west manner to the north of the subject property.

Per the most recent Site Plan prepared by Baldassarra Architects Inc., the elements envisioned for this development include:

- Three industrial use warehouse buildings with a combined GFA of 58,078.87 m²
- Associated at-ground parking (417 spaces)
- Two (2) site accesses from Winston Churchill Boulevard (full movement access at the north end of the property and right-in-right-out access at the south end)

The Site Plan is included in Appendix I – Site Plan.

5.0 Site Generated Traffic

The proposed development will result in additional vehicles on the boundary road network that would otherwise not exist. The development will also result in additional turning movements at the intersections.

5.1 ITE Trip Generation

Site generated traffic for the proposed development was calculated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, using Land Use Category (LUC) 150 "Warehousing". The average rate was used for the peak period calculations for a conservative analysis.

Per the ITE Trip Generation Handbook, 3rd Edition, approximately 20% of the net generated site traffic generated by LUC 150 "Warehousing" during the weekday A.M. and P.M. peak hours is heavy truck traffic. The heavy truck volumes were separately calculated in Table 5.

Notably, the most recent Site Plan has a reduction of area for the industrial building square footage in comparison to the previous Site Plan. The most recent Site Plan includes a total gross floor area (GFA) of 635,919 square feet, resulting in a reduction of approximately 3,589 square feet. As such, the trip generation results presented in this report are a conservative estimate of the actual trips anticipated to be generated by the proposed development.

The site-generated trips from the proposed development are tabulated in Table 5.

Table 5: Site Generated Trips

Land Use	Parameter	Weekday A.M. Peak Hour			Weekday P.M. Peak Hour		
		In	Out	Total	In	Out	Total
Warehousing (150) 639,508.35 ft ²	ITE Generated Passenger Car Trips	66	20	86	26	70	96
	ITE Generated Heavy Vehicular Trips	17	5	22	7	18	25
	Net Generated Trips	83	25	108	33	88	121

Note: The most recent Site Plan has a lower GFA than presented.

The proposed development is expected to generate approximately 86 and 96 total two-way passenger car trips during the weekday A.M. and P.M. peak hours, respectively, and approximately 22 and 25 total two-way heavy truck trips during the weekday A.M. and P.M. peak hours, respectively.

5.2 Trip Distribution and Assignment

Vehicles entering and exiting the proposed site were distributed based on existing travel patterns. Trip distribution was applied among the study intersections. All heavy vehicular traffic was assigned to the northern site access. It was assumed that all heavy truck traffic from the site would head north on Winston Churchill Boulevard.

The site trip distribution for primary trips and heavy vehicular trips is included in Appendix J – Trip Distribution. The trips generated by the proposed development were assigned to the boundary road network as per the noted trip distribution. The total trip assignment is illustrated in Figure 9.

6.0 Site Access Review

6.1 Access Spacing

Per the Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada (TAC), dated June 2017, the recommended minimum spacing downstream and upstream of an access from a signalized intersection on arterial roads is 70 metres and 15 metres from an unsignalized intersection (Figure 8.8.2).

The Halton Region Access Management Guidelines (January 2015) state in Section 3.3 that the general spacing guidelines for full movement access are 300 to 400 meters. This spacing range is based on various factors, including posted Speed, traffic signal coordination, and storage requirements for left-turning vehicles. For right in/right out accesses, the desired spacing is 115 to 140 metres between accesses. However, a spacing of 30 metres to 60 metres can also be considered if the spacing is not conducive due to physical or economic reasons.

The subject site's northern access on Winston Churchill Boulevard is proposed to be situated approximately 620 meters south of the rail crossing and approximately 285 meters (centre to centre) from the future Orr Road Extension north of the subject site.

The proposed southern site access is located approximately 75 meters from the nearest road, Deer Run Avenue, which is only accessible to emergency vehicles and approximately 180 meters (centre to centre) from the northern access. Accordingly, both proposed accesses are sufficiently spaced from the stop-controlled intersections and the signalized intersections per guidelines stated in TAC and Halton Regions Access Management Guidelines.

6.2 Sight Line Review

The available sightlines at the proposed truck access (full-moves access to the north of the property) and the passenger vehicle access (RIRO access to the south of the property) off Winston Churchill Boulevard were measured and compared to the standards set out in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), June 2017. Sight distance was measured using the following assumptions:

- A standard driver eye height of 1.08 m for a passenger car, and
- A 4.4 m setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the Site.

Intersection sight distance is calculated using Equation 9.9.1 from the GDGCR as outlined below:

$$ISD = 0.278 * V_{major} * tg$$

Where:

ISD = Intersection Sight Distance

V major = design speed of roadway (km/h)

tg = assumed time gap for vehicles to turn from stop onto roadway (s)

Table 6 summarizes the required and available sight lines at the proposed accesses. Figure S-01 and S-02 illustrates the sight lines at the proposed truck and passenger access, respectively. It is noted only the right-turn sight distances were verified for the passenger access, as left-turns will not be permitted at the access.

Table 6: Sight Distance Analysis

Feature	Truck Access	Passenger Access
Access Type	Full-moves	Right-in/Right-out
Posted Speed Limit of Roadway	60 km/h	60 km/h
Assumed Design Speed	70 km/h	70 km/h
Critical Base Time Gap ¹	10.5 s (right-turn) ² 11.5 s (left-turn) ²	6.5 s (right turn) ³
Grade of Roadway	Less than 3%	Less than 3%
Horizontal Alignment of Roadway	Straight	Straight
Required Sight Distance ⁴	205 m (to the left) 225 m (to the right)	130 m (to the left)
Available Sight Distance (see figure)	>205 m (to the left) >225 m (to the right)	>130 m (to the left)
Minimum Sight Distances Satisfied?	Yes	Yes

Note 1: The critical time gap is the largest time gap required for the permissible movements at the access.

Note 2: The time gap is for left and right-turning combination trucks (WB 19 or WB 20) onto a two-lane highway with no median and with a grade less than 3%.

Note 3: The time gap is for right-turning vehicles onto a two-lane highway with no median and a grade less than 3%.

Note 4: Sight distance values calculated from Intersection Sight Distance equation 9.9.1 in the GDGCR.

Per the results contained in the sight distance analysis, the proposed site accesses would provide sufficient visibility to vehicles entering and exiting the site.

6.3 Access Configuration & Design

Per the Geometric Design Guide for Canadian Roads, the recommended number of driveways for a property frontage greater than 150 metres is four or more (Table 8.9.2). TAC also states that it is good to practice for industrial uses to provide separate driveways for loading and parking areas.

The property frontage for the subject site is approximately 460 metres. Given the spacing constraints and the property frontage, it is recommended that two accesses be provided. The northern access to operate as full movement access is to be utilized only by heavy vehicles entering and exiting the site. The southern access is proposed to be a right-in/right-out for passenger vehicle use only.

Per discussions with the Region of Peel and included in the Functional Design Brief submitted on September 13, 2021, the following storage and taper lengths are provided for the accesses:

Northern Site Access:

- A northbound left-turn lane with 30 metres of storage length, 66.3 metres of deceleration and 52.5 metres of taper
- A southbound right turn lane with 20 metres of storage length, 97.9 metres of taper.
- A southbound left-turn lane with 30 metres of storage length, 52.5 metres of deceleration and 52.5 metres of taper
- 20 metres of a raised median on north and south of the main access

Southern Site Access:

- A southbound right turn lane with 30 metres storage length and 60 metres of taper
- A right-in, right-out channelized island

The proposed intersection improvements on Winston Churchill Boulevard and the Northern Site Access consist of the following geometry:

- 3.75 m through lanes on Winston Churchill Boulevard (matching existing conditions)
- 3.50 m right-turn and left-turn lanes on Winston Churchill Boulevard
- 1.00 m to 2.50 m wide shoulders on Winston Churchill Boulevard

The proposed intersection improvements on Winston Churchill Boulevard and the South Site Access consist of the following geometry:

- 3.50 m right turn lane
- 5.00 m lanes for the right-in and right-out access to the south

The proposed lane configuration will be accommodated by widening Winston Churchill Boulevard on both the north and south sides, spanning from station 9+798.512 to station 10+155.038 for a total length of approximately 354 m.

A 30% Functional Design of the roadway is presented in Appendix K – Functional Design.

7.0 Total Traffic Conditions

The future total traffic volumes for the two (2) horizon years consist of the following components:

- Future Background traffic volumes from the corresponding year.
- Proposed development site generated traffic volumes.

The resulting total volumes in the horizon years 2022, 2027 and 2032 are presented in Figure 10, 11 and 12, respectively.

7.1 Intersection Operations

The results of the 2022, 2027 and 2032 future total traffic conditions are summarized in Table 7 and queuing analysis is summarized in Table 8. Detailed capacity analysis worksheets are included in Appendix L – Detailed Capacity Analysis – 2022, 2027, 2032 Future Total.

Table 7: 2022, 2027, 2032 Future Total Levels of Service

Intersection	2022 Horizon Year				2027 Horizon Year				2032 Horizon Year			
	Level of Service (Average Delay Per Vehicle(s))		V/C Ratio (Approach)		Level of Service (Average Delay Per Vehicle(s))		V/C Ratio (Approach)		Level of Service (Average Delay Per Vehicle(s))		V/C Ratio (Approach)	
	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak
Ford Drive and Royal Windsor Drive	C (33.6)	D (37.2)	0.80 (EBT)	0.82 (EBT)	C (34.9)	D (40.3)	0.82 (EBT)	0.94 (SBL)	C (37.2)	E (51.9)	0.87 (EBT)	1.52 (SBL)
Ford Drive and Cornwall Road	C (35.4)	D (31.7)	0.94 (SBL)	0.81 (EBL)	E (47.9)	D (34.6)	1.09 (SBL)	0.87 (SBL)	E (73.7)	D (41.5)	1.30 (SBL)	1.02 (SBL) 0.87 (EBL)
WCB and Royal Windsor Drive	D (39.1)	D (41.9)	0.76 (WBT)	1.00 (EBL)	D (39.8)	D (43.9)	0.80 (WBT)	1.10 (EBL)	D (43.8)	D (48.1)	0.85 (EBL)	1.22 (EBL)
WCB and Lakeshore Road East	B (12.8)	B (11.0)	0.41 (EBT)	0.26 (EBT)	B (13.0)	B (11.2)	0.45 (EBT)	0.36 (EBT)	B (13.7)	B (11.4)	0.47 (EBT)	0.31 (EBT)
WCB and Beryl Road	A (8.2)	B (10.9)	0.36 (EBL)	0.53 (EBL)	A (8.4)	B (11.7)	0.40 (EBL)	0.55 (EBL)	A (9.0)	B (12.9)	0.42 (EBL)	0.60 (EBL)
WCB at North Access	B (0.8)	B (1.9)	0.04 (EB)	0.12 (EB)	B (0.8)	B (1.9)	0.04 (EB)	0.12 (EB)	B (0.8)	B (1.9)	0.04 (EB)	0.12 (EB)
WCB at South Access	A (0.1)	A (0.1)	0.02 (EBR)	0.01 (EBR)	A (9.3)	A (9.2 s)	0.01 (EBR)	0.6 (EBR)	A (9.3)	A (9.2 s)	0.01 (EBR)	0.6 (EBR)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. The Level of Service of a Stop-Controlled intersection is based on the critical approach's delay. Exiting Signal Timings provided by Peel Region and Halton Region were used.

Note 2: All v/c ratios greater than 0.85 are highlighted.

Note 3: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM2000).

Note 4: The critical v/c ratio for a stop-controlled intersection is considered to be the maximum v/c ratio for movements at the intersection.

Table 8: 2022, 2027, 2032 Future Total Queue Analysis

Intersection	95 th %ile Queue Length > Storage Length					
	2022 Horizon Year		2027 Horizon Year		2032 Horizon Year	
	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak	A.M. Peak	P.M. Peak
Ford Drive and Royal Windsor Drive	None	90 m (SBL)	90 m (SBL)	115 m (SBL)	120 m (SBL)	60 m (NBL) 130 m (SBL)
Ford Drive and Cornwall Road	215 m (SBL)	155 m (SBL)	255 m (SBL)	180 m (SBL)	305 m (SBL)	205 m (SBL)
WCB and Royal Windsor Drive	None	110 m (EBL)	None	120 m (EBL)	65 m (EBL) 45 m (WBL)	150 m (EBL) 50 m (WBL)
WCB and Lakeshore Road East	None					
WCB and Beryl Road	None					
WCB at North Access	None					
WCB at South Access	None					

With respect to future background traffic conditions, the intersection of Ford Drive and Royal Windsor Drive is expected to operate with Level of Service "D" or better during the 2022 and 2027 horizon years, and with Level of Service "E" during the P.M. peak period for the 2032 horizon year. In the 2027 horizon year, the southbound left-turn movement exceeds capacity during the A.M. peak period, and is forecasted to near capacity during the P.M. peak period. For the 2032 horizon year, the southbound left-turn movement exceeds capacity for both peak periods, and the eastbound left-turn movement is expected to near capacity. Queue analysis indicates the 95th percentile queue is expected to exceed the available storage length for the southbound left-turn movement during all peak periods for all horizon years.

Under future background traffic conditions, the intersection of Ford Drive and Cornwall Road is expected to operate with a Level of Service "D" or better for the 2022 horizon year, and Level of Service "E" or better for the 2027 and 2032 horizon year. The southbound left-turn movement is expected to near capacity in the 2022 horizon year during the A.M. peak hour. This movement is expected to exceed capacity during the 2027 horizon year during the A.M. peak hour, and nears capacity during the P.M. peak hour. By the 2032 horizon year, the southbound left-turn movement is expected to exceed capacity during both the A.M. and P.M. peak hours. 95th percentile queues were observed at this intersection, and it is noted that the 95th percentile queues for the southbound left-turn movement are expected to exceed the available storage length during the P.M. period in the 2022 horizon year. The 95th percentile queues are expected to exceed storage length during both the A.M. and P.M. peak periods for the 2027 and 2032 horizon years for the southbound left-turn movement.

The intersection of WCB and Royal Windsor Drive is forecasted to operate with a Level of Service "D" or better during the 2022 horizon year, and with a Level of Service "E" or better during the 2027 and 2032 horizon year under future background traffic conditions. The intersection is forecasted to exceed capacity for the eastbound left-turn movement during the P.M. peak period for all horizon years. The 95th percentile queues were also observed for all movements at the intersection; the 95th percentile queue is expected to be exceeded for the eastbound left-turn movement for all horizon years during the P.M. peak period, and during the A.M. peak period only for the 2032 horizon year.

Additionally, the eastbound left-turn movement was also observed to have 95th percentile queues exceeding the available storage during the 2032 A.M. and P.M. peak period. It is of note, in most average cases (represented by the 50th percentile queue), the available storage length would accommodate queues for the eastbound left-turn movement.

The intersections of WCB and Beryl Road as well as the intersection of Lakeshore Road East and WCB are expected to operate with a Level of Service "B" or better and well under capacity for all movements under future background traffic conditions for all horizon years and peak periods. The storage lengths provided at these intersections are anticipated to sufficiently accommodate queues for all approaches.

It is recommended that the Town of Oakville monitor the intersections of WCB and Royal Windsor, Ford Drive and Royal Windsor Drive, as well as Ford Drive and Cornwall Road for signal optimization to further improve the operations at these intersections.

8.0 Summary

In comparing the future background and future total traffic conditions within the surrounding road network of the proposed site, it is noted there are no significant differences with respect to delays and volume-to-capacity ratios observed. As such, it is concluded that the proposed development does not materially impact the operations of the surrounding road network.

However, it is noted that the intersection of Ford Drive and Cornwall Road as well as the intersection of Ford Drive and Royal Windsor Drive have capacity concerns in relation to the southbound left-turn movement under both future background and future total traffic conditions.

The southbound left turn movement did not have a dedicated phase in the signal timing plan for these intersections, and as such, the capacity concerns are likely attributed to the lack of a southbound left-turn phase. Notably, these concerns were observed for both the future background and future total traffic scenarios, and as such, the site-generated traffic is unlikely to be causing these concerns. Nonetheless, the recommendations made for this intersection, outlined in the next section, include the addition of southbound left-turn phases that alleviate these concerns.

9.0 Recommendations

In consideration of the capacity and operational issues identified in the analysis of existing, future background and future total conditions within the road network of study, a variety of mitigation measures are proposed to reduce delays and improve capacity issues. These recommendations were modelled for the most critical scenario – the 2032 Future Total traffic condition, and the comparison of results are provided in Table 9 and 10. Appendix M – Detailed Capacity Analysis – Signal Optimization includes the details of the signal timing adjustments as well as the results of the analysis.

9.1 A.M. Peak Period

For the A.M. peak period at the intersection of Ford Drive and Cornwall Road, the following measures are recommended:

- Addition of a southbound left-turn phase. The scenario presented in Table 8 used the timing for the eastbound left-turn phase.
- As a result of the additional phase, the cycle length increases from 130.0 seconds to 140.0 seconds.
- Signal timing optimization is also recommended at the intersection.
- Notably, as part of the signal timing optimization performed, the walk symbol for pedestrians was reduced from 7.0 seconds to 4.0 seconds. The “flash don’t walk” time remains unchanged.

Table 9: Optimization Results (A.M. Peak)

Intersection	2032 Future Total Not Optimized		2032 Future Total Optimized	
	Level of Service (Average Delay Per Vehicle(s))	Max V/C Ratio (Approach) > 0.85	Level of Service (Average Delay Per Vehicle(s))	Max V/C Ratio (Approach) > 0.85
	A.M. Peak	A.M. Peak	A.M. Peak	A.M. Peak
Ford Drive and Royal Windsor Drive	C (37.2)	0.87 (EBT)	No recommendation.	
Ford Drive and Cornwall Road	E (73.7)	1.30 (SBL)	D (44.5)	0.96 (SBL)
WCB and Royal Windsor Drive	D (43.8)	0.85 (EBL)	No recommendation.	
WCB and Lakeshore Road East	B (13.7)	0.47 (EBT)	No recommendation.	
WCB and Beryl Road	A (9.0)	0.42 (EBL)	No recommendation.	

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. Existing Signal Timings provided by Peel Region and Halton Region were used.

Note 2: All v/c ratios greater than 0.85 are highlighted.

Per the results presented in Table 8, signal timing optimizations were conducted for the intersection of Ford Drive and Cornwall Road due to operational and capacity concerns identified in the 2032 horizon year during the A.M. peak period. The optimizations would reduce the anticipated delays by 29.2 seconds bringing forecasted operations at the intersection from a Level of Service "E" to "D". Furthermore, the volume to capacity ratio is reduced from 1.30 to 0.96 following the optimizations, mitigating the capacity concerns at the intersection.

9.2 P.M. Peak Period

For the P.M. peak period signal timing, the following changes are recommended at the intersection of Ford Drive and Cornwall Road:

- Addition of a southbound left-turn phase. The scenario presented in Table 9 used the timing for the eastbound left-turn phase.
- As a result of the additional phase, the cycle length increases from 130.0 seconds to 140.0 seconds.
- Signal timing optimization is also recommended at the intersection.
- Notably, as part of the signal timing optimization performed, the walk symbol for pedestrians was reduced from 7.0 seconds to 4.0 seconds. The "flash don't walk" time remains unchanged.

The following changes are recommended at the intersection of Ford Drive and Royal Windsor Drive:

- Addition of a southbound left-turn phase. The scenario presented in Table 9 used the timing for the eastbound left-turn phase.

- As a result of the additional phase, the cycle length increases from 130.0 seconds to 140.0 seconds.

At the intersection of WCB and Royal Windsor Drive, signal optimization for splits is recommended with no adjustment to the cycle length.

Table 10: Optimization Results (P.M. Peak)

Intersection	2032 Future Total Not Optimized		2032 Future Total Optimized	
	Level of Service (Average Delay Per Vehicle(s))	Max V/C Ratio (Approach) > 0.85	Level of Service (Average Delay Per Vehicle(s))	Max V/C Ratio (Approach) > 0.85
	P.M. Peak	P.M. Peak	P.M. Peak	P.M. Peak
Ford Drive and Royal Windsor Drive	E (51.9)	1.52 (SBL)	D (48.7)	0.87 (SBL) 0.89 (WBL) 0.93 (EBT)
Ford Drive and Cornwall Road	D (41.5)	1.02 (SBL) 0.87 (EBL)	D (44.9)	0.81 (SBL) 0.93 (EBL)
WCB and Royal Windsor Drive	D (45.2)	1.22 (EBL)	C (30.9)	0.83 (EBL)
WCB and Lakeshore Road East	B (11.4)	0.31 (EBT)	No recommendation.	
WCB and Beryl Road	B (12.9)	0.60 (EBL)	No recommendation.	

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. Existing Signal Timings provided by Peel Region and Halton Region were used.

Note 2: All v/c ratios greater than 0.85 are highlighted.

Per the results presented in Table 9, signal timing optimizations were conducted for the intersection of Ford Drive and Cornwall Road due to operational and capacity concerns identified in the 2032 horizon year during the P.M. peak period. The volume to capacity ratio for the southbound left-turn movement would be reduced from 1.02 to 0.81 post-optimization, reducing the concern for the movement operating above capacity.

The signal timing optimizations at Ford Drive and Royal Windsor Drive reduced the delay anticipated at the intersection by 3.2 seconds, improving the expected Level of Service from "E" to "D". The southbound left-turn movement operating well above capacity was improved to be operating with a volume-to-capacity ratio of 0.81 post-optimization.

For the intersection of WCB and Royal Windsor Drive, the signal timing optimizations are expected to reduce delays for the 2032 P.M. peak period by 14.3 seconds, improving the expected Level of Service from "D" to "C". The over-capacity eastbound left-turn movement was improved with a volume-to-capacity ratio of 0.83 post-optimization.

9.3 Signal Warrants

Per comments from the previous Traffic Impact Study submission, signal warrant analysis was conducted for the proposed north full-movement access to the site. The signal warrant for the proposed access intersection for the 2032 horizon year was conducted in accordance with the methods set out in the Ontario Traffic Manual, Book 12 (Justification 7).

The results are included in Appendix N – Signal Warrants.

Per the warrants conducted, signalization would not be warranted for the 2032 horizon year for the proposed north site access. This is reasonable considering the minimal delays expected for the proposed site access.

9.4 Roadway Improvements

As outlined previously, geometric roadway improvements are proposed for the northern and southern site accesses to support the proposed development. A 30% Functional Design including the Design Brief submitted to Peel Region and Halton Region on September 13, 2021 is included in Appendix K – Functional Design and Brief. The details of the roadway design is re-iterated below:

Northern Site Access:

- Northbound left-turn lane with 30 metres of storage length, 66.3 metres of deceleration and 52.5 metres of taper.
- Northbound right turn lane with 20 metres of storage length, 97.9 metres of taper.
- Outhbound left-turn lane with 30 metres of storage length, 52.5 metres of deceleration and 52.5 metres of taper.
- 20 metres of a raised median on the north and south of the main access.

Southern Site Access:

- Southbound right turn lane with 30 metres storage length and 60 metres of taper.
- Right-in, right-out channelized island.

The proposed intersection improvements on Winston Churchill Boulevard and the Northern Site Access consist of the following geometry:

- 3.75 m through lanes on Winston Churchill Boulevard (matching existing conditions)
- 3.50 m right-turn and left-turn lanes on Winston Churchill Boulevard
- 1.00 m to 2.50 m wide shoulders on Winston Churchill Boulevard

The proposed intersection improvements on Winston Churchill Boulevard and the South Site Access consist of the following geometry:

- 3.50 m right-turn lane
- 5.00 m lanes for the right-in and right-out access to the south

10.0 Parking Review

This section discusses the parking requirements per the Town of Oakville Zoning By-Law (ZBA) and compares the forecasted peak parking demand based on standard analysis criteria.

10.1 Zoning By-Law Parking Requirements

Table 5.2.1 of the Town of Oakville Zoning By-Law 2014-014 was used to calculate the number of parking spaces required for the proposed development. The "Warehousing" parking rate was used to calculate the required parking for the proposed development.

Table 11 summarizes the Town of Oakville Zoning By-Law parking requirements for the proposed development.

Table 11: Parking Requirements

Use		Parking Requirements	Parking Required	Total Parking Provided
Warehouse	Building 'A' 16, 205.91 m ²	1/100m ² for first 7500 m ² plus 1 /200m ² for remaining space	119	407 Parking Spaces
	Building 'B' 12,790.65 m ²		101	
	Building 'C' 30, 082.31 m ²		187	

As outlined in Table 10, the proposed development meets the Zoning By-Law for the Town of Oakville. A total of 410 parking spaces are required for the entire development. The Site Plan proposes a collective total of 407 parking spaces, resulting in a parking surplus of 3 parking spaces based on the Town of Oakville Zoning By-Law requirements.

11.0 On-Site Circulation Review

An AutoTURN analysis was undertaken to confirm the turning radii and that a WB-20 truck, and passenger car, heavy single unit truck, emergency vehicle and waste vehicle can manoeuvre throughout the site. Figure TT-01/A, TT-02/A, and TT-03/A, TT-04/A, and TT-05/A illustrate the manoeuvres of a WB-20 truck, Fire Truck, Halton Waste Vehicle, Heavy Single Unit Truck (HSU), and a passenger vehicle through the site, respectively.

It is noted that no encroachments have been identified for any of the above noted design vehicles. However, it should be noted that a WB-20 design vehicle is unable maneuver the first three loading spaces from the northwest of Building B. Therefore, these three loading spaces would need to be restricted for smaller heavy vehicles (HSU) only.

12.0 Transportation Demand Management

12.1 Existing Modal Split

Transportation Tomorrow Survey data was used to determine the existing modal split for trips entering the study area. Results were filtered to auto trips entering Zones "4021" and "4023" for the purposes of "work" during the weekday A.M. and P.M. peak period. From this query, trip origins were determined, and percentage of trips assigned from each origin was accounted for.

The existing modal split is outlined in Table 12.

Table 12: Modal Split

Mode	Percentage
Transit	2%
Cycling	0%
Auto Driver	79%
Auto Passenger	11%
Walking	2%

Approximately 79% of trips traveling to Halton during the A.M. and P.M. peak hours for the purposes of work are made by auto drivers, with an additional 11% of trips made by auto passengers. These percentages indicate that there is a heavy reliance on automobile travel in the study area, which is expected given the environment of the study area and the limited active transportation services and infrastructure in the study area. Appendix O – TTS Results contains the TTS data.

12.2 Existing Transit

As previously mentioned, MiWay Transit Route 14 is available in the study area and provides reasonable access to transit within the vicinity of the proposed development. Access to transit may reduce the passenger trips since employees may use available bus services to enter or exit the site as opposed to using a vehicle, thus resulting in lower parking demand. Relevant map excerpts can be found in Appendix B.

12.3 Smart Commute

Smart Commute is a non-profit Transportation Management Association (TMA) committed to reducing traffic congestion, improving air quality, and acting on climate change. Smart Commute incorporates the immediate study area. Smart Commute works with many businesses in the Town of Oakville by providing resources and tools which allow commuters to consider transportation alternatives.

More specifically, the following Transportation Demand Strategies are provided by Smart Commute and have been historically shown to reduce single-occupant vehicle (SOV) trips to and from industrial developments similar to the proposed development.

- a. Carpooling: Smart Commute promotes carpooling as a viable transportation mode choice. A new online tool called "SmartTripsON" is in the works, which will help commuters find and share carpool trips. Employers can also set up their networks to assist their staff in finding carpool partners. Additionally, Smart Commute highlights carpooling benefits, such as cost savings, benefits to the environment, and stress reduction.
- b. Cycling and Walking: Smart Commute encourages increased walking and cycling by offering an online tool where users can set goals and track active commuting habits and calories burned. Members can also earn rewards for walking and cycling to work.
- c. Emergency Ride Home: Employees working for businesses that participate in the Smart Commute Program are eligible for reimbursements for an emergency ride home (ERH). In unexpected circumstances that require employees to get home immediately, employees can request a reimbursement of up to \$75 for emergency transportation costs.

Smart Commute also promotes initiatives such as flexible working hours and telework. However, given the proposed development's warehousing and distribution focus, employees would traditionally be required to work at the site and between scheduled shifts physically.

The Smart Commute Program is utilized citywide by many employers and organizations and will reduce SOV trips generated by the proposed development.

12.4 TDM Opportunities

12.4.1 Transit Proximity

There are limited transit services available in the area. The Oakville Transit Route 11 and 4 is available within proximity of the subject site. Relevant map excerpts are provided in Appendix B.

12.4.2 Participation with Smart Commute

As part of its management role as landlord for the building, the owner will encourage the tenants to participate in the Smart Commute Program to provide the benefits of Smart Commute Program to future tenants of warehouse building and provide the respective provisions to support the alternate modes of transportation.

12.4.3 Education and Incentives

There are opportunities for the implementation of "soft" TDM measures. For example, employers can provide information on available TDM opportunities and information on Smart Commute to educate employees of alternate modes of transportation. This promoted awareness of TDM opportunities can encourage the use of alternate modes of transportation and reduce SOV trips to and from the site.

The provision of trail, cycling and transit maps will increase awareness of nearby pedestrian, cycling and transit routes and provide incentive for employees to utilize the existing network. Employees can be informed of the active transportation options at the proposed development.

The applicant, as owner of the proposed development, is willing to provide this information and more as part of a tenant welcome package, for tenants to pass on to their employees.

12.4.4 The Future of Warehousing

Warehousing and distribution facilities are changing rapidly. The introduction of robotics, artificial intelligence, and autonomous vehicles will reduce demand for parking at these facilities over time, and certainly within the lifespan of this building.

12.5 TDM Trip Generation Reductions

The implementation of the recommended TDM measures would encourage the use of alternate modes transportation and, as a result, reduce single-occupancy vehicle trips to and from the site. Various literature studies were reviewed to document reductions experienced by other transportation agencies to quantify trip generation reductions.

The trip reduction percentages for each individual recommended TDM measure were multiplied together to form a combined trip reduction range applied to the total two-way trip generation during the weekday A.M. and P.M. peak hours.

Table 13 outlines trip generation reductions from TDM measures as recommended for the proposed development.

Table 13: TDM Potential Trip Reductions

TDM Measure	Trip Reductions (%)	Trip Reduction		Source
		Weekday A.M. Peak (151 two-way trips)	Weekday P.M. Peak (101 two-way trips)	
Pedestrian Network Improvements	0% - 2%	0 - 1	0 - 1	CAPCOA ¹
Preferential Parking for Carpooling	0.5% - 1%	1 - 1	1 - 1	DeIDOT ²
Emergency Ride Home	0% - 1%	0 - 1	0 - 1	Berkeley ³
Promotion and Marketing	0.8% - 4%	1 - 2	1 - 1	CAPCOA ¹
Total Possible Trip Reductions:	1.3% - 8.0%	2 - 5	2 - 4	---

1. California Air Pollution Control Officers Association (2010). Quantifying GHG Mitigation Measures.

2. Delaware Department of Transportation and Wilmington Area Planning Commission, Trip Reduction/Transportation Demand Management (TDM) Measures Selection Form.

3. Wilbur Smith Associates (2008). West Berkeley Circulation Master Plan.

As outlined above, implementing the potential TDM measures outlined in this report could reduce the total number of two-way SOV trips between 2 to 7 trips during the weekday A.M. peak hour and between 2 to 8 trips weekday P.M. peak hour.

13.0 Conclusions and Recommendations

The findings and recommendations of our analysis are summarized as the following:

- The eastbound left-turn movement at Winston Churchill Boulevard (WCB) operates at capacity during the P.M. peak hours under 2021 existing conditions. All other movements operate with acceptable Levels of Service and under capacity.
- Capacity concerns were identified at several intersections with respect to future background traffic conditions, which carried on to future total traffic conditions.
- It is noted, the addition of site-generated traffic did not significantly impact operations at the study intersections in comparison to anticipated operations during future background traffic conditions for all horizon years and peak periods.
- Mitigation measures including signal timing optimization, phase changes and cycle length changes were recommended to mitigate capacity concerns for the most critical traffic conditions (i.e. 2032 future total traffic conditions). It is recommended that the Town and Regions continue to monitor the signal timing plans at critical intersections to determine if and when changes are warranted.
- The north and south site accesses are expected to operate with acceptable Levels of Service and under capacity for all horizon years and peak period. Furthermore, the proposed site accesses meet guidelines set out in the TAC and Halton Region Access Management Guidelines.
- The 30% functional design for the proposed north and south accesses have also been included within this submission.
- It is also recommended that the proposed northern site access be approved as a full movement stop-controlled access and the southern site access as a right-in left-out.
- The proposed total supply of 417 parking spaces exceeds the minimum requirement of 410 parking spaces for warehouses per Town of Oakville's By-Law 2014-014.
- Implementation of the recommended TDM measures may reduce single occupant vehicle (SOV) trips between 2 to 7 trips for the A.M. peak hour, and between 2 to 8 trips during the P.M. peak hour.

We trust that this review satisfies any access and transportation concerns associated with the proposed development. Please feel free to contact the undersigned for any further information required.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.



Farah Tasnim Choudhury, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.



Brandon Bradt, M.Eng.CEM, P.Eng
Project Manager, Transportation

C.F. CROZIER & ASSOCIATES INC.



Aaron Wignall
Associate, Transportation

FC/cj

I:\700\756-Blackwood Partners Inc\5105-560 Winston Churchill Blvd\Reports\Traffic\2022.06.17_ (0756-5105)_560 WCB TIS
Update_Final.docx

Appendix A

Agency Correspondence

Farah Choudhury

From: Aquisha Khan <aquisha.khan@oakville.ca>
Sent: Tuesday, August 24, 2021 11:44 PM
To: Farah Choudhury
Cc: Aaron Wignall
Subject: RE: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

Hello Farah/Aaron;

Please see my feedback as follows:

Study Methodology for the Transportation Impact Study

Study intersections should include the following:

- Royal Windsor Drive and Ford Drive

Traffic Counts

The undertaking of 2021 traffic count volumes and applying a growth rate of 2% to the existing 2021 is acceptable.

Additional Background Developments

- 772 Winston Churchill Blvd (Reference No. 1601.029)
- 2400 Cornwall Road (Reference No. 1602.013)
- 2395 Cornwall Road (Reference No. TBD)

Analysis Periods and Scenarios

Please confirm when full build-out is anticipated and provide weekday AM & PM peak period analysis it as well as for 5-year and 10-year horizon periods post buildout.

Regards

Aquisha

From: Farah Choudhury <fchoudhury@cfcrozier.ca>
Sent: August 24, 2021 12:21 PM
To: Aquisha Khan <aquisha.khan@oakville.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>
Subject: RE: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

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Hi Aquisha,

No worries, I'll be looking forward to your email. Let me know if I may provide any additional information in the meantime!

Thanks,

Farah

Farah Choudhury | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026



Crozier Connections: [f](#) [t](#) [in](#)

Read our latest news and announcements [here](#).

From: Aquisha Khan <aquisha.khan@oakville.ca>
Sent: Monday, August 23, 2021 8:44 AM
To: Farah Choudhury <fchoudhury@cfcrozier.ca>
Subject: RE: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

Hi Farrah,

Sorry I missed this one. Please allow me a day to review and respond.

Thanks

Aquisha

Sent from my Galaxy

----- Original message -----

From: Farah Choudhury <fchoudhury@cfcrozier.ca>
Date: 2021-08-23 8:40 a.m. (GMT-05:00)
To: Aquisha Khan <aquisha.khan@oakville.ca>, Martin Maguire <martin.maguire@oakville.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>, "Steiger, Bernie" <Bernie.Steiger@halton.ca>, "Pasquini-Smith, Alexandria" <Alex.Pasquini-Smith@halton.ca>, Hashim Ali Hamdani <hashimali.hamdani@peelregion.ca>, Matt Krusto <matt.krusto@halton.ca>, "Barnes, Catherine" <catherine.barnes@peelregion.ca>
Subject: RE: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

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Hello Aquisha,

I hope you had a great weekend! I was looking to ask whether the Town was able to comment on the Terms of Reference included below, and if there were any concerns the Town has beyond the comments made by Peel and Halton Region.

Thanks,

Farah

Farah Choudhury | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026



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From: Farah Choudhury
Sent: Thursday, August 19, 2021 12:20 PM
To: Krusto, Matt <Matt.Krusto@halton.ca>; 'Barnes, Catherine' <catherine.barnes@peelregion.ca>
Cc: Aaron Wignall <awignall@cfcrozier.ca>; Steiger, Bernie <Bernie.Steiger@halton.ca>; Pasquini-Smith, Alessandria <Alex.Pasquini-Smith@halton.ca>; Hashim Ali Hamdani <hashimali.hamdani@peelregion.ca>; 'aquisha.khan@oakville.ca' <aquisha.khan@oakville.ca>; 'martin.maguire@oakville.ca' <martin.maguire@oakville.ca>
Subject: RE: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

Hello Matt and Catherine,

Thank you both very much for your comments and will definitely address these moving forward with the submission.

Please do not hesitate to let me know if you had further comments or concerns. Hope you both have a great rest of your week!

Kind regards,

Farah

From: Krusto, Matt <Matt.Krusto@halton.ca>
Sent: Thursday, August 19, 2021 9:51 AM
To: Farah Choudhury <fchoudhury@cfcrozier.ca>

Cc: Aaron Wignall <awignall@cfcrozier.ca>; Steiger, Bernie <Bernie.Steiger@halton.ca>; Pasquini-Smith, Alexandria <Alex.Pasquini-Smith@halton.ca>; 'Barnes, Catherine' <catherine.barnes@peelregion.ca>; Hashim Ali Hamdani <hashimali.hamdani@peelregion.ca>; 'aquisha.khan@oakville.ca' <aquisha.khan@oakville.ca>; 'martin.maguire@oakville.ca' <martin.maguire@oakville.ca>

Subject: RE: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

Hi Farah,

Further to the Region of Peel's comments, please find Halton Region's comments:

Halton Transportation Planning Comments:

Further to your comment "*We will be using all other assumptions (Horizon Years, Analysis Periods, Trip Generation and Distribution, Background Developments, Analysis Methods) that were used in the previous TIS for consistency.*" Please note that all assumptions need to be re-stated as part of the updated terms of reference.

The request to use the 2% growth factor due to Covid is acceptable to Halton and as stated, is acceptable to Peel Region..

A functional design plan for the site accesses, with preliminary road improvements and design features, must be provided as part 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 772 Winston Churchill Boulevard. This corridor review must also include all existing accesses on both sides of Winston Churchill Boulevard.

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 (in relation to the proposed 772 WCBld full movement access).

Other standard terms of reference comments to be reviewed are:

The TIS report will include:

- *Site Plan and Map,*
- *Size & Number of Development Phases,*
- *Existing Conditions (Study Area Intersections, Road Network, Pedestrian Routes, Cycling Routes, Transit Services),*
- *Existing Traffic Conditions (Site Operating Characteristics, Data Collection/Traffic Counts, Analysis Periods (5 years Ahead),*
- *Future Background Conditions (Horizon Years, Horizon Year Volumes)*
- *Background Traffic Demand (with TMC's < 2 years old),*
- *Background Traffic Demand Forecast (with acceptable growth rates)*
- *Site Generated Traffic (Transit Modal Split, Trip Generation/Distribution/Assignment)*
- *Future Total Traffic Demand,*
- *Capacity Analysis (by Intersection, with LOS, Avg. Delay, V/C ratios),*
- *Traffic Impacts (Tables – Total Traffic with/without Mitigation)*
- *Access Considerations – Existing, Proposed, Geometrics (turn lanes, sight lines),*
- *Recommendations - Identify required/recommended road improvements either as a result of the development impacts, or general non-development improvements.*
- *TDM recommendations (Transit, Pedestrian & Cycling Facilities Analysis)*
- *Conclusions*

Data Requests:

For the traffic volume counts and traffic signal timing (from Halton Region), information can be requested from our Road Operations group at trafficdatarequests@halton.ca.

Mode Splits:

Mode split assumptions require assumptions to reasonable percentages based on current year (2021), + horizon years in the Study, and must be based on existing facilities and service in the area to date (planned &/or proposed). Reasonable assumptions and rationale must be clearly outlined in the Study.

The Background Developments must be confirmed and approved by the Town of Oakville and Region of Peel.

Previous site plan comments (May 2021) must also be reviewed as part of the updated TIS. These included:

Access:

-The North site access is proposed as a full movement stop controlled entrance, and the South site access as a right-in/right-out.

-Spacing between the north and south accesses is approximately 185m and sight lines are good at both accesses.

-The north access is +500m from the rail crossing to the north.

-It is not clear from the drawings how the proposed North access will align with what is existing on the east side. Therefore, the North access location is subject to change, should it not safely align with any existing east side access. All existing east side driveways must be accurately shown on the site plan.

-Additional and more detailed access features will be commented on further with through additional site plan submissions and an Engineering Submission.

-Truck turning templates should be provided for all accesses and incorporate all turning movements.

-The proposed development is expected to generate approximately 86 and 96 total two-way passenger car trips during the weekday a.m. and p.m. peak hours, respectively, and approximately 22 and 25 total two-way heavy truck trips during the weekday a.m. and p.m. peak hours, respectively.

-The unsignalized intersection of Winston Churchill Boulevard at the North Site Access is anticipated to operate with a level of service "B" during the weekday a.m. and "C" during the weekday p.m. peak period. The un-signalized intersection of Winston Churchill Boulevard at the South Site Access is anticipated to operate with Level of Service "B" during the weekday a.m. and "A" during weekday p.m. peak periods.

-The North entrance to Winston Churchill Boulevard, due to the rural area and operating speeds of the roadway, will require a northbound left-turn lane and southbound right-turn taper lane, and a Servicing Agreement through Peel Region. These road improvements are shown on the proposed site plan.

Let me know if there are any questions.

Matt

Matt Krusto

Supervisor, Transportation Development Review

Infrastructure Planning & Policy

Public Works

Halton Region

905-825-6000, ext. 7225 | 1-866-442-5866



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From: Barnes, Catherine <catherine.barnes@peelregion.ca>

Sent: Thursday, August 19, 2021 9:18 AM

To: Farah Choudhury <fchoudhury@cfcrozier.ca>; Hamdani, Hashim <hashimali.hamdani@peelregion.ca>; Krusto, Matt <Matt.Krusto@halton.ca>; asad.yousfani@oakville.ca

Cc: Aaron Wignall <awignall@cfcrozier.ca>

Subject: RE: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

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Hi Farah,

Sorry for the delayed response, the Region is in support of the revised scope to include the additional intersections due to nearby developments. And using a growth factor, as counts during Covid are not reflective of the normal environment.

Thank you,

Catherine Barnes

Region of Peel

Technical Analyst

Traffic Development & Permits

10 Peel Centre Drive Suite B, 4th Floor

Brampton, ON L6T 4B9

During this Health Emergency please contact me via email as I am out of the office working remotely.



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the email. Thank you.

From: Farah Choudhury <fchoudhury@cfcrozier.ca>

Sent: July 30, 2021 3:54 PM

To: Hamdani, Hashim <hashimali.hamdani@peelregion.ca>; Barnes, Catherine <catherine.barnes@peelregion.ca>; Matt Krusto <matt.krusto@halton.ca>; asad.yousfani@oakville.ca

Cc: Aaron Wignall <awignall@cfcrozier.ca>

Subject: Revised Scope of TIS CFC#0756-5105 (560 Winston Churchill)

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Hello,

Crozier has been retained to prepare a Traffic Impact Study for an industrial development located at 560 Winston Churchill Boulevard in the Town of Oakville, Halton Region. A TIS has been previously submitted for the proposed development, with the most recent update in March 2021. After receiving additional information on nearby developments, a revised scope of study is proposed moving forward with this development. As such, we are kindly requesting you review the changes to the scope of study and provide comments.

Revisions to Study Methodology

The following intersections were originally analyzed as part of the scope of study:

- Royal Windsor Drive at Winston Churchill Boulevard
- Lakeshore Road at Winston Churchill Boulevard

The revised scope of study would include the following intersections:

- Winston Churchill Boulevard and Beryl Road
- Ford Drive and Cornwall Road
- **Royal Windsor Drive and Cornwall Road (does not intersect)**

Additionally, we are looking to collect counts at the above noted intersections, including the previously analyzed intersections. Due to the impact of the ongoing global COVID-19 pandemic, travel patterns are not reflective of typical commuter patterns. As such, we are proposing to apply a 2% factor to existing counts to reflect the impact of COVID.

We will be using all other assumptions (Horizon Years, Analysis Periods, Trip Generation and Distribution, Background Developments, Analysis Methods) that were used in the previous TIS for consistency.

Please inform us whether the adjustments to the intersections of study are acceptable with the application of a growth factor, and if any revisions to the previous TIS assumptions are required.

Should you have any questions or require any further information, please feel free to contact myself or Aaron Wignall.

Kind regards,

Farah Choudhury

Farah Choudhury | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026



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Aquisha Khan, P. Eng.
Transportation Engineer
Transportation and Engineering
Town of Oakville | 905-845-6601, | www.oakville.ca

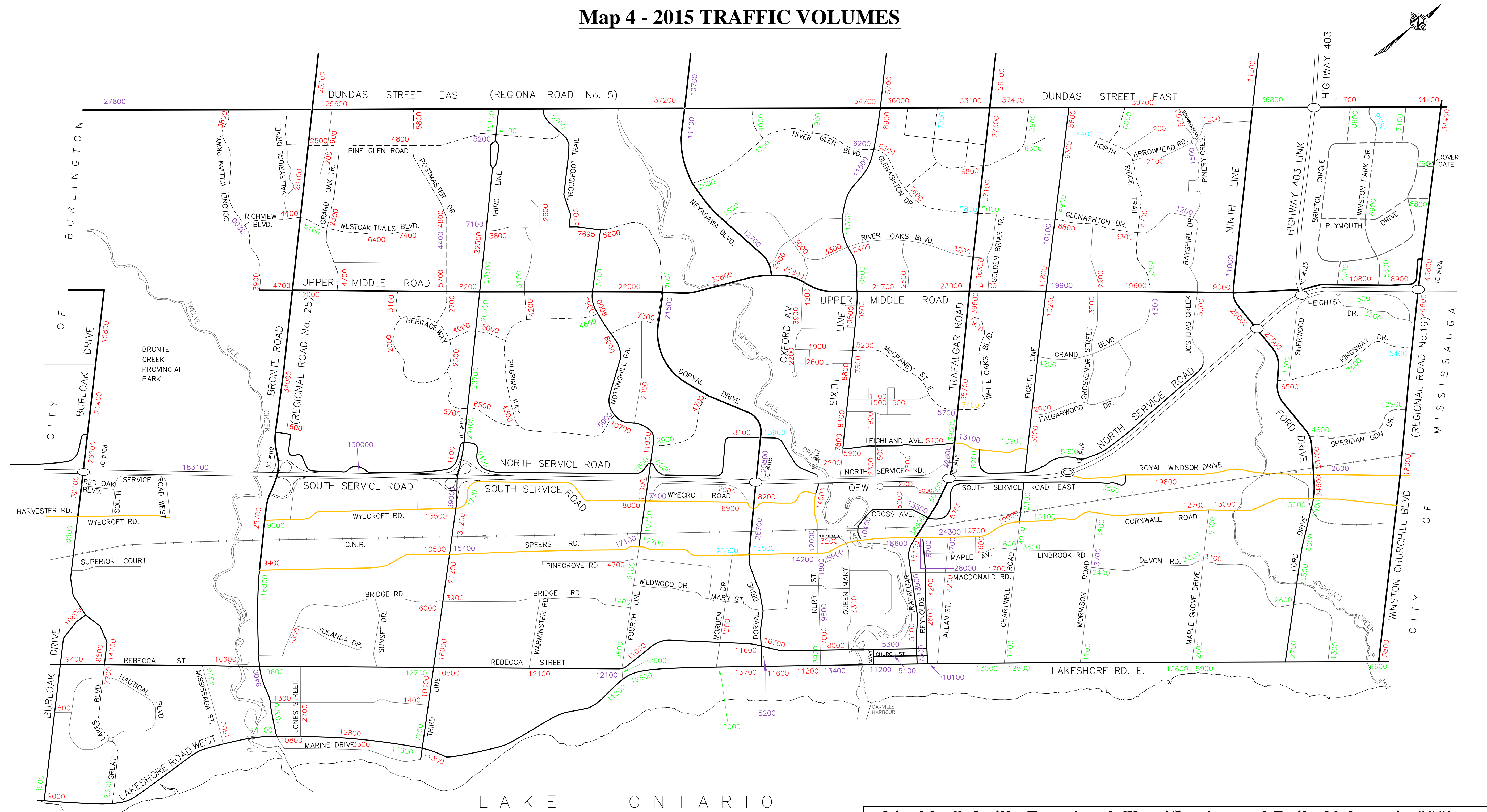
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Appendix B

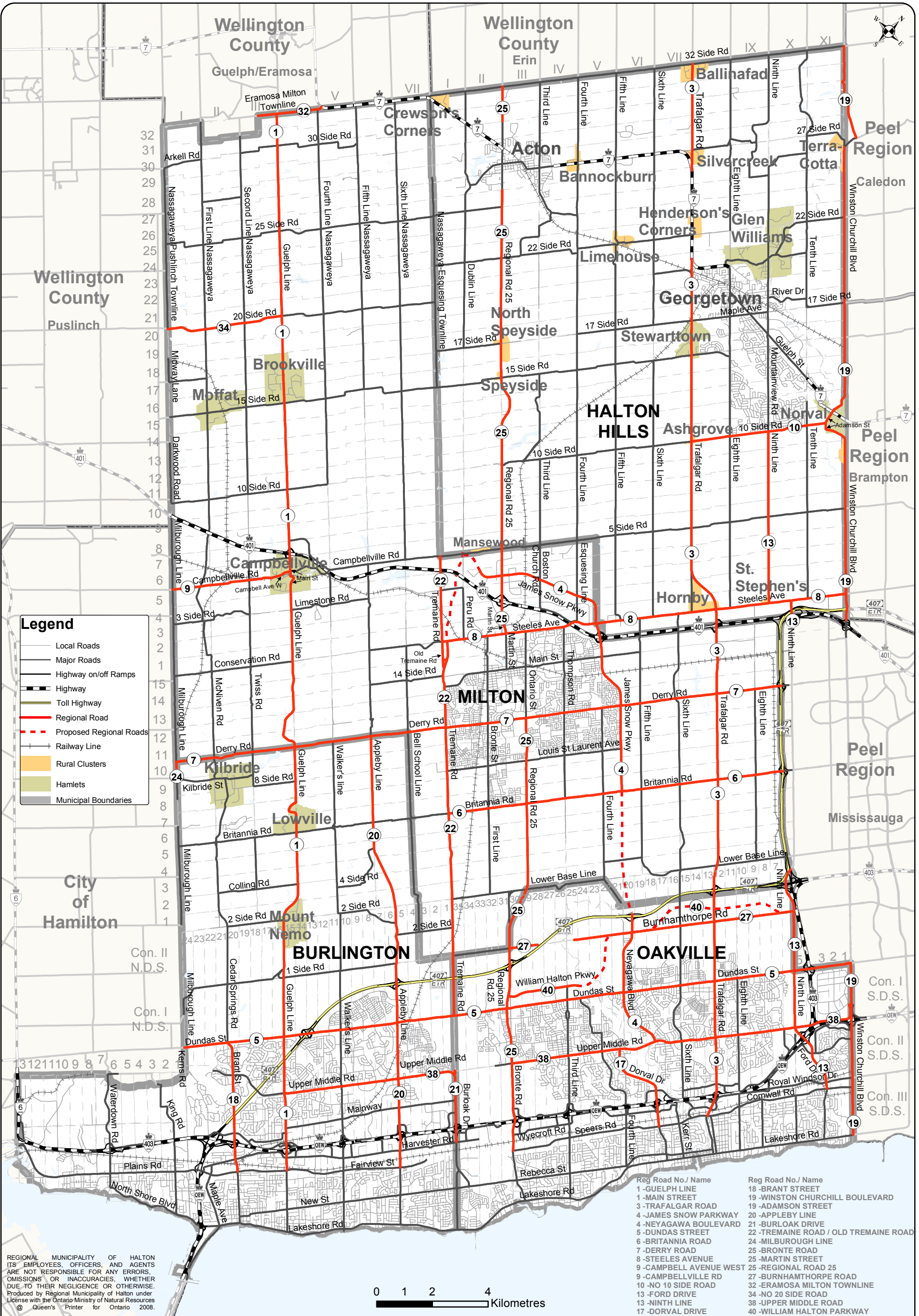
Town of Oakville, Halton Region and Peel Region Official Plans,
Transit Plans, and By-Law Excerpts

Map 4 - 2015 TRAFFIC VOLUMES



LEGEND				
2014 Volumes	2013 Volumes	2012 Volumes	2011 Volumes	2010 Volumes
Please Note: All Volumes Are Rounded to the Nearest 100.				

Livable Oakville Functional Classification and Daily Volume in 000's					
Road Class	Typical Maximum		Road Class	Typical Maximum	
Major Arterials	40-60	—————	Industrial Arterials	15	-----
Multi-purpose Arterials	20-40	—————	Major Collectors	10	-----
Minor Arterials	20-40	—————	Collectors	5	-----



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Regional Municipality of Halton Regional Road Network

Halton Region
Public Works

June 2017

RegionalRoads_NetworkMapNew060117.mxd

This map illustrates the recommended draft active transportation (walking and cycling) route network for the Town of Oakville. The dashed lines represent a recommended on and off road network in combination with the Region of Halton's planned Cycling and Pathways Network that will serve as the spine of the Town's active transportation network. As part of this Study, existing walking and cycling facilities have been reviewed and in some cases a new facility type has been proposed.

Proposed AT routes through Bronte Provincial Park and over Highway 403 are not roadway connections.



Legend

Proposed Active Transportation Network

- Bike Lane (On-Road)
- Paved Shoulder Bikeway (On-Road)
- Signed Bike Route (On-Road)
- Multi-use Trail (Off-Road - In Boulevard)
- Major Trail (Off-Road - Parks & Open Space)

This active transportation network map focuses on cycling facility types and trails. All of the active transportation routes shown on this map are also proposed to have pedestrian facilities (e.g. sidewalks). A separate map has been prepared to show existing and proposed sidewalks.

Existing on-road routes shown on the "Oakville Cycleways & Trails Guide" may or may not currently be signed as cycling routes. These routes have been reviewed and in some cases are recommended to be included in the active transportation network. Appropriate bike route signage should be added to designate these facilities.

The proposed Active Transportation (AT) network routes, facility types and recommended phasing identified in this AT Master Plan will be reviewed and confirmed through environmental assessment studies (where required) and / or design feasibility reviews at the time implementation of a particular network segment is being considered. Through this process, route and network facility type adjustments may be adopted and the network plan revised accordingly.

Existing Active Transportation Facilities

- Bike Lane (On-Road)
- Paved Shoulder Bikeway (On-Road)
- Signed Bike Route (On-Road)
- Multi-use Trail (Off-Road / In Boulevard)
- Major Trail (Off-Road / Parks & Open Space)

- ATMP Proposed Grade Separated Pedestrian Crossing
- Previously Planned Grade Separated Pedestrian Crossing
- Existing Grade Separated Pedestrian Crossing
- Waterfront Trail
- Potential Active Transportation Connection to Other Municipality
- GO Rail Line
- Proposed Road Network
- GO Station
- Parks and Natural Heritage System Area
- Lake and River

September 2009

OAKVILLE TRANSIT **Weekday Route Map**

Solid line indicates regular service route.
 Dashed line indicates rush hour or limited service route, or change in routing pattern.

Not all routes operate on Saturday, Sunday/Holidays.

Saturday Routes:

3 4 5 5A 6 13 14 14A 15 18 19 20 24 28

Sunday/Holidays Routes:

3 4 5 6 13 14 14A 15 18 19 20 24 28

Visit oakvilletransit.ca for information on schedules, fares and other services.

Downtown Oakville

- Bus stop
- Centennial Pool
- Central Library
- Church and Dunn bus stop
- Erchless Estates
- George's Square
- Lakeside Park
- Oakville Centre for the Performing Arts
- Oakville Museum
- Tannery Park
- Towne Square
- Trafalgar Park
- Community Centre



Oakville Trafalgar Memorial Hospital

3 3A 5 5A



Dundas & Walkers 407 GO Carpool

5 5A



Bronte GO

3 3A 4 6 10 13 18 28 34



South Oakville Centre

3 3A 14 14A 15



Oakville GO

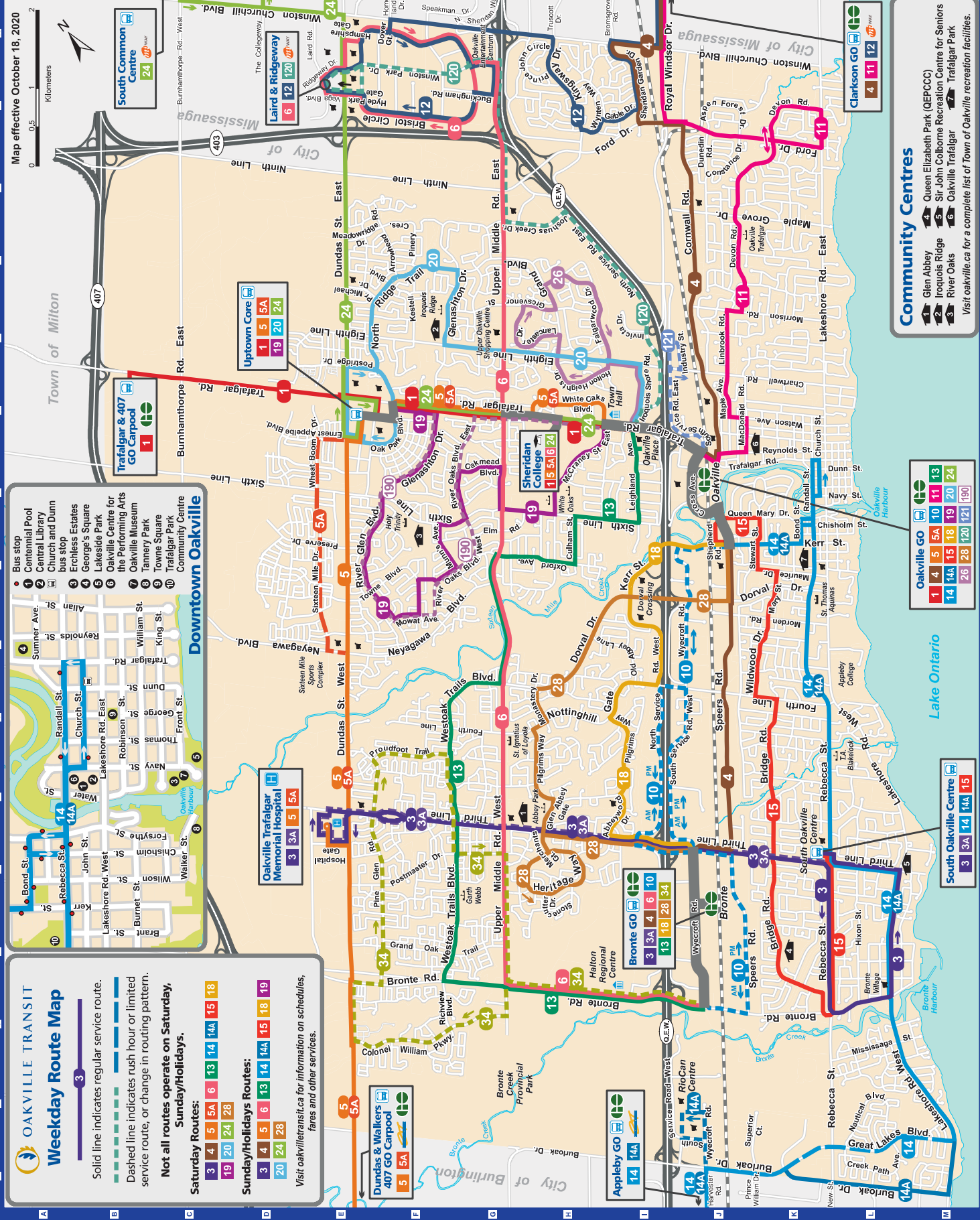
1 4 5 5A 10 11 13 14 14A 15 18 19 20 24 26 28 120 121 190



Community Centres

- Glen Abbey
- Queen Elizabeth Park (QEPCC)
- Irquois Ridge
- Sir John Colborne Recreation Centre for Seniors
- River Oaks
- Oakville Trafalgar
- Trafalgar Park

Visit oakville.ca for a complete list of Town of Oakville recreation facilities.

Map effective October 18, 2020

0 0.5 1 2 Kilometers

Oakville Transit service schedules

Effective February 28, 2021 until further notice

6 Upper Middle (East)											6 Upper Middle (West)										
Timepoint	Bronte GO (Depart)	Upper Middle & Bronte	Upper Middle & Third Line	Upper Middle & Dorval	Upper Middle & Trafalgar	Sheridan College	Trafalgar & Upper Middle	Upper Middle & Ford	Winston Pk. & Bristol Circle	Laird & Ridgeway (Ar.)	Timepoint	Laird & Ridgeway (Dp.)	Winston Pk. & Bristol Circle	Upper Middle & Ford	Upper Middle & Golden Brier	Sheridan College	Upper Middle & Trafalgar	Upper Middle & Dorval	Upper Middle & Third Line	Upper Middle & Bronte	Bronte GO (Arrive)
Monday to Friday																					
Eastbound to Laird & Ridgeway											Westbound to Bronte GO										
a.m.	--	--	--	--	--	--	--	--	--	--	6:50	6:56	7:00	7:05	7:10	7:13	7:19	7:23	7:27	7:35	
	6:38	6:45	6:49	6:53	6:58	7:03	7:06	7:11	7:14	7:20	7:20	7:26	7:30	7:35	7:40	7:43	7:49	7:53	7:57	8:05	
	7:08	7:15	7:19	7:23	7:28	7:33	7:36	7:41	7:44	7:50	7:50	7:56	8:00	8:05	8:10	8:13	8:19	8:23	8:27	8:35	
	7:38	7:45	7:49	7:53	7:58	8:03	8:06	8:11	8:14	8:20	8:20	8:26	8:30	8:35	8:40	8:43	8:49	8:53	8:57	9:05	
	8:08	8:15	8:19	8:23	8:28	8:33	8:36	8:41	8:44	8:50	8:50	8:56	9:00	9:05	9:10	9:13	9:19	9:23	9:27	9:35	
	9:08	9:15	9:19	9:23	9:28	9:33	9:36	9:41	9:44	9:50	9:50	9:56	10:00	10:05	10:10	10:13	10:19	10:23	10:27	10:35	
and every 60 minutes until											and every 60 minutes until										
p.m.	2:08	2:15	2:19	2:23	2:28	2:33	2:36	2:41	2:44	2:50	2:50	2:56	3:00	3:05	3:10	3:13	3:19	3:23	3:27	3:35	
	3:08	3:15	3:19	3:23	3:28	3:33	3:36	3:41	3:44	3:50	3:50	3:56	4:00	4:05	4:10	4:13	4:19	4:23	4:27	4:35	
	--	--	--	--	--	4:03	4:06	4:11	4:14	4:20	4:20	4:26	4:30	4:35	4:40	4:43	4:49	4:53	4:57	5:05	
	4:08	4:15	4:19	4:23	4:28	4:33	4:36	4:41	4:44	4:50	4:50	4:56	5:00	5:05	5:10	5:13	5:19	5:23	5:27	5:35	
	4:38	4:45	4:49	4:53	4:58	5:03	5:06	5:11	5:14	5:20	5:20	5:26	5:30	5:35	5:40	5:43	5:49	5:53	5:57	6:05	
	5:08	5:15	5:19	5:23	5:28	5:33	5:36	5:41	5:44	5:50	5:50	5:56	6:00	6:05	6:10	6:13	6:19	6:23	6:27	6:35	
Saturday																					
a.m.	--	--	--	--	--	--	--	--	--	--	6:50	6:56	7:00	7:05	7:10	7:13	7:19	7:23	7:27	7:35	
	7:08	7:15	7:19	7:23	7:28	7:33	7:36	7:41	7:44	7:50	7:50	7:56	8:00	8:05	8:10	8:13	8:19	8:23	8:27	8:35	
	8:08	8:15	8:19	8:23	8:28	8:33	8:36	8:41	8:44	8:50	8:50	8:56	9:00	9:05	9:10	9:13	9:19	9:23	9:27	9:35	
	and every 60 minutes until										and every 60 minutes until										
	5:08	5:15	5:19	5:23	5:28	5:33	5:36	5:41	5:44	5:50	5:50	5:56	6:00	6:05	6:10	6:13	6:19	6:23	6:27	6:35	
	6:08	6:15	6:19	6:23	6:28	6:33	6:36	6:41	6:44	6:50	6:50	6:56	7:00	7:05	7:10	7:13	7:19	7:23	7:27	7:35	
p.m.	7:08	7:15	7:19	7:23	7:28	7:33	7:36	7:41	7:44	7:50	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5:08	5:15	5:19	5:23	5:28	5:33	5:36	5:41	5:44	5:50	5:50	5:56	6:00	6:05	6:10	6:13	6:19	6:23	6:27	6:35	
	6:08	6:15	6:19	6:23	6:28	6:33	6:36	6:41	6:44	6:50	6:50	6:56	7:00	7:05	7:10	7:13	7:19	7:23	7:27	7:35	
	7:08	7:15	7:19	7:23	7:28	7:33	7:36	7:41	7:44	7:50	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sunday / Holidays																					
a.m.	--	--	--	--	--	--	--	--	--	--	7:50	7:56	8:00	8:05	8:10	8:13	8:19	8:23	8:27	8:35	
	8:08	8:15	8:19	8:23	8:28	8:33	8:36	8:41	8:44	8:50	8:50	8:56	9:00	9:05	9:10	9:13	9:19	9:23	9:27	9:35	
	9:08	9:15	9:19	9:23	9:28	9:33	9:36	9:41	9:44	9:50	9:50	9:56	10:00	10:05	10:10	10:13	10:19	10:23	10:27	10:35	
	and every 60 minutes until										and every 60 minutes until										
	5:08	5:15	5:19	5:23	5:28	5:33	5:36	5:41	5:44	5:50	5:50	5:56	6:00	6:05	6:10	6:13	6:19	6:23	6:27	6:35	
	6:08	6:15	6:19	6:23	6:28	6:33	6:36	6:41	6:44	6:50	6:50	6:56	7:00	7:05	7:10	7:13	7:19	7:23	7:27	7:35	
p.m.	7:08	7:15	7:19	7:23	7:28	7:33	7:36	7:41	7:44	7:50	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5:08	5:15	5:19	5:23	5:28	5:33	5:36	5:41	5:44	5:50	5:50	5:56	6:00	6:05	6:10	6:13	6:19	6:23	6:27	6:35	
	6:08	6:15	6:19	6:23	6:28	6:33	6:36	6:41	6:44	6:50	6:50	6:56	7:00	7:05	7:10	7:13	7:19	7:23	7:27	7:35	
	7:08	7:15	7:19	7:23	7:28	7:33	7:36	7:41	7:44	7:50	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

10 West Industrial							
Timepoint	Oakville GO (Depart)	Wycroft & Fourth Line	Third Line & Speers	Bronte GO (Arrive)	Bronte GO (Depart)	North Service & Fourth Line	Oakville GO (Arrive)
Monday to Friday (morning)							
a.m.	To Bronte GO			To Oakville GO			
	6:40	6:50	6:55	7:05	7:16	7:23	7:36
	7:10	7:20	7:25	7:35	7:46	7:53	8:06
	7:40	7:50	7:55	8:05	8:16	8:23	8:36
	8:10	8:20	8:25	8:35	8:46	8:53	9:06
	8:40	8:50	8:55	9:05	9:16	9:23	9:36
p.m.	9:10	9:20	9:25	9:35	9:46	9:53	10:06
	9:40	9:50	9:55	10:05	10:16	10:23	10:36

10 West Industrial							
Timepoint	Oakville GO (Depart)	North Service & Fourth Line	Bronte GO (Arrive)	Bronte GO (Depart)	Third Line & Speers	Wycroft & Fourth Line	Oakville GO (Arrive)
Monday to Friday (afternoon)							
p.m.	To Bronte GO			To Oakville GO			
	2:15	2:25	2:35	2:40	2:50	2:55	3:08
	2:45	2:55	3:05	3:10	3:20	3:25	3:38
	3:15	3:25	3:35	3:40	3:50	3:55	4:08
	3:45	3:55	4:05	4:10	4:20	4:25	4:38
	4:15	4:25	4:35	4:40	4:50	4:55	5:08
p.m.	4:45	4:55	5:05	5:10	5:20	5:25	5:38
	5:15	5:25	5:35	5:40	5:50	5:55	6:08

11 Linbrook														
Timepoint	Oakville GO (Depart)	Reynolds & MacDonald	Devon & Morrison	Devon & Maple Grove	Devon & Lakeshore	Ford & Royal Windsor	Clarkson GO (Arrive)	Clarkson GO (Depart)	Ford & Royal Windsor	Devon & Lakeshore	Devon & Maple Grove	Devon & Morrison	Reynolds & MacDonald	Oakville GO (Arrive)
Monday to Friday														
a.m.	To Clarkson GO							To Oakville GO						
	5:52	5:57	6:01	6:04	6:08	6:12	6:20	6:23	6:29	6:33	6:37	6:39	6:44	6:51
	6:52	6:57	7:01	7:04	7:08	7:12	7:20	7:23	7:29	7:33	7:37	7:39	7:44	7:51
	7:52	7:57	8:01	8:04	8:08	8:12	8:20	8:23	8:29	8:33	8:37	8:39	8:44	8:51
	8:52	8:57	9:01	9:04	9:08	9:12	9:20	9:23	9:29	9:33	9:37	9:39	9:44	9:51
p.m.	and every 60 minutes until							and every 60 minutes until						
	5:52	5:57	6:01	6:04	6:08	6:12	6:20	6:23	6:29	6:33	6:37	6:39	6:44	6:51
	6:52	6:57	7:01	7:04	7:08	7:12	7:20	7:23	7:29	7:33	7:37	7:39	7:44	7:51
	7:52	7:57	8:01	8:04	8:08	8:12	8:20	8:23	8:29	8:33	8:37	8:39	8:44	8:51
	8:52	8:57	9:01	9:04	9:08	9:12	9:20	9:23	9:29	9:33	9:37	9:39	9:44	9:51

Appendix C

Traffic Counts



Turning Movement Count (2 . FORD DR & CORNWALL RD)

Start Time	N Approach FORD DR						E Approach CORNWALL RD						S Approach FORD DR						W Approach CORNWALL RD						Int. Total (15 min)	Int. Total (1 hr)	
	Right N-W	Thru N-S	Left N-E	UTurn N-N	Peds N:	Approach Total	Right E-N	Thru E-W	Left E-S	UTurn E-E	Peds E:	Approach Total	Right S-E	Thru S-N	Left S-W	UTurn S-S	Peds S:	Approach Total	Right W-S	Thru W-E	Left W-N	UTurn W-W	Peds W:	Approach Total			
06:00:00	12	5	8	0	0	25	4	2	0	0	1	6	0	13	2	0	0	15	1	4	14	0	0	19	65		
06:15:00	20	8	15	0	0	43	3	2	0	0	0	5	1	13	0	0	0	14	1	4	8	0	0	13	75		
06:30:00	37	10	6	0	0	53	10	1	0	0	1	11	1	19	3	0	2	23	0	7	33	0	0	40	127		
06:45:00	66	9	12	0	0	87	10	2	0	0	1	12	6	31	1	0	0	38	1	2	24	0	0	27	164	431	
07:00:00	50	12	9	0	0	71	11	5	2	0	0	18	1	36	3	0	0	40	3	6	30	0	0	39	168	534	
07:15:00	66	24	8	0	0	98	11	4	0	0	0	15	1	53	1	0	1	55	2	8	42	0	0	52	220	679	
07:30:00	69	22	12	0	0	103	3	11	0	0	0	14	4	49	4	0	2	57	4	10	49	0	0	63	237	789	
07:45:00	96	28	19	0	1	143	9	11	3	0	2	23	10	49	4	0	0	63	5	16	62	0	0	83	312	937	
08:00:00	87	30	15	0	0	132	9	6	5	0	0	20	4	52	3	0	1	59	4	10	60	0	0	74	285	1054	
08:15:00	114	29	18	0	2	161	7	13	1	0	4	21	6	53	3	0	0	62	7	5	56	0	1	68	312	1146	
08:30:00	101	27	20	1	0	149	18	19	2	0	1	39	10	71	8	0	3	89	6	12	70	0	1	88	365	1274	
08:45:00	148	56	19	0	2	223	15	10	4	0	0	29	4	67	5	0	3	76	4	12	80	0	2	96	424	1386	
09:00:00	96	40	13	1	0	150	9	20	4	0	0	33	6	52	4	0	1	62	6	17	110	0	0	133	378	1479	
09:15:00	109	28	15	0	0	152	16	7	6	0	0	29	4	62	5	0	0	71	7	11	74	0	0	92	344	1511	
09:30:00	87	29	12	0	1	128	15	10	6	0	4	31	9	54	6	0	0	69	3	13	80	0	0	96	324	1470	
09:45:00	91	43	13	0	1	147	14	11	2	0	0	27	5	55	6	0	0	66	8	17	73	0	0	98	338	1384	
BREAK																											
15:00:00	120	50	11	0	0	181	11	18	10	0	1	39	2	50	7	0	2	59	14	22	137	0	0	173	452		
15:15:00	93	55	23	0	2	171	23	24	10	0	0	57	6	72	7	0	0	85	13	24	107	0	0	144	457		
15:30:00	109	53	10	0	0	172	25	19	11	0	2	55	6	61	14	0	1	81	7	19	110	0	0	136	444		
15:45:00	114	68	17	2	0	201	16	20	6	0	2	42	2	55	9	1	1	67	6	19	119	0	0	144	454	1807	
16:00:00	118	70	12	1	0	201	28	19	3	0	2	50	6	78	10	0	0	94	13	30	143	0	1	186	531	1886	
16:15:00	84	66	23	0	0	173	8	31	11	0	0	50	10	48	16	0	0	74	15	34	133	0	2	182	479	1908	
16:30:00	98	55	15	0	0	168	26	17	7	0	1	50	8	53	4	0	0	65	10	34	113	0	2	157	440	1904	
16:45:00	96	65	16	0	0	177	20	18	6	0	4	44	4	57	10	0	3	71	12	28	140	0	1	180	472	1922	
17:00:00	109	70	10	1	2	190	22	15	3	0	3	40	10	63	14	0	1	87	7	29	123	0	0	159	476	1867	
17:15:00	102	70	25	0	3	197	10	14	7	0	6	31	7	56	9	0	2	72	15	36	145	0	2	196	496	1884	
17:30:00	84	89	30	0	0	203	24	10	10	0	3	44	6	63	9	0	2	78	12	37	129	0	0	178	503	1947	
17:45:00	92	91	16	0	2	199	27	18	9	0	0	54	7	54	7	0	0	68	20	27	118	1	1	166	487	1962	
18:00:00	96	49	19	0	0	164	13	9	4	0	2	26	7	74	7	0	1	88	9	28	96	0	2	133	411	1897	
18:15:00	96	61	15	0	1	172	17	14	6	0	0	37	4	48	4	0	0	56	13	13	95	1	0	122	387	1788	
18:30:00	74	60	19	0	0	153	13	6	10	0	5	29	0	45	10	0	0	55	3	17	74	0	0	94	331	1616	
18:45:00	51	57	18	0	1	126	25	9	5	0	4	39	2	51	4	0	0	57	12	10	75	0	3	97	319	1448	
Grand Total	2785	1429	493	6	18	4713	472	395	153	0	49	1020	159	1657	199	1	26	2016	243	561	2722	2	18	3528	11277	-	
Approach%	59.1%	30.3%	10.5%	0.1%		-	46.3%	38.7%	15%	0%		-	7.9%	82.2%	9.9%	0%		-	6.9%	15.9%	77.2%	0.1%		-	-	-	
Totals %	24.7%	12.7%	4.4%	0.1%		41.8%	4.2%	3.5%	1.4%	0%		9%	1.4%	14.7%	1.8%	0%		17.9%	2.2%	5%	24.1%	0%		31.3%	-	-	
Heavy	88	36	68	0		-	88	26	2	0		-	4	29	7	0		-	2	25	97	0		-	-	-	
Heavy %	3.2%	2.5%	13.8%	0%		-	18.6%	6.6%	1.3%	0%		-	2.5%	1.8%	3.5%	0%		-	0.8%	4.5%	3.6%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	



Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)

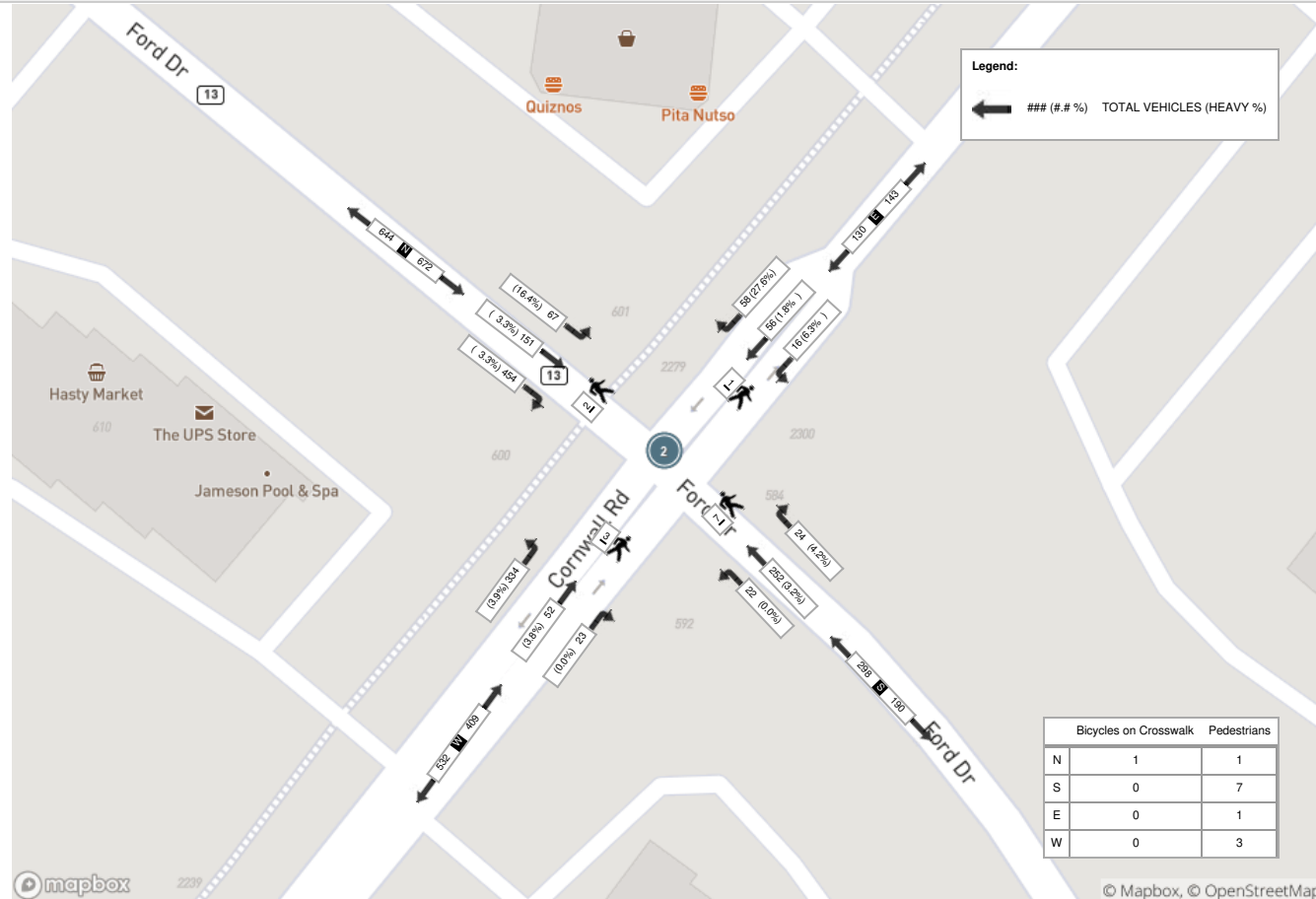
Start Time	N Approach FORD DR						E Approach CORNWALL RD						S Approach FORD DR						W Approach CORNWALL RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	101	27	20	1	0	149	18	19	2	0	1	39	10	71	8	0	3	89	6	12	70	0	1	88	365
08:45:00	148	56	19	0	2	223	15	10	4	0	0	29	4	67	5	0	3	76	4	12	80	0	2	96	424
09:00:00	96	40	13	1	0	150	9	20	4	0	0	33	6	52	4	0	1	62	6	17	110	0	0	133	378
09:15:00	109	28	15	0	0	152	16	7	6	0	0	29	4	62	5	0	0	71	7	11	74	0	0	92	344
Grand Total	454	151	67	2	2	674	58	56	16	0	1	130	24	252	22	0	7	298	23	52	334	0	3	409	1511
Approach%	67.4%	22.4%	9.9%	0.3%		-	44.6%	43.1%	12.3%	0%		-	8.1%	84.6%	7.4%	0%		-	5.6%	12.7%	81.7%	0%		-	-
Totals %	30%	10%	4.4%	0.1%		44.6%	3.8%	3.7%	1.1%	0%		8.6%	1.6%	16.7%	1.5%	0%		19.7%	1.5%	3.4%	22.1%	0%		27.1%	-
PHF	0.77	0.67	0.84	0.5		0.76	0.81	0.7	0.67	0		0.83	0.6	0.89	0.69	0		0.84	0.82	0.76	0.76	0		0.77	-
Heavy	15	5	11	0		31	16	1	1	0		18	1	8	0	0		9	0	2	13	0		15	-
Heavy %	3.3%	3.3%	16.4%	0%		4.6%	27.6%	1.8%	6.3%	0%		13.8%	4.2%	3.2%	0%	0%		3%	0%	3.8%	3.9%	0%		3.7%	-
Lights	437	144	56	2		639	42	54	15	0		111	23	242	22	0		287	22	50	320	0		392	-
Lights %	96.3%	95.4%	83.6%	100%		94.8%	72.4%	96.4%	93.8%	0%		85.4%	95.8%	96%	100%	0%		96.3%	95.7%	96.2%	95.8%	0%		95.8%	-
Single-Unit Trucks	8	2	7	0		17	12	1	1	0		14	1	6	0	0		7	0	2	7	0		9	-
Single-Unit Trucks %	1.8%	1.3%	10.4%	0%		2.5%	20.7%	1.8%	6.3%	0%		10.8%	4.2%	2.4%	0%	0%		2.3%	0%	3.8%	2.1%	0%		2.2%	-
Buses	3	2	0	0		5	0	0	0	0		0	0	2	0	0		2	0	0	3	0		3	-
Buses %	0.7%	1.3%	0%	0%		0.7%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.7%	0%	0%	0.9%	0%		0.7%	-
Articulated Trucks	4	1	4	0		9	4	0	0	0		4	0	0	0	0		0	0	0	3	0		3	-
Articulated Trucks %	0.9%	0.7%	6%	0%		1.3%	6.9%	0%	0%	0%		3.1%	0%	0%	0%	0%		0%	0%	0%	0.9%	0%		0.7%	-
Bicycles on Road	2	2	0	0		4	0	1	0	0		1	0	2	0	0		2	1	0	1	0		2	-
Bicycles on Road %	0.4%	1.3%	0%	0%		0.6%	0%	1.8%	0%	0%		0.8%	0%	0.8%	0%	0%		0.7%	4.3%	0%	0.3%	0%		0.5%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	7	-	-	-	-	-	3	-	-
Pedestrians%	-	-	-	-	7.7%	-	-	-	-	-	7.7%	-	-	-	-	-	53.8%	-	-	-	-	-	23.1%	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	7.7%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-



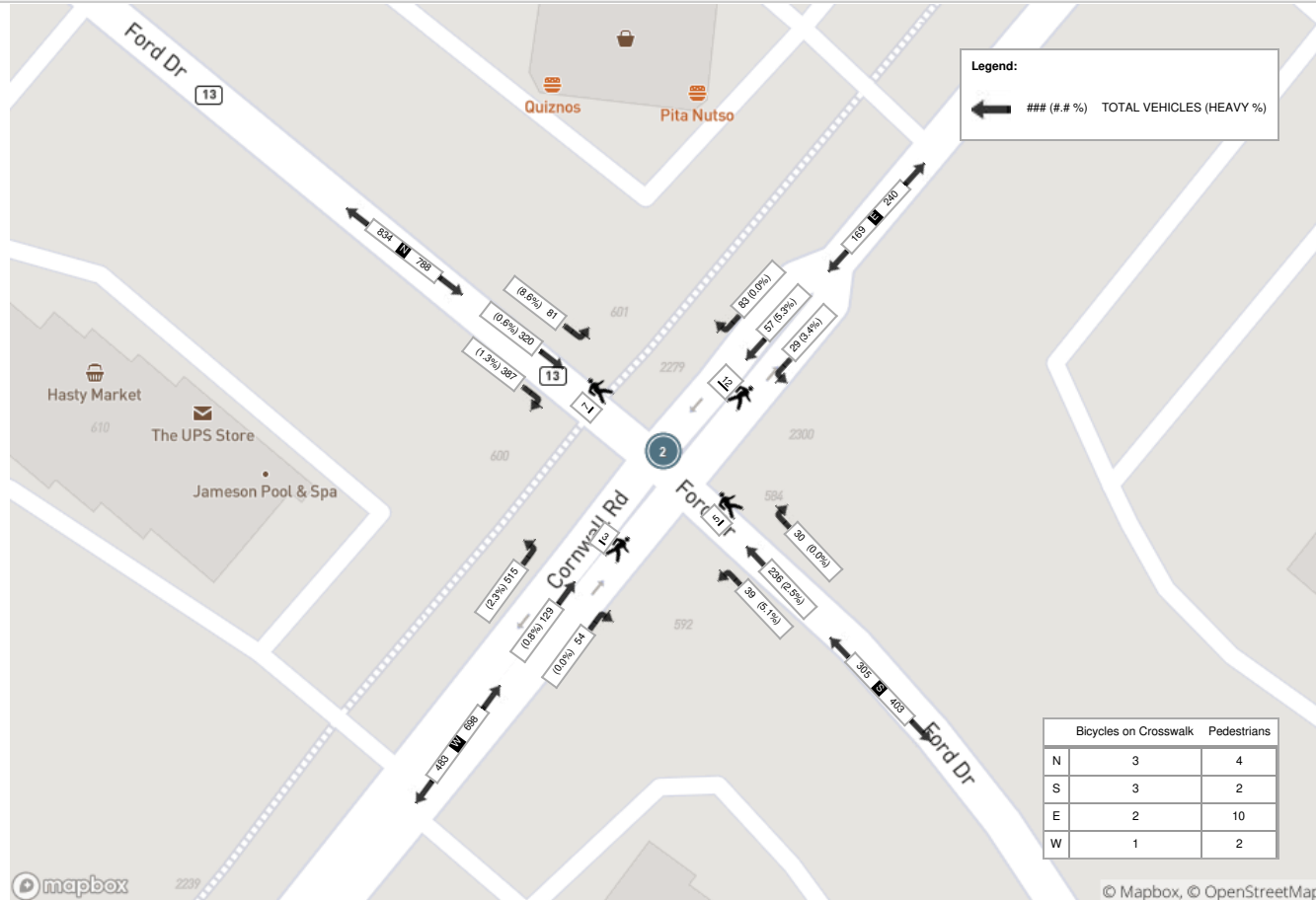
Peak Hour: 05:00 PM - 06:00 PM Weather: Clear Sky (31.59 °C)

Start Time	N Approach FORD DR						E Approach CORNWALL RD						S Approach FORD DR						W Approach CORNWALL RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
17:00:00	109	70	10	1	2	190	22	15	3	0	3	40	10	63	14	0	1	87	7	29	123	0	0	159	476
17:15:00	102	70	25	0	3	197	10	14	7	0	6	31	7	56	9	0	2	72	15	36	145	0	2	196	496
17:30:00	84	89	30	0	0	203	24	10	10	0	3	44	6	63	9	0	2	78	12	37	129	0	0	178	503
17:45:00	92	91	16	0	2	199	27	18	9	0	0	54	7	54	7	0	0	68	20	27	118	1	1	166	487
Grand Total	387	320	81	1	7	789	83	57	29	0	12	169	30	236	39	0	5	305	54	129	515	1	3	699	1962
Approach%	49%	40.6%	10.3%	0.1%		-	49.1%	33.7%	17.2%	0%		-	9.8%	77.4%	12.8%	0%		-	7.7%	18.5%	73.7%	0.1%		-	-
Totals %	19.7%	16.3%	4.1%	0.1%		40.2%	4.2%	2.9%	1.5%	0%		8.6%	1.5%	12%	2%	0%		15.5%	2.8%	6.6%	26.2%	0.1%		35.6%	-
PHF	0.89	0.88	0.68	0.25		0.97	0.77	0.79	0.73	0		0.78	0.75	0.94	0.7	0		0.88	0.68	0.87	0.89	0.25		0.89	-
Heavy	5	2	7	0		14	0	3	1	0		4	0	6	2	0		8	0	1	12	0		13	-
Heavy %	1.3%	0.6%	8.6%	0%		1.8%	0%	5.3%	3.4%	0%		2.4%	0%	2.5%	5.1%	0%		2.6%	0%	0.8%	2.3%	0%		1.9%	-
Lights	381	316	74	1		772	83	54	28	0		165	29	230	37	0		296	54	128	503	1		686	-
Lights %	98.4%	98.8%	91.4%	100%		97.8%	100%	94.7%	96.6%	0%		97.6%	96.7%	97.5%	94.9%	0%		97%	100%	99.2%	97.7%	100%		98.1%	-
Single-Unit Trucks	2	1	3	0		6	0	3	1	0		4	0	5	2	0		7	0	1	4	0		5	-
Single-Unit Trucks %	0.5%	0.3%	3.7%	0%		0.8%	0%	5.3%	3.4%	0%		2.4%	0%	2.1%	5.1%	0%		2.3%	0%	0.8%	0.8%	0%		0.7%	-
Buses	2	1	0	0		3	0	0	0	0		0	0	1	0	0		1	0	0	2	0		2	-
Buses %	0.5%	0.3%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.3%	0%	0%	0.4%	0%		0.3%	-
Articulated Trucks	1	0	4	0		5	0	0	0	0		0	0	0	0	0		0	0	0	6	0		6	-
Articulated Trucks %	0.3%	0%	4.9%	0%		0.6%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	1.2%	0%		0.9%	-
Bicycles on Road	1	2	0	0		3	0	0	0	0		0	1	0	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0.3%	0.6%	0%	0%		0.4%	0%	0%	0%	0%		0%	3.3%	0%	0%	0%		0.3%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	4	-	-	-	-	-	10	-	-	-	-	-	2	-	-	-	-	-	2	-	-
Pedestrians%	-	-	-	-	14.8%	-	-	-	-	-	37%	-	-	-	-	-	7.4%	-	-	-	-	-	7.4%	-	-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	3	-	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	-	11.1%	-	-	-	-	-	7.4%	-	-	-	-	-	11.1%	-	-	-	-	-	3.7%	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Clear Sky (31.59 °C)





Turning Movement Count (5 . LAKESHORE RD E & WINSTON CHURCHILL BLVD) CustID: 01900000 MIdID:

Start Time	N Approach WINSTON CHURCHILL BLVD					E Approach LAKESHORE RD E					W Approach LAKESHORE RD W					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	UTurn E:E	Peds E:	Approach Total	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	3	18	0	0	21	10	5	0	0	15	12	4	0	0	16	52	
06:15:00	4	29	0	0	33	2	5	0	0	7	10	7	0	0	17	57	
06:30:00	5	30	0	0	35	11	8	0	0	19	20	5	0	0	25	79	
06:45:00	9	32	0	0	41	8	10	0	0	18	18	4	0	0	22	81	269
07:00:00	9	13	0	0	22	9	12	0	0	21	22	12	0	0	34	77	294
07:15:00	6	18	0	0	24	15	15	0	0	30	18	6	0	2	24	78	315
07:30:00	4	19	0	0	23	14	9	0	0	23	23	12	0	0	35	81	317
07:45:00	12	24	0	0	36	11	17	0	0	28	39	14	0	0	53	117	353
08:00:00	16	22	0	0	38	12	22	1	0	35	24	21	0	0	45	118	394
08:15:00	13	17	0	0	30	7	20	0	0	27	27	22	0	0	49	106	422
08:30:00	21	15	0	0	36	18	23	0	0	41	26	15	0	0	41	118	459
08:45:00	27	25	0	0	52	18	24	0	0	42	37	18	0	1	55	149	491
09:00:00	20	21	0	1	41	16	26	0	0	42	32	12	0	2	44	127	500
09:15:00	21	15	0	0	36	17	22	0	0	39	26	14	0	0	40	115	509
09:30:00	19	15	0	0	34	11	27	0	0	38	34	22	0	2	56	128	519
09:45:00	22	22	0	0	44	11	19	0	0	30	28	16	0	0	44	118	488
BREAK																	
15:00:00	24	11	0	0	35	41	37	0	0	78	53	31	0	0	84	197	
15:15:00	23	16	0	0	39	26	25	0	0	51	44	23	0	0	67	157	
15:30:00	26	12	0	0	38	24	46	0	0	70	66	39	0	0	105	213	
15:45:00	31	14	0	1	45	21	42	0	0	63	57	30	0	3	87	195	762
16:00:00	34	10	0	0	44	28	53	0	0	81	43	24	0	0	67	192	757
16:15:00	24	17	0	0	41	21	35	0	0	56	58	34	0	0	92	189	789
16:30:00	28	13	0	0	41	26	40	0	0	66	50	21	0	0	71	178	754
16:45:00	31	15	0	0	46	21	56	0	0	77	62	25	0	0	87	210	769
17:00:00	33	12	0	0	45	24	40	0	0	64	56	22	0	0	78	187	764
17:15:00	24	22	0	0	46	25	43	0	0	68	55	33	0	0	88	202	777
17:30:00	29	13	0	0	42	32	45	0	0	77	65	30	0	0	95	214	813
17:45:00	29	6	0	0	35	33	41	0	0	74	52	19	0	1	71	180	783
18:00:00	31	19	0	0	50	13	42	0	0	55	59	23	0	0	82	187	783
18:15:00	18	11	0	0	29	10	29	0	0	39	35	12	0	0	47	115	696
18:30:00	17	18	0	0	35	16	44	0	0	60	40	33	0	0	73	168	650
18:45:00	24	30	0	0	54	13	29	0	0	42	46	15	0	0	61	157	627



Grand Total	637	574	0	2	1211	564	911	1	0	1476	1237	618	0	11	1855	4542	-
Approach%	52.6%	47.4%	0%		-	38.2%	61.7%	0.1%		-	66.7%	33.3%	0%		-	-	-
Totals %	14%	12.6%	0%		26.7%	12.4%	20.1%	0%		32.5%	27.2%	13.6%	0%		40.8%	-	-
Heavy	17	146	0		-	151	5	0		-	11	13	0		-	-	-
Heavy %	2.7%	25.4%	0%		-	26.8%	0.5%	0%		-	0.9%	2.1%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 08:45 AM - 09:45 AM Weather: Clear Sky (19.75 °C)

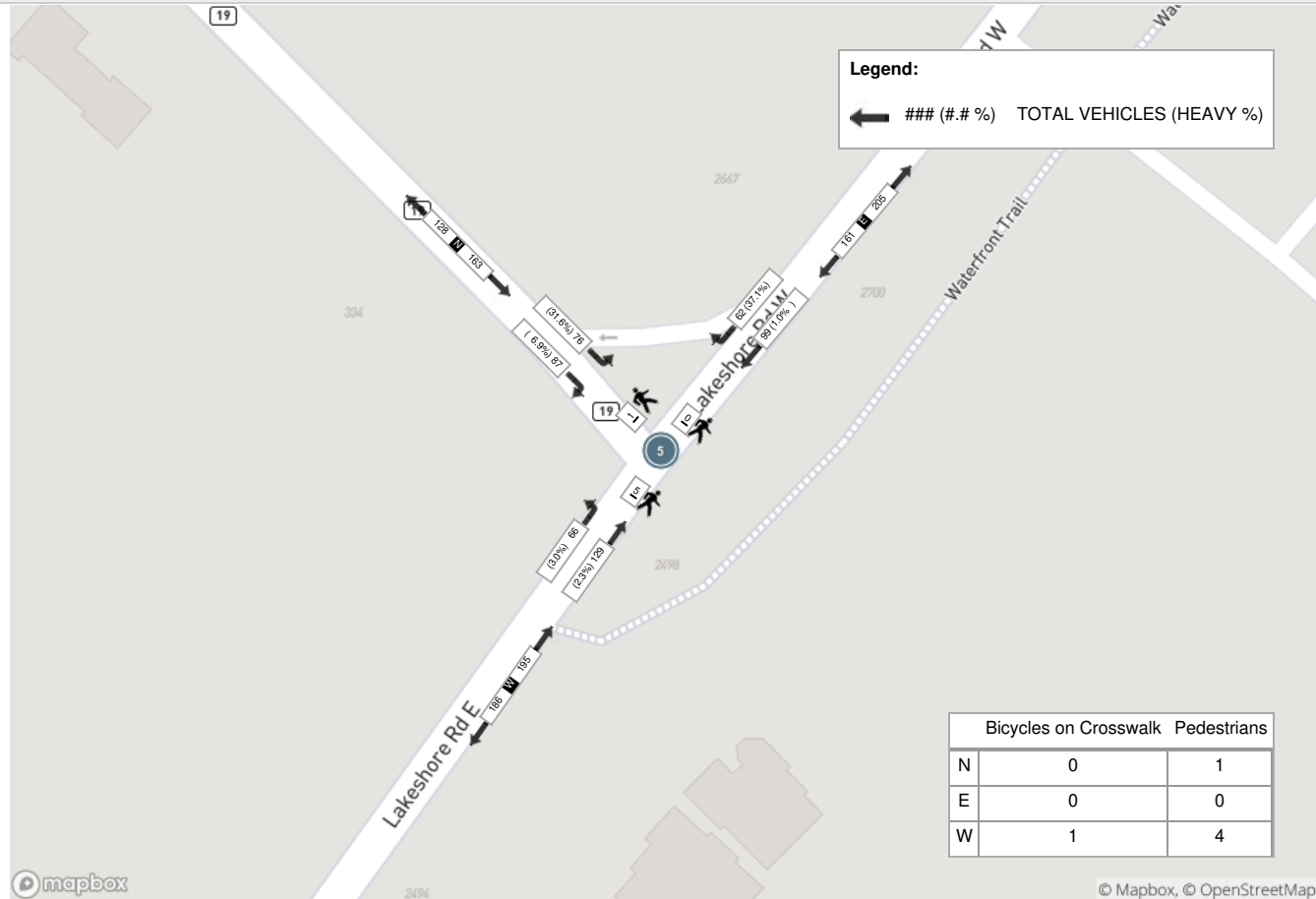
Start Time	N Approach WINSTON CHURCHILL BLVD					E Approach LAKESHORE RD E					W Approach LAKESHORE RD W					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
08:45:00	27	25	0	0	52	18	24	0	0	42	37	18	0	1	55	149
09:00:00	20	21	0	1	41	16	26	0	0	42	32	12	0	2	44	127
09:15:00	21	15	0	0	36	17	22	0	0	39	26	14	0	0	40	115
09:30:00	19	15	0	0	34	11	27	0	0	38	34	22	0	2	56	128
Grand Total	87	76	0	1	163	62	99	0	0	161	129	66	0	5	195	519
Approach%	53.4%	46.6%	0%		-	38.5%	61.5%	0%		-	66.2%	33.8%	0%		-	-
Totals %	16.8%	14.6%	0%		31.4%	11.9%	19.1%	0%		31%	24.9%	12.7%	0%		37.6%	-
PHF	0.81	0.76	0		0.78	0.86	0.92	0		0.96	0.87	0.75	0		0.87	-
Heavy	6	24	0		30	23	1	0		24	3	2	0		5	-
Heavy %	6.9%	31.6%	0%		18.4%	37.1%	1%	0%		14.9%	2.3%	3%	0%		2.6%	-
Lights	80	52	0		132	39	89	0		128	122	62	0		184	-
Lights %	92%	68.4%	0%		81%	62.9%	89.9%	0%		79.5%	94.6%	93.9%	0%		94.4%	-
Single-Unit Trucks	6	11	0		17	9	1	0		10	3	2	0		5	-
Single-Unit Trucks %	6.9%	14.5%	0%		10.4%	14.5%	1%	0%		6.2%	2.3%	3%	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	0	13	0		13	14	0	0		14	0	0	0		0	-
Articulated Trucks %	0%	17.1%	0%		8%	22.6%	0%	0%		8.7%	0%	0%	0%		0%	-
Bicycles on Road	1	0	0		1	0	9	0		9	4	2	0		6	-
Bicycles on Road %	1.1%	0%	0%		0.6%	0%	9.1%	0%		5.6%	3.1%	3%	0%		3.1%	-
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	4	-	-
Pedestrians%	-	-	-	16.7%	-	-	-	-	0%	-	-	-	-	66.7%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	16.7%	-	-



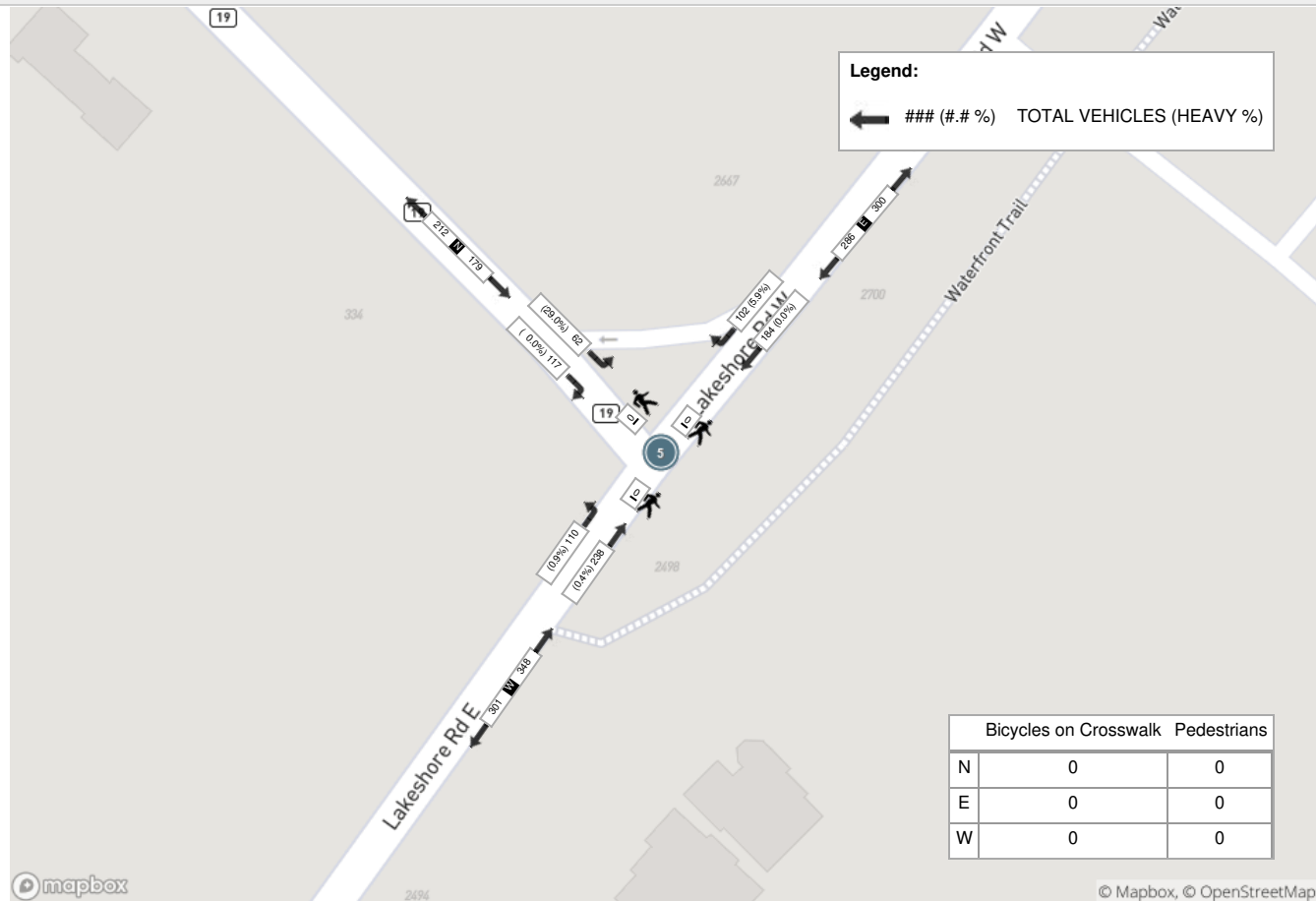
Peak Hour: 04:45 PM - 05:45 PM Weather: Clear Sky (31.59 °C)

Start Time	N Approach WINSTON CHURCHILL BLVD					E Approach LAKESHORE RD E					W Approach LAKESHORE RD W					Int. Total (15 min)
	Right	Left	UTurn	Peds	Approach Total	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	31	15	0	0	46	21	56	0	0	77	62	25	0	0	87	210
17:00:00	33	12	0	0	45	24	40	0	0	64	56	22	0	0	78	187
17:15:00	24	22	0	0	46	25	43	0	0	68	55	33	0	0	88	202
17:30:00	29	13	0	0	42	32	45	0	0	77	65	30	0	0	95	214
Grand Total	117	62	0	0	179	102	184	0	0	286	238	110	0	0	348	813
Approach%	65.4%	34.6%	0%		-	35.7%	64.3%	0%		-	68.4%	31.6%	0%		-	-
Totals %	14.4%	7.6%	0%		22%	12.5%	22.6%	0%		35.2%	29.3%	13.5%	0%		42.8%	-
PHF	0.89	0.7	0		0.97	0.8	0.82	0		0.93	0.92	0.83	0		0.92	-
Heavy	0	18	0		18	6	0	0		6	1	1	0		2	-
Heavy %	0%	29%	0%		10.1%	5.9%	0%	0%		2.1%	0.4%	0.9%	0%		0.6%	-
Lights	117	44	0		161	95	180	0		275	235	108	0		343	-
Lights %	100%	71%	0%		89.9%	93.1%	97.8%	0%		96.2%	98.7%	98.2%	0%		98.6%	-
Single-Unit Trucks	0	5	0		5	3	0	0		3	1	1	0		2	-
Single-Unit Trucks %	0%	8.1%	0%		2.8%	2.9%	0%	0%		1%	0.4%	0.9%	0%		0.6%	-
Buses	0	0	0		0	1	0	0		1	0	0	0		0	-
Buses %	0%	0%	0%		0%	1%	0%	0%		0.3%	0%	0%	0%		0%	-
Articulated Trucks	0	13	0		13	2	0	0		2	0	0	0		0	-
Articulated Trucks %	0%	21%	0%		7.3%	2%	0%	0%		0.7%	0%	0%	0%		0%	-
Bicycles on Road	0	0	0		0	1	4	0		5	2	1	0		3	-
Bicycles on Road %	0%	0%	0%		0%	1%	2.2%	0%		1.7%	0.8%	0.9%	0%		0.9%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 08:45 AM - 09:45 AM Weather: Clear Sky (19.75 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Clear Sky (31.59 °C)





Turning Movement Count (1 . ROYAL WINDSOR DR & FORD DR)

Start Time	N Approach FORD DR						E Approach ROYAL WINDSOR DR						S Approach FORD DR						W Approach ROYAL WINDSOR DR						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
06:00:00	6	15	30	0	0	51	10	40	2	0	1	52	14	9	4	0	0	27	8	70	8	0	2	86	216		
06:15:00	14	27	36	0	0	77	9	36	8	0	0	53	4	19	4	0	0	27	11	105	6	0	0	122	279		
06:30:00	8	38	51	0	0	97	12	46	11	0	1	69	14	32	9	0	0	55	7	120	10	0	0	137	358		
06:45:00	15	57	53	0	0	125	15	46	19	0	1	80	25	36	10	0	0	71	15	111	12	0	0	138	414	1267	
07:00:00	8	44	38	0	0	90	24	54	18	0	0	96	22	36	13	0	0	71	9	102	9	0	0	120	377	1428	
07:15:00	17	66	41	0	0	124	23	57	16	0	0	96	24	53	20	0	0	97	20	93	20	0	0	133	450	1599	
07:30:00	18	62	43	0	1	123	27	80	29	0	0	136	22	65	24	0	0	111	21	110	15	0	1	146	516	1757	
07:45:00	16	97	68	0	0	181	25	74	35	0	2	134	33	69	20	0	0	122	21	99	11	0	0	131	568	1911	
08:00:00	22	85	43	0	0	150	39	76	28	0	0	143	32	72	22	1	0	127	19	86	24	0	0	129	549	2083	
08:15:00	21	102	40	0	0	163	24	76	41	0	7	141	22	84	14	0	0	120	22	87	22	0	1	131	555	2188	
08:30:00	33	107	39	0	0	179	32	94	33	0	0	159	31	95	20	0	0	146	15	96	22	0	0	133	617	2289	
08:45:00	31	161	44	0	0	236	31	73	41	0	5	145	42	107	20	0	2	169	22	114	25	0	1	161	711	2432	
09:00:00	26	99	43	0	0	168	29	73	34	0	1	136	49	98	10	0	0	157	26	100	23	0	0	149	610	2493	
09:15:00	24	103	45	0	0	172	27	66	43	0	2	136	39	101	29	0	0	169	15	102	27	0	2	144	621	2559	
09:30:00	25	72	37	0	1	134	20	78	38	1	4	137	38	81	22	0	0	141	21	100	25	0	1	146	558	2500	
09:45:00	24	107	45	0	1	176	28	67	28	0	5	123	28	102	20	1	3	151	17	94	25	0	0	136	586	2375	
BREAK																											
15:00:00	37	103	34	0	2	174	51	127	60	0	1	238	48	127	35	0	0	210	17	100	35	0	2	152	774		
15:15:00	32	117	39	0	0	188	51	118	53	0	0	222	57	135	14	0	0	206	21	110	55	0	0	186	802		
15:30:00	26	109	34	0	0	169	60	127	44	0	1	231	47	126	31	0	0	204	15	128	35	0	0	178	782		
15:45:00	26	144	34	0	0	204	41	95	49	0	1	185	57	126	23	1	0	207	20	110	40	0	1	170	766	3124	
16:00:00	28	158	44	0	1	230	58	91	52	0	2	201	56	182	21	0	0	259	14	128	39	0	2	181	871	3221	
16:15:00	25	115	38	0	0	178	46	95	44	0	2	185	33	124	25	0	0	182	20	138	53	0	1	211	756	3175	
16:30:00	16	115	42	0	0	173	50	91	46	0	0	187	51	145	21	0	0	217	19	94	40	0	1	153	730	3123	
16:45:00	17	115	31	0	0	163	51	100	41	0	5	192	56	144	27	0	0	227	18	139	45	0	1	202	784	3141	
17:00:00	20	145	43	0	0	208	47	91	40	0	2	178	47	162	19	0	0	228	19	161	42	0	0	222	836	3106	
17:15:00	16	136	37	0	0	189	45	92	45	0	3	182	37	139	26	0	1	202	27	144	41	0	1	212	785	3135	
17:30:00	25	142	45	0	0	212	39	74	49	0	3	162	58	156	23	0	0	237	15	124	53	0	0	192	803	3208	
17:45:00	24	114	32	0	0	170	37	86	50	1	3	174	55	110	25	0	0	190	31	119	37	0	1	187	721	3145	
18:00:00	12	112	45	0	0	169	32	75	40	0	3	147	48	138	18	0	0	204	17	110	38	0	1	165	685	2994	
18:15:00	13	103	27	0	2	143	41	65	52	0	1	158	27	99	24	0	1	150	18	115	44	0	1	177	628	2837	
18:30:00	18	115	27	0	0	160	34	63	26	0	2	123	33	107	13	0	0	153	15	110	36	0	0	161	597	2631	
18:45:00	10	79	30	0	0	119	33	56	32	1	1	122	30	90	20	0	0	140	16	99	33	0	2	148	529	2439	
Grand Total	653	3164	1278	0	8	5095	1091	2482	1147	3	59	4723	1179	3169	626	3	7	4977	571	3518	950	0	22	5039	19834	-	
Approach%	12.8%	62.1%	25.1%	0%		-	23.1%	52.6%	24.3%	0.1%		-	23.7%	63.7%	12.6%	0.1%		-	11.3%	69.8%	18.9%	0%		-	-	-	
Totals %	3.3%	16%	6.4%	0%		25.7%	5.5%	12.5%	5.8%	0%		23.8%	5.9%	16%	3.2%	0%		25.1%	2.9%	17.7%	4.8%	0%		25.4%	-	-	
Heavy	80	130	133	0		-	118	285	34	0		-	46	136	30	0		-	34	326	65	0		-	-	-	
Heavy %	12.3%	4.1%	10.4%	0%		-	10.8%	11.5%	3%	0%		-	3.9%	4.3%	4.8%	0%		-	6%	9.3%	6.8%	0%		-	-	-	
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	



Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)

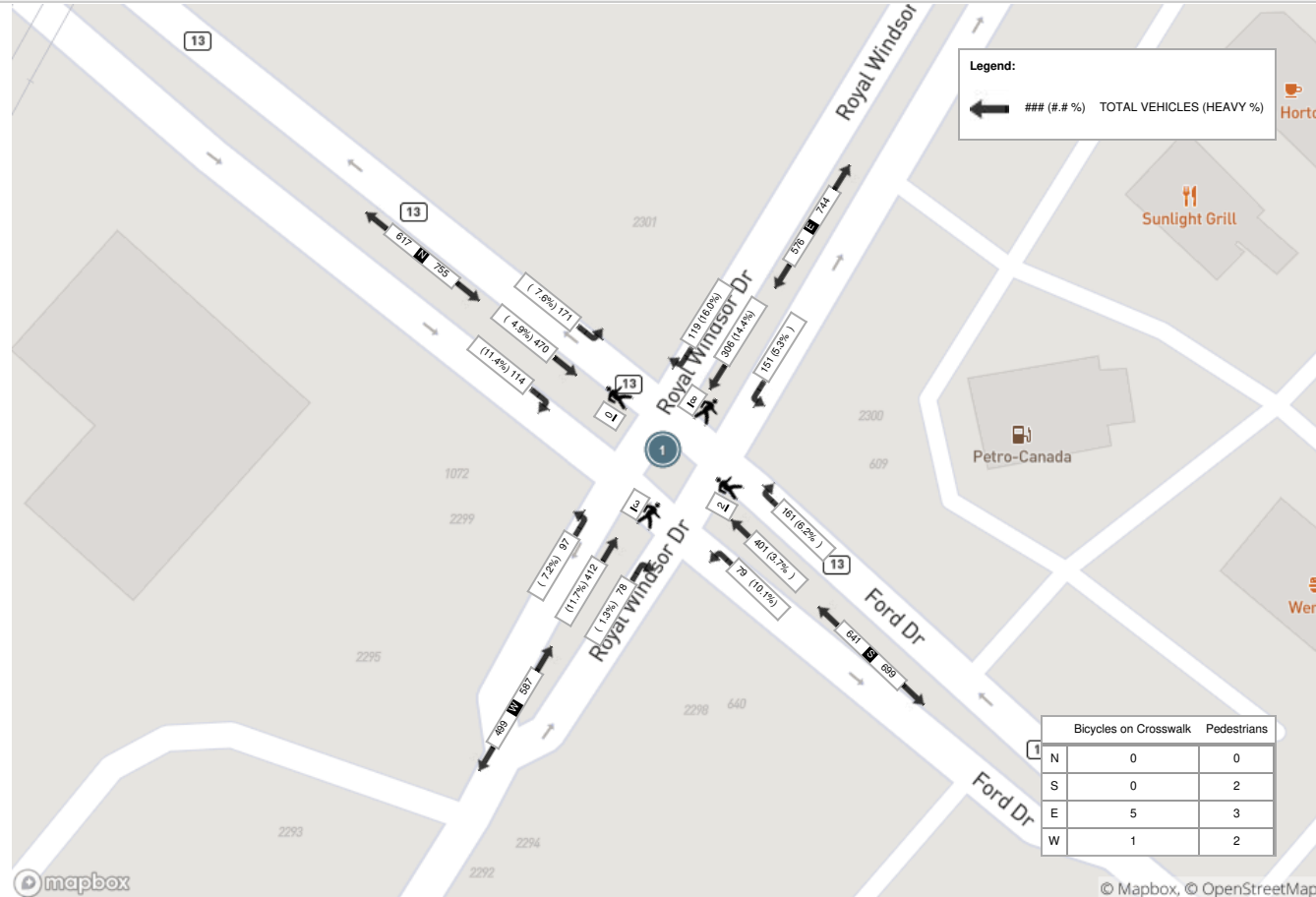
Start Time	N Approach FORD DR						E Approach ROYAL WINDSOR DR						S Approach FORD DR						W Approach ROYAL WINDSOR DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	33	107	39	0	0	179	32	94	33	0	0	159	31	95	20	0	0	146	15	96	22	0	0	133	617
08:45:00	31	161	44	0	0	236	31	73	41	0	5	145	42	107	20	0	2	169	22	114	25	0	1	161	711
09:00:00	26	99	43	0	0	168	29	73	34	0	1	136	49	98	10	0	0	157	26	100	23	0	0	149	610
09:15:00	24	103	45	0	0	172	27	66	43	0	2	136	39	101	29	0	0	169	15	102	27	0	2	144	621
Grand Total	114	470	171	0	0	755	119	306	151	0	8	576	161	401	79	0	2	641	78	412	97	0	3	587	2559
Approach%	15.1%	62.3%	22.6%	0%		-	20.7%	53.1%	26.2%	0%		-	25.1%	62.6%	12.3%	0%		-	13.3%	70.2%	16.5%	0%		-	-
Totals %	4.5%	18.4%	6.7%	0%		29.5%	4.7%	12%	5.9%	0%		22.5%	6.3%	15.7%	3.1%	0%		25%	3%	16.1%	3.8%	0%		22.9%	-
PHF	0.86	0.73	0.95	0		0.8	0.93	0.81	0.88	0		0.91	0.82	0.94	0.68	0		0.95	0.75	0.9	0.9	0		0.91	-
Heavy	13	23	13	0		49	19	44	8	0		71	10	15	8	0		33	1	48	7	0		56	-
Heavy %	11.4%	4.9%	7.6%	0%		6.5%	16%	14.4%	5.3%	0%		12.3%	6.2%	3.7%	10.1%	0%		5.1%	1.3%	11.7%	7.2%	0%		9.5%	-
Lights	101	444	158	0		703	100	262	143	0		505	151	385	71	0		607	77	364	90	0		531	-
Lights %	88.6%	94.5%	92.4%	0%		93.1%	84%	85.6%	94.7%	0%		87.7%	93.8%	96%	89.9%	0%		94.7%	98.7%	88.3%	92.8%	0%		90.5%	-
Single-Unit Trucks	1	11	6	0		18	9	8	6	0		23	7	7	7	0		21	1	23	2	0		26	-
Single-Unit Trucks %	0.9%	2.3%	3.5%	0%		2.4%	7.6%	2.6%	4%	0%		4%	4.3%	1.7%	8.9%	0%		3.3%	1.3%	5.6%	2.1%	0%		4.4%	-
Buses	0	4	0	0		4	0	1	1	0		2	1	4	0	0		5	0	1	0	0		1	-
Buses %	0%	0.9%	0%	0%		0.5%	0%	0.3%	0.7%	0%		0.3%	0.6%	1%	0%	0%		0.8%	0%	0.2%	0%	0%		0.2%	-
Articulated Trucks	12	8	7	0		27	10	35	1	0		46	2	4	1	0		7	0	24	5	0		29	-
Articulated Trucks %	10.5%	1.7%	4.1%	0%		3.6%	8.4%	11.4%	0.7%	0%		8%	1.2%	1%	1.3%	0%		1.1%	0%	5.8%	5.2%	0%		4.9%	-
Bicycles on Road	0	3	0	0		3	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	-
Bicycles on Road %	0%	0.6%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	23.1%	-	-	-	-	15.4%	-	-	-	-	-	15.4%	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	5	-	-	-	-	0	-	-	-	-	-	-	1	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	38.5%	-	-	-	-	0%	-	-	-	-	-	-	7.7%	-	-	-



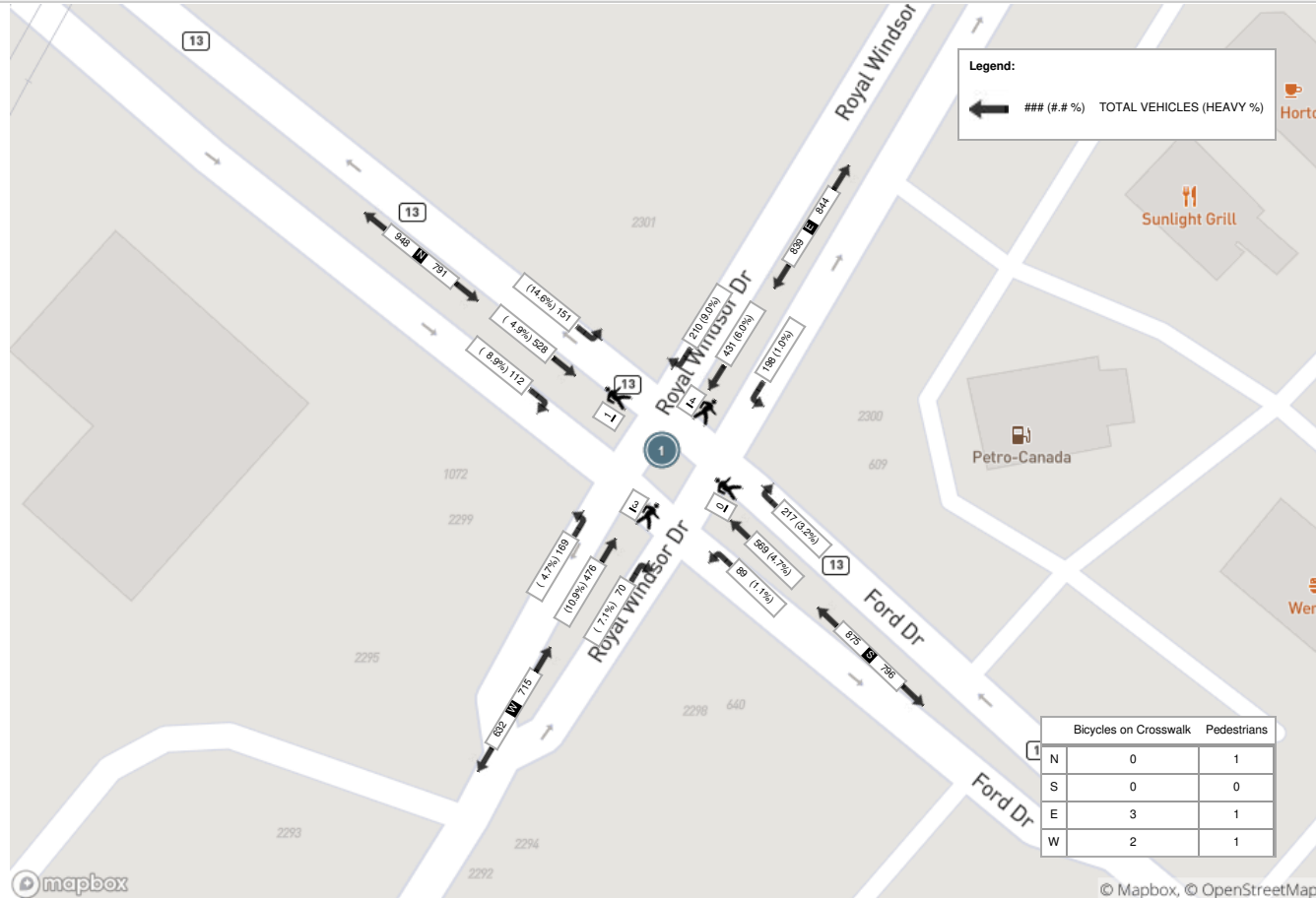
Peak Hour: 03:15 PM - 04:15 PM Weather: Clear Sky (31.59 °C)

Start Time	N Approach FORD DR						E Approach ROYAL WINDSOR DR						S Approach FORD DR						W Approach ROYAL WINDSOR DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
15:15:00	32	117	39	0	0	188	51	118	53	0	0	222	57	135	14	0	0	206	21	110	55	0	0	186	802
15:30:00	26	109	34	0	0	169	60	127	44	0	1	231	47	126	31	0	0	204	15	128	35	0	0	178	782
15:45:00	26	144	34	0	0	204	41	95	49	0	1	185	57	126	23	1	0	207	20	110	40	0	1	170	766
16:00:00	28	158	44	0	1	230	58	91	52	0	2	201	56	182	21	0	0	259	14	128	39	0	2	181	871
Grand Total	112	528	151	0	1	791	210	431	198	0	4	839	217	569	89	1	0	876	70	476	169	0	3	715	3221
Approach%	14.2%	66.8%	19.1%	0%		-	25%	51.4%	23.6%	0%		-	24.8%	65%	10.2%	0.1%		-	9.8%	66.6%	23.6%	0%		-	-
Totals %	3.5%	16.4%	4.7%	0%		24.6%	6.5%	13.4%	6.1%	0%		26%	6.7%	17.7%	2.8%	0%		27.2%	2.2%	14.8%	5.2%	0%		22.2%	-
PHF	0.88	0.84	0.86	0		0.86	0.88	0.85	0.93	0		0.91	0.95	0.78	0.72	0.25		0.85	0.83	0.93	0.77	0		0.96	-
Heavy	10	26	22	0		58	19	26	2	0		47	7	27	1	0		35	5	52	8	0		65	-
Heavy %	8.9%	4.9%	14.6%	0%		7.3%	9%	6%	1%	0%		5.6%	3.2%	4.7%	1.1%	0%		4%	7.1%	10.9%	4.7%	0%		9.1%	-
Lights	102	501	129	0		732	191	405	196	0		792	210	540	88	1		839	65	424	161	0		650	-
Lights %	91.1%	94.9%	85.4%	0%		92.5%	91%	94%	99%	0%		94.4%	96.8%	94.9%	98.9%	100%		95.8%	92.9%	89.1%	95.3%	0%		90.9%	-
Single-Unit Trucks	3	11	11	0		25	12	10	1	0		23	5	14	1	0		20	4	14	2	0		20	-
Single-Unit Trucks %	2.7%	2.1%	7.3%	0%		3.2%	5.7%	2.3%	0.5%	0%		2.7%	2.3%	2.5%	1.1%	0%		2.3%	5.7%	2.9%	1.2%	0%		2.8%	-
Buses	0	3	0	0		3	0	0	1	0		1	1	3	0	0		4	0	1	0	0		1	-
Buses %	0%	0.6%	0%	0%		0.4%	0%	0%	0.5%	0%		0.1%	0.5%	0.5%	0%	0%		0.5%	0%	0.2%	0%	0%		0.1%	-
Articulated Trucks	7	12	11	0		30	7	16	0	0		23	1	10	0	0		11	1	37	6	0		44	-
Articulated Trucks %	6.3%	2.3%	7.3%	0%		3.8%	3.3%	3.7%	0%	0%		2.7%	0.5%	1.8%	0%	0%		1.3%	1.4%	7.8%	3.6%	0%		6.2%	-
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	-
Bicycles on Road %	0%	0.2%	0%	0%		0.1%	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.2%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	12.5%	-	-	-	-	-	12.5%	-	-	-	-	-	0%	-	-	-	-	-	12.5%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	2	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	-	37.5%	-	-	-	-	-	0%	-	-	-	-	-	25%	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)



Peak Hour: 03:15 PM - 04:15 PM Weather: Clear Sky (31.59 °C)





Turning Movement Count (3 . ROYAL WINDSOR DR & WINSTON CHURCHILL BLVD) CustID: 01902061 Miod:

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	UTurn N-N	Peds N:	Approach Total	Right E-N	Thru E-W	Left E-S	UTurn E-E	Peds E:	Approach Total	Right S-E	Thru S-N	Left S-W	UTurn S-S	Peds S:	Approach Total	Right W-S	Thru W-E	Left W-N	UTurn W-W	Peds W:	Approach Total			
06:00:00	18	10	18	0	0	46	6	29	4	0	0	39	7	10	10	0	0	27	14	66	9	0	0	89	201		
06:15:00	27	19	32	0	2	78	12	33	5	0	0	50	7	7	1	0	0	15	22	105	5	0	0	132	275		
06:30:00	28	16	26	0	0	70	15	45	6	0	0	66	8	23	6	0	0	37	30	110	16	0	0	156	329		
06:45:00	36	22	37	0	1	95	19	64	9	0	0	92	2	9	4	0	1	15	22	134	27	0	1	183	385	1190	
07:00:00	21	24	26	0	1	71	35	71	5	0	1	111	7	22	10	0	1	39	12	101	22	0	1	135	356	1345	
07:15:00	26	23	30	0	0	79	13	77	2	0	0	92	4	17	5	0	0	26	19	87	33	0	0	139	336	1406	
07:30:00	34	20	30	0	1	84	19	94	8	0	0	121	3	23	9	0	0	35	19	113	35	0	0	167	407	1484	
07:45:00	45	37	47	0	0	129	38	98	7	0	2	143	15	30	10	0	2	55	10	122	44	0	1	176	503	1602	
08:00:00	42	26	36	0	1	104	52	103	7	0	1	162	13	22	11	0	0	46	21	100	45	0	0	166	478	1724	
08:15:00	50	38	44	0	0	132	46	95	11	0	1	152	19	36	10	0	1	65	18	84	41	0	1	143	492	1880	
08:30:00	49	45	30	0	0	124	34	101	15	0	0	150	12	19	11	0	0	42	11	114	38	0	0	163	479	1952	
08:45:00	52	51	45	0	3	148	50	100	20	0	2	170	16	36	8	0	0	60	15	143	32	0	0	190	568	2017	
09:00:00	31	35	33	0	0	99	46	108	11	0	0	165	20	25	10	0	0	55	13	127	49	0	0	189	508	2047	
09:15:00	37	18	39	0	0	94	46	85	12	0	0	143	11	41	12	0	0	64	20	132	45	0	0	197	498	2053	
09:30:00	34	32	37	0	0	103	49	86	7	0	0	142	8	38	6	0	0	52	19	122	32	0	0	173	470	2044	
09:45:00	27	36	44	0	0	107	44	101	12	0	2	157	11	26	12	0	0	49	20	102	29	0	0	151	464	1940	
BREAK																											
15:00:00	41	30	40	0	8	111	114	179	16	0	4	309	10	47	15	0	0	72	12	136	44	0	0	192	684		
15:15:00	42	46	66	0	0	154	71	135	15	0	0	221	26	55	19	0	0	100	11	133	67	0	0	211	686		
15:30:00	34	47	59	0	4	140	78	161	12	0	1	251	22	44	20	0	0	86	12	152	80	0	0	244	721		
15:45:00	32	43	50	0	3	125	66	114	13	0	1	193	14	63	11	0	1	88	8	145	43	0	1	196	602	2693	
16:00:00	34	35	41	0	0	110	89	161	15	0	0	265	26	42	17	0	0	85	9	177	79	0	0	265	725	2734	
16:15:00	40	34	46	0	1	120	86	140	21	0	0	247	38	61	15	0	0	114	10	130	56	0	0	196	677	2725	
16:30:00	38	45	65	0	0	148	83	124	19	0	0	226	21	59	13	0	1	93	10	132	66	0	0	208	675	2679	
16:45:00	41	35	63	0	0	139	84	111	20	0	1	215	34	45	14	0	0	93	12	158	70	0	0	240	687	2764	
17:00:00	25	43	54	0	0	122	87	145	9	0	1	241	24	71	10	0	1	105	10	188	73	0	0	271	739	2778	
17:15:00	44	34	57	0	2	135	75	126	11	0	1	212	25	65	14	0	0	104	10	176	60	0	0	246	697	2798	
17:30:00	32	34	45	0	0	111	71	90	22	0	3	183	26	53	26	0	1	105	9	172	61	0	1	242	641	2764	
17:45:00	36	34	41	0	2	111	60	107	11	0	0	178	28	50	21	0	0	99	5	150	61	0	0	216	604	2681	
18:00:00	31	29	49	0	1	109	77	113	12	0	1	202	22	43	6	0	0	71	4	145	58	0	0	207	589	2531	
18:15:00	33	33	56	0	0	122	52	110	14	0	0	176	9	26	8	0	0	43	9	111	57	0	0	177	518	2352	
18:30:00	34	31	38	0	0	103	64	80	4	0	0	148	12	35	4	0	2	51	6	107	60	0	0	173	475	2186	
18:45:00	20	50	51	0	0	121	46	79	8	0	1	133	12	43	9	0	0	64	6	106	54	0	0	166	484	2066	
Grand Total	1114	1055	1375	0	30	3544	1727	3265	363	0	23	5355	512	1186	357	0	11	2055	428	4080	1491	0	6	5999	16953	-	
Approach%	31.4%	29.8%	38.8%	0%	-	-	32.3%	61%	6.8%	0%	-	-	24.9%	57.7%	17.4%	0%	-	-	7.1%	68%	24.9%	0%	-	-	-	-	
Totals %	6.6%	6.2%	8.1%	0%	-	20.9%	10.2%	19.3%	2.1%	0%	-	31.6%	3%	7%	2.1%	0%	-	12.1%	2.5%	24.1%	8.8%	0%	-	35.4%	-	-	
Heavy	83	83	94	0	-	-	129	221	25	0	-	-	39	96	92	0	-	-	127	278	86	0	-	-	-	-	
Heavy %	7.5%	7.9%	6.8%	0%	-	-	7.5%	6.8%	6.9%	0%	-	-	7.6%	8.1%	25.8%	0%	-	-	29.7%	6.8%	5.8%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)

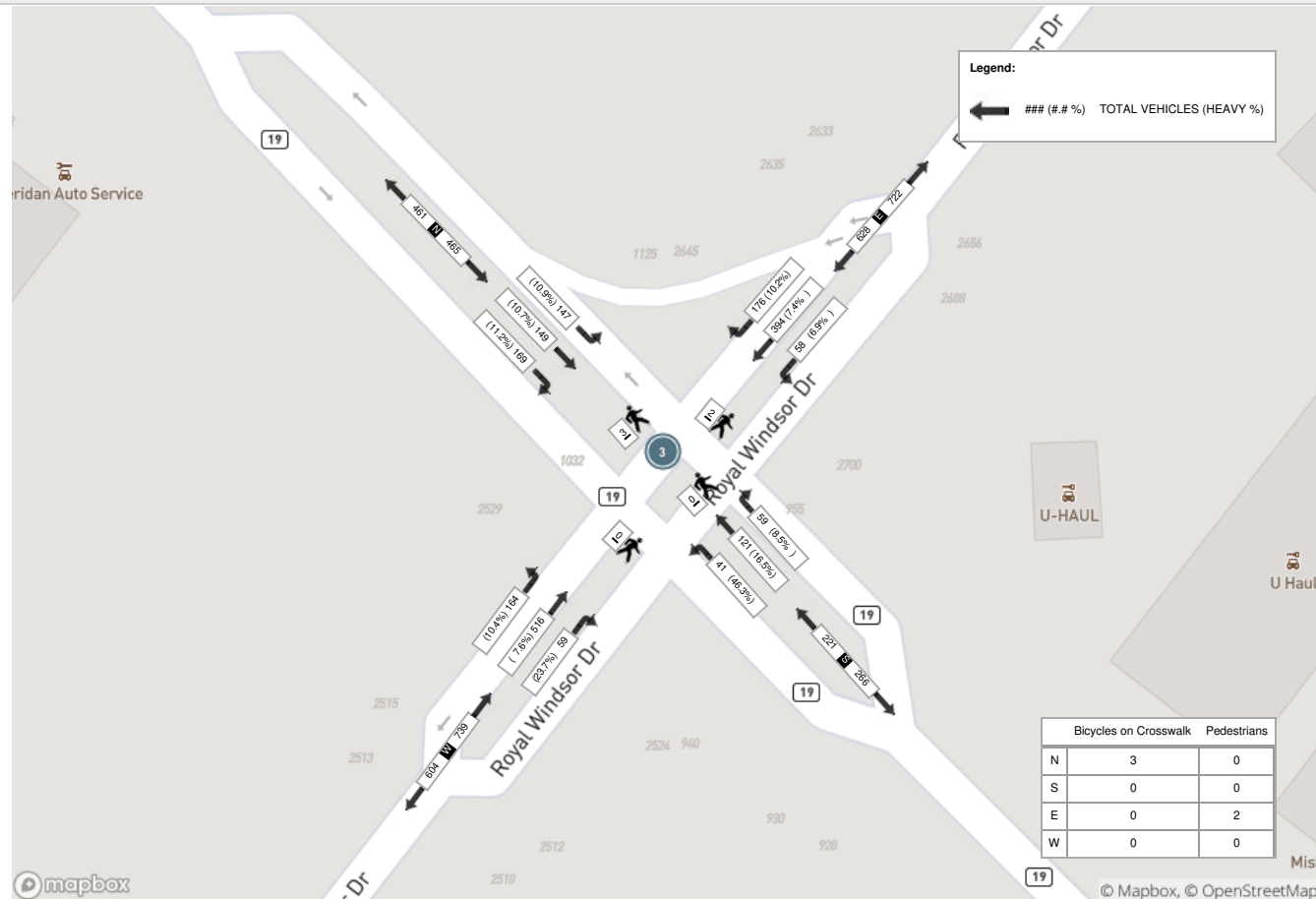
Start Time	N Approach WINSTON CHURCHILL BLVD						E Approach ROYAL WINDSOR DR						S Approach WINSTON CHURCHILL BLVD						W Approach ROYAL WINDSOR DR						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
08:30:00	49	45	30	0	0	124	34	101	15	0	0	150	12	19	11	0	0	42	11	114	38	0	0	163	479
08:45:00	52	51	45	0	3	148	50	100	20	0	2	170	16	36	8	0	0	60	15	143	32	0	0	190	568
09:00:00	31	35	33	0	0	99	46	108	11	0	0	165	20	25	10	0	0	55	13	127	49	0	0	189	508
09:15:00	37	18	39	0	0	94	46	85	12	0	0	143	11	41	12	0	0	64	20	132	45	0	0	197	498
Grand Total	169	149	147	0	3	465	176	394	58	0	2	628	59	121	41	0	0	221	59	516	164	0	0	739	2053
Approach%	36.3%	32%	31.6%	0%		-	28%	62.7%	9.2%	0%		-	26.7%	54.8%	18.6%	0%		-	8%	69.8%	22.2%	0%		-	-
Totals %	8.2%	7.3%	7.2%	0%		22.6%	8.6%	19.2%	2.8%	0%		30.6%	2.9%	5.9%	2%	0%		10.8%	2.9%	25.1%	8%	0%		36%	-
PHF	0.81	0.73	0.82	0		0.79	0.88	0.91	0.73	0		0.92	0.74	0.74	0.85	0		0.86	0.74	0.9	0.84	0		0.94	-
Heavy	19	16	16	0		51	18	29	4	0		51	5	20	19	0		44	14	39	17	0		70	-
Heavy %	11.2%	10.7%	10.9%	0%		11%	10.2%	7.4%	6.9%	0%		8.1%	8.5%	16.5%	46.3%	0%		19.9%	23.7%	7.6%	10.4%	0%		9.5%	-
Lights	150	132	131	0		413	158	365	53	0		576	54	99	22	0		175	45	477	147	0		669	-
Lights %	88.8%	88.6%	89.1%	0%		88.8%	89.8%	92.6%	91.4%	0%		91.7%	91.5%	81.8%	53.7%	0%		79.2%	76.3%	92.4%	89.6%	0%		90.5%	-
Single-Unit Trucks	14	11	7	0		32	8	7	3	0		18	3	11	4	0		18	1	24	9	0		34	-
Single-Unit Trucks %	8.3%	7.4%	4.8%	0%		6.9%	4.5%	1.8%	5.2%	0%		2.9%	5.1%	9.1%	9.8%	0%		8.1%	1.7%	4.7%	5.5%	0%		4.6%	-
Buses	0	0	7	0		7	5	2	0	0		7	2	0	0	0		2	0	1	1	0		2	-
Buses %	0%	0%	4.8%	0%		1.5%	2.8%	0.5%	0%	0%		1.1%	3.4%	0%	0%	0%		0.9%	0%	0.2%	0.6%	0%		0.3%	-
Articulated Trucks	5	5	2	0		12	5	20	1	0		26	0	9	15	0		24	13	14	7	0		34	-
Articulated Trucks %	3%	3.4%	1.4%	0%		2.6%	2.8%	5.1%	1.7%	0%		4.1%	0%	7.4%	36.6%	0%		10.9%	22%	2.7%	4.3%	0%		4.6%	-
Bicycles on Road	0	1	0	0		1	0	0	1	0		1	0	2	0	0		2	0	0	0	0		0	-
Bicycles on Road %	0%	0.7%	0%	0%		0.2%	0%	0%	1.7%	0%		0.2%	0%	1.7%	0%	0%		0.9%	0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	-	0	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
Pedestrians%	-	-	-	-	0%	-	-	-	-	40%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-
Bicycles on Crosswalk	-	-	-	-	3	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-
Bicycles on Crosswalk%	-	-	-	-	60%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-



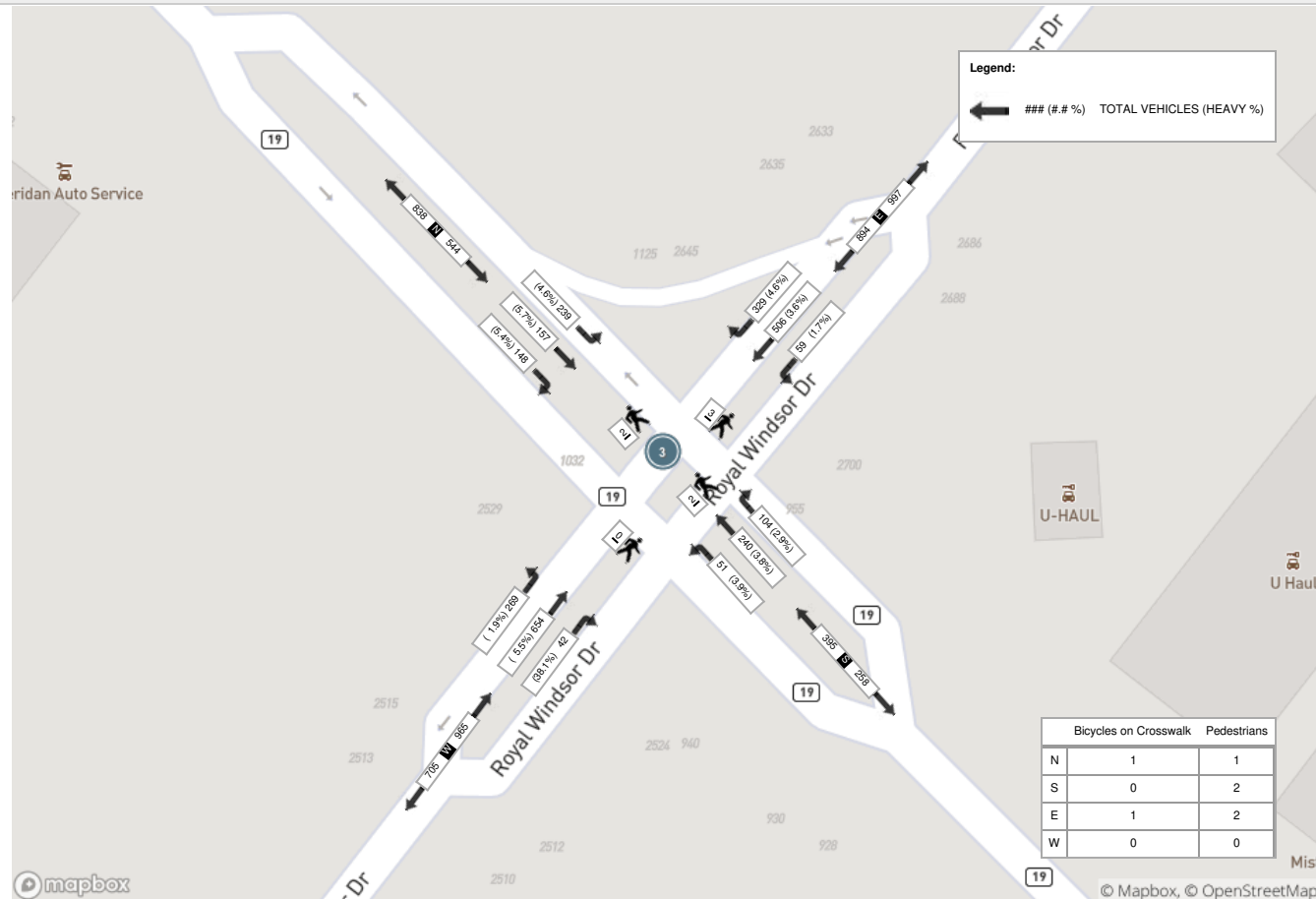
Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (31.59 °C)

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	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:30:00	38	45	65	0	0	148	83	124	19	0	0	226	21	59	13	0	1	93	10	132	66	0	0	208	675
16:45:00	41	35	63	0	0	139	84	111	20	0	1	215	34	45	14	0	0	93	12	158	70	0	0	240	687
17:00:00	25	43	54	0	0	122	87	145	9	0	1	241	24	71	10	0	1	105	10	188	73	0	0	271	739
17:15:00	44	34	57	0	2	135	75	126	11	0	1	212	25	65	14	0	0	104	10	176	60	0	0	246	697
Grand Total	148	157	239	0	2	544	329	506	59	0	3	894	104	240	51	0	2	395	42	654	269	0	0	965	2798
Approach%	27.2%	28.9%	43.9%	0%	-	-	36.8%	56.6%	6.6%	0%	-	-	26.3%	60.8%	12.9%	0%	-	-	4.4%	67.8%	27.9%	0%	-	-	-
Totals %	5.3%	5.6%	8.5%	0%	19.4%	11.8%	18.1%	2.1%	0%	32%	3.7%	8.6%	1.8%	0%	14.1%	1.5%	23.4%	9.6%	0%	34.5%	-	-	-	-	-
PHF	0.84	0.87	0.92	0	0.92	0.95	0.87	0.74	0	0.93	0.76	0.85	0.91	0	0.94	0.88	0.87	0.92	0	0.89	-	-	-	-	-
Heavy	8	9	11	0	28	15	18	1	0	34	3	9	2	0	14	16	36	5	0	57	-	-	-	-	-
Heavy %	5.4%	5.7%	4.6%	0%	5.1%	4.6%	3.6%	1.7%	0%	3.8%	2.9%	3.8%	3.9%	0%	3.5%	38.1%	5.5%	1.9%	0%	5.9%	-	-	-	-	-
Lights	140	148	228	0	516	313	488	58	0	859	100	230	49	0	379	26	618	264	0	908	-	-	-	-	-
Lights %	94.6%	94.3%	95.4%	0%	94.9%	95.1%	96.4%	98.3%	0%	96.1%	96.2%	95.8%	96.1%	0%	95.9%	61.9%	94.5%	98.1%	0%	94.1%	-	-	-	-	-
Single-Unit Trucks	3	6	3	0	12	4	8	0	0	12	1	4	0	0	5	4	11	2	0	17	-	-	-	-	-
Single-Unit Trucks %	2%	3.8%	1.3%	0%	2.2%	1.2%	1.6%	0%	0%	1.3%	1%	1.7%	0%	0%	1.3%	9.5%	1.7%	0.7%	0%	1.8%	-	-	-	-	-
Buses	0	0	6	0	6	7	1	0	0	8	2	0	0	0	2	0	1	0	0	1	-	-	-	-	-
Buses %	0%	0%	2.5%	0%	1.1%	2.1%	0.2%	0%	0%	0.9%	1.9%	0%	0%	0%	0.5%	0%	0.2%	0%	0%	0.1%	-	-	-	-	-
Articulated Trucks	5	3	2	0	10	4	9	1	0	14	0	5	2	0	7	12	24	3	0	39	-	-	-	-	-
Articulated Trucks %	3.4%	1.9%	0.8%	0%	1.8%	1.2%	1.8%	1.7%	0%	1.6%	0%	2.1%	3.9%	0%	1.8%	28.6%	3.7%	1.1%	0%	4%	-	-	-	-	-
Bicycles on Road	0	0	0	0	0	1	0	0	0	1	1	1	0	0	2	0	0	0	0	0	-	-	-	-	-
Bicycles on Road %	0%	0%	0%	0%	0%	0.3%	0%	0%	0%	0.1%	1%	0.4%	0%	0%	0.5%	0%	0%	0%	0%	0%	-	-	-	-	-
Pedestrians	-	-	-	-	1	-	-	-	-	2	-	-	-	-	2	-	-	-	-	0	-	-	-	-	-
Pedestrians%	-	-	-	-	14.3%	-	-	-	-	28.6%	-	-	-	-	28.6%	-	-	-	-	0%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	14.3%	-	-	-	-	14.3%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (31.59 °C)





Turning Movement Count (4 . WINSTON CHURCHILL BLVD & BERYL RD) CustID: 01901714 MiodID:

Start Time	N Approach WINSTON CHURCHILL BLVD					S Approach WINSTON CHURCHILL BLVD					W Approach BERYL RD					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	UTurn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Left W:N	UTurn W:W	Peds W:	Approach Total		
06:00:00	6	18	0	0	24	14	0	0	0	14	4	2	0	0	6	44	
06:15:00	8	30	0	0	38	9	0	0	0	9	6	4	0	0	10	57	
06:30:00	5	36	0	0	41	22	2	0	0	24	5	12	0	0	17	82	
06:45:00	8	37	0	0	45	11	2	0	0	13	3	6	0	0	9	67	250
07:00:00	10	25	0	0	35	24	0	0	0	24	4	6	0	1	10	69	275
07:15:00	12	29	0	0	41	17	3	0	0	20	4	10	0	0	14	75	293
07:30:00	14	24	0	0	38	28	5	0	0	33	7	8	0	1	15	86	297
07:45:00	12	30	0	0	42	28	5	0	0	33	12	17	0	0	29	104	334
08:00:00	19	30	0	0	49	37	2	0	0	39	6	15	0	0	21	109	374
08:15:00	21	35	0	0	56	32	1	0	0	33	4	17	0	0	21	110	409
08:30:00	30	37	0	0	67	31	6	0	1	37	8	14	0	0	22	126	449
08:45:00	31	47	0	0	78	31	10	0	0	41	7	19	0	0	26	145	490
09:00:00	22	41	1	0	64	27	4	0	0	31	4	27	0	0	31	126	507
09:15:00	11	37	1	0	49	36	5	0	0	41	5	17	0	0	22	112	509
09:30:00	15	39	0	0	54	34	4	0	0	38	3	15	0	0	18	110	493
09:45:00	22	44	0	0	66	32	7	0	0	39	8	17	0	0	25	130	478
BREAK																	
15:00:00	24	30	0	0	54	56	10	0	0	66	4	16	0	0	20	140	
15:15:00	25	44	0	0	69	55	5	0	0	60	2	23	0	0	25	154	
15:30:00	19	40	0	0	59	56	5	0	0	61	2	25	0	0	27	147	
15:45:00	15	47	0	0	62	59	7	0	0	66	6	22	0	0	28	156	597
16:00:00	21	47	0	1	68	49	8	0	0	57	1	35	0	0	36	161	618
16:15:00	26	35	0	1	61	58	6	0	0	64	3	40	0	0	43	168	632
16:30:00	26	46	0	0	72	40	8	0	0	48	3	41	0	0	44	164	649
16:45:00	20	42	0	0	62	41	12	0	1	53	9	37	0	0	46	161	654
17:00:00	15	45	0	1	60	40	5	0	0	45	4	39	0	0	43	148	641
17:15:00	15	38	0	0	53	57	4	0	0	61	5	41	0	0	46	160	633
17:30:00	22	38	0	0	60	58	5	0	0	63	3	35	0	0	38	161	630
17:45:00	10	34	0	0	44	47	8	0	0	55	5	40	0	0	45	144	613
18:00:00	7	40	0	1	47	32	8	0	0	40	9	29	0	0	38	125	590
18:15:00	12	35	0	0	47	19	4	0	0	23	2	19	0	0	21	91	521
18:30:00	13	27	0	0	40	45	1	0	0	46	4	10	0	0	14	100	460
18:45:00	6	57	0	0	63	33	3	0	0	36	1	17	0	0	18	117	433



Grand Total	522	1184	2	4	1708	1158	155	0	2	1313	153	675	0	2	828	3849	-
Approach%	30.6%	69.3%	0.1%		-	88.2%	11.8%	0%		-	18.5%	81.5%	0%		-	-	-
Totals %	13.6%	30.8%	0.1%		44.4%	30.1%	4%	0%		34.1%	4%	17.5%	0%		21.5%	-	-
Heavy	79	149	0		-	154	24	0		-	28	52	0		-	-	-
Heavy %	15.1%	12.6%	0%		-	13.3%	15.5%	0%		-	18.3%	7.7%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)

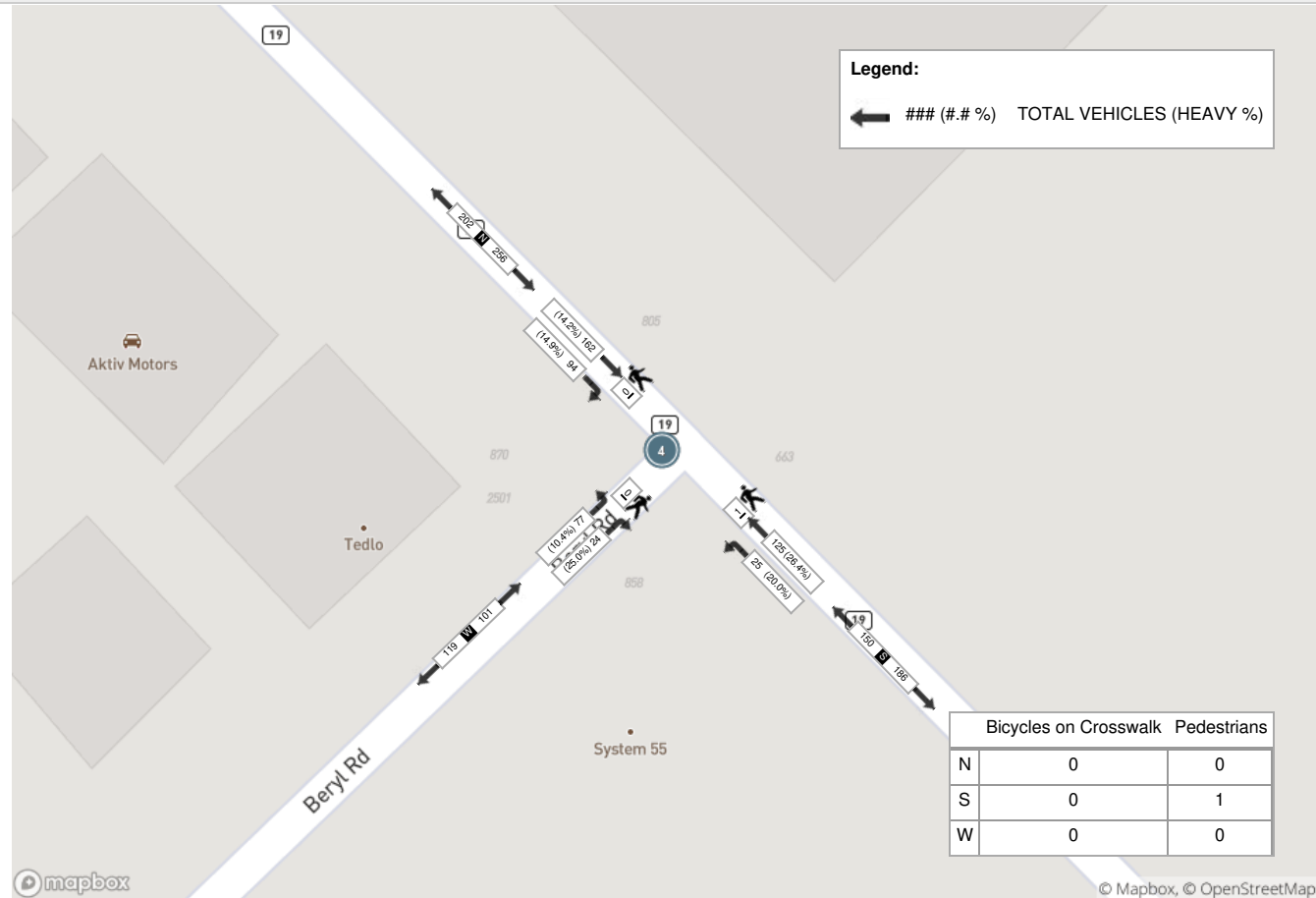
Start Time	N Approach WINSTON CHURCHILL BLVD					S Approach WINSTON CHURCHILL BLVD					W Approach BERYL RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
08:30:00	30	37	0	0	67	31	6	0	1	37	8	14	0	0	22	126
08:45:00	31	47	0	0	78	31	10	0	0	41	7	19	0	0	26	145
09:00:00	22	41	1	0	64	27	4	0	0	31	4	27	0	0	31	126
09:15:00	11	37	1	0	49	36	5	0	0	41	5	17	0	0	22	112
Grand Total	94	162	2	0	258	125	25	0	1	150	24	77	0	0	101	509
Approach%	36.4%	62.8%	0.8%		-	83.3%	16.7%	0%		-	23.8%	76.2%	0%		-	-
Totals %	18.5%	31.8%	0.4%		50.7%	24.6%	4.9%	0%		29.5%	4.7%	15.1%	0%		19.8%	-
PHF	0.76	0.86	0.5		0.83	0.87	0.63	0		0.91	0.75	0.71	0		0.81	-
Heavy	14	23	0		37	33	5	0		38	6	8	0		14	-
Heavy %	14.9%	14.2%	0%		14.3%	26.4%	20%	0%		25.3%	25%	10.4%	0%		13.9%	-
Lights	79	138	2		219	91	20	0		111	18	69	0		87	-
Lights %	84%	85.2%	100%		84.9%	72.8%	80%	0%		74%	75%	89.6%	0%		86.1%	-
Single-Unit Trucks	9	11	0		20	9	5	0		14	6	6	0		12	-
Single-Unit Trucks %	9.6%	6.8%	0%		7.8%	7.2%	20%	0%		9.3%	25%	7.8%	0%		11.9%	-
Buses	0	0	0		0	2	0	0		2	0	0	0		0	-
Buses %	0%	0%	0%		0%	1.6%	0%	0%		1.3%	0%	0%	0%		0%	-
Articulated Trucks	5	12	0		17	22	0	0		22	0	2	0		2	-
Articulated Trucks %	5.3%	7.4%	0%		6.6%	17.6%	0%	0%		14.7%	0%	2.6%	0%		2%	-
Bicycles on Road	1	1	0		2	1	0	0		1	0	0	0		0	-
Bicycles on Road %	1.1%	0.6%	0%		0.8%	0.8%	0%	0%		0.7%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



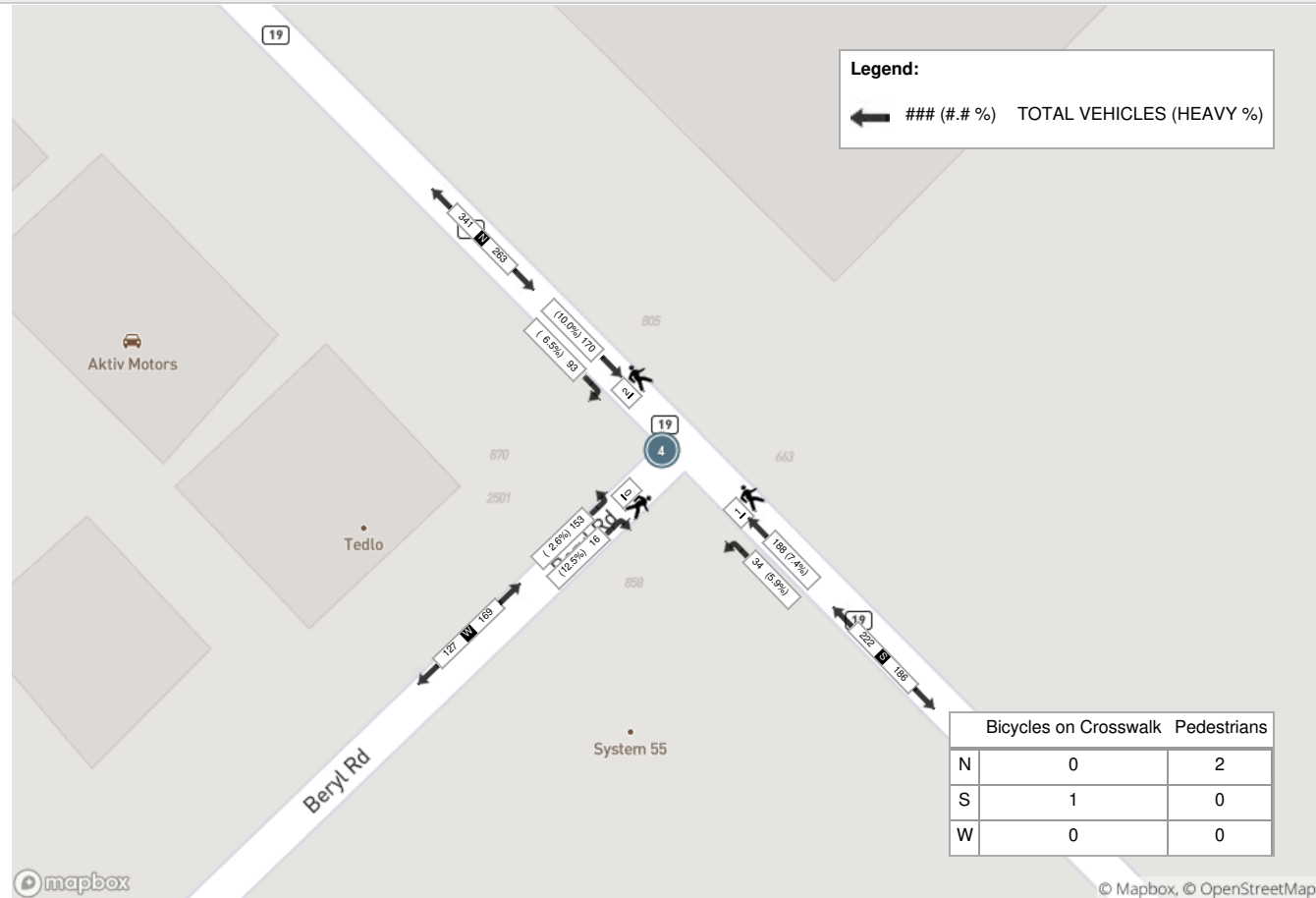
Peak Hour: 04:00 PM - 05:00 PM Weather: Clear Sky (31.59 °C)

Start Time	N Approach WINSTON CHURCHILL BLVD					S Approach WINSTON CHURCHILL BLVD					W Approach BERYL RD					Int. Total (15 min)
	Right	Thru	UTurn	Peds	Approach Total	Thru	Left	UTurn	Peds	Approach Total	Right	Left	UTurn	Peds	Approach Total	
16:00:00	21	47	0	1	68	49	8	0	0	57	1	35	0	0	36	161
16:15:00	26	35	0	1	61	58	6	0	0	64	3	40	0	0	43	168
16:30:00	26	46	0	0	72	40	8	0	0	48	3	41	0	0	44	164
16:45:00	20	42	0	0	62	41	12	0	1	53	9	37	0	0	46	161
Grand Total	93	170	0	2	263	188	34	0	1	222	16	153	0	0	169	654
Approach%	35.4%	64.6%	0%		-	84.7%	15.3%	0%		-	9.5%	90.5%	0%		-	-
Totals %	14.2%	26%	0%		40.2%	28.7%	5.2%	0%		33.9%	2.4%	23.4%	0%		25.8%	-
PHF	0.89	0.9	0		0.91	0.81	0.71	0		0.87	0.44	0.93	0		0.92	-
Heavy	6	17	0		23	14	2	0		16	2	4	0		6	-
Heavy %	6.5%	10%	0%		8.7%	7.4%	5.9%	0%		7.2%	12.5%	2.6%	0%		3.6%	-
Lights	87	153	0		240	174	32	0		206	13	148	0		161	-
Lights %	93.5%	90%	0%		91.3%	92.6%	94.1%	0%		92.8%	81.3%	96.7%	0%		95.3%	-
Single-Unit Trucks	3	5	0		8	5	2	0		7	0	2	0		2	-
Single-Unit Trucks %	3.2%	2.9%	0%		3%	2.7%	5.9%	0%		3.2%	0%	1.3%	0%		1.2%	-
Buses	0	0	0		0	2	0	0		2	0	0	0		0	-
Buses %	0%	0%	0%		0%	1.1%	0%	0%		0.9%	0%	0%	0%		0%	-
Articulated Trucks	3	12	0		15	7	0	0		7	2	2	0		4	-
Articulated Trucks %	3.2%	7.1%	0%		5.7%	3.7%	0%	0%		3.2%	12.5%	1.3%	0%		2.4%	-
Bicycles on Road	0	0	0		0	0	0	0		0	1	1	0		2	-
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	6.3%	0.7%	0%		1.2%	-
Pedestrians	-	-	-	2	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	66.7%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	33.3%	-	-	-	-	0%	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Clear Sky (19.75 °C)



Peak Hour: 04:00 PM - 05:00 PM Weather: Clear Sky (31.59 °C)



Appendix D

Level of Service Definitions

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Appendix E

Signal Timing Plans

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	iNet		Prepared Date	August 24, 2021
Database Rev	iNet		Completed By	MA
Timing Card / Field rev	-		Checked By	BL

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	iNet		Prepared Date	August 24, 2021
Database Rev	iNet		Completed By	MA
Timing Card / Field rev	-		Checked By	BL

Location	Winston Churchill Boulevard @ Lakeshore Road East								
----------	---	--	--	--	--	--	--	--	--

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					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
Semi-Actuated Mode Yes								

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date	iNet		Prepared Date	August 24, 2021
Database Rev	iNet		Completed By	MA
Timing Card / Field rev	-		Checked By	BL

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 Prot. Perm. 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	-	-	-	-	-	-	-	-

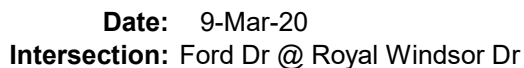
System Control

Yes

Semi-Actuated Mode

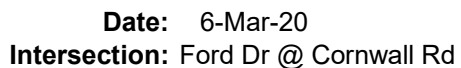
Yes

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



Intersection: Ford Dr @ Royal Windsor Dr

8 Phase Basic Timing Sheet												
	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use		X	X	X		X	X	X				
Direction		NB	WBLT	EB		SB	EBLT	WB				
Min Green		15	6	10		15	6	10				
Veh Ext.		3.5	3.5	3.5		3.5	3.5	3.5				
Yellow		4	4	4		4	4	4				
Red		3	3	3		3	3	3				
Walk		7		7		7		7				
Don't Walk		32		29		32		29				
Max 1		50	40	40		50	40	40				
Max 2												
Max 3												
Veh Recall		X				X						
Ped Recall												
Notes:	Pedestrian Reservice Active											



Date: 6-Mar-20

Intersection: Ford Dr @ Cornwall Rd

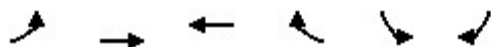
8 Phase Basic Timing Sheet												
	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use		X	X	X		X	X	X				
Direction		NB	WBLT	EB	EB	SB	EBLT	WB				
Min Green		15	6	10		15	6	10				
Veh Ext.		3.5	3.5	3.5		3.5	3.5	3.5				
Yellow		4	4	4		4	4	4				
Red		3	3	3		3	3	3				
Walk		7		7		7		7				
Don't Walk		28		24		28		24				
Max 1		50	40	40		50	40	40				
Max 2												
Max 3												
Veh Recall		X				X						
Ped Recall												
Notes:	Pedestrian Reservice Active											

Appendix F

Detailed Capacity Analysis - 2021 Existing

2021 Existing AM
1: Lakeshore Road East & Winston Churchill Blvd

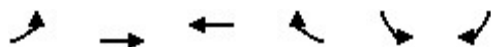
September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	67	132	101	63	78	89
Future Volume (vph)	67	132	101	63	78	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.685				0.950	
Satd. Flow (perm)	1290	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				69		98
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	74	145	111	69	85	98
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	145	111	69	85	98
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Prot	Perm

2021 Existing AM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	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	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	53.0	53.0	53.0	53.0	24.8	24.8
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	9.1	9.1	9.1	9.1	29.1	29.1
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.63	0.63
v/c Ratio	0.29	0.39	0.30	0.22	0.09	0.10
Control Delay	19.0	19.4	18.0	7.1	6.0	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	19.4	18.0	7.1	6.0	2.0
LOS	B	B	B	A	A	A
Approach Delay		19.3	13.8		3.9	
Approach LOS		B	B		A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 46.3

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 12.7

Intersection LOS: B

Intersection Capacity Utilization 27.2%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd














2021 Existing AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	341	53	23	16	57	59	22	257	24	463	154	68
Future Volume (vph)	341	53	23	16	57	59	22	257	24	463	154	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.954			0.924			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1720	0	1767	2960	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.652			0.568		
Satd. Flow (perm)	3318	1720	0	1742	2960	0	1175	3525	0	987	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			63			8				92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	367	57	25	17	61	63	24	276	26	498	166	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	367	82	0	17	124	0	24	302	0	498	166	73
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2021 Existing AM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	NA	Perm
Protected Phases	7	4	3		8		2		2		6		6
Permitted Phases							2				6		6
Detector Phase	7	4	3		8		2	2			6	6	6
Switch Phase													
Minimum Initial (s)	6.0	10.0	6.0		10.0		15.0	15.0			15.0	15.0	15.0
Minimum Split (s)	13.0	38.0	13.0		38.0		42.0	42.0			42.0	42.0	42.0
Total Split (s)	40.0	40.0	40.0		40.0		50.0	50.0			50.0	50.0	50.0
Total Split (%)	30.8%	30.8%	30.8%		30.8%		38.5%	38.5%			38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0	33.0		33.0		43.0	43.0			43.0	43.0	43.0
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		3.0	3.0			3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0			7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0			3.0	3.0	3.0
Recall Mode	None	None	None		None		C-Max	C-Max			C-Max	C-Max	C-Max
Walk Time (s)	4.0		7.0		7.0		7.0	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	24.0		24.0		28.0		28.0	28.0			28.0	28.0	28.0
Pedestrian Calls (#/hr)	0		0		0		0	0			0	0	0
Act Effct Green (s)	19.6	30.9	7.0		10.3		79.1	79.1			79.1	79.1	79.1
Actuated g/C Ratio	0.15	0.24	0.05		0.08		0.61	0.61			0.61	0.61	0.61
v/c Ratio	0.73	0.19	0.18		0.42		0.03	0.14			0.83	0.15	0.08
Control Delay	61.3	34.3	62.6		33.7		11.7	11.3			29.9	8.7	1.0
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0			0.0	0.0	0.0
Total Delay	61.3	34.3	62.6		33.7		11.7	11.3			29.9	8.7	1.0
LOS	E	C	E		C		B	B			C	A	A
Approach Delay	56.3		37.2		11.4		22.2						
Approach LOS	E		D		B		C						

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.6

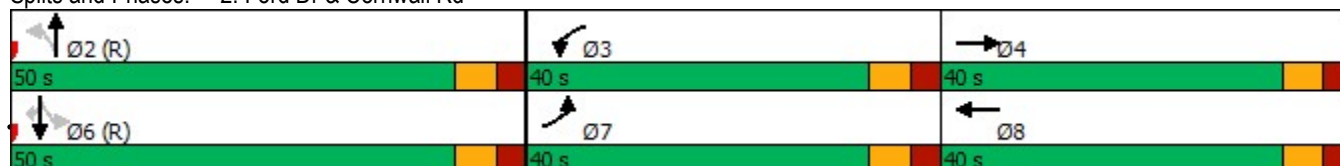
Intersection LOS: C

Intersection Capacity Utilization 90.2%

ICU Level of Service E

Analysis Period (min) 15








Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2021 Existing AM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	79	24	26	128	165	96
Future Volume (vph)	79	24	26	128	165	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.950	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1605	0
Flt Permitted	0.950		0.588			
Satd. Flow (perm)	1690	1384	961	1700	1605	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		26			56	
Link Speed (k/h)	60			60	48	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	14.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	85	26	28	138	177	103
Shared Lane Traffic (%)						
Lane Group Flow (vph)	85	26	28	138	280	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2021 Existing AM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	8.5	8.5	42.7	42.7	42.7	
Actuated g/C Ratio	0.14	0.14	0.71	0.71	0.71	
v/c Ratio	0.36	0.12	0.04	0.11	0.24	
Control Delay	26.8	10.7	4.7	4.7	4.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.8	10.7	4.7	4.7	4.4	
LOS	C	B	A	A	A	
Approach Delay	23.0			4.7	4.4	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

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

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 8.2

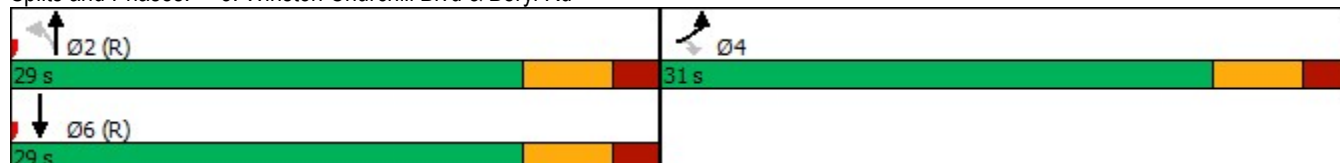
Intersection LOS: A

Intersection Capacity Utilization 36.3%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2021 Existing AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	420	80	154	312	121	81	409	164	174	479	116
Future Volume (vph)	99	420	80	154	312	121	81	409	164	174	479	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	1.00		0.99
Frt		0.976			0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3275	0	1733	3138	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.381			0.210			0.427			0.474		
Satd. Flow (perm)	669	3275	0	383	3138	0	763	3510	1505	806	3510	1405
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			42				180			119
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			2			2	3		8	8		3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	109	462	88	169	343	133	89	449	180	191	526	127
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	550	0	169	476	0	89	449	180	191	526	127
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2021 Existing AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	38.1	27.1		45.0	30.5		67.5	67.5	67.5	67.5	67.5	67.5
Actuated g/C Ratio	0.29	0.21		0.35	0.23		0.52	0.52	0.52	0.52	0.52	0.52
v/c Ratio	0.39	0.79		0.60	0.62		0.23	0.25	0.21	0.46	0.29	0.16
Control Delay	30.2	55.9		36.0	43.4		30.6	27.7	14.9	26.6	19.5	4.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	55.9		36.0	43.4		30.6	27.7	14.9	26.6	19.5	4.6
LOS	C	E		D	D		C	C	B	C	B	A
Approach Delay		51.6			41.5			24.8			18.8	
Approach LOS		D			D			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 33.0

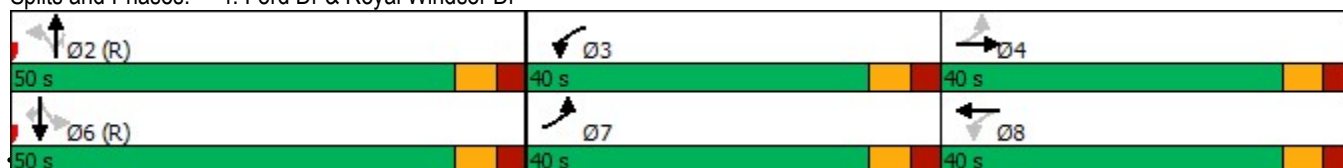
Intersection LOS: C
























Intersection Capacity Utilization 91.9%













ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	526	60	59	402	180	42	123	60	150	152	172
Future Volume (vph)	167	526	60	59	402	180	42	123	60	150	152	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.985				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3287	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.262			0.412			0.649			0.950		
Satd. Flow (perm)	464	3287	0	723	3411	1468	968	3380	1457	3222	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				194			94			185
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	180	566	65	63	432	194	46	134	65	161	163	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	180	631	0	63	432	194	46	134	65	161	163	185
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	9.5	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	20.0	56.0		36.0	36.0	36.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	14.3%	40.0%		25.7%	25.7%	25.7%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Maximum Green (s)	17.0	49.0		29.0	29.0	29.0	27.7	27.7	27.7	44.0	76.7	76.7
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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	46.5	42.5		23.7	23.7	23.7	65.9	65.9	65.9	12.4	83.2	83.2
Actuated g/C Ratio	0.33	0.30		0.17	0.17	0.17	0.47	0.47	0.47	0.09	0.59	0.59
v/c Ratio	0.62	0.63		0.52	0.75	0.47	0.10	0.08	0.09	0.56	0.08	0.19
Control Delay	43.6	43.7		67.2	63.4	10.1	24.8	22.6	2.1	68.7	13.2	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	43.7		67.2	63.4	10.1	24.8	22.6	2.1	68.7	13.2	2.4
LOS	D	D		E	E	B	C	C	A	E	B	A
Approach Delay		43.7			48.7			17.6			26.8	
Approach LOS		D			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 108 (77%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 38.6

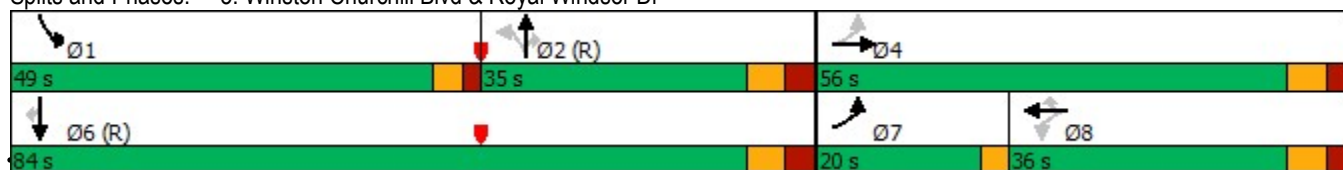
Intersection LOS: D

Intersection Capacity Utilization 74.2%

ICU Level of Service D

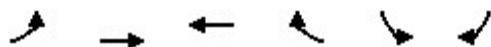
Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



2021 Existing PM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	112	243	188	63	63	119
Future Volume (vph)	112	243	188	63	63	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.628				0.950	
Satd. Flow (perm)	1183	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				69		131
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	123	267	207	69	69	131
Shared Lane Traffic (%)						
Lane Group Flow (vph)	123	267	207	69	69	131
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	97			97	97	97
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	25.0	25.0	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	48.0	48.0	48.0	48.0	29.8	29.8
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?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	48.0	48.0	48.0	48.0	29.8	29.8

2021 Existing PM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
v/c Ratio	0.20	0.26	0.20	0.10	0.15	0.22
Control Delay	12.0	12.3	11.7	3.1	22.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	12.3	11.7	3.1	22.3	5.1
LOS	B	B	B	A	C	A
Approach Delay		12.2	9.5		11.0	
Approach LOS		B	A		B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.26

Intersection Signal Delay: 11.1

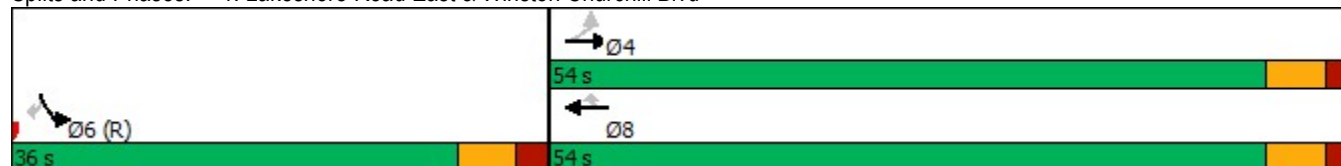
Intersection LOS: B

Intersection Capacity Utilization 38.4%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2021 Existing PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	525	132	55	30	58	85	40	241	31	395	326	83
Future Volume (vph)	525	132	55	30	58	85	40	241	31	395	326	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.911			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2888	0	1716	3509	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.487			0.573		
Satd. Flow (perm)	3318	1724	0	1746	2888	0	878	3509	0	996	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			91			11				92
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	565	142	59	32	62	91	43	259	33	425	351	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	565	201	0	32	153	0	43	292	0	425	351	89
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2021 Existing PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	Perm
Protected Phases	7	4	3		8		2			6		
Permitted Phases							2		6			6
Detector Phase	7	4	3		8		2	2	6			6
Switch Phase												
Minimum Initial (s)	6.0	10.0	6.0		10.0		15.0	15.0	15.0		15.0	15.0
Minimum Split (s)	13.0	39.5	13.0		38.0		42.0	42.0	42.0		42.0	42.0
Total Split (s)	40.0	40.0	40.0		40.0		50.0	50.0	50.0		50.0	50.0
Total Split (%)	30.8%	30.8%	30.8%		30.8%		38.5%	38.5%	38.5%		38.5%	38.5%
Maximum Green (s)	33.0	33.0	33.0		33.0		43.0	43.0	43.0		43.0	43.0
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		3.0	3.0	3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None	None		None		C-Max	C-Max	C-Max		C-Max	C-Max
Walk Time (s)	4.0		7.0		7.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)	24.0		24.0		28.0		28.0	28.0	28.0		28.0	28.0
Pedestrian Calls (#/hr)	0		0		0		0	0	0		0	0
Act Effct Green (s)	27.2	35.0	8.0		10.4		71.4	71.4	71.4		71.4	71.4
Actuated g/C Ratio	0.21	0.27	0.06		0.08		0.55	0.55	0.55		0.55	0.55
v/c Ratio	0.81	0.42	0.30		0.49		0.09	0.15	0.78		0.34	0.10
Control Delay	58.6	40.2	64.8		29.8		16.3	14.8	28.4		11.9	1.2
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0
Total Delay	58.6	40.2	64.8		29.8		16.3	14.8	28.4		11.9	1.2
LOS	E	D	E		C		B	B	C		B	A
Approach Delay	53.7		35.8		15.0		18.9					
Approach LOS	D		D		B		B					

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 32.2

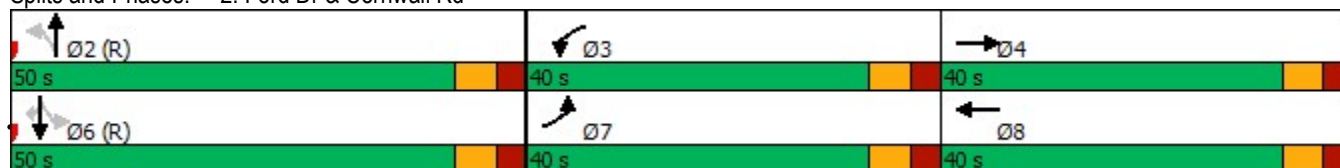
Intersection LOS: C

Intersection Capacity Utilization 98.8%

ICU Level of Service F

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2021 Existing PM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	156	16	35	192	173	95
Future Volume (vph)	156	16	35	192	173	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.952	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1608	0
Flt Permitted	0.950		0.583			
Satd. Flow (perm)	1690	1384	953	1700	1608	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		17			53	
Link Speed (k/h)	60			60	60	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	11.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	168	17	38	206	186	102
Shared Lane Traffic (%)						
Lane Group Flow (vph)	168	17	38	206	288	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2021 Existing PM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	11.3	11.3	40.1	40.1	40.1	
Actuated g/C Ratio	0.19	0.19	0.67	0.67	0.67	
v/c Ratio	0.53	0.06	0.06	0.18	0.26	
Control Delay	27.2	9.6	6.5	6.5	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.2	9.6	6.5	6.5	6.0	
LOS	C	A	A	A	A	
Approach Delay	25.6			6.5	6.0	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.53

Intersection Signal Delay: 11.2

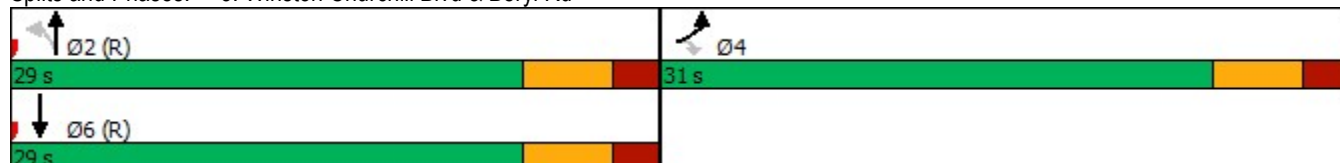
Intersection LOS: B

Intersection Capacity Utilization 43.1%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2021 Existing PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	185	579	81	179	364	186	97	613	202	159	549	80
Future Volume (vph)	185	579	81	179	364	186	97	613	202	159	549	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.98	1.00		0.99
Frt		0.982			0.949				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3121	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.253			0.175			0.366			0.327		
Satd. Flow (perm)	444	3294	0	319	3121	0	654	3510	1498	556	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			66				222			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	203	636	89	197	400	204	107	674	222	175	603	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	203	725	0	197	604	0	107	674	222	175	603	88
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2021 Existing PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	50.0	34.6		49.2	34.2		59.4	59.4	59.4	59.4	59.4	59.4
Actuated g/C Ratio	0.38	0.27		0.38	0.26		0.46	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.64	0.82		0.70	0.70		0.36	0.42	0.28	0.69	0.38	0.13
Control Delay	32.5	52.0		37.1	42.3		41.2	37.4	17.6	47.0	25.4	5.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	52.0		37.1	42.3		41.2	37.4	17.6	47.0	25.4	5.0
LOS	C	D		D	D		D	D	B	D	C	A
Approach Delay		47.8			41.0			33.4			27.7	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 37.4

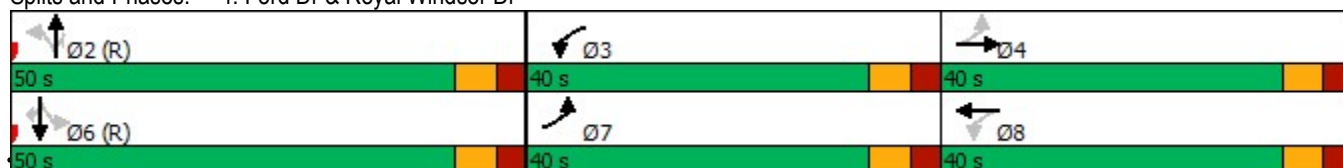
Intersection LOS: D
























Intersection Capacity Utilization 97.1%













ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	274	667	43	60	516	336	52	245	106	244	160	151
Future Volume (vph)	274	667	43	60	516	336	52	245	106	244	160	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.991				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3337	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.263			0.291			0.643			0.950		
Satd. Flow (perm)	465	3337	0	511	3411	1468	959	3380	1457	3225	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				361			115			162
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	295	717	46	65	555	361	57	266	115	262	172	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	295	763	0	65	555	361	57	266	115	262	172	162
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
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%
Maximum Green (s)	11.0	63.0		49.0	49.0	49.0	31.7	31.7	31.7	26.0	62.7	62.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	52.4	45.4		31.4	31.4	31.4	58.7	58.7	58.7	16.6	80.3	80.3
Actuated g/C Ratio	0.37	0.32		0.22	0.22	0.22	0.42	0.42	0.42	0.12	0.57	0.57
v/c Ratio	1.00	0.70		0.57	0.73	0.59	0.14	0.19	0.17	0.68	0.09	0.18
Control Delay	88.2	44.4		66.6	55.6	8.1	30.2	28.0	6.0	68.3	14.6	2.9
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	88.2	44.4		66.6	55.6	8.1	30.2	28.0	6.0	68.3	14.6	2.9
LOS	F	D		E	E	A	C	C	A	E	B	A
Approach Delay		56.6			38.9			22.5			35.0	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 41.9

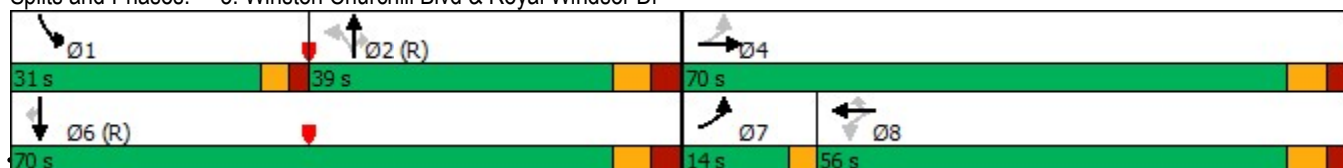
Intersection LOS: D

Intersection Capacity Utilization 79.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



Appendix G

Background Development Report Excerpts

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
April 6, 2021

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**), one background development located at 560 Winston Churchill Boulevard was identified, located south of the development site.

The application of the above-noted proposed background development is currently under review from Town of Oakville staff, and consists of the construction of 2 warehouse buildings, totalling 58,655 m² in size. In lieu of any identified transportation impact studies published for the proposed 560 Winston Churchill Boulevard development, background development site trips were estimated using fitted curve data from the publication **Trip Generation Manual, 10th Edition** (Institute of Transportation Engineers, September 2017) and assigned to the study area road network based on logical travel patterns. The estimated net vehicle trips for the proposed background development at 560 Winston Churchill Boulevard are presented in **Exhibit 3-1**. Trip generation source data is presented in **Appendix F**.

Exhibit 3-1: 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%

Based on the above, the proposed background development at 560 Winston Churchill Boulevard is expected to generate up to 101 net new vehicle trips (78 inbound trips and 23 outbound trips) during the Weekday AM Peak Hour and up to 104 net new vehicle trips (28 inbound trips and 76 outbound trips) during the Weekday PM Peak Hour. Background development trip assignments are illustrated in **Exhibit 3-2**.

Table 4: ITE Trip Generation

Table with 7 columns: Use, 1000 sq. ft. GLA, Peak Hour, Rate/Equation Used, Inbound, Outbound, Total

Building A						
Use	1000 sq. ft. GLA	Peak Hour	Rate/Equation Used	Number of Trips		
				Inbound	Outbound	Total
General Light Industrial - 110	16.52	A.M.	$\ln(T)=0.74\ln(X)+0.39$	10 (88%)	2 (12%)	12
		P.M.	$\ln(T)=0.69\ln(X)+0.43$	1 (13%)	10 (87%)	11
Total			Weekday A.M.	10	2	12
			Weekday P.M.	1	10	11
Building B						
Use	1000 sq. ft. GLA	Peak Hour	Rate/Equation Used	Number of Trips		
				Inbound	Outbound	Total
General Light Industrial - 110	17.22 ¹	A.M.	$\ln(T)=0.74\ln(X)+0.39$	11 (88%)	1 (12%)	12
		P.M.	$\ln(T)=0.69\ln(X)+0.43$	1 (13%)	10 (87%)	11
Total			Weekday A.M.	11	1	12
			Weekday P.M.	1	10	11

Note 1: The GFA for Building B used here is a larger number than outlined in the most recent Site Plan.

As shown in Table 4, Building A is expected to generate 12 total trips in the A.M. peak hour and 11 total trips in the P.M. peak hour. Building B is expected to generate 12 total trips in the A.M. peak hour and 11 total trips in the P.M. peak hour.

3.2 Trip Distribution and Assignment

Vehicles entering and exiting the proposed site were distributed to the surrounding road network using existing traffic patterns.

The trip distribution used for the development is included in Appendix K – Trip Distribution. The total assignment of site-generated trips is included in Figure 7.

3.3 Intersection Operations

Traffic operations at the study intersections were analyzed following addition of site-generated trips to the future background volumes anticipated within the boundary road network. Volumes anticipated for the future total conditions for all horizon years are included in Figures 8, 9 and 10. Table 4 summarizes the 2022, 2027, and 2032 future total Levels of Service. Detailed capacity analyses are included in Appendix L – Detailed Capacity Analysis – 2022, 2027, 2032 Future Total.

Appendix H

Detailed Capacity Analysis – 2022, 2027, 2032 Future Background

2022 Future Background AM

1: Lakeshore Road East & Winston Churchill Blvd

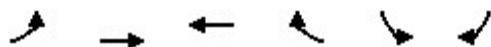
September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	68	135	103	64	80	91
Future Volume (vph)	68	135	103	64	80	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950	0.997			0.950	
Satd. Flow (prot)	1700	1801	1902	1286	1428	1551
Flt Permitted	0.684	0.974			0.950	
Satd. Flow (perm)	1224	1759	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				70		100
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	75	148	113	70	87	100
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	67	156	113	70	87	100
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Prot	Perm

2022 Future Background AM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	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	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	53.0	53.0	53.0	53.0	24.8	24.8
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	9.5	9.5	9.5	9.5	29.2	29.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.62	0.62
v/c Ratio	0.27	0.44	0.29	0.22	0.10	0.10
Control Delay	18.5	20.3	17.7	6.9	6.3	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	20.3	17.7	6.9	6.3	2.1
LOS	B	C	B	A	A	A
Approach Delay		19.7	13.5		4.1	
Approach LOS		B	B		A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 46.8

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 12.9

Intersection LOS: B

Intersection Capacity Utilization 28.9%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2022 Future Background AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	349	56	23	16	58	61	22	263	25	480	157	69
Future Volume (vph)	349	56	23	16	58	61	22	263	25	480	157	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.923			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2954	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.650			0.563		
Satd. Flow (perm)	3318	1724	0	1742	2954	0	1171	3525	0	978	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			66			8				92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	375	60	25	17	62	66	24	283	27	516	169	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	375	85	0	17	128	0	24	310	0	516	169	74
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2022 Future Background AM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	NA	Perm
Protected Phases	7	4	3		8		2		2		6		6
Permitted Phases							2				6		6
Detector Phase	7	4	3		8		2	2			6	6	6
Switch Phase													
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		15.0		15.0	15.0
Minimum Split (s)	13.0	38.0		13.0	38.0		42.0	42.0		42.0		42.0	42.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0		50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%		38.5%		38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0		43.0		43.0	43.0
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		3.0	3.0		3.0		3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0		7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max		C-Max	C-Max
Walk Time (s)	4.0		7.0		7.0		7.0	7.0		7.0		7.0	7.0
Flash Dont Walk (s)	24.0		24.0		28.0		28.0	28.0		28.0		28.0	28.0
Pedestrian Calls (#/hr)	0		0		0		0	0		0		0	0
Act Effct Green (s)	20.0	31.3		7.0	10.3		78.7	78.7		78.7		78.7	78.7
Actuated g/C Ratio	0.15	0.24		0.05	0.08		0.61	0.61		0.61		0.61	0.61
v/c Ratio	0.73	0.20		0.18	0.43		0.03	0.15		0.87		0.15	0.08
Control Delay	61.0	34.8		62.6	33.3		11.9	11.6		34.5		8.7	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0		0.0	0.0
Total Delay	61.0	34.8		62.6	33.3		11.9	11.6		34.5		8.7	0.9
LOS	E	C		E	C		B	B		C		A	A
Approach Delay	56.2		36.7		11.6		25.5						
Approach LOS	E		D		B		C						

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 32.0

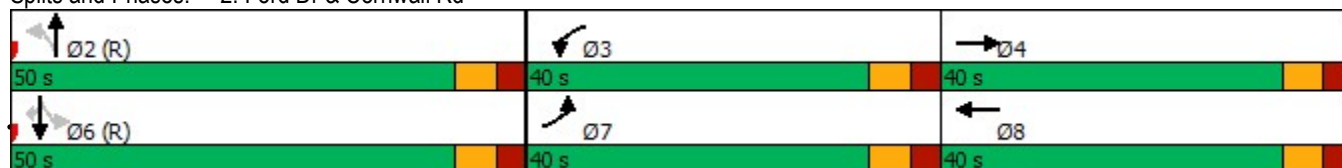
Intersection LOS: C

Intersection Capacity Utilization 91.3%

ICU Level of Service F

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2022 Future Background AM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	81	27	27	139	192	100
Future Volume (vph)	81	27	27	139	192	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.954	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1612	0
Flt Permitted	0.950		0.570			
Satd. Flow (perm)	1690	1384	931	1700	1612	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		29			51	
Link Speed (k/h)	60			60	48	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	14.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	87	29	29	149	206	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	29	29	149	314	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2022 Future Background AM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	8.5	8.5	42.7	42.7	42.7	
Actuated g/C Ratio	0.14	0.14	0.71	0.71	0.71	
v/c Ratio	0.36	0.13	0.04	0.12	0.27	
Control Delay	26.8	10.3	4.8	4.8	4.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.8	10.3	4.8	4.8	4.7	
LOS	C	B	A	A	A	
Approach Delay	22.7			4.8	4.7	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

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

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 8.2

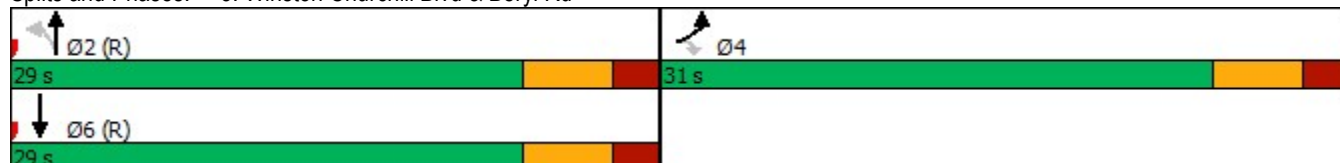
Intersection LOS: A

Intersection Capacity Utilization 37.3%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2022 Future Background AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	435	82	157	318	123	83	418	170	180	496	118
Future Volume (vph)	101	435	82	157	318	123	83	418	170	180	496	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	1.00		0.99
Frt		0.976			0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3275	0	1733	3138	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.379			0.202			0.415			0.467		
Satd. Flow (perm)	666	3275	0	368	3138	0	742	3510	1505	795	3510	1405
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			42				187			117
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			2			2	3		8	8		3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	111	478	90	173	349	135	91	459	187	198	545	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	568	0	173	484	0	91	459	187	198	545	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2022 Future Background AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	38.8	27.8		45.9	31.3		66.6	66.6	66.6	66.6	66.6	66.6
Actuated g/C Ratio	0.30	0.21		0.35	0.24		0.51	0.51	0.51	0.51	0.51	0.51
v/c Ratio	0.39	0.80		0.61	0.61		0.24	0.26	0.22	0.49	0.30	0.17
Control Delay	29.7	55.6		36.0	42.8		31.6	28.3	15.0	28.1	20.1	5.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.7	55.6		36.0	42.8		31.6	28.3	15.0	28.1	20.1	5.2
LOS	C	E		D	D		C	C	B	C	C	A
Approach Delay		51.4			41.0			25.3			19.7	
Approach LOS		D			D			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 33.2

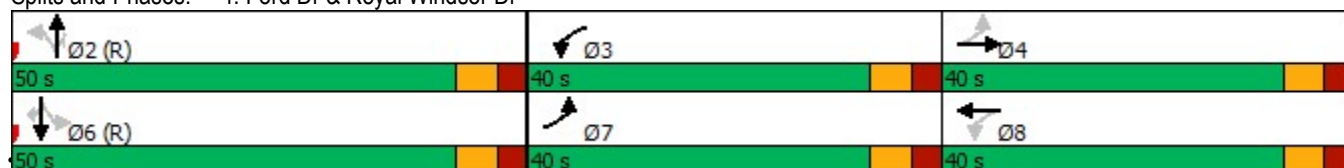
Intersection LOS: C

Intersection Capacity Utilization 92.5%

ICU Level of Service F
























Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



2022 Future Background AM
5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	538	68	64	414	184	43	130	64	153	170	176
Future Volume (vph)	170	538	68	64	414	184	43	130	64	153	170	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.983				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3274	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.253			0.404			0.636			0.950		
Satd. Flow (perm)	448	3274	0	709	3411	1468	948	3380	1457	3222	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				198			94			189
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	183	578	73	69	445	198	47	141	70	165	183	189
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	651	0	69	445	198	47	141	70	165	183	189
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2022 Future Background AM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	9.5	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	20.0	56.0		36.0	36.0	36.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	14.3%	40.0%		25.7%	25.7%	25.7%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Maximum Green (s)	17.0	49.0		29.0	29.0	29.0	27.7	27.7	27.7	44.0	76.7	76.7
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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	47.1	43.1		24.3	24.3	24.3	65.1	65.1	65.1	12.5	82.6	82.6
Actuated g/C Ratio	0.34	0.31		0.17	0.17	0.17	0.46	0.46	0.46	0.09	0.59	0.59
v/c Ratio	0.63	0.64		0.57	0.75	0.47	0.11	0.09	0.10	0.57	0.09	0.20
Control Delay	43.8	43.7		70.2	63.1	9.9	25.3	23.1	2.5	68.6	13.5	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	43.7		70.2	63.1	9.9	25.3	23.1	2.5	68.6	13.5	2.4
LOS	D	D		E	E	A	C	C	A	E	B	A
Approach Delay		43.7			49.0			17.9			26.6	
Approach LOS		D			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 108 (77%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 38.5

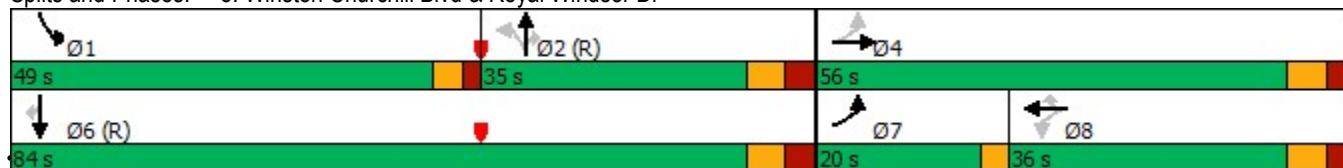
Intersection LOS: D

Intersection Capacity Utilization 74.8%

ICU Level of Service D

Analysis Period (min) 15

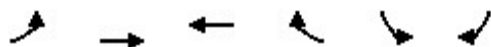
Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



2022 Future Background PM

1: Lakeshore Road East & Winston Churchill Blvd

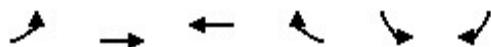
September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	114	248	192	64	64	121
Future Volume (vph)	114	248	192	64	64	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950	0.998			0.950	
Satd. Flow (prot)	1700	1803	1902	1286	1428	1551
Flt Permitted	0.626	0.985			0.950	
Satd. Flow (perm)	1120	1779	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				70		133
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	125	273	211	70	70	133
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	112	286	211	70	70	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	97			97	97	97
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	25.0	25.0	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	48.0	48.0	48.0	48.0	29.8	29.8
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?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	48.0	48.0	48.0	48.0	29.8	29.8

2022 Future Background PM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
v/c Ratio	0.19	0.30	0.21	0.10	0.15	0.22
Control Delay	12.0	12.8	11.7	3.1	22.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	12.8	11.7	3.1	22.3	5.1
LOS	B	B	B	A	C	A
Approach Delay	12.5		9.6		11.0	
Approach LOS	B		A		B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 11.2

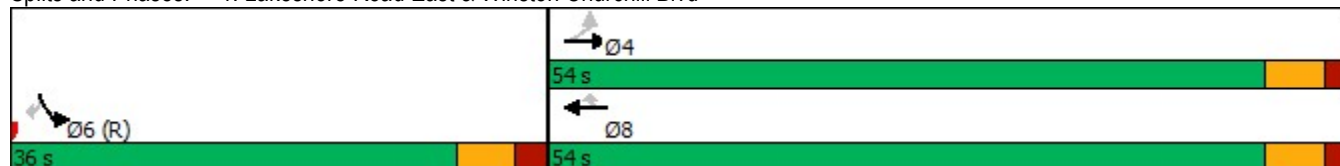
Intersection LOS: B

Intersection Capacity Utilization 45.0%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2022 Future Background PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	536	136	56	32	61	90	41	246	32	404	334	85
Future Volume (vph)	536	136	56	32	61	90	41	246	32	404	334	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.911			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2888	0	1716	3509	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.480			0.569		
Satd. Flow (perm)	3318	1724	0	1746	2888	0	866	3509	0	989	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			97			11				92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	576	146	60	34	66	97	44	265	34	434	359	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	576	206	0	34	163	0	44	299	0	434	359	91
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2022 Future Background PM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	NA	Perm
Protected Phases	7	4	3		8		2			6		6	
Permitted Phases							2				6	6	
Detector Phase	7	4	3		8		2	2			6	6	
Switch Phase													
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0			15.0	15.0	
Minimum Split (s)	13.0	39.5		13.0	38.0		42.0	42.0			42.0	42.0	
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0			50.0	50.0	
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%			38.5%	38.5%	
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0			43.0	43.0	
Yellow Time (s)	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		3.0	3.0			3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	
Walk Time (s)	4.0		7.0		7.0		7.0				7.0	7.0	
Flash Dont Walk (s)	24.0		24.0		28.0		28.0				28.0	28.0	
Pedestrian Calls (#/hr)	0		0		0		0				0	0	
Act Effct Green (s)	27.5	35.2		8.1	10.5		71.0	71.0			71.0	71.0	
Actuated g/C Ratio	0.21	0.27		0.06	0.08		0.55	0.55			0.55	0.55	
v/c Ratio	0.82	0.43		0.31	0.51		0.09	0.16			0.80	0.35	
Control Delay	58.7	40.3		65.0	30.0		16.6	15.1			30.9	12.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0	
Total Delay	58.7	40.3		65.0	30.0		16.6	15.1			30.9	12.0	
LOS	E	D		E	C		B	B			C	B	
Approach Delay	53.9		36.0		15.3		20.2						
Approach LOS	D		D		B		C						

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 32.8

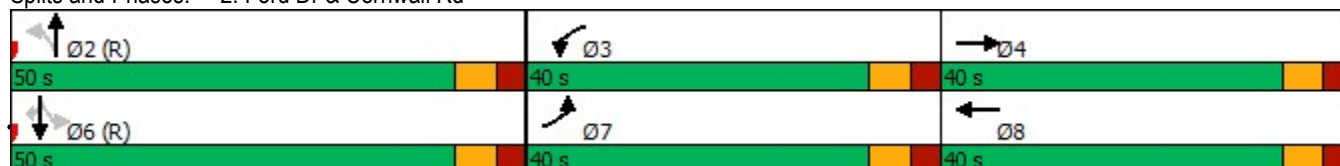
Intersection LOS: C

Intersection Capacity Utilization 99.6%

ICU Level of Service F

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2022 Future Background PM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	163	17	37	223	185	97
Future Volume (vph)	163	17	37	223	185	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.954	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1612	0
Flt Permitted	0.950		0.575			
Satd. Flow (perm)	1690	1384	939	1700	1612	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		18			51	
Link Speed (k/h)	60			60	60	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	11.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	175	18	40	240	199	104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	18	40	240	303	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2022 Future Background PM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	11.5	11.5	39.9	39.9	39.9	
Actuated g/C Ratio	0.19	0.19	0.66	0.66	0.66	
v/c Ratio	0.54	0.06	0.06	0.21	0.28	
Control Delay	27.3	9.2	6.6	6.8	6.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.3	9.2	6.6	6.8	6.2	
LOS	C	A	A	A	A	
Approach Delay	25.6			6.8	6.2	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 11.3

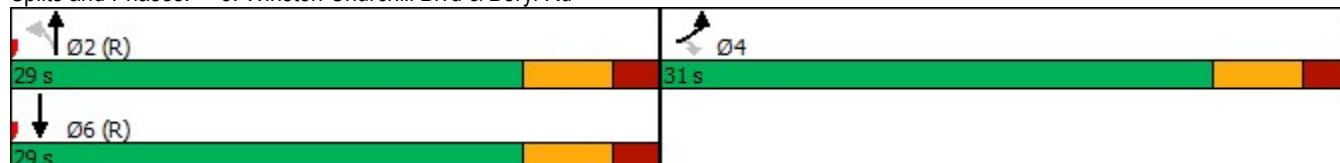
Intersection LOS: B

Intersection Capacity Utilization 44.3%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2022 Future Background PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	593	83	185	376	193	99	627	206	162	561	82
Future Volume (vph)	189	593	83	185	376	193	99	627	206	162	561	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.98	1.00		0.99
Frt		0.982			0.949				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3121	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.248			0.170			0.355			0.315		
Satd. Flow (perm)	435	3294	0	310	3121	0	635	3510	1498	536	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			67				226			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	208	652	91	203	413	212	109	689	226	178	616	90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	208	743	0	203	625	0	109	689	226	178	616	90
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2022 Future Background PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	51.0	35.5		50.7	35.3		58.2	58.2	58.2	58.2	58.2	58.2
Actuated g/C Ratio	0.39	0.27		0.39	0.27		0.45	0.45	0.45	0.45	0.45	0.45
v/c Ratio	0.66	0.82		0.70	0.70		0.39	0.44	0.28	0.74	0.39	0.13
Control Delay	32.3	51.4		36.7	41.7		43.1	38.6	17.9	53.3	26.5	5.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.3	51.4		36.7	41.7		43.1	38.6	17.9	53.3	26.5	5.5
LOS	C	D		D	D		D	D	B	D	C	A
Approach Delay		47.3			40.4			34.5			29.7	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 38.0

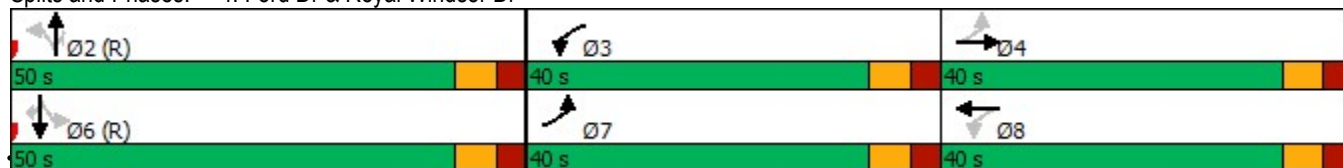
Intersection LOS: D

Intersection Capacity Utilization 97.9%

ICU Level of Service F
























Analysis Period (min) 15













Splits and Phases: 4: Ford Dr & Royal Windsor Dr



2022 Future Background PM
5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	281	684	45	63	526	343	59	270	113	249	169	154
Future Volume (vph)	281	684	45	63	526	343	59	270	113	249	169	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.991				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3337	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.259			0.279			0.637			0.950		
Satd. Flow (perm)	458	3337	0	490	3411	1468	950	3380	1457	3225	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				369			123			166
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	302	735	48	68	566	369	64	293	123	268	182	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	783	0	68	566	369	64	293	123	268	182	166
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
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%
Maximum Green (s)	11.0	63.0		49.0	49.0	49.0	31.7	31.7	31.7	26.0	62.7	62.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	53.1	46.1		32.1	32.1	32.1	57.8	57.8	57.8	16.9	79.6	79.6
Actuated g/C Ratio	0.38	0.33		0.23	0.23	0.23	0.41	0.41	0.41	0.12	0.57	0.57
v/c Ratio	1.02	0.71		0.61	0.72	0.60	0.16	0.21	0.18	0.69	0.09	0.18
Control Delay	93.2	44.2		70.0	55.0	8.0	31.1	28.9	6.0	68.2	15.0	2.9
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	93.2	44.2		70.0	55.0	8.0	31.1	28.9	6.0	68.2	15.0	2.9
LOS	F	D		E	D	A	C	C	A	E	B	A
Approach Delay		57.8			38.7			23.3			34.9	
Approach LOS		E			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 42.2

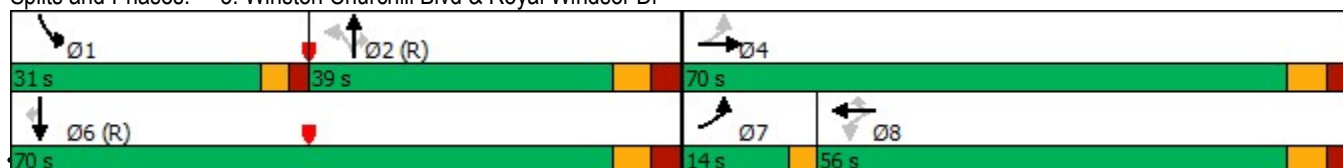
Intersection LOS: D

Intersection Capacity Utilization 80.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



2027 Future Background AM

1: Lakeshore Road East & Winston Churchill Blvd

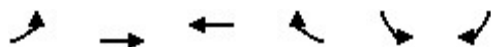
September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	75	149	114	71	88	100
Future Volume (vph)	75	149	114	71	88	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950	0.998			0.950	
Satd. Flow (prot)	1700	1803	1902	1286	1428	1551
Flt Permitted	0.677	0.980			0.950	
Satd. Flow (perm)	1211	1770	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				78		110
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	82	164	125	78	96	110
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	74	172	125	78	96	110
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Prot	Perm

2027 Future Background AM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	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	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	53.0	53.0	53.0	53.0	24.8	24.8
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	10.0	10.0	10.0	10.0	26.5	26.5
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.54	0.54
v/c Ratio	0.30	0.47	0.32	0.24	0.12	0.12
Control Delay	18.9	21.0	18.0	6.7	6.7	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	21.0	18.0	6.7	6.7	2.2
LOS	B	C	B	A	A	A
Approach Delay		20.3	13.6		4.3	
Approach LOS		C	B		A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 48.8

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 13.2

Intersection LOS: B

Intersection Capacity Utilization 29.5%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2027 Future Background AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	385	62	26	18	64	67	25	290	28	529	173	77
Future Volume (vph)	385	62	26	18	64	67	25	290	28	529	173	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.923			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1723	0	1767	2956	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.640			0.546		
Satd. Flow (perm)	3318	1723	0	1742	2956	0	1153	3525	0	949	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			72			8				92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	414	67	28	19	69	72	27	312	30	569	186	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	414	95	0	19	141	0	27	342	0	569	186	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2027 Future Background AM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm	
Protected Phases	7	4		3	8			2			6		
Permitted Phases							2					6	6
Detector Phase	7	4		3	8		2	2		6	6	6	
Switch Phase													
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		15.0	15.0	15.0	
Minimum Split (s)	13.0	38.0		13.0	38.0		42.0	42.0		42.0	42.0	42.0	
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0	
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%		38.5%	38.5%	38.5%	
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0		43.0	43.0	43.0	
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		3.0	3.0		3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max	
Walk Time (s)	4.0			7.0			7.0	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	24.0			24.0			28.0	28.0		28.0	28.0	28.0	
Pedestrian Calls (#/hr)	0			0			0	0		0	0	0	
Act Effct Green (s)	21.5	32.8		7.1	10.4		77.1	77.1		77.1	77.1	77.1	
Actuated g/C Ratio	0.17	0.25		0.05	0.08		0.59	0.59		0.59	0.59	0.59	
v/c Ratio	0.75	0.21		0.20	0.47		0.04	0.16		1.01	0.17	0.09	
Control Delay	60.6	34.3		63.0	33.7		12.8	12.5		62.1	9.1	1.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	60.6	34.3		63.0	33.7		12.8	12.5		62.1	9.1	1.0	
LOS	E	C		E	C		B	B		E	A	A	
Approach Delay	55.7			37.2			12.5			44.3			
Approach LOS	E			D			B			D			

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 40.5

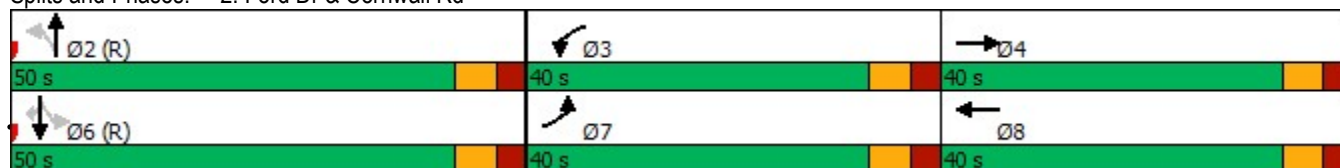
Intersection LOS: D

Intersection Capacity Utilization 102.3%

ICU Level of Service G

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2027 Future Background AM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	30	29	152	210	110
Future Volume (vph)	89	30	29	152	210	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.954	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1612	0
Flt Permitted	0.950		0.554			
Satd. Flow (perm)	1690	1384	905	1700	1612	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		32			51	
Link Speed (k/h)	60			60	48	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	14.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	96	32	31	163	226	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	32	31	163	344	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2027 Future Background AM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	8.8	8.8	42.4	42.4	42.4	
Actuated g/C Ratio	0.15	0.15	0.71	0.71	0.71	
v/c Ratio	0.39	0.14	0.05	0.14	0.30	
Control Delay	26.9	9.9	5.0	5.0	5.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.9	9.9	5.0	5.0	5.1	
LOS	C	A	A	A	A	
Approach Delay	22.7			5.0	5.1	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

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

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 8.4

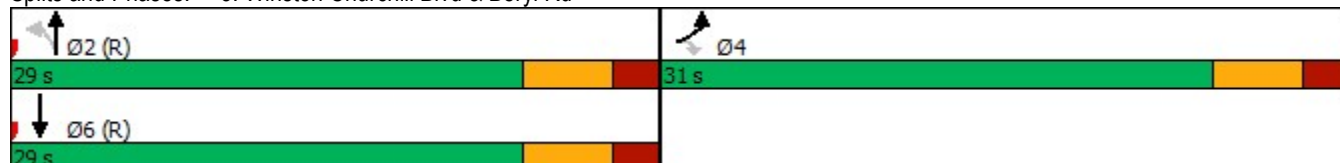
Intersection LOS: A

Intersection Capacity Utilization 39.4%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2027 Future Background AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	480	90	173	351	136	91	462	188	199	546	131
Future Volume (vph)	111	480	90	173	351	136	91	462	188	199	546	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	1.00		0.99
Frt		0.976			0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3275	0	1733	3138	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.347			0.180			0.378			0.432		
Satd. Flow (perm)	609	3275	0	328	3138	0	676	3510	1505	735	3510	1405
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			42				207			118
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			2			2	3		8	8		3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	122	527	99	190	386	149	100	508	207	219	600	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	626	0	190	535	0	100	508	207	219	600	144
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Background AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	41.5	30.1		48.9	33.8		63.8	63.8	63.8	63.8	63.8	63.8
Actuated g/C Ratio	0.32	0.23		0.38	0.26		0.49	0.49	0.49	0.49	0.49	0.49
v/c Ratio	0.43	0.81		0.66	0.63		0.30	0.30	0.25	0.61	0.35	0.19
Control Delay	28.7	54.8		36.5	42.0		35.0	30.5	15.3	35.6	22.3	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	54.8		36.5	42.0		35.0	30.5	15.3	35.6	22.3	6.5
LOS	C	D		D	D		D	C	B	D	C	A
Approach Delay		50.6			40.6			27.2			23.0	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 34.3

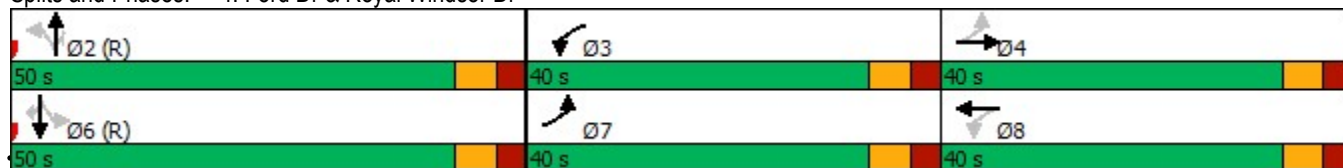
Intersection LOS: C

Intersection Capacity Utilization 94.8%

ICU Level of Service F
























Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



2027 Future Background AM
5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	593	75	70	457	203	47	144	71	169	186	195
Future Volume (vph)	188	593	75	70	457	203	47	144	71	169	186	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.983				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3274	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.223			0.378			0.626			0.950		
Satd. Flow (perm)	395	3274	0	664	3411	1468	933	3380	1457	3223	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				218			94			210
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	202	638	81	75	491	218	51	157	77	182	200	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	202	719	0	75	491	218	51	157	77	182	200	210
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Background AM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	9.5	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	20.0	56.0		36.0	36.0	36.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	14.3%	40.0%		25.7%	25.7%	25.7%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Maximum Green (s)	17.0	49.0		29.0	29.0	29.0	27.7	27.7	27.7	44.0	76.7	76.7
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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	48.8	44.8		25.7	25.7	25.7	62.6	62.6	62.6	13.3	80.9	80.9
Actuated g/C Ratio	0.35	0.32		0.18	0.18	0.18	0.45	0.45	0.45	0.10	0.58	0.58
v/c Ratio	0.71	0.68		0.62	0.79	0.49	0.12	0.10	0.11	0.59	0.10	0.22
Control Delay	46.9	43.9		74.3	63.9	9.6	26.6	24.4	3.5	68.5	14.2	2.5
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	46.9	43.9		74.3	63.9	9.6	26.6	24.4	3.5	68.5	14.2	2.5
LOS	D	D		E	E	A	C	C	A	E	B	A
Approach Delay		44.6			49.8			19.2			26.7	
Approach LOS		D			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 108 (77%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 39.3

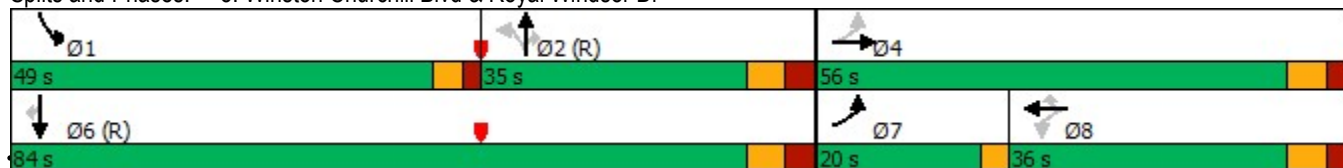
Intersection LOS: D

Intersection Capacity Utilization 76.5%

ICU Level of Service D

Analysis Period (min) 15

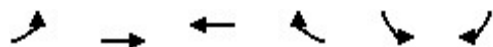
Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



2027 Future Background PM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	126	274	212	71	71	134
Future Volume (vph)	126	274	212	71	71	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950	0.998			0.950	
Satd. Flow (prot)	1700	1803	1902	1286	1428	1551
Flt Permitted	0.610	0.984			0.950	
Satd. Flow (perm)	1091	1777	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				78		147
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	138	301	233	78	78	147
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	124	315	233	78	78	147
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	97			97	97	97
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	25.0	25.0	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	48.0	48.0	48.0	48.0	29.8	29.8
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?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	48.0	48.0	48.0	48.0	29.8	29.8

2027 Future Background PM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
v/c Ratio	0.21	0.33	0.23	0.11	0.17	0.24
Control Delay	12.3	13.1	11.9	3.0	22.5	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	13.1	11.9	3.0	22.5	4.9
LOS	B	B	B	A	C	A
Approach Delay	12.9		9.7		11.0	
Approach LOS	B		A		B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 11.4

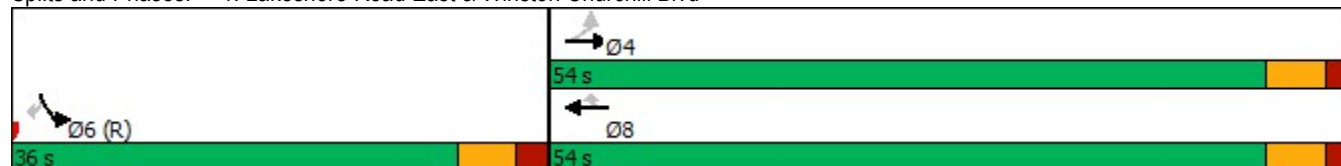
Intersection LOS: B

Intersection Capacity Utilization 47.4%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2027 Future Background PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	591	150	62	35	67	99	45	271	35	446	368	93
Future Volume (vph)	591	150	62	35	67	99	45	271	35	446	368	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.911			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2888	0	1716	3508	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.446			0.553		
Satd. Flow (perm)	3319	1724	0	1746	2888	0	805	3508	0	961	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			106			12				100
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	635	161	67	38	72	106	48	291	38	480	396	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	635	228	0	38	178	0	48	329	0	480	396	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2027 Future Background PM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	NA	Perm
Protected Phases	7	4	3		8		2		6		6		
Permitted Phases							2	6				6	
Detector Phase	7	4	3		8		2	2	6		6	6	
Switch Phase													
Minimum Initial (s)	6.0	10.0	6.0		10.0		15.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	13.0	39.5	13.0		38.0		42.0	42.0	42.0		42.0	42.0	
Total Split (s)	40.0	40.0	40.0		40.0		50.0	50.0	50.0		50.0	50.0	
Total Split (%)	30.8%	30.8%	30.8%		30.8%		38.5%	38.5%	38.5%		38.5%	38.5%	
Maximum Green (s)	33.0	33.0	33.0		33.0		43.0	43.0	43.0		43.0	43.0	
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		3.0	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0		7.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0	3.0		3.0		3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None	None		None		C-Max	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	4.0		7.0		7.0		7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	24.0		24.0		28.0		28.0	28.0	28.0		28.0	28.0	
Pedestrian Calls (#/hr)	0		0		0		0	0	0		0	0	
Act Effct Green (s)	29.2	34.1	8.4		10.7		69.1	69.1	69.1		69.1	69.1	
Actuated g/C Ratio	0.22	0.26	0.06		0.08		0.53	0.53	0.53		0.53	0.53	
v/c Ratio	0.85	0.49	0.34		0.53		0.11	0.18	0.94		0.40	0.12	
Control Delay	59.7	42.5	65.4		30.0		17.7	16.1	50.3		12.5	1.1	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	0.0		0.0	0.0	
Total Delay	59.7	42.5	65.4		30.0		17.7	16.1	50.3		12.5	1.1	
LOS	E	D	E		C		B	B	D		B	A	
Approach Delay	55.1		36.2		16.3		29.9						
Approach LOS	E		D		B		C						

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 37.3

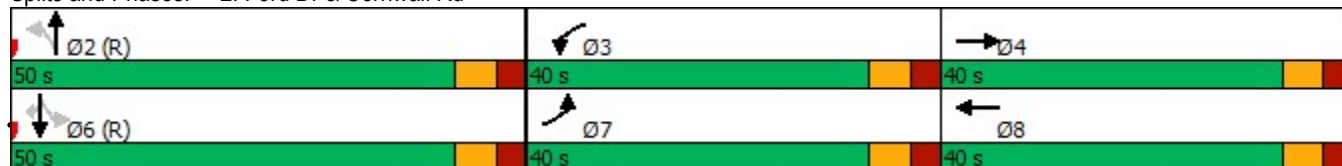
Intersection LOS: D

Intersection Capacity Utilization 103.5%

ICU Level of Service G

Analysis Period (min) 15













Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2027 Future Background PM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	180	19	40	243	204	107
Future Volume (vph)	180	19	40	243	204	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.954	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1612	0
Flt Permitted	0.950		0.559			
Satd. Flow (perm)	1690	1384	913	1700	1612	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		20			51	
Link Speed (k/h)	60			60	60	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	11.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	194	20	43	261	219	115
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	20	43	261	334	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2027 Future Background PM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	12.2	12.2	35.4	35.4	35.4	
Actuated g/C Ratio	0.20	0.20	0.59	0.59	0.59	
v/c Ratio	0.56	0.07	0.08	0.26	0.34	
Control Delay	27.2	8.6	7.2	7.8	7.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.2	8.6	7.2	7.8	7.3	
LOS	C	A	A	A	A	
Approach Delay	25.4			7.7	7.3	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 12.0

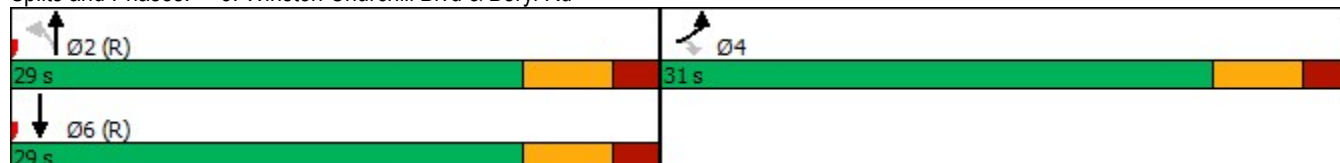
Intersection LOS: B

Intersection Capacity Utilization 46.8%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2027 Future Background PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	654	91	204	415	212	109	692	227	179	619	90
Future Volume (vph)	208	654	91	204	415	212	109	692	227	179	619	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.98	1.00		0.99
Frt		0.982			0.949				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3121	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.236			0.155			0.302			0.259		
Satd. Flow (perm)	414	3294	0	283	3121	0	540	3510	1498	441	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			67				229			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	229	719	100	224	456	233	120	760	249	197	680	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	229	819	0	224	689	0	120	760	249	197	680	99
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Background PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	56.0	39.4		56.5	39.7		52.7	52.7	52.7	52.7	52.7	52.7
Actuated g/C Ratio	0.43	0.30		0.43	0.31		0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.68	0.81		0.72	0.69		0.55	0.53	0.34	1.11	0.48	0.16
Control Delay	30.1	48.4		36.2	39.3		54.5	44.0	20.3	136.3	31.3	7.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	48.4		36.2	39.3		54.5	44.0	20.3	136.3	31.3	7.3
LOS	C	D		D	D		D	D	C	F	C	A
Approach Delay		44.4			38.5			39.9			50.0	
Approach LOS		D			D			D			D	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 43.2

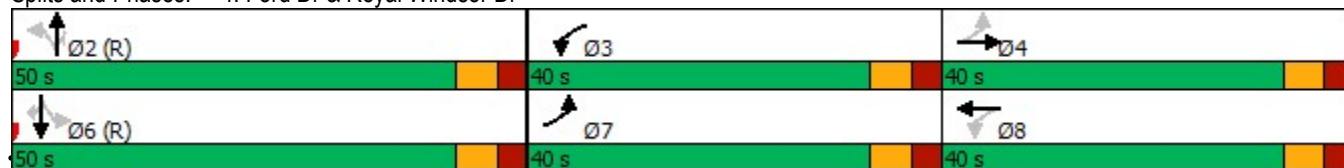
Intersection LOS: D

Intersection Capacity Utilization 100.8%

ICU Level of Service G
























Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



2027 Future Background PM
5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	755	49	70	581	378	65	296	124	275	186	170
Future Volume (vph)	311	755	49	70	581	378	65	296	124	275	186	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.991				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3337	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.239			0.239			0.626			0.950		
Satd. Flow (perm)	423	3337	0	420	3411	1468	933	3380	1457	3226	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				406			110			183
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	334	812	53	75	625	406	71	322	135	296	200	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	334	865	0	75	625	406	71	322	135	296	200	183
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Background PM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
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%
Maximum Green (s)	11.0	63.0		49.0	49.0	49.0	31.7	31.7	31.7	26.0	62.7	62.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	56.6	49.6		35.6	35.6	35.6	53.0	53.0	53.0	18.1	76.1	76.1
Actuated g/C Ratio	0.40	0.35		0.25	0.25	0.25	0.38	0.38	0.38	0.13	0.54	0.54
v/c Ratio	1.12	0.73		0.71	0.72	0.60	0.20	0.25	0.22	0.71	0.11	0.20
Control Delay	122.1	42.4		79.5	52.0	7.2	35.7	32.9	10.6	67.8	17.1	3.3
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	122.1	42.4		79.5	52.0	7.2	35.7	32.9	10.6	67.8	17.1	3.3
LOS	F	D		E	D	A	D	C	B	E	B	A
Approach Delay		64.6			37.4			27.6			35.5	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 44.9

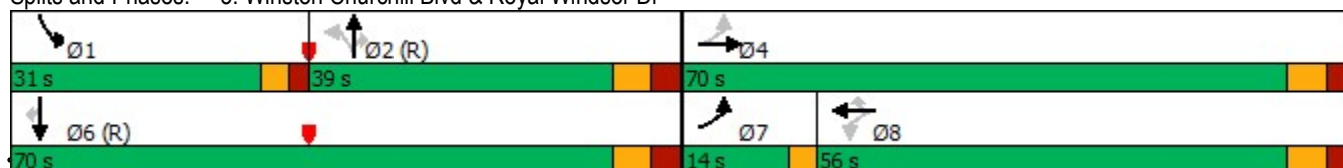
Intersection LOS: D

Intersection Capacity Utilization 83.7%

ICU Level of Service E

Analysis Period (min) 15

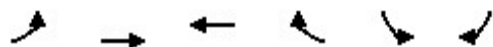
Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



2032 Future Background AM

1: Lakeshore Road East & Winston Churchill Blvd

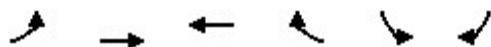
September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	83	164	126	78	97	111
Future Volume (vph)	83	164	126	78	97	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950	0.998			0.950	
Satd. Flow (prot)	1700	1803	1902	1286	1428	1551
Flt Permitted	0.669	0.978			0.950	
Satd. Flow (perm)	1197	1766	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				86		122
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	91	180	138	86	105	122
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	82	189	138	86	105	122
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Prot	Perm

2032 Future Background AM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	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	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	53.0	53.0	53.0	53.0	24.8	24.8
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	10.3	10.3	10.3	10.3	25.6	25.6
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.53	0.53
v/c Ratio	0.32	0.50	0.34	0.25	0.14	0.14
Control Delay	19.0	21.2	18.0	6.5	7.0	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	21.2	18.0	6.5	7.0	2.2
LOS	B	C	B	A	A	A
Approach Delay		20.5	13.5		4.4	
Approach LOS		C	B		A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 48.2

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 13.3

Intersection LOS: B

Intersection Capacity Utilization 37.1%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2032 Future Background AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	425	68	29	20	71	74	27	321	31	584	191	85
Future Volume (vph)	425	68	29	20	71	74	27	321	31	584	191	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.955			0.923			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1722	0	1767	2955	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.626			0.526		
Satd. Flow (perm)	3318	1722	0	1742	2955	0	1128	3525	0	914	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			80			8				92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	457	73	31	22	76	80	29	345	33	628	205	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	457	104	0	22	156	0	29	378	0	628	205	91
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2032 Future Background AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	13.0	38.0		13.0	38.0		42.0	42.0		42.0	42.0	42.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%		38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0		43.0	43.0	43.0
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		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		4.0			7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		24.0			24.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)		0			0		0	0		0	0	0
Act Effct Green (s)	23.1	31.6		7.3	10.6		75.3	75.3		75.3	75.3	75.3
Actuated g/C Ratio	0.18	0.24		0.06	0.08		0.58	0.58		0.58	0.58	0.58
v/c Ratio	0.77	0.24		0.22	0.50		0.04	0.18		1.19	0.19	0.10
Control Delay	60.0	35.9		63.4	33.7		13.8	13.6		124.1	9.6	1.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	60.0	35.9		63.4	33.7		13.8	13.6		124.1	9.6	1.2
LOS	E	D		E	C		B	B		F	A	A
Approach Delay		55.5			37.3			13.6			86.6	
Approach LOS		E			D			B			F	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.19

Intersection Signal Delay: 59.6

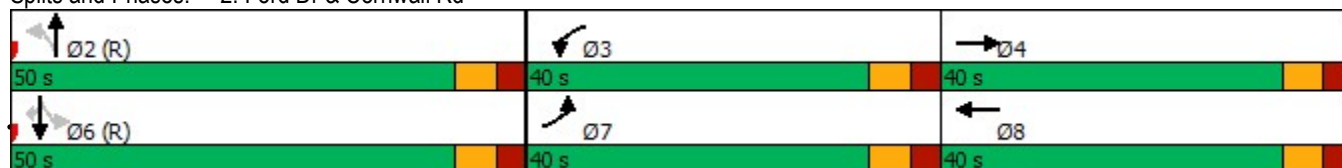
Intersection LOS: E

Intersection Capacity Utilization 106.4%

ICU Level of Service G

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2032 Future Background AM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	98	33	32	167	229	121
Future Volume (vph)	98	33	32	167	229	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.953	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1610	0
Flt Permitted	0.950		0.538			
Satd. Flow (perm)	1690	1384	879	1700	1610	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		35			51	
Link Speed (k/h)	60			60	48	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	14.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	105	35	34	180	246	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	35	34	180	376	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2032 Future Background AM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	9.1	9.1	42.1	42.1	42.1	
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.70	
v/c Ratio	0.41	0.15	0.06	0.15	0.33	
Control Delay	27.0	9.6	5.2	5.2	5.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.0	9.6	5.2	5.2	5.6	
LOS	C	A	A	A	A	
Approach Delay	22.7			5.2	5.6	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

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

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 8.7

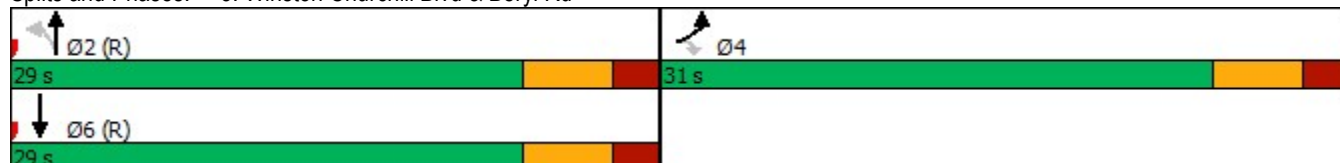
Intersection LOS: A

Intersection Capacity Utilization 42.4%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2032 Future Background AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	529	99	191	388	150	101	510	207	219	603	144
Future Volume (vph)	123	529	99	191	388	150	101	510	207	219	603	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	1.00		0.99
Frt		0.976			0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3275	0	1733	3138	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.315			0.162			0.336			0.394		
Satd. Flow (perm)	553	3275	0	296	3138	0	601	3510	1505	671	3510	1405
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			42				227			117
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			2			2	3		8	8		3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	135	581	109	210	426	165	111	560	227	241	663	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	690	0	210	591	0	111	560	227	241	663	158
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Background AM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	44.7	32.8		52.2	36.6		60.5	60.5	60.5	60.5	60.5	60.5
Actuated g/C Ratio	0.34	0.25		0.40	0.28		0.47	0.47	0.47	0.47	0.47	0.47
v/c Ratio	0.46	0.82		0.72	0.65		0.40	0.34	0.28	0.77	0.41	0.22
Control Delay	27.7	53.2		39.0	40.9		40.6	33.1	15.7	49.9	25.1	8.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.7	53.2		39.0	40.9		40.6	33.1	15.7	49.9	25.1	8.3
LOS	C	D		D	D		D	C	B	D	C	A
Approach Delay		49.0			40.4			29.6			28.3	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 36.1

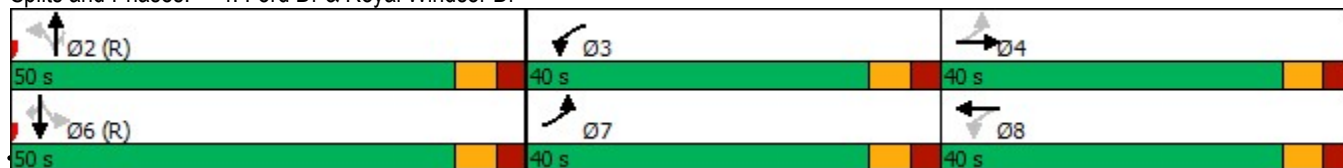
Intersection LOS: D

Intersection Capacity Utilization 97.3%

ICU Level of Service F
























Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



2032 Future Background AM
5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	655	82	77	504	224	52	158	78	187	204	215
Future Volume (vph)	208	655	82	77	504	224	52	158	78	187	204	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.983				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3275	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.193			0.331			0.615			0.950		
Satd. Flow (perm)	342	3275	0	581	3411	1468	917	3380	1457	3223	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				241			94			231
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	224	704	88	83	542	241	57	172	85	201	219	231
Shared Lane Traffic (%)												
Lane Group Flow (vph)	224	792	0	83	542	241	57	172	85	201	219	231
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Background AM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	9.5	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	20.0	56.0		36.0	36.0	36.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	14.3%	40.0%		25.7%	25.7%	25.7%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Maximum Green (s)	17.0	49.0		29.0	29.0	29.0	27.7	27.7	27.7	44.0	76.7	76.7
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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	50.7	46.7		27.1	27.1	27.1	59.9	59.9	59.9	14.1	79.0	79.0
Actuated g/C Ratio	0.36	0.33		0.19	0.19	0.19	0.43	0.43	0.43	0.10	0.56	0.56
v/c Ratio	0.79	0.72		0.74	0.82	0.50	0.15	0.12	0.13	0.62	0.11	0.24
Control Delay	53.7	44.4		88.7	65.0	9.3	28.0	25.8	4.7	68.4	14.9	2.5
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	53.7	44.4		88.7	65.0	9.3	28.0	25.8	4.7	68.4	14.9	2.5
LOS	D	D		F	E	A	C	C	A	E	B	A
Approach Delay		46.4			51.8			20.5			27.0	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 108 (77%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 40.8

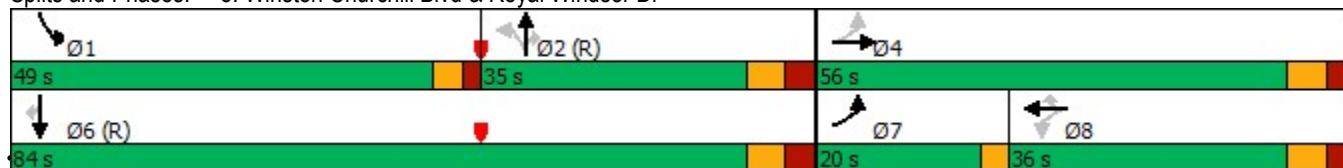
Intersection LOS: D

Intersection Capacity Utilization 78.5%

ICU Level of Service D

Analysis Period (min) 15

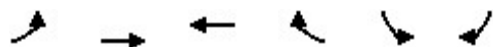
Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



2032 Future Background PM

1: Lakeshore Road East & Winston Churchill Blvd

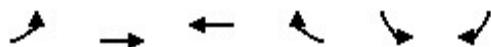
September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	139	302	234	78	78	148
Future Volume (vph)	139	302	234	78	78	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950	0.998			0.950	
Satd. Flow (prot)	1700	1803	1902	1286	1428	1551
Flt Permitted	0.588	0.983			0.950	
Satd. Flow (perm)	1052	1776	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				86		163
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		1716.2	
Travel Time (s)		18.2	24.5		103.0	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	153	332	257	86	86	163
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	138	347	257	86	86	163
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		7.0	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	97			97	97	97
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	25.0	25.0	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	48.0	48.0	48.0	48.0	29.8	29.8
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?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	48.0	48.0	48.0	48.0	29.8	29.8

2032 Future Background PM
1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
v/c Ratio	0.25	0.37	0.25	0.12	0.18	0.26
Control Delay	12.7	13.6	12.2	2.9	22.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.7	13.6	12.2	2.9	22.8	4.9
LOS	B	B	B	A	C	A
Approach Delay	13.3		9.8	11.0		
Approach LOS	B		A	B		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.37

Intersection Signal Delay: 11.7

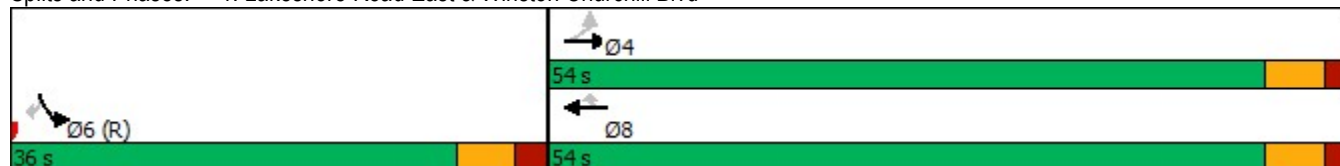
Intersection LOS: B

Intersection Capacity Utilization 50.0%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd



2032 Future Background PM
2: Ford Dr & Cornwall Rd













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	653	165	68	38	74	109	50	300	39	492	406	103
Future Volume (vph)	653	165	68	38	74	109	50	300	39	492	406	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.911			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2889	0	1716	3508	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.404			0.529		
Satd. Flow (perm)	3319	1724	0	1747	2889	0	729	3508	0	919	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			117			12				111
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	702	177	73	41	80	117	54	323	42	529	437	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	702	250	0	41	197	0	54	365	0	529	437	111
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2032 Future Background PM

2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	13.0	39.5		13.0	38.0		42.0	42.0		42.0	42.0	42.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%		38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0		43.0	43.0	43.0
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		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		4.0			7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		24.0			24.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)		0			0		0	0		0	0	0
Act Effect Green (s)	30.9	35.9		8.5	10.9		67.2	67.2		67.2	67.2	67.2
Actuated g/C Ratio	0.24	0.28		0.07	0.08		0.52	0.52		0.52	0.52	0.52
v/c Ratio	0.89	0.51		0.35	0.56		0.14	0.20		1.11	0.45	0.13
Control Delay	61.7	42.2		65.8	30.2		19.1	17.3		101.7	13.7	1.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	61.7	42.2		65.8	30.2		19.1	17.3		101.7	13.7	1.4
LOS	E	D		E	C		B	B		F	B	A
Approach Delay		56.6			36.3			17.5			55.6	
Approach LOS		E			D			B			E	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 48.3

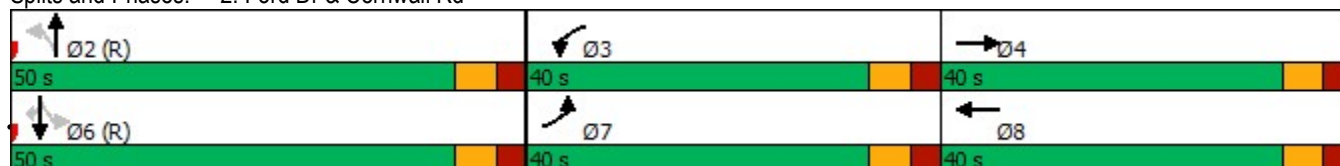
Intersection LOS: D

Intersection Capacity Utilization 107.8%

ICU Level of Service G

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2032 Future Background PM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	198	21	45	266	224	118
Future Volume (vph)	198	21	45	266	224	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.953	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1610	0
Flt Permitted	0.950		0.536			
Satd. Flow (perm)	1690	1384	876	1700	1610	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		23			51	
Link Speed (k/h)	60			60	60	
Link Distance (m)	437.2			1716.2	190.2	
Travel Time (s)	26.2			103.0	11.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	213	23	48	286	241	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	23	48	286	368	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2032 Future Background PM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	12.9	12.9	34.7	34.7	34.7	
Actuated g/C Ratio	0.22	0.22	0.58	0.58	0.58	
v/c Ratio	0.59	0.07	0.09	0.29	0.39	
Control Delay	27.1	8.1	7.8	8.4	8.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.1	8.1	7.8	8.4	8.2	
LOS	C	A	A	A	A	
Approach Delay	25.2			8.3	8.2	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 12.5

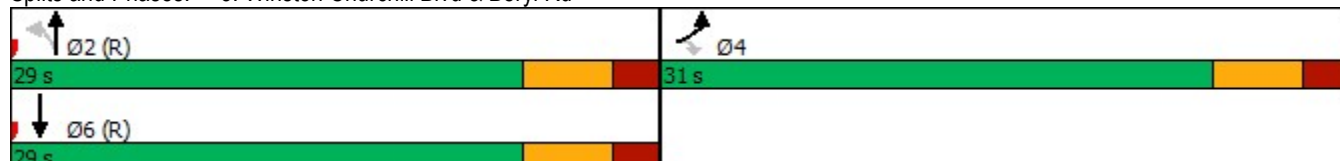
Intersection LOS: B

Intersection Capacity Utilization 49.5%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd















2032 Future Background PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	722	101	225	458	234	121	764	251	198	684	99
Future Volume (vph)	230	722	101	225	458	234	121	764	251	198	684	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.98	1.00		0.99
Frt		0.982			0.949				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3121	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.218			0.156			0.232			0.186		
Satd. Flow (perm)	383	3294	0	285	3121	0	415	3510	1498	317	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			67				230			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	253	793	111	247	503	257	133	840	276	218	752	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	253	904	0	247	760	0	133	840	276	218	752	109
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Background PM
4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	64.1	45.4		62.3	44.5		45.8	45.8	45.8	45.8	45.8	45.8
Actuated g/C Ratio	0.49	0.35		0.48	0.34		0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.68	0.78		0.74	0.68		0.91	0.68	0.41	1.96	0.61	0.20
Control Delay	26.9	43.6		35.3	37.6		101.9	51.3	23.1	492.0	37.8	9.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.9	43.6		35.3	37.6		101.9	51.3	23.1	492.0	37.8	9.2
LOS	C	D		D	D		F	D	C	F	D	A
Approach Delay		40.0			37.0			50.4			126.7	
Approach LOS		D			D			D			F	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.96

Intersection Signal Delay: 63.0

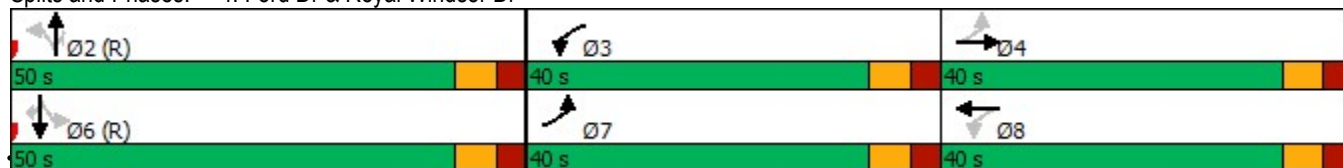
Intersection LOS: E

Intersection Capacity Utilization 104.1%

ICU Level of Service G
























Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



2032 Future Background PM
5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	833	54	77	642	418	71	325	137	303	205	188
Future Volume (vph)	343	833	54	77	642	418	71	325	137	303	205	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.991				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3337	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.219			0.204			0.614			0.950		
Satd. Flow (perm)	388	3337	0	358	3411	1468	916	3380	1457	3226	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				449			94			202
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	369	896	58	83	690	449	77	353	149	326	220	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	369	954	0	83	690	449	77	353	149	326	220	202
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Background PM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
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%
Maximum Green (s)	11.0	63.0		49.0	49.0	49.0	31.7	31.7	31.7	26.0	62.7	62.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	60.2	53.2		39.2	39.2	39.2	48.2	48.2	48.2	19.3	72.5	72.5
Actuated g/C Ratio	0.43	0.38		0.28	0.28	0.28	0.34	0.34	0.34	0.14	0.52	0.52
v/c Ratio	1.25	0.75		0.83	0.72	0.61	0.24	0.30	0.26	0.73	0.13	0.23
Control Delay	164.6	40.9		100.0	49.5	6.7	40.2	37.0	16.8	67.5	19.0	3.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	164.6	40.9		100.0	49.5	6.7	40.2	37.0	16.8	67.5	19.0	3.5
LOS	F	D		F	D	A	D	D	B	E	B	A
Approach Delay		75.4			37.2			32.2			35.9	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 49.3

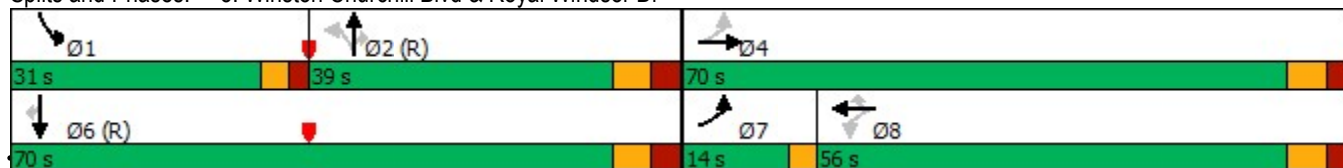
Intersection LOS: D

Intersection Capacity Utilization 87.8%

ICU Level of Service E

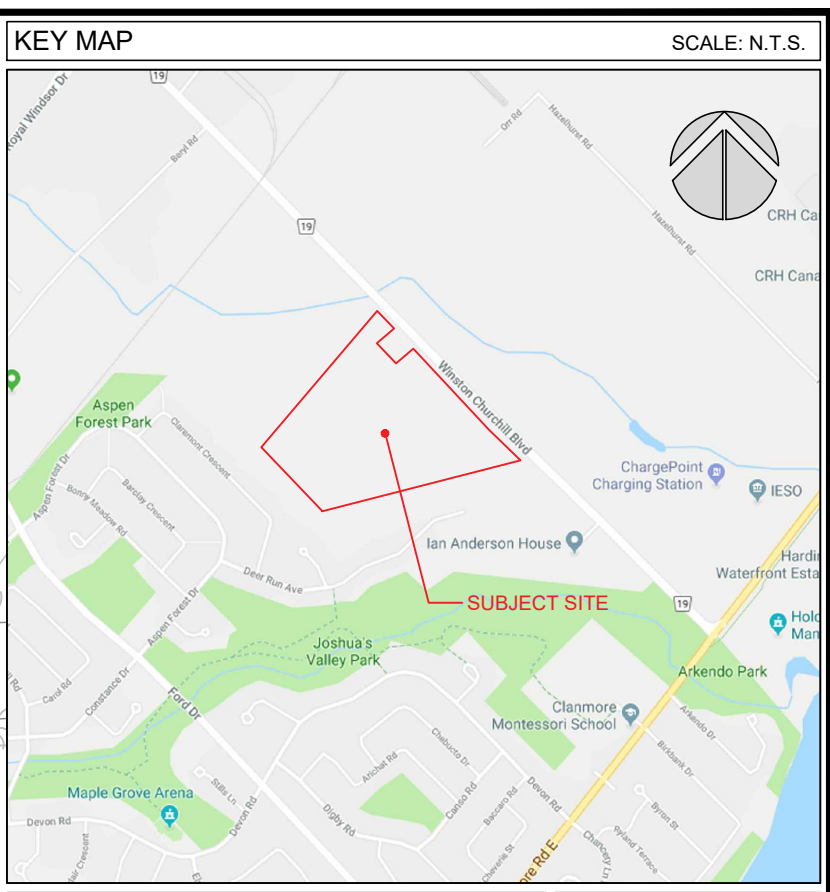
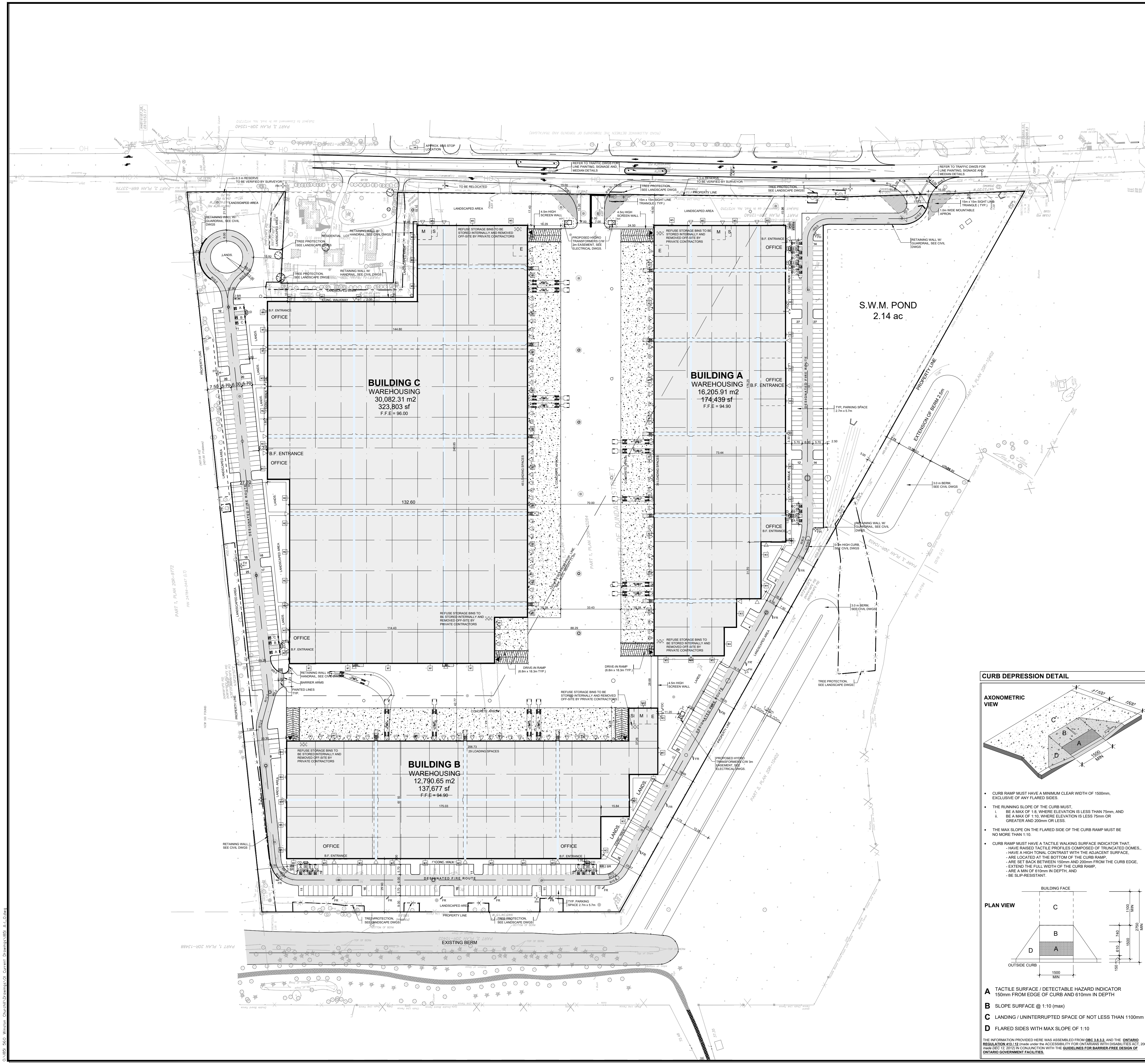
Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



Appendix I

Site Plan



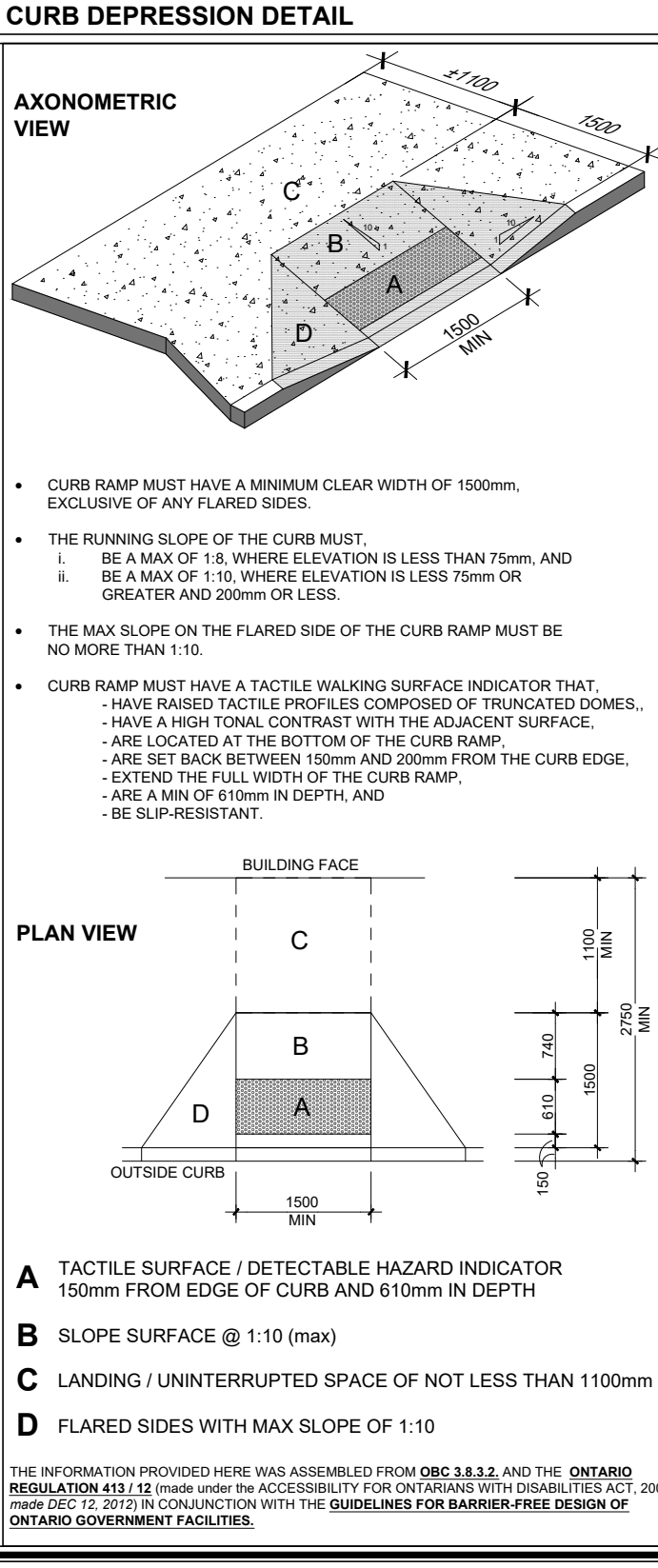
LEGAL DESCRIPTION
TOPOGRAPHIC SURVEY OF
PART OF LOT 1
CONCESSION 3
SOUTH OF DUNDAS STREET
(GEOGRAPHIC TOWNSHIP OF TRAFALGAR)
TOWN OF OAKVILLE
REGIONAL MUNICIPALITY OF HALTON

PROJECT NORTH

AS PREPARED BY:
SPEIGHT, VAN NOSTRAND & GIBSON
LIMITED
ONTARIO LAND SURVEYORS

TRUE NORTH

SITE STATISTICS		
SITE AREA	129,311.39 m ² or 31.95 acres	
ZONING	E2 - BUSINESS EMPLOYMENT	
LOT FRONTAGE	30.00 m (MIN)	460.41 m
FRONT YARD (EAST) WINSTON CHURCHILL BLVD	3.00 m	15.96 m
REAR YARD (WEST)	3.00 m	29.40 m
INTERIOR SIDE YARD (NORTH)	3.00 m	16.50 m
INTERIOR SIDE YARD (SOUTH)	3.00 m	16.50 m
G.F.A.	BUILDING A OFFICE	16,205.91 m ² or 174,439 sf
	WAREHOUSE	1,084.59 m ² or 11,674 sf
	MECH. / ELECT. / STAIR	14,986.39 m ² or 161,313 sf
		134.93 m ² or 1,452 sf
	BUILDING B OFFICE	12,790.65 m ² or 137,677 sf
	WAREHOUSE	1,156.17 m ² or 12,445 sf
	MECH. / ELECT. / STAIR	11,499.70 m ² or 123,781 sf
		144.74 m ² or 1,451 sf
	BUILDING C OFFICE	30,082.31 m ² or 323,803 sf
	WAREHOUSE	1,072.28 m ² or 11,542 sf
	MECH. / ELECT. / STAIR	28,873.61 m ² or 310,703 sf
		136.42 m ² or 1,558 sf
TOTAL BUILDING G.F.A.		59,078.87 m ² or 635,919 sf
SITE COVERAGE	59,078.87 m ² or 45.69%	
LANDSCAPED AREA	30,778.83 m ² or 23.80%	
PAVED AREA	39,453.69 m ² or 30.51%	
	REQUIRED	PROVIDED
BUILDING HEIGHT (BUILDING A & B)	11.00 m (MAX)	11.00 m
PARKING	WAREHOUSING 1.0 space / 100 m ² for first 7,500 m ² of G.F.A. 1.00 m ² @ 1.0 space / 100 m ² 1.0 space / 200 m ² for additional G.F.A. 51,578.87 m ² @ 1.0 space / 200 m ²	75 spaces 258 spaces 333 spaces
	ACCESSIBLE PARKING TYPE A & B SPACES 7 + 2% of total provided	11 spaces 13 spaces
	ACCESSIBLE PARKING TYPE C SPACES 4 + 1% with 100 over 301	7 spaces 7 spaces
	BICYCLE SPACES 2 + 0.25 spaces / 1,000 m ² G.F.A. (50 spaces max)	17 spaces 20 spaces
LOADING SPACES		110 spaces
SNOW STORAGE	TO BE REMOVED OFF-SITE	



SYMBOL LEGEND	
MAN DOOR	LOADING DOCK DOOR
DRIVE-IN / OVERHEAD DOOR	HYDRANT + VALVE
FIRE DEPARTMENT CONNECTION / SIAMSE	CATCH BASIN
DOUBLE CATCH BASIN	SANIMH
SANIMH	CATCH BASIN / MAN HOLE
CBMH	STORM MAN HOLE
HP	HYDRO POLE STANDARD / UTILITY POLE
BR	BIKE RACK (2-3 BIKES)
HT	HYDRO TRANSFORMER
ACCESSIBLE PARKING SPACE	ACCESSIBLE PARKING SPACE SIGNAGE
SNW	SNOW STORAGE AREA
G	REFUSE STORAGE BINS

NOTES

No.	ISSUED	DATE
1	ISSUED FOR COORDINATION	SEPT. 17, 2020
2	RE-ISSUED FOR SPA	MAR. 1 2021
3	RE-ISSUED FOR SPA	NOV. 25 2021

30 Great Gulf Drive, Unit 20 | Concord ON | L4K 0K7
T. 905.660.0722 | www.baldassarra.ca

ONTARIO ASSOCIATION
OF ARCHITECTS
A. BALDASSARRA
LICENSE 3654

OWNERS INFORMATION:

560 Winston Churchill Blvd.

Oakville, Ontario

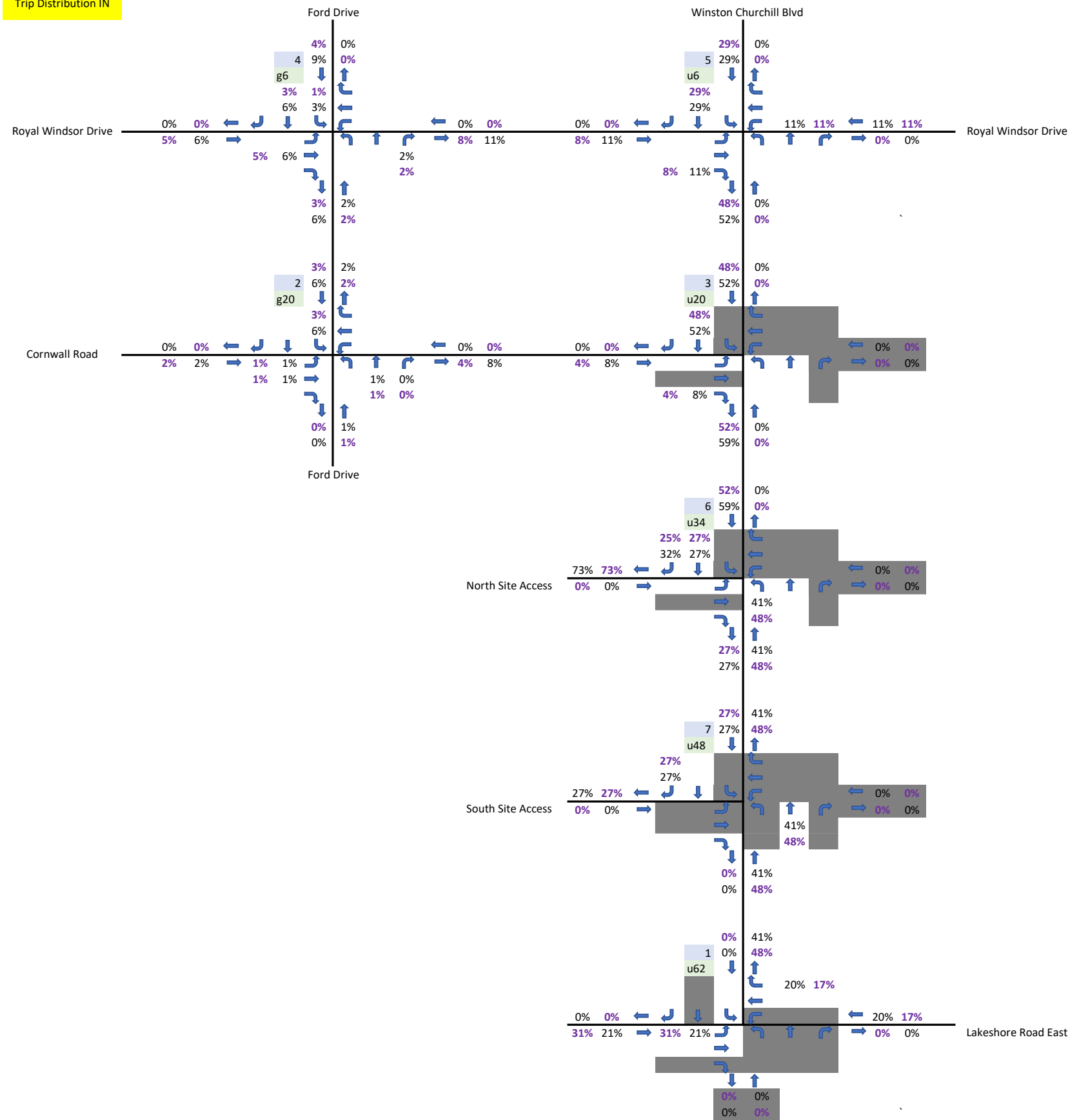
SITE PLAN

DATE:	DRAWN BY:	CHECKED:	SCALE:
AUG. 2020	DM/LY		1:1000
PROJECT No.	DRAWING No.		
18-51	A-1.0		

Appendix J

Trip Distribution

Trip Distribution IN

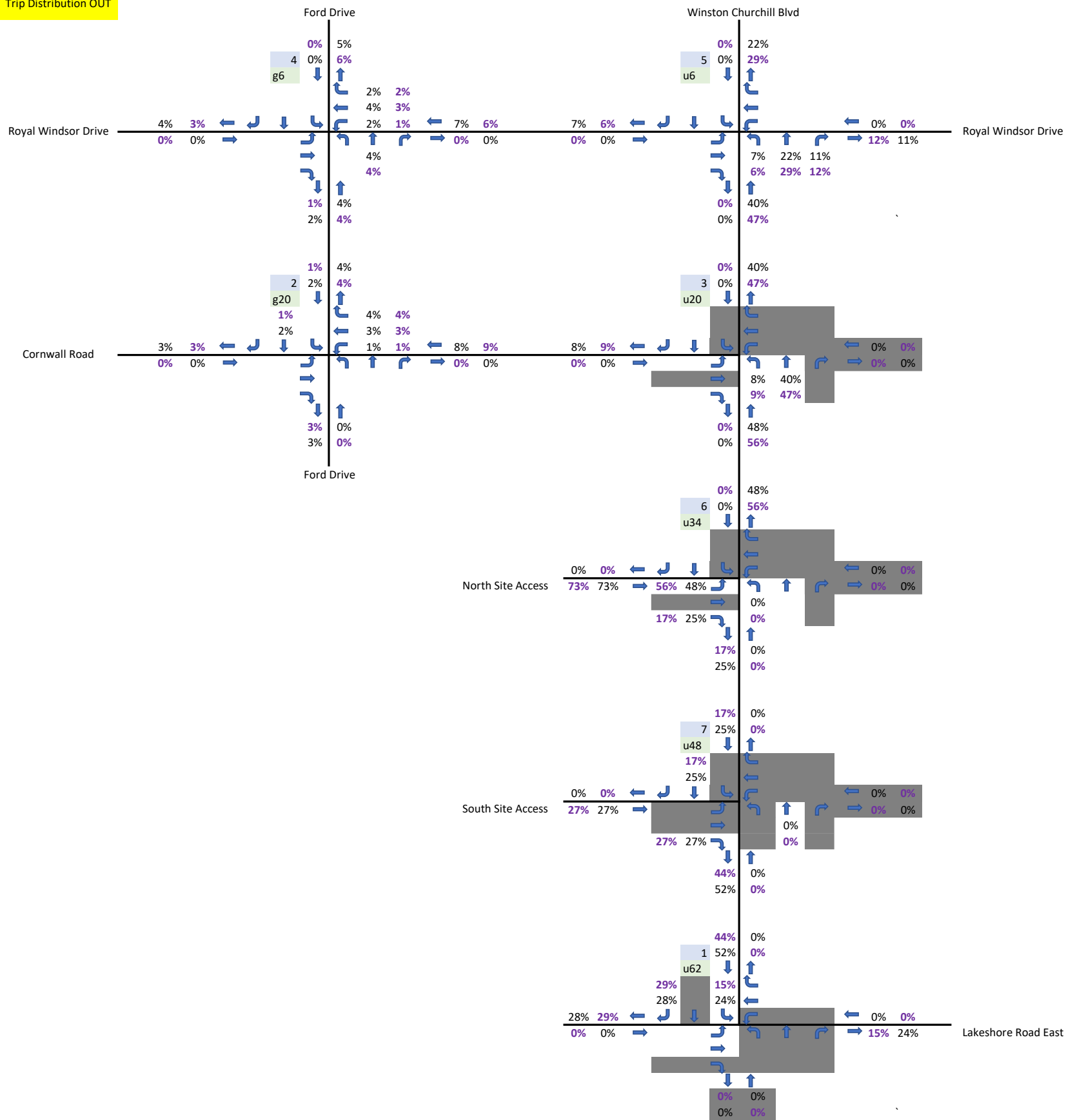


	IN	OUT
AM	319	321
PM	364	409

	internal check	IN	OUT
AM	100%	0%	0%
PM	100%	0%	0%

	external check	IN	OUT
AM	100%	0%	0%
PM	100%	0%	0%

Trip Distribution OUT

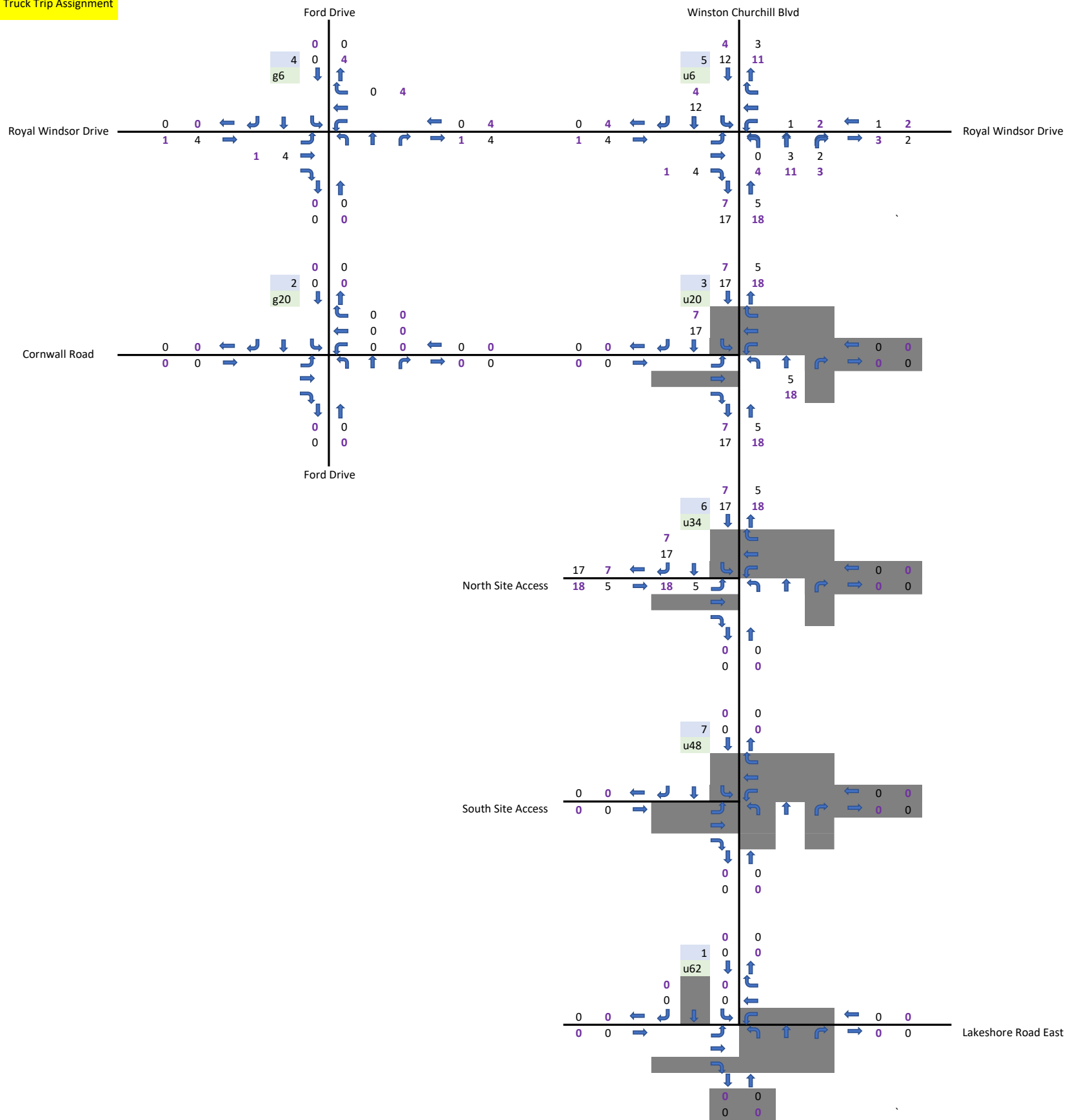


	IN	OUT
AM	319	321
PM	364	409

	IN	OUT
AM	0%	100%
PM	0%	100%

	IN	OUT
AM	0%	100%
PM	0%	100%

Truck Trip Assignment



	IN	OUT
AM	319	321
PM	364	409

	IN	OUT
AM	17	5
PM	7	18

	IN	OUT
AM	17	5
PM	7	18

Appendix K

Functional Design and Brief

MEMO

DATE September 13, 2021 **PROJECT NO.** 756-5105

RE Functional Design and Brief
560 Winston Churchill Blvd

TO Catherine Barnes - Region of Peel

FROM Ryan MacLaughlan, M.Eng., P.Eng.
Pradeep Roy Eranki, M.Sc., PMP

CC Hashim Ali Hamdani, Region of Peel
Matt Krusto, Region of Halton

Dear Catherine,

C. F. Crozier & Associates Inc. (Crozier) was retained by Blackwood Partners Inc. to undertake the functional design and subsequent detailed design of the proposed industrial development at 560 Winston Churchill Boulevard (Site) in the Town of Oakville, Regional Municipality of Halton (Halton Region).

At this location, Winston Churchill Boulevard is operated and maintained by the Region of Peel. Accordingly, the improvements are being designed to Region of Peel requirements.

The purpose of this Functional Design Brief is to present our proposed preliminary design for the external works on Winston Churchill Boulevard at the north and south site accesses. These improvements were established in the Traffic Impact Study (Crozier, 2021) prepared to support the development application.

After receiving the Region's preliminary support, we will proceed in preparing the detailed design package of the required improvements on Winston Churchill Boulevard as presented in the functional design layout appended to this brief for your review.

We have organized this memo into the following sections:

1. Background
2. Proposed Access Geometry
3. Shoulders, Slopes and Ditch Configuration
4. Future Submissions
5. Closing

1.0 Background

The Traffic Impact Study, 560 Winston Churchill Boulevard (Crozier, 2021) indicated that specific road improvements are required to support buildout of this development.

The findings of the Traffic Impact Study included recommendations on the northern and southern site access. These recommendations include:

Northern Site Access

- A northbound left-turn lane with 30 m of storage length, 66.3 metres of deceleration and 52.5 metres of taper.
- A southbound right turn lane with 20 m of storage length and 97.9 metres of taper.
- A southbound left-turn lane with 30 m of storage length, 52.5 metres of deceleration and 52.5 metres of taper.
- 20 m of a raised median on Winston Churchill Boulevard north and south of the access.

Southern Site Access

- A southbound right turn lane with 30 m storage and 60 metres of taper.
- A right-in, right-out channelized island.

2.0 Proposed Access Geometry

The following standards and documents were consulted in preparation of the attached functional design:

- Traffic Impact Study (Crozier 2021).
- Regional of Peel Engineering Standard Drawings.
- Ontario Traffic manuals (OTM): Book 5 (Regulatory Signs), Book 6 (Warning Signs) and Book 11 (Pavement, Hazard and Delineation Markings, March 2020).

The proposed intersection improvements on Winston Churchill Boulevard and the North site access consist of the following geometry:

- 3.75 m through lanes on Winston Churchill Boulevard (matching existing).
- 3.50 m right-turn and left-turn lanes on Winston Churchill Boulevard.
- 1.00 m to 2.50 m wide shoulders on Winston Churchill Boulevard the details of which are presented in Section 3.5 of this report.

The proposed intersection improvements on Winston Churchill Boulevard and the South site access consist of the following geometry:

- 3.50 m right turn lane.
- 5.00 m lanes right-in and right -out access on south site access.

Per the Traffic Impact study, the proposed lane configuration will be accommodated by widening the Winston Churchill Boulevard on both the north and south sides, spanning from station 9+798.512 to station 10+155.038 for a total length of approximately 354 m.

3.0 Shoulders, Slopes and Ditch Configuration

In addition to the lane configuration, for a complete cross section, below is the proposed configuration for shoulders, slopes, and ditch:

- The proposed shoulders have 1.0 to 2.5 m width, to keep the road construction works within the Right-of-way.
- On east side of the Winston Churchill Blvd - Shoulder of 1.0m is proposed from 9+85.900 to 10+040.780 and varying width from 1.0m at 10+040.780 to 2.5m existing width at 10+176.000.
- On west side of the Winston Churchill Blvd - Shoulder of 1.0m is proposed from 9+798.510 to 10+096.860 and varying width from 1.0m at 10+040.780 to 2.5m existing width at 10+176.000.
- We proposed ditch side slopes of 2H:1V to ensure the widening works are contained within the right-of-way and private property encroachments are avoided.

4.0 Future Submissions

Upon review and approval of the functional design, a complete detailed design package will be prepared including the following information:

- Removal Plan
- New Construction (Plan and Profile)
- Pavement Elevation and Grading
- Pavement Marking and Signage
- Construction Notes and Details
- Typical Cross Sections
- Cross Sections (20 m intervals)

5.0 Closing

We trust that this design brief has provided enough detail and context to facilitate a review of the functional design for improvements on Winston Churchill Boulevard at North site access and South site access. If you have any questions regarding this submission, please contact us.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.



Ryan MacLaughlan, M.Eng., P.Eng.
Project Engineer, Transportation


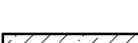
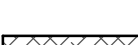





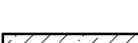
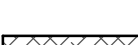





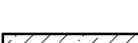
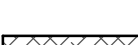




C.F. CROZIER & ASSOCIATES INC.



Pradeep Roy Eranki M.Sc., PMP
Road Designer, Transportation


RM/kb


I:\700\756-Blackwood Partners Inc\5105-560 Winston Churchill Blvd\Memos\2021.09.13 5160 Winston Churchill Blvd Design Brief.docx




PAVEMENT MARKINGS LEGEND		LEGEND																											
<table><tr><td>1</td><td>SOLID YELLOW, 10cm</td></tr><tr><td>5</td><td>SOLID WHITE, 10cm</td></tr><tr><td>6</td><td>333 BROKEN WHITE, 10cm</td></tr><tr><td>11</td><td>333 BROKEN WHITE, 20cm</td></tr><tr><td>13</td><td>SOLID WHITE, 30cm</td></tr><tr><td>20</td><td>SYMBOLS</td></tr><tr><td colspan="2">] [LIMITS OF MARKINGS</td></tr></table>	1	SOLID YELLOW, 10cm	5	SOLID WHITE, 10cm	6	333 BROKEN WHITE, 10cm	11	333 BROKEN WHITE, 20cm	13	SOLID WHITE, 30cm	20	SYMBOLS] [LIMITS OF MARKINGS		<table><tr><td></td><td>NEW ASPHALT PAVEMENT</td></tr><tr><td></td><td>PROPOSED ASPHALT RAISED MEDIAN</td></tr><tr><td></td><td>PROPOSED SHOULDER PAVEMENT</td></tr><tr><td></td><td>PROPOSED DRIVEWAY PAVEMENT</td></tr><tr><td></td><td>EXISTING ROW</td></tr><tr><td></td><td>PROPOSED. ROW</td></tr><tr><td></td><td>PROPOSED. DITCH</td></tr></table>		NEW ASPHALT PAVEMENT		PROPOSED ASPHALT RAISED MEDIAN		PROPOSED SHOULDER PAVEMENT		PROPOSED DRIVEWAY PAVEMENT		EXISTING ROW		PROPOSED. ROW		PROPOSED. DITCH
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	PROPOSED DRIVEWAY PAVEMENT																												
	EXISTING ROW																												
	PROPOSED. ROW																												
	PROPOSED. DITCH																												




NOTES:

1. 333 DENOTES PAVEMENT MARKING SPACING AS 3m LINE, 3m GAP, 3m LINE

2. USE  TO DENOTE PAVEMENT MARKING

3. USE  TO DENOTE DURABLE PAVEMENT MARKING

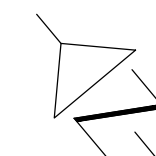
SIGNAGE LEGEND					
SIGN NAME	SIGN NUMBER	SIZE (cm)	OTM BOOK	QUANTITY	
STOP					
	Ra-1	60x60	5	1	
NO LEFT TURN					
	Rb-12	60x60	5	1	
DO NOT ENTER					
	Rb-19	60x60	5	1	

SIGNAGE LEGEND					
SIGN NAME	SIGN NUMBER	SIZE (cm)	OTM BOOK	QUANTITY	
KEEP RIGHT					
	Rb-25	60x75	5	1	
OBJECT MARKER					
	Wa-33L	30x90	6	1	
OBJECT MARKER					
	Wa-33LR	45x90	6	1	

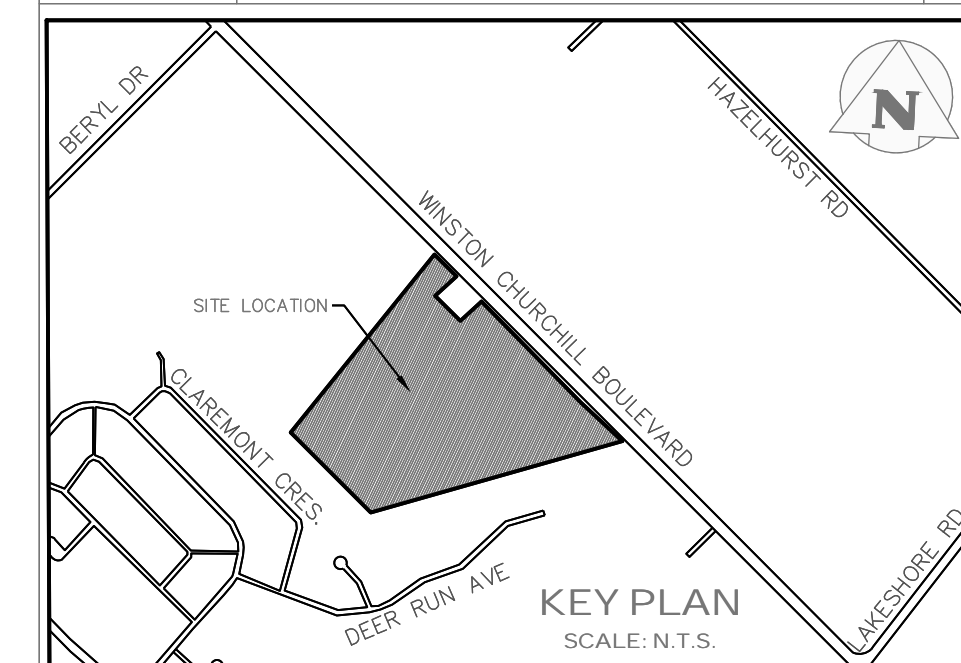
NOTES:

1. PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL (OTM), BOOK 11.

2. SIGNAGE SHALL BE IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL (OTM); BOOKS 5 AND 6.



SERVICE DATA					
SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			HYDRO ONE		
PARKS & REC.			CTV		
ONT. CLEAN WATER			COMMUNIC. CABLES		
REVISIONS					
DATE	DETAILS				INIT.
09/13/2021	ISSUED FOR 30% DESIGN REVIEW				R

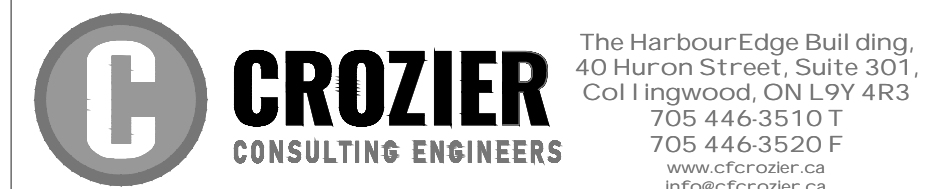


DRAWING NOTES:

General Notes

B.M. No. O.B.M. #49. Elev. 99.330m

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.



FOR REVIEW

NOTICE TO CONTRACTOR	
48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING	
THE REGIONAL MUNICIPALITY OF PEELE	CABLE TELEVISION/FIBEROPTIC PROVIDER
CITY OF MISSISSAUGA WORKS DEPT.	BELL CANADA
WATER & SEWER DEPT.	ENERSOURCE TELECOM
TOWN OF CALEDON WORKS DEPT.	HYDRO ONE TELECOM
BELL CANADA	ROGERS CABLE
ENBRIDGE INCORPORATED—GAS DISTRIBUTION	ALLSTREAM
ONTARIO MINISTRY OF TRANSPORTATION	PSN (PUBLIC SECURE NETWORK)
ONTARIO CLEAN WATER AGENCY	FUTUREWAY (FCI BROADBAND)
HYDRO ONE NETWORKS	
ENERSOURCE, HYDRO MISSISSAUGA	
HYDRO ONE BRAMPTON	



ROAD WIDENING
WINSTON CHURCHILL BOULEVARD
REGIONAL MUNICIPALITY OF PEEL

CAD Area	Area	Project No. 756-510
Checked by R.M./A.F.	Drawn by P.E.	
Date SEP 13, 2021	Sheet 1 of 1	Plan No. 101

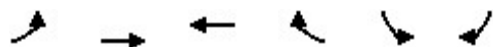
Appendix L

Detailed Capacity Analysis – 2022, 2027, 2032 Future Total

2022 Future Total AM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	82	135	103	77	85	97
Future Volume (vph)	82	135	103	77	85	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.684				0.950	
Satd. Flow (perm)	1288	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				85		107
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		795.8	
Travel Time (s)		18.2	24.5		47.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	90	148	113	85	92	107
Shared Lane Traffic (%)						
Lane Group Flow (vph)	90	148	113	85	92	107
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Prot	Perm

2022 Future Total AM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	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	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	53.0	53.0	53.0	53.0	24.8	24.8
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	9.2	9.2	9.2	9.2	29.1	29.1
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.63	0.63
v/c Ratio	0.35	0.39	0.30	0.26	0.10	0.11
Control Delay	20.2	19.5	18.0	7.0	6.1	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.2	19.5	18.0	7.0	6.1	2.0
LOS	C	B	B	A	A	A
Approach Delay		19.7	13.3		3.9	
Approach LOS		B	B		A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 46.4

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 28.0%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2022 Future Total AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	350	56	23	16	59	62	22	264	25	484	157	69
Future Volume (vph)	350	56	23	16	59	62	22	264	25	484	157	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.923			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2954	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.650			0.563		
Satd. Flow (perm)	3318	1724	0	1742	2954	0	1171	3525	0	978	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			67			8				92
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	376	60	25	17	63	67	24	284	27	520	169	74
Shared Lane Traffic (%)												
Lane Group Flow (vph)	376	85	0	17	130	0	24	311	0	520	169	74
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2022 Future Total AM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	NA	Perm
Protected Phases	7	4	3		8		2		6		6		
Permitted Phases							2					6	6
Detector Phase	7	4	3		8		2	2	6		6	6	
Switch Phase													
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	13.0	38.0		13.0	38.0		42.0	42.0	42.0		42.0	42.0	
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0		50.0	50.0	
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%		38.5%	38.5%	
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0		43.0	43.0	
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		3.0	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	4.0		7.0		7.0		7.0		7.0		7.0		
Flash Dont Walk (s)	24.0		24.0		28.0		28.0		28.0		28.0		
Pedestrian Calls (#/hr)	0		0		0		0		0		0		
Act Effct Green (s)	20.0	31.3		7.0	10.3		78.7	78.7	78.7		78.7	78.7	
Actuated g/C Ratio	0.15	0.24		0.05	0.08		0.61	0.61	0.61		0.61	0.61	
v/c Ratio	0.73	0.20		0.18	0.44		0.03	0.15	0.88		0.15	0.08	
Control Delay	61.1	34.8		62.6	33.4		12.0	11.6	35.3		8.7	0.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0	
Total Delay	61.1	34.8		62.6	33.4		12.0	11.6	35.3		8.7	0.9	
LOS	E	C		E	C		B	B	D		A	A	
Approach Delay	56.2		36.7		11.6		26.1						
Approach LOS	E		D		B		C						

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 135

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 32.3

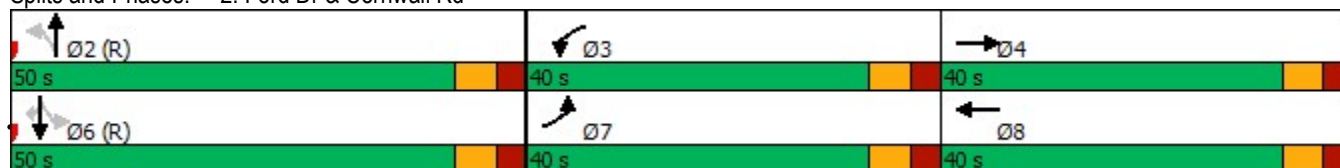
Intersection LOS: C

Intersection Capacity Utilization 98.8%

ICU Level of Service F

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2022 Future Total AM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	81	32	29	152	243	100
Future Volume (vph)	81	32	29	152	243	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.960	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1624	0
Flt Permitted	0.950		0.542			
Satd. Flow (perm)	1690	1384	886	1700	1624	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		34			40	
Link Speed (k/h)	60			60	48	
Link Distance (m)	437.2			655.5	190.2	
Travel Time (s)	26.2			39.3	14.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	87	34	31	163	261	108
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	34	31	163	369	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2022 Future Total AM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	8.5	8.5	42.7	42.7	42.7	
Actuated g/C Ratio	0.14	0.14	0.71	0.71	0.71	
v/c Ratio	0.36	0.15	0.05	0.13	0.32	
Control Delay	26.8	10.1	4.8	4.8	5.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.8	10.1	4.8	4.8	5.3	
LOS	C	B	A	A	A	
Approach Delay	22.1			4.8	5.3	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

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

Maximum v/c Ratio: 0.36

Intersection Signal Delay: 8.1

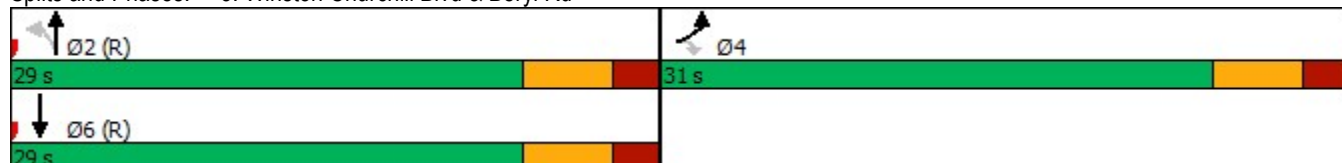
Intersection LOS: A

Intersection Capacity Utilization 38.9%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd



2022 Future Total AM

4: Ford Dr & Royal Windsor Dr


September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	101	443	82	157	319	123	83	419	172	182	500	118
Future Volume (vph)	101	443	82	157	319	123	83	419	172	182	500	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	1.00		0.99
Frt		0.977			0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3278	0	1733	3138	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.379			0.198			0.412			0.466		
Satd. Flow (perm)	666	3278	0	361	3138	0	736	3510	1505	793	3510	1405
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			41				189			117
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			2			2	3		8	8		3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	111	487	90	173	351	135	91	460	189	200	549	130
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	577	0	173	486	0	91	460	189	200	549	130
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2022 Future Total AM

4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	39.1	28.1		46.2	31.6		66.4	66.4	66.4	66.4	66.4	66.4
Actuated g/C Ratio	0.30	0.22		0.36	0.24		0.51	0.51	0.51	0.51	0.51	0.51
v/c Ratio	0.39	0.80		0.61	0.61		0.24	0.26	0.22	0.50	0.31	0.17
Control Delay	29.5	55.6		36.0	42.7		31.8	28.4	15.0	28.6	20.3	5.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.5	55.6		36.0	42.7		31.8	28.4	15.0	28.6	20.3	5.2
LOS	C	E		D	D		C	C	B	C	C	A
Approach Delay		51.4			40.9			25.4			19.9	
Approach LOS		D			D			C			B	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 33.3

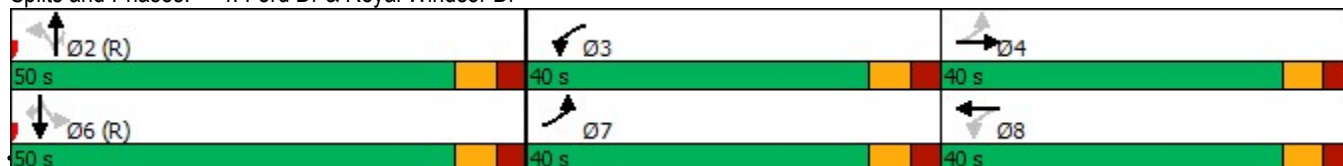
Intersection LOS: C

Intersection Capacity Utilization 92.7%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



C.F. Crozier and Associates
























Project No. 0756-5105

Synchro 11 Light Report

2022 Future Total AM

5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	538	80	71	414	184	44	137	68	153	201	176
Future Volume (vph)	170	538	80	71	414	184	44	137	68	153	201	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.981				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3256	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.253			0.399			0.617			0.950		
Satd. Flow (perm)	448	3256	0	701	3411	1468	920	3380	1457	3223	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13				198			94			189
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	183	578	86	76	445	198	48	149	74	165	216	189
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	664	0	76	445	198	48	149	74	165	216	189
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2022 Future Total AM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	9.5	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	20.0	56.0		36.0	36.0	36.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	14.3%	40.0%		25.7%	25.7%	25.7%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Maximum Green (s)	17.0	49.0		29.0	29.0	29.0	27.7	27.7	27.7	44.0	76.7	76.7
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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	47.1	43.1		24.3	24.3	24.3	65.1	65.1	65.1	12.5	82.6	82.6
Actuated g/C Ratio	0.34	0.31		0.17	0.17	0.17	0.46	0.46	0.46	0.09	0.59	0.59
v/c Ratio	0.63	0.66		0.63	0.75	0.47	0.11	0.09	0.10	0.57	0.11	0.20
Control Delay	43.8	44.0		75.6	63.1	9.9	25.4	23.1	3.0	68.6	13.6	2.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	44.0		75.6	63.1	9.9	25.4	23.1	3.0	68.6	13.6	2.4
LOS	D	D		E	E	A	C	C	A	E	B	A
Approach Delay		44.0			49.8			18.0			25.8	
Approach LOS		D			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 108 (77%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 38.5

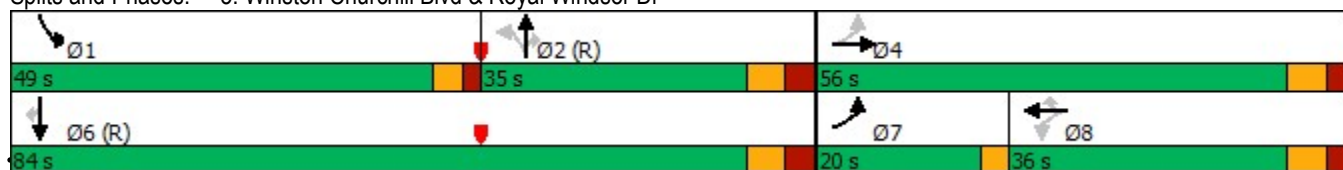
Intersection LOS: D

Intersection Capacity Utilization 75.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



















C.F. Crozier and Associates

Project No. 0756-5105

Synchro 11 Light Report



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	5	27	186	282	38
Future Volume (vph)	15	5	27	186	282	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					0.850
Flt Protected	0.963		0.950			
Satd. Flow (prot)	1492	0	1521	1601	1671	1361
Flt Permitted	0.963		0.950			
Satd. Flow (perm)	1492	0	1521	1601	1671	1361
Link Speed (k/h)	50			60	60	
Link Distance (m)	232.0			265.0	655.5	
Travel Time (s)	16.7			15.9	39.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	20%	20%	15%	20%
Adj. Flow (vph)	16	5	29	202	307	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	0	29	202	307	41
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.5%			ICU Level of Service A		
Analysis Period (min)	15					

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	27	186	282	38
Future Volume (Veh/h)	15	5	27	186	282	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	5	29	202	307	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	567	307	348			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	567	307	348			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	96	99	97			
cM capacity (veh/h)	444	693	1117			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	21	29	202	307	41	
Volume Left	16	29	0	0	0	
Volume Right	5	0	0	0	41	
cSH	486	1117	1700	1700	1700	
Volume to Capacity	0.04	0.03	0.12	0.18	0.02	
Queue Length 95th (m)	1.0	0.6	0.0	0.0	0.0	
Control Delay (s)	12.7	8.3	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	12.7	1.0		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			31.5%	ICU Level of Service		A
Analysis Period (min)			15			

2022 Future Total AM

7: Winston Churchill Blvd & South Site Access











September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↕↗	
Traffic Volume (vph)	0	5	0	186	292	18
Future Volume (vph)	0	5	0	186	292	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.991	
Flt Protected						
Satd. Flow (prot)	0	1629	0	1601	3014	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	1601	3014	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	201.0			795.8	265.0	
Travel Time (s)	14.5			47.7	15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	20%	20%	20%
Adj. Flow (vph)	0	5	0	202	317	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	5	0	202	337	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type: Other						
Control Type: Unsignalized						
Intersection Capacity Utilization 18.6% ICU Level of Service A						
Analysis Period (min) 15						

2022 Future Total AM
7: Winston Churchill Blvd & South Site Access

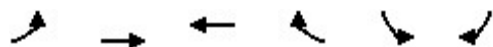
September 2021

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (veh/h)	0	5	0	186	292	18
Future Volume (Veh/h)	0	5	0	186	292	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	202	317	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	529	168	337			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	529	168	337			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	479	846	1219			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	5	202	211	126		
Volume Left	0	0	0	0		
Volume Right	5	0	0	20		
cSH	846	1700	1700	1700		
Volume to Capacity	0.01	0.12	0.12	0.07		
Queue Length 95th (m)	0.1	0.0	0.0	0.0		
Control Delay (s)	9.3	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			18.6%		ICU Level of Service	A
Analysis Period (min)			15			

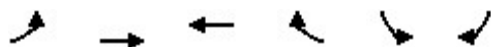
2022 Future Total PM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	122	248	192	69	75	141
Future Volume (vph)	122	248	192	69	75	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.626				0.950	
Satd. Flow (perm)	1179	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				76		155
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		795.8	
Travel Time (s)		18.2	24.5		47.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	134	273	211	76	82	155
Shared Lane Traffic (%)						
Lane Group Flow (vph)	134	273	211	76	82	155
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	97			97	97	97
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	25.0	25.0	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	48.0	48.0	48.0	48.0	29.8	29.8
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?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	48.0	48.0	48.0	48.0	29.8	29.8



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
v/c Ratio	0.21	0.27	0.21	0.11	0.17	0.25
Control Delay	12.2	12.3	11.7	3.0	22.7	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.2	12.3	11.7	3.0	22.7	4.9
LOS	B	B	B	A	C	A
Approach Delay		12.3	9.4		11.0	
Approach LOS		B	A		B	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.27

Intersection Signal Delay: 11.1

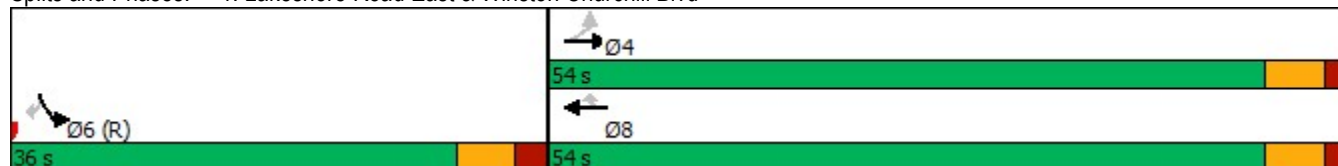
Intersection LOS: B

Intersection Capacity Utilization 38.7%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2022 Future Total PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	536	136	56	33	63	93	41	246	32	405	335	85
Future Volume (vph)	536	136	56	33	63	93	41	246	32	405	335	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.911			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2888	0	1716	3509	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.478			0.569		
Satd. Flow (perm)	3319	1724	0	1746	2888	0	862	3509	0	989	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			100			11				92
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	576	146	60	35	68	100	44	265	34	435	360	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	576	206	0	35	168	0	44	299	0	435	360	91
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2022 Future Total PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	Perm
Protected Phases	7	4	3		8		2		6		6	
Permitted Phases							2	6				6
Detector Phase	7	4	3		8		2	2	6		6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	13.0	39.5		13.0	38.0		42.0	42.0		42.0	42.0	42.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%		38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0		43.0	43.0	43.0
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		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	4.0		7.0		7.0		7.0		7.0		7.0	
Flash Dont Walk (s)	24.0		24.0		28.0		28.0		28.0		28.0	
Pedestrian Calls (#/hr)	0		0		0		0		0		0	
Act Effct Green (s)	27.5	35.3		8.2	10.6		70.9	70.9		70.9	70.9	70.9
Actuated g/C Ratio	0.21	0.27		0.06	0.08		0.55	0.55		0.55	0.55	0.55
v/c Ratio	0.82	0.43		0.32	0.52		0.09	0.16		0.81	0.35	0.10
Control Delay	58.7	40.2		65.1	29.9		16.7	15.1		31.1	12.1	1.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	58.7	40.2		65.1	29.9		16.7	15.1		31.1	12.1	1.2
LOS	E	D		E	C		B	B		C	B	A
Approach Delay	53.9		36.0		15.3		20.3					
Approach LOS	D		D		B		C					

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 125

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 32.8

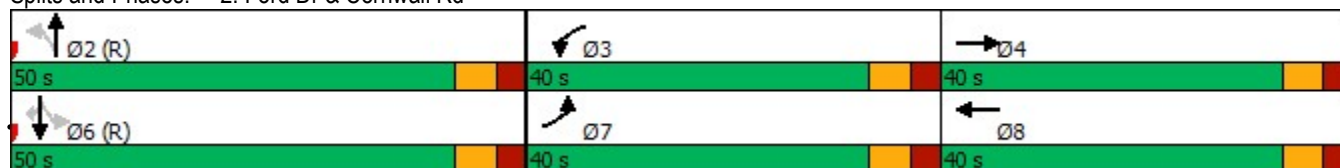
Intersection LOS: C

Intersection Capacity Utilization 99.7%

ICU Level of Service F

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2022 Future Total PM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	163	18	43	274	204	97
Future Volume (vph)	163	18	43	274	204	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.957	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1618	0
Flt Permitted	0.950		0.565			
Satd. Flow (perm)	1690	1384	923	1700	1618	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		19			46	
Link Speed (k/h)	60			60	60	
Link Distance (m)	437.2			655.5	190.2	
Travel Time (s)	26.2			39.3	11.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	175	19	46	295	219	104
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	19	46	295	323	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2022 Future Total PM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	11.5	11.5	39.9	39.9	39.9	
Actuated g/C Ratio	0.19	0.19	0.66	0.66	0.66	
v/c Ratio	0.54	0.07	0.07	0.26	0.30	
Control Delay	27.3	9.2	6.7	7.1	6.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.3	9.2	6.7	7.1	6.5	
LOS	C	A	A	A	A	
Approach Delay	25.5			7.1	6.5	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 11.0

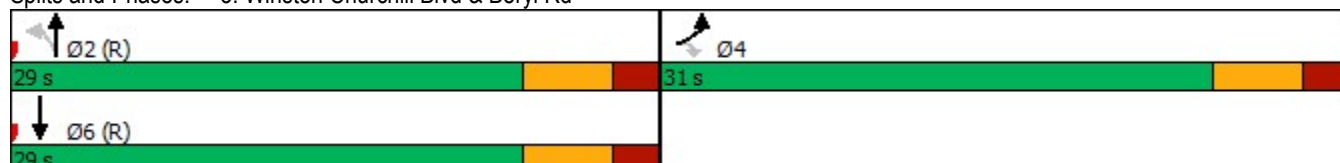
Intersection LOS: B

Intersection Capacity Utilization 45.3%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd



2022 Future Total PM
4: Ford Dr & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	595	83	186	382	194	99	630	206	162	562	82
Future Volume (vph)	189	595	83	186	382	194	99	630	206	162	562	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.98	1.00		0.99
Frt		0.982			0.950				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3124	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.245			0.169			0.353			0.313		
Satd. Flow (perm)	430	3294	0	308	3124	0	631	3510	1498	532	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			66				226			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	208	654	91	204	420	213	109	692	226	178	618	90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	208	745	0	204	633	0	109	692	226	178	618	90
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2022 Future Total PM

4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	51.0	35.6		51.1	35.6		58.0	58.0	58.0	58.0	58.0	58.0
Actuated g/C Ratio	0.39	0.27		0.39	0.27		0.45	0.45	0.45	0.45	0.45	0.45
v/c Ratio	0.66	0.82		0.70	0.70		0.39	0.44	0.28	0.75	0.40	0.13
Control Delay	32.4	51.3		36.6	41.8		43.4	38.8	17.9	54.3	26.6	5.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	51.3		36.6	41.8		43.4	38.8	17.9	54.3	26.6	5.5
LOS	C	D		D	D		D	D	B	D	C	A
Approach Delay		47.2			40.5			34.7			30.0	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 38.1

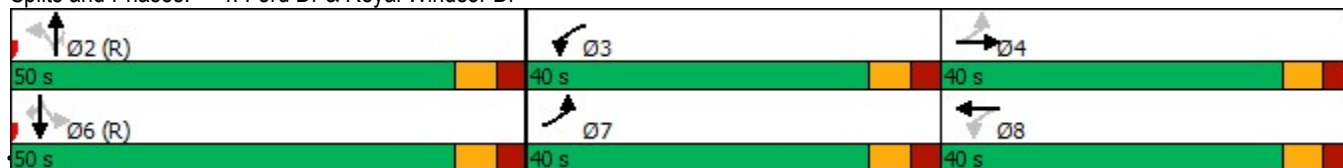
Intersection LOS: D

Intersection Capacity Utilization 98.0%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



C.F. Crozier and Associates
























Project No. 0756-5105

Synchro 11 Light Report

2022 Future Total PM

5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	281	684	48	66	526	343	67	301	125	249	181	154
Future Volume (vph)	281	684	48	66	526	343	67	301	125	249	181	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.990				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3330	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.259			0.276			0.629			0.950		
Satd. Flow (perm)	458	3330	0	485	3411	1468	938	3380	1457	3226	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				369			136			166
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	302	735	52	71	566	369	73	327	136	268	195	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	787	0	71	566	369	73	327	136	268	195	166
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2022 Future Total PM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
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%
Maximum Green (s)	11.0	63.0		49.0	49.0	49.0	31.7	31.7	31.7	26.0	62.7	62.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	53.1	46.1		32.1	32.1	32.1	57.8	57.8	57.8	16.9	79.6	79.6
Actuated g/C Ratio	0.38	0.33		0.23	0.23	0.23	0.41	0.41	0.41	0.12	0.57	0.57
v/c Ratio	1.02	0.72		0.65	0.72	0.60	0.19	0.23	0.20	0.69	0.10	0.18
Control Delay	93.2	44.3		73.7	55.0	8.0	31.5	29.2	5.8	68.2	15.0	2.9
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	93.2	44.3		73.7	55.0	8.0	31.5	29.2	5.8	68.2	15.0	2.9
LOS	F	D		E	D	A	C	C	A	E	B	A
Approach Delay		57.8			39.1			23.6			34.5	
Approach LOS		E			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 41.9

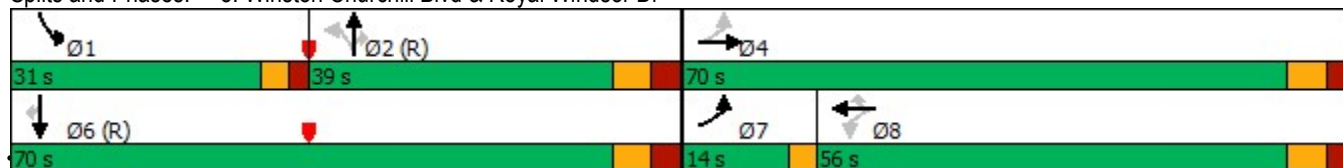
Intersection LOS: D

Intersection Capacity Utilization 80.0%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



C.F. Crozier and Associates

Project No. 0756-5105

Synchro 11 Light Report

2022 Future Total PM

6: Winston Churchill Blvd & North Site Access

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	57	12	13	203	230	13
Future Volume (vph)	57	12	13	203	230	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.977					0.850
Flt Protected	0.960		0.950			
Satd. Flow (prot)	1502	0	1789	1601	1671	1361
Flt Permitted	0.960		0.950			
Satd. Flow (perm)	1502	0	1789	1601	1671	1361
Link Speed (k/h)	50			60	60	
Link Distance (m)	232.0			265.0	655.5	
Travel Time (s)	16.7			15.9	39.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	2%	20%	15%	20%
Adj. Flow (vph)	62	13	14	221	250	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	75	0	14	221	250	14
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	












Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 22.7% ICU Level of Service A

Analysis Period (min) 15




						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	12	13	203	230	13
Future Volume (Veh/h)	57	12	13	203	230	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	13	14	221	250	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	499	250	264			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	499	250	264			
tC, single (s)	6.6	6.4	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.2			
p0 queue free %	87	98	99			
cM capacity (veh/h)	495	747	1300			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	75	14	221	250	14	
Volume Left	62	14	0	0	0	
Volume Right	13	0	0	0	14	
cSH	526	1300	1700	1700	1700	
Volume to Capacity	0.14	0.01	0.13	0.15	0.01	
Queue Length 95th (m)	3.8	0.2	0.0	0.0	0.0	
Control Delay (s)	13.0	7.8	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	13.0	0.5		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.9			
Intersection Capacity Utilization			22.7%	ICU Level of Service		A
Analysis Period (min)			15			

2022 Future Total PM

7: Winston Churchill Blvd & South Site Access











September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	19	0	203	254	7
Future Volume (vph)	0	19	0	203	254	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1629	0	1883	3564	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	1883	3564	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	201.0			795.8	265.0	
Travel Time (s)	15.1			59.7	19.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	21	0	221	276	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	0	221	284	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.2%			ICU Level of Service A		
Analysis Period (min)	15					

2022 Future Total PM
7: Winston Churchill Blvd & South Site Access

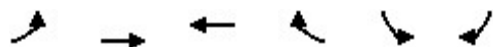
September 2021

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (veh/h)	0	19	0	203	254	7
Future Volume (Veh/h)	0	19	0	203	254	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	0	221	276	8
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	501	142	284			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	501	142	284			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	499	880	1275			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	21	221	184	100		
Volume Left	0	0	0	0		
Volume Right	21	0	0	8		
cSH	880	1700	1700	1700		
Volume to Capacity	0.02	0.13	0.11	0.06		
Queue Length 95th (m)	0.6	0.0	0.0	0.0		
Control Delay (s)	9.2	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.2	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			17.2%		ICU Level of Service	A
Analysis Period (min)			15			

2027 Future Total AM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021

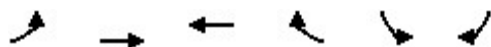


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	79	149	114	75	109	124
Future Volume (vph)	79	149	114	75	109	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.677				0.950	
Satd. Flow (perm)	1275	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				82		136
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		795.8	
Travel Time (s)		18.2	24.5		47.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	87	164	125	82	118	136
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	164	125	82	118	136
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Prot	Perm

2027 Future Total AM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	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	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	53.0	53.0	53.0	53.0	24.8	24.8
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	9.5	9.5	9.5	9.5	26.3	26.3
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.55	0.55
v/c Ratio	0.35	0.44	0.33	0.26	0.15	0.15
Control Delay	19.9	20.1	18.4	6.9	6.6	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	20.1	18.4	6.9	6.6	2.0
LOS	B	C	B	A	A	A
Approach Delay		20.1	13.8		4.1	
Approach LOS		C	B		A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 48.1

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 12.6

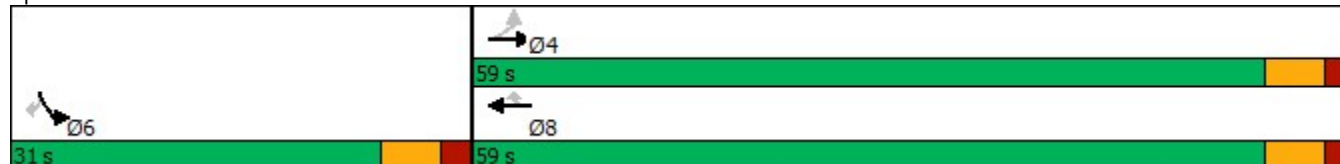
Intersection LOS: B

Intersection Capacity Utilization 27.9%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2027 Future Total AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	385	62	26	19	67	70	25	290	28	530	175	77
Future Volume (vph)	385	62	26	19	67	70	25	290	28	530	175	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.923			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1723	0	1767	2956	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.639			0.546		
Satd. Flow (perm)	3318	1723	0	1742	2956	0	1152	3525	0	949	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			75			8				92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	414	67	28	20	72	75	27	312	30	570	188	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	414	95	0	20	147	0	27	342	0	570	188	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2027 Future Total AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2	6				6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	13.0	38.0		13.0	38.0		42.0	42.0		42.0	42.0	42.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%		38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0		43.0	43.0	43.0
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		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)	4.0			7.0			7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	24.0			24.0			28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)	0			0			0	0		0	0	0
Act Effct Green (s)	21.5	32.8		7.2	10.5		77.1	77.1		77.1	77.1	77.1
Actuated g/C Ratio	0.17	0.25		0.06	0.08		0.59	0.59		0.59	0.59	0.59
v/c Ratio	0.75	0.21		0.21	0.48		0.04	0.16		1.01	0.17	0.09
Control Delay	60.6	34.3		63.1	33.8		12.8	12.5		62.8	9.1	1.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	60.6	34.3		63.1	33.8		12.8	12.5		62.8	9.1	1.0
LOS	E	C		E	C		B	B		E	A	A
Approach Delay	55.7			37.3			12.5			44.7		
Approach LOS	E			D			B			D		

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 40.7

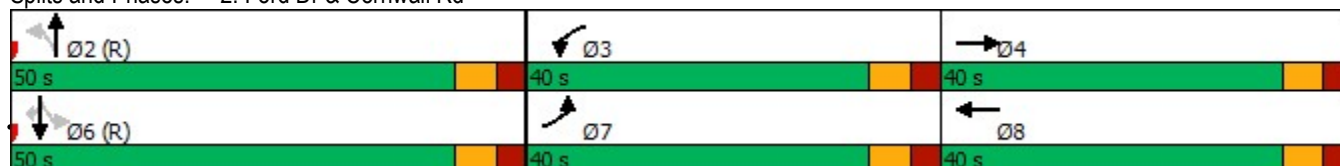
Intersection LOS: D

Intersection Capacity Utilization 102.3%

ICU Level of Service G

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2027 Future Total AM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	89	32	36	191	237	110
Future Volume (vph)	89	32	36	191	237	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.957	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1618	0
Flt Permitted	0.950		0.540			
Satd. Flow (perm)	1690	1384	882	1700	1618	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		34			45	
Link Speed (k/h)	60			60	48	
Link Distance (m)	437.2			655.5	190.2	
Travel Time (s)	26.2			39.3	14.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	96	34	39	205	255	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	34	39	205	373	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2027 Future Total AM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	8.8	8.8	42.4	42.4	42.4	
Actuated g/C Ratio	0.15	0.15	0.71	0.71	0.71	
v/c Ratio	0.39	0.15	0.06	0.17	0.32	
Control Delay	26.9	9.9	5.1	5.1	5.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	26.9	9.9	5.1	5.1	5.4	
LOS	C	A	A	A	A	
Approach Delay	22.5			5.1	5.4	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

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

Maximum v/c Ratio: 0.39

Intersection Signal Delay: 8.3

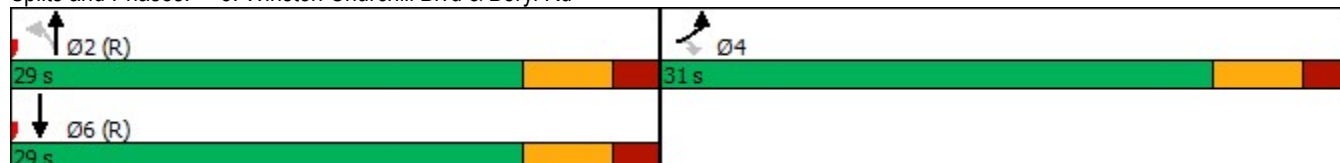
Intersection LOS: A

Intersection Capacity Utilization 43.7%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd



2027 Future Total AM

4: Ford Dr & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	111	485	90	175	354	137	91	465	188	200	547	131
Future Volume (vph)	111	485	90	175	354	137	91	465	188	200	547	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	1.00		0.99
Frt		0.977			0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3278	0	1733	3138	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.344			0.178			0.377			0.429		
Satd. Flow (perm)	604	3278	0	325	3138	0	674	3510	1505	730	3510	1405
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			42				207			118
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			2			2	3		8	8		3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	122	533	99	192	389	151	100	511	207	220	601	144
Shared Lane Traffic (%)												
Lane Group Flow (vph)	122	632	0	192	540	0	100	511	207	220	601	144
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Total AM

4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	41.6	30.3		49.4	34.1		63.5	63.5	63.5	63.5	63.5	63.5
Actuated g/C Ratio	0.32	0.23		0.38	0.26		0.49	0.49	0.49	0.49	0.49	0.49
v/c Ratio	0.43	0.82		0.67	0.63		0.30	0.30	0.25	0.62	0.35	0.19
Control Delay	28.6	54.8		36.5	41.8		35.3	30.7	15.3	36.2	22.5	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	54.8		36.5	41.8		35.3	30.7	15.3	36.2	22.5	6.5
LOS	C	D		D	D		D	C	B	D	C	A
Approach Delay		50.5			40.4			27.4			23.3	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 34.4

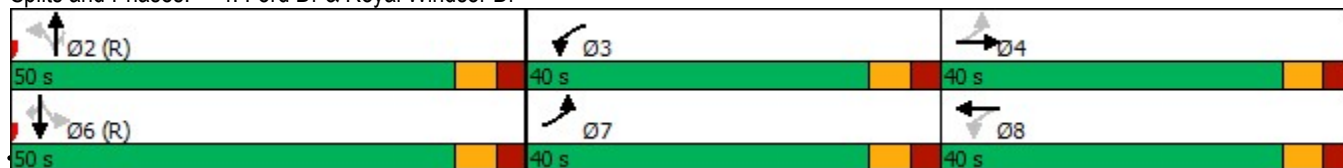
Intersection LOS: C

Intersection Capacity Utilization 95.0%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



C.F. Crozier and Associates
























Project No. 0756-5105

Synchro 11 Light Report

2027 Future Total AM

5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	593	81	72	457	203	53	166	82	169	204	195
Future Volume (vph)	188	593	81	72	457	203	53	166	82	169	204	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.982				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3266	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.223			0.376			0.615			0.950		
Satd. Flow (perm)	395	3266	0	660	3411	1468	917	3380	1457	3223	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				218			94			210
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	202	638	87	77	491	218	58	180	89	182	219	210
Shared Lane Traffic (%)												
Lane Group Flow (vph)	202	725	0	77	491	218	58	180	89	182	219	210
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Total AM

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September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	9.5	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	20.0	56.0		36.0	36.0	36.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	14.3%	40.0%		25.7%	25.7%	25.7%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Maximum Green (s)	17.0	49.0		29.0	29.0	29.0	27.7	27.7	27.7	44.0	76.7	76.7
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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	48.8	44.8		25.7	25.7	25.7	62.6	62.6	62.6	13.3	80.9	80.9
Actuated g/C Ratio	0.35	0.32		0.18	0.18	0.18	0.45	0.45	0.45	0.10	0.58	0.58
v/c Ratio	0.71	0.69		0.64	0.79	0.49	0.14	0.12	0.13	0.59	0.11	0.22
Control Delay	47.0	44.1		76.3	63.9	9.6	26.9	24.5	4.9	68.5	14.3	2.5
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	47.0	44.1		76.3	63.9	9.6	26.9	24.5	4.9	68.5	14.3	2.5
LOS	D	D		E	E	A	C	C	A	E	B	A
Approach Delay		44.7			50.0			19.6			26.4	
Approach LOS		D			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 108 (77%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 39.0

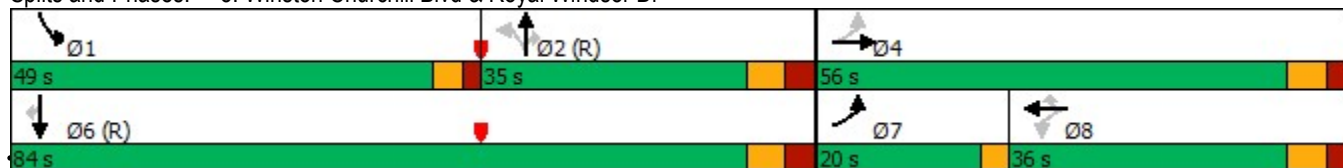
Intersection LOS: D

Intersection Capacity Utilization 76.7%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



C.F. Crozier and Associates

Synchro 11 Light Report






Project No. 0756-5105












2027 Future Total AM

6: Winston Churchill Blvd & North Site Access




September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	46	21	8	162	276	23
Future Volume (vph)	46	21	8	162	276	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.957					0.850
Flt Protected	0.967		0.950			
Satd. Flow (prot)	1651	0	1521	1883	1671	1601
Flt Permitted	0.967		0.950			
Satd. Flow (perm)	1651	0	1521	1883	1671	1601
Link Speed (k/h)	50			60	60	
Link Distance (m)	232.0			265.0	655.5	
Travel Time (s)	16.7			15.9	39.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	20%	20%	2%	15%	2%
Adj. Flow (vph)	50	23	9	176	300	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	73	0	9	176	300	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type: Other						
Control Type: Unsignalized						
Intersection Capacity Utilization 25.0% ICU Level of Service A						
Analysis Period (min) 15						











						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	46	21	8	162	276	23
Future Volume (Veh/h)	46	21	8	162	276	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	23	9	176	300	25
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	494	300	325			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	494	300	325			
tC, single (s)	6.4	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.5	2.4			
p0 queue free %	91	97	99			
cM capacity (veh/h)	530	699	1140			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	73	9	176	300	25	
Volume Left	50	9	0	0	0	
Volume Right	23	0	0	0	25	
cSH	574	1140	1700	1700	1700	
Volume to Capacity	0.13	0.01	0.10	0.18	0.01	
Queue Length 95th (m)	3.3	0.2	0.0	0.0	0.0	
Control Delay (s)	12.2	8.2	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	12.2	0.4		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			25.0%	ICU Level of Service		A
Analysis Period (min)			15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	23	0	162	319	5
Future Volume (vph)	0	23	0	162	319	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.998	
Flt Protected						
Satd. Flow (prot)	0	1629	0	1883	3571	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	1883	3571	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	201.0			795.8	265.0	
Travel Time (s)	14.5			47.7	15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	25	0	176	347	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	25	0	176	352	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.0%			ICU Level of Service A		
Analysis Period (min)	15					

2027 Future Total AM
7: Winston Churchill Blvd & South Site Access

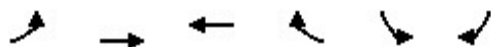
September 2021

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (veh/h)	0	23	0	162	319	5
Future Volume (Veh/h)	0	23	0	162	319	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	25	0	176	347	5
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	526	176	352			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	176	352			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	100			
cM capacity (veh/h)	482	837	1203			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	25	176	231	121		
Volume Left	0	0	0	0		
Volume Right	25	0	0	5		
cSH	837	1700	1700	1700		
Volume to Capacity	0.03	0.10	0.14	0.07		
Queue Length 95th (m)	0.7	0.0	0.0	0.0		
Control Delay (s)	9.4	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.4	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			19.0%		ICU Level of Service	A
Analysis Period (min)			15			

2027 Future Total PM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021

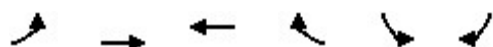


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	134	274	212	76	82	154
Future Volume (vph)	134	274	212	76	82	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.610				0.950	
Satd. Flow (perm)	1149	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				84		169
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		795.8	
Travel Time (s)		18.2	24.5		47.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	147	301	233	84	90	169
Shared Lane Traffic (%)						
Lane Group Flow (vph)	147	301	233	84	90	169
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	97			97	97	97
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	25.0	25.0	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	48.0	48.0	48.0	48.0	29.8	29.8
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?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	48.0	48.0	48.0	48.0	29.8	29.8

2027 Future Total PM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
v/c Ratio	0.24	0.30	0.23	0.12	0.19	0.27
Control Delay	12.5	12.6	11.9	2.9	22.9	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.5	12.6	11.9	2.9	22.9	4.8
LOS	B	B	B	A	C	A
Approach Delay	12.6		9.5	11.1		
Approach LOS	B		A	B		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.30

Intersection Signal Delay: 11.3

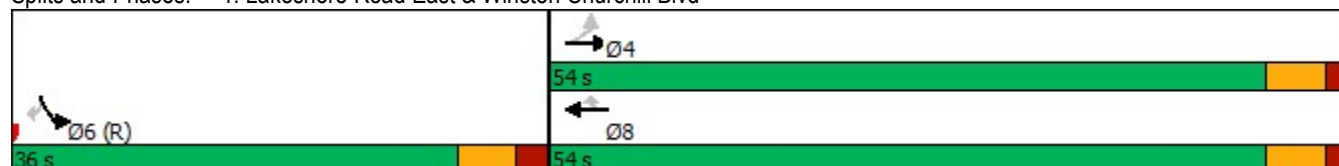
Intersection LOS: B

Intersection Capacity Utilization 40.4%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2027 Future Total PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	591	150	62	36	69	102	45	271	35	447	369	93
Future Volume (vph)	591	150	62	36	69	102	45	271	35	447	369	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.910			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2884	0	1716	3508	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.445			0.553		
Satd. Flow (perm)	3319	1724	0	1746	2884	0	803	3508	0	961	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			110			12				100
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	635	161	67	39	74	110	48	291	38	481	397	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	635	228	0	39	184	0	48	329	0	481	397	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2027 Future Total PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		6
Detector Phase	7	4		3	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	13.0	39.5		13.0	38.0		42.0	42.0		42.0	42.0	42.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%		38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0		43.0	43.0	43.0
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		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		C-Max	C-Max	C-Max
Walk Time (s)		4.0			7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)		24.0			24.0		28.0	28.0		28.0	28.0	28.0
Pedestrian Calls (#/hr)		0			0		0	0		0	0	0
Act Effct Green (s)	29.2	34.1		8.4	10.7		69.1	69.1		69.1	69.1	69.1
Actuated g/C Ratio	0.22	0.26		0.06	0.08		0.53	0.53		0.53	0.53	0.53
v/c Ratio	0.85	0.49		0.34	0.54		0.11	0.18		0.94	0.40	0.12
Control Delay	59.7	42.5		65.6	29.9		17.8	16.2		51.0	12.5	1.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	59.7	42.5		65.6	29.9		17.8	16.2		51.0	12.5	1.1
LOS	E	D		E	C		B	B		D	B	A
Approach Delay		55.1			36.2			16.4			30.3	
Approach LOS		E			D			B			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 37.4

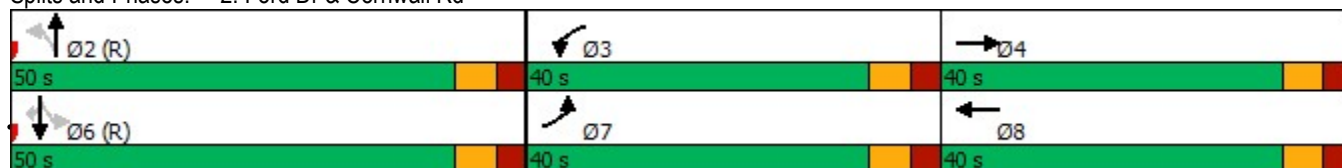
Intersection LOS: D

Intersection Capacity Utilization 103.6%

ICU Level of Service G

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2027 Future Total PM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	180	20	46	294	223	107
Future Volume (vph)	180	20	46	294	223	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.956	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1616	0
Flt Permitted	0.950		0.549			
Satd. Flow (perm)	1690	1384	897	1700	1616	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		22			46	
Link Speed (k/h)	60			60	60	
Link Distance (m)	437.2			655.5	190.2	
Travel Time (s)	26.2			39.3	11.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	194	22	49	316	240	115
Shared Lane Traffic (%)						
Lane Group Flow (vph)	194	22	49	316	355	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2027 Future Total PM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	12.2	12.2	35.4	35.4	35.4	
Actuated g/C Ratio	0.20	0.20	0.59	0.59	0.59	
v/c Ratio	0.56	0.07	0.09	0.32	0.37	
Control Delay	27.2	8.5	7.3	8.2	7.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.2	8.5	7.3	8.2	7.7	
LOS	C	A	A	A	A	
Approach Delay	25.3			8.1	7.7	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 11.9

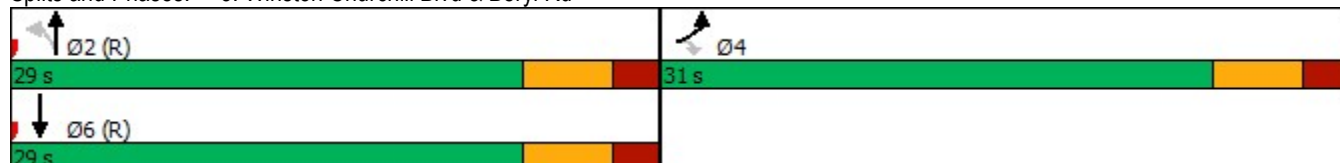
Intersection LOS: B

Intersection Capacity Utilization 47.8%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd



2027 Future Total PM
4: Ford Dr & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	656	91	205	421	213	109	695	227	179	620	90
Future Volume (vph)	208	656	91	205	421	213	109	695	227	179	620	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.98	1.00		0.99
Frt		0.982			0.950				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3124	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.231			0.154			0.301			0.257		
Satd. Flow (perm)	406	3294	0	281	3124	0	538	3510	1498	437	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			65				228			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	229	721	100	225	463	234	120	764	249	197	681	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	229	821	0	225	697	0	120	764	249	197	681	99
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Total PM

4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	56.2	39.5		56.6	39.7		52.6	52.6	52.6	52.6	52.6	52.6
Actuated g/C Ratio	0.43	0.30		0.44	0.31		0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.68	0.81		0.73	0.70		0.55	0.54	0.34	1.12	0.48	0.16
Control Delay	30.2	48.4		36.6	39.7		54.8	44.1	20.3	140.5	31.4	7.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.2	48.4		36.6	39.7		54.8	44.1	20.3	140.5	31.4	7.3
LOS	C	D		D	D		D	D	C	F	C	A
Approach Delay		44.4			38.9			40.0			50.9	
Approach LOS		D			D			D			D	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 43.5

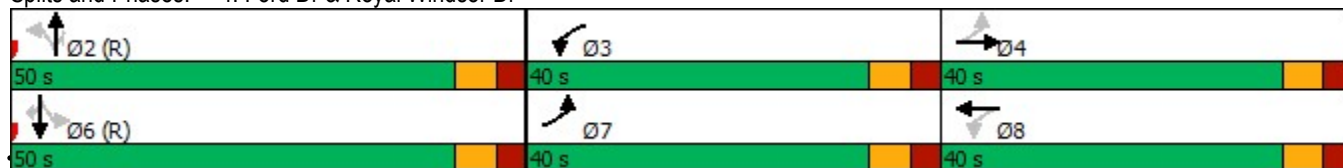
Intersection LOS: D

Intersection Capacity Utilization 100.9%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



C.F. Crozier and Associates
























Project No. 0756-5105

Synchro 11 Light Report

2027 Future Total PM

5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	755	52	73	581	378	73	327	136	275	198	170
Future Volume (vph)	311	755	52	73	581	378	73	327	136	275	198	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.990				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3331	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.241			0.238			0.618			0.950		
Satd. Flow (perm)	427	3331	0	418	3411	1468	922	3380	1457	3226	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				406			110			183
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	334	812	56	78	625	406	79	355	148	296	213	183
Shared Lane Traffic (%)												
Lane Group Flow (vph)	334	868	0	78	625	406	79	355	148	296	213	183
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2027 Future Total PM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
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%
Maximum Green (s)	11.0	63.0		49.0	49.0	49.0	31.7	31.7	31.7	26.0	62.7	62.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	56.8	49.8		35.8	35.8	35.8	52.8	52.8	52.8	18.1	75.9	75.9
Actuated g/C Ratio	0.41	0.36		0.26	0.26	0.26	0.38	0.38	0.38	0.13	0.54	0.54
v/c Ratio	1.12	0.73		0.74	0.72	0.60	0.23	0.28	0.24	0.71	0.12	0.20
Control Delay	119.6	42.2		82.9	51.7	7.1	36.5	33.5	12.3	67.8	17.3	3.3
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	119.6	42.2		82.9	51.7	7.1	36.5	33.5	12.3	67.8	17.3	3.3
LOS	F	D		F	D	A	D	C	B	E	B	A
Approach Delay		63.7			37.6			28.5			35.2	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 44.4

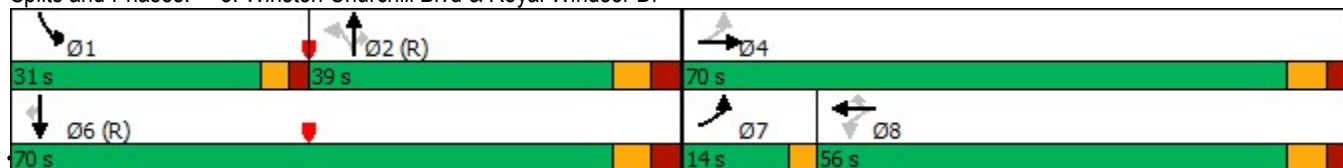
Intersection LOS: D

Intersection Capacity Utilization 83.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



C.F. Crozier and Associates

Project No. 0756-5105

Synchro 11 Light Report

2027 Future Total PM

6: Winston Churchill Blvd & North Site Access

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	57	12	13	222	251	13
Future Volume (vph)	57	12	13	222	251	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.977					0.850
Flt Protected	0.960		0.950			
Satd. Flow (prot)	1502	0	1521	1601	1671	1361
Flt Permitted	0.960		0.950			
Satd. Flow (perm)	1502	0	1521	1601	1671	1361
Link Speed (k/h)	48			48	48	
Link Distance (m)	232.0			265.0	655.5	
Travel Time (s)	17.4			19.9	49.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	20%	20%	20%	15%	20%
Adj. Flow (vph)	62	13	14	241	273	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	75	0	14	241	273	14
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	

Intersection Summary












Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 23.8%

ICU Level of Service A

Analysis Period (min) 15




						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	12	13	222	251	13
Future Volume (Veh/h)	57	12	13	222	251	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	13	14	241	273	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	542	273	287			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	273	287			
tC, single (s)	6.6	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	87	98	99			
cM capacity (veh/h)	466	724	1179			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	75	14	241	273	14	
Volume Left	62	14	0	0	0	
Volume Right	13	0	0	0	14	
cSH	497	1179	1700	1700	1700	
Volume to Capacity	0.15	0.01	0.14	0.16	0.01	
Queue Length 95th (m)	4.0	0.3	0.0	0.0	0.0	
Control Delay (s)	13.5	8.1	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	13.5	0.4		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			23.8%	ICU Level of Service		A
Analysis Period (min)			15			

2027 Future Total PM

7: Winston Churchill Blvd & South Site Access











September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	19	0	222	275	7
Future Volume (vph)	0	19	0	222	275	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1629	0	1601	3564	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	1601	3564	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	201.0			795.8	265.0	
Travel Time (s)	15.1			59.7	19.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	20%	2%	2%
Adj. Flow (vph)	0	21	0	241	299	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	0	241	307	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	17.8%			ICU Level of Service A		
Analysis Period (min)	15					

2027 Future Total PM
7: Winston Churchill Blvd & South Site Access

September 2021

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (veh/h)	0	19	0	222	275	7
Future Volume (Veh/h)	0	19	0	222	275	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	0	241	299	8
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	544	154	307			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	544	154	307			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	469	865	1250			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	21	241	199	108		
Volume Left	0	0	0	0		
Volume Right	21	0	0	8		
cSH	865	1700	1700	1700		
Volume to Capacity	0.02	0.14	0.12	0.06		
Queue Length 95th (m)	0.6	0.0	0.0	0.0		
Control Delay (s)	9.3	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			17.8%		ICU Level of Service	A
Analysis Period (min)			15			

2032 Future Total AM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	97	164	126	91	102	117
Future Volume (vph)	97	164	126	91	102	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.669				0.950	
Satd. Flow (perm)	1260	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				100		129
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		795.8	
Travel Time (s)		18.2	24.5		47.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.92	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	107	180	138	100	111	129
Shared Lane Traffic (%)						
Lane Group Flow (vph)	107	180	138	100	111	129
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	2.0	10.0	10.0	2.0	2.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6	0.6	2.0	2.0	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4	9.4			
Detector 2 Size(m)		0.6	0.6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Prot	Perm

2032 Future Total AM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Detector Phase	4	4	8	8	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	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	53.0	53.0	53.0	53.0	24.8	24.8
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	9.8	9.8	9.8	9.8	25.3	25.3
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.53	0.53
v/c Ratio	0.41	0.46	0.35	0.29	0.15	0.15
Control Delay	21.1	20.2	18.4	6.7	6.8	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.1	20.2	18.4	6.7	6.8	2.1
LOS	C	C	B	A	A	A
Approach Delay		20.5	13.5		4.3	
Approach LOS		C	B		A	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 47.3

Natural Cycle: 50

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 13.2

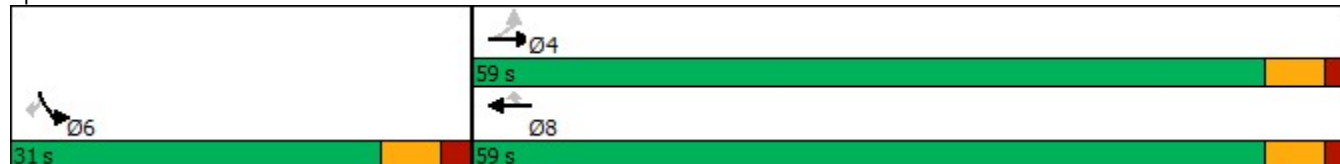
Intersection LOS: B

Intersection Capacity Utilization 35.2%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2032 Future Total AM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	426	68	29	20	72	75	27	322	31	588	191	85
Future Volume (vph)	426	68	29	20	72	75	27	322	31	588	191	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.955			0.923			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1722	0	1767	2955	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.626			0.526		
Satd. Flow (perm)	3318	1722	0	1742	2955	0	1128	3525	0	914	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			81			8				92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	458	73	31	22	77	81	29	346	33	632	205	91
Shared Lane Traffic (%)												
Lane Group Flow (vph)	458	104	0	22	158	0	29	379	0	632	205	91
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2032 Future Total AM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	NA	Perm
Protected Phases	7	4	3		8		2		6		6		
Permitted Phases							2					6	6
Detector Phase	7	4	3		8		2	2	6		6	6	
Switch Phase													
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0		15.0	15.0	
Minimum Split (s)	13.0	38.0		13.0	38.0		42.0	42.0	42.0		42.0	42.0	
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0		50.0	50.0	
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%		38.5%	38.5%	
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0		43.0	43.0	
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		3.0	3.0	3.0		3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0		7.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	4.0		7.0		7.0		7.0		7.0		7.0		
Flash Dont Walk (s)	24.0		24.0		28.0		28.0		28.0		28.0		
Pedestrian Calls (#/hr)	0		0		0		0		0		0		
Act Effct Green (s)	23.1	31.7		7.3	10.6		75.2	75.2	75.2		75.2	75.2	
Actuated g/C Ratio	0.18	0.24		0.06	0.08		0.58	0.58	0.58		0.58	0.58	
v/c Ratio	0.77	0.24		0.22	0.50		0.04	0.19	1.20		0.19	0.10	
Control Delay	60.0	35.8		63.4	33.7		13.8	13.6	127.5		9.5	1.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0	
Total Delay	60.0	35.8		63.4	33.7		13.8	13.6	127.5		9.5	1.1	
LOS	E	D		E	C		B	B	F		A	A	
Approach Delay	55.5		37.4		13.6		89.0						
Approach LOS	E		D		B		F						

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.20

Intersection Signal Delay: 60.7

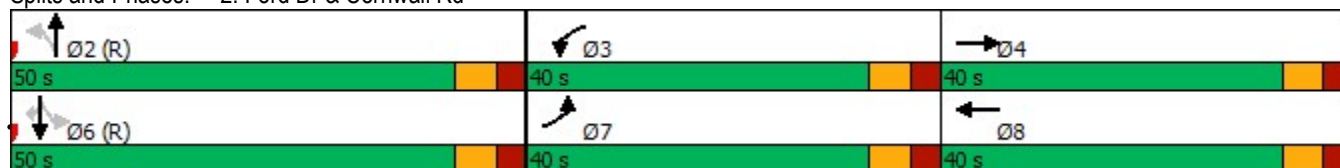
Intersection LOS: E

Intersection Capacity Utilization 106.7%

ICU Level of Service G

Analysis Period (min) 15

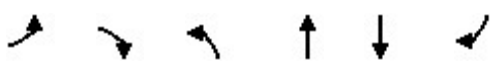






Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2032 Future Total AM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	98	38	34	180	280	121
Future Volume (vph)	98	38	34	180	280	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.959	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1622	0
Flt Permitted	0.950		0.508			
Satd. Flow (perm)	1690	1384	830	1700	1622	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		41			42	
Link Speed (k/h)	60			60	48	
Link Distance (m)	437.2			655.5	190.2	
Travel Time (s)	26.2			39.3	14.3	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	105	41	37	194	301	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	105	41	37	194	431	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2032 Future Total AM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	9.1	9.1	42.1	42.1	42.1	
Actuated g/C Ratio	0.15	0.15	0.70	0.70	0.70	
v/c Ratio	0.41	0.17	0.06	0.16	0.37	
Control Delay	27.0	9.3	5.3	5.2	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.0	9.3	5.3	5.2	6.1	
LOS	C	A	A	A	A	
Approach Delay	22.1			5.2	6.1	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

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

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 8.8

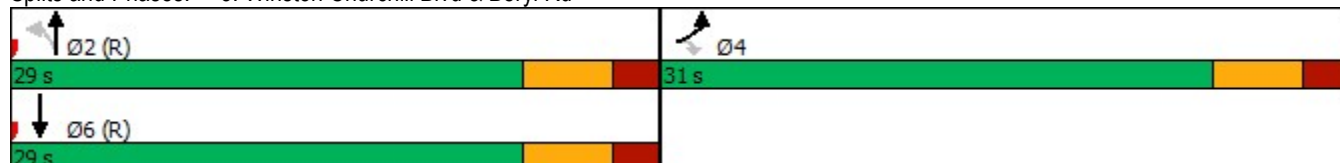
Intersection LOS: A

Intersection Capacity Utilization 44.0%

ICU Level of Service A























Analysis Period (min) 15

Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd



2032 Future Total AM
4: Ford Dr & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	537	99	191	389	150	101	511	209	221	607	144
Future Volume (vph)	123	537	99	191	389	150	101	511	209	221	607	144
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00			1.00		1.00		0.98	1.00		0.99
Frt		0.977			0.958				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3278	0	1733	3138	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.318			0.162			0.332			0.391		
Satd. Flow (perm)	558	3278	0	296	3138	0	594	3510	1505	666	3510	1405
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			42				230			117
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			2			2	3		8	8		3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	135	590	109	210	427	165	111	562	230	243	667	158
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	699	0	210	592	0	111	562	230	243	667	158
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Total AM

4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	45.2	33.4		52.7	37.1		60.1	60.1	60.1	60.1	60.1	60.1
Actuated g/C Ratio	0.35	0.26		0.41	0.29		0.46	0.46	0.46	0.46	0.46	0.46
v/c Ratio	0.46	0.82		0.72	0.64		0.41	0.35	0.28	0.79	0.41	0.22
Control Delay	27.3	52.7		38.5	40.4		41.3	33.4	15.8	52.1	25.5	8.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	52.7		38.5	40.4		41.3	33.4	15.8	52.1	25.5	8.4
LOS	C	D		D	D		D	C	B	D	C	A
Approach Delay		48.6			39.9			29.9			29.0	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 36.2

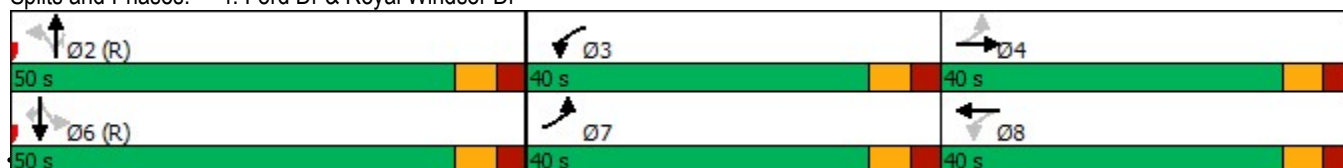
Intersection LOS: D

Intersection Capacity Utilization 97.5%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



C.F. Crozier and Associates
























Synchro 11 Light Report

Project No. 0756-5105

2032 Future Total AM

5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	655	94	84	504	224	53	165	82	187	235	215
Future Volume (vph)	208	655	94	84	504	224	53	165	82	187	235	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.981				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3259	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.192			0.319			0.595			0.950		
Satd. Flow (perm)	340	3259	0	560	3411	1468	887	3380	1457	3223	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				241			94			231
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	224	704	101	90	542	241	58	179	89	201	253	231
Shared Lane Traffic (%)												
Lane Group Flow (vph)	224	805	0	90	542	241	58	179	89	201	253	231
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Total AM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	9.5	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	20.0	56.0		36.0	36.0	36.0	35.0	35.0	35.0	49.0	84.0	84.0
Total Split (%)	14.3%	40.0%		25.7%	25.7%	25.7%	25.0%	25.0%	25.0%	35.0%	60.0%	60.0%
Maximum Green (s)	17.0	49.0		29.0	29.0	29.0	27.7	27.7	27.7	44.0	76.7	76.7
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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	50.6	46.6		27.1	27.1	27.1	60.0	60.0	60.0	14.1	79.1	79.1
Actuated g/C Ratio	0.36	0.33		0.19	0.19	0.19	0.43	0.43	0.43	0.10	0.56	0.56
v/c Ratio	0.80	0.74		0.83	0.82	0.50	0.15	0.12	0.13	0.62	0.13	0.24
Control Delay	54.1	44.9		103.8	65.0	9.3	28.2	25.8	5.0	68.4	15.0	2.5
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	54.1	44.9		103.8	65.0	9.3	28.2	25.8	5.0	68.4	15.0	2.5
LOS	D	D		F	E	A	C	C	A	E	B	A
Approach Delay		46.9			53.6			20.6			26.5	
Approach LOS		D			D			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 108 (77%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 41.2

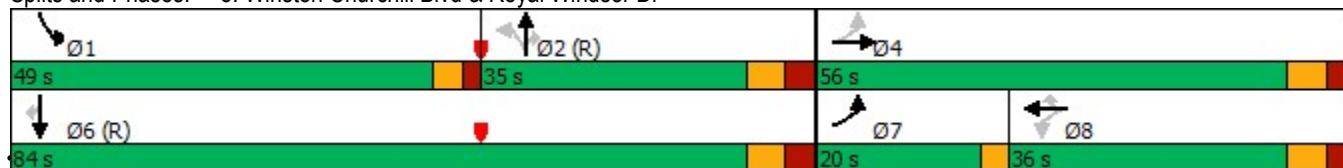
Intersection LOS: D

Intersection Capacity Utilization 78.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



















C.F. Crozier and Associates

Project No. 0756-5105

Synchro 11 Light Report












Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	15	5	27	215	325	38
Future Volume (vph)	15	5	27	215	325	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.968					0.850
Flt Protected	0.963		0.950			
Satd. Flow (prot)	1548	0	1789	1601	1883	1601
Flt Permitted	0.963		0.950			
Satd. Flow (perm)	1548	0	1789	1601	1883	1601
Link Speed (k/h)	50			60	60	
Link Distance (m)	232.0			265.0	655.5	
Travel Time (s)	16.7			15.9	39.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	20%	2%	2%	20%	2%	2%
Adj. Flow (vph)	16	5	29	234	353	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	0	29	234	353	41
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.4%			ICU Level of Service A		
Analysis Period (min)	15					

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	5	27	215	325	38
Future Volume (Veh/h)	15	5	27	215	325	38
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	5	29	234	353	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	645	353	394			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	645	353	394			
tC, single (s)	6.6	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.7	3.3	2.2			
p0 queue free %	96	99	98			
cM capacity (veh/h)	399	691	1165			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	21	29	234	353	41	
Volume Left	16	29	0	0	0	
Volume Right	5	0	0	0	41	
cSH	444	1165	1700	1700	1700	
Volume to Capacity	0.05	0.02	0.14	0.21	0.02	
Queue Length 95th (m)	1.1	0.6	0.0	0.0	0.0	
Control Delay (s)	13.5	8.2	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	13.5	0.9		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			32.4%	ICU Level of Service		A
Analysis Period (min)			15			

2032 Future Total AM











7: Winston Churchill Blvd & South Site Access

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	0	215	335	18
Future Volume (vph)	0	5	0	215	335	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.992	
Flt Protected						
Satd. Flow (prot)	0	1629	0	1883	3550	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	1883	3550	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	201.0			795.8	265.0	
Travel Time (s)	14.5			47.7	15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	5	0	234	364	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	5	0	234	384	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	19.8%			ICU Level of Service A		
Analysis Period (min)	15					

2032 Future Total AM
7: Winston Churchill Blvd & South Site Access

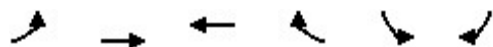
September 2021

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (veh/h)	0	5	0	215	335	18
Future Volume (Veh/h)	0	5	0	215	335	18
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	5	0	234	364	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	608	192	384			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	608	192	384			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	427	817	1171			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	5	234	243	141		
Volume Left	0	0	0	0		
Volume Right	5	0	0	20		
cSH	817	1700	1700	1700		
Volume to Capacity	0.01	0.14	0.14	0.08		
Queue Length 95th (m)	0.1	0.0	0.0	0.0		
Control Delay (s)	9.4	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.4	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			19.8%		ICU Level of Service	A
Analysis Period (min)			15			

2032 Future Total PM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	147	302	234	83	89	168
Future Volume (vph)	147	302	234	83	89	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.7	3.7	3.5	3.5
Storage Length (m)	45.0			55.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	45.0				7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1789	1902	1902	1286	1428	1551
Flt Permitted	0.588				0.950	
Satd. Flow (perm)	1107	1902	1902	1286	1428	1551
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				91		185
Link Speed (k/h)		60	60		60	
Link Distance (m)		303.1	408.3		795.8	
Travel Time (s)		18.2	24.5		47.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	1%	1%	27%	25%	3%
Adj. Flow (vph)	162	332	257	91	98	185
Shared Lane Traffic (%)						
Lane Group Flow (vph)	162	332	257	91	98	185
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.5	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		4.9	
Two way Left Turn Lane		Yes	Yes			
Headway Factor	0.99	0.99	0.99	0.99	1.01	1.01
Turning Speed (k/h)	97			97	97	97
Turn Type	Perm	NA	NA	Perm	Prot	Perm
Protected Phases		4	8		6	
Permitted Phases	4			8		6
Minimum Split (s)	25.0	25.0	25.0	25.0	24.2	24.2
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%
Maximum Green (s)	48.0	48.0	48.0	48.0	29.8	29.8
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?						
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	12.0	12.0	12.0	12.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	48.0	48.0	48.0	48.0	29.8	29.8

2032 Future Total PM

1: Lakeshore Road East & Winston Churchill Blvd

September 2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.33	0.33
v/c Ratio	0.27	0.33	0.25	0.12	0.21	0.29
Control Delay	13.1	13.0	12.2	2.8	23.1	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.1	13.0	12.2	2.8	23.1	4.8
LOS	B	B	B	A	C	A
Approach Delay	13.0		9.7	11.1		
Approach LOS	B		A	B		

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2: and 6:SBL, Start of Green

Natural Cycle: 50

Control Type: Pretimed

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 11.5

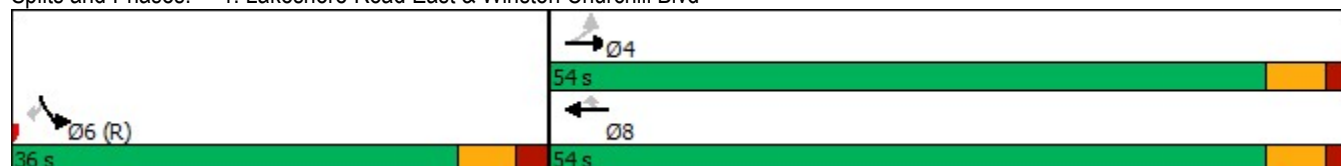
Intersection LOS: B

Intersection Capacity Utilization 42.3%

ICU Level of Service A






















Analysis Period (min) 15

Splits and Phases: 1: Lakeshore Road East & Winston Churchill Blvd















2032 Future Total PM
2: Ford Dr & Cornwall Rd

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	653	165	68	39	76	112	50	300	39	493	407	103
Future Volume (vph)	653	165	68	39	76	112	50	300	39	493	407	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.911			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1724	0	1767	2889	0	1716	3508	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.403			0.529		
Satd. Flow (perm)	3319	1724	0	1747	2889	0	727	3508	0	919	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			120			12				111
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	702	177	73	42	82	120	54	323	42	530	438	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	702	250	0	42	202	0	54	365	0	530	438	111
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

2032 Future Total PM
2: Ford Dr & Cornwall Rd

September 2021

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Detector 2 Channel													
Detector 2 Extend (s)	0.0			0.0			0.0			0.0			
Turn Type	Prot	NA		Prot	NA		Perm		NA		Perm	Perm	
Protected Phases	7	4		3	8		2				6	6	
Permitted Phases							2					6	6
Detector Phase	7	4		3	8		2	2			6	6	
Switch Phase													
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0			15.0	15.0	
Minimum Split (s)	13.0	39.5		13.0	38.0		42.0	42.0			42.0	42.0	
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0			50.0	50.0	
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%			38.5%	38.5%	
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0			43.0	43.0	
Yellow Time (s)	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		3.0	3.0			3.0	3.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	7.0	
Lead/Lag	Lead	Lag		Lead	Lag								
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0	
Recall Mode	None	None		None	None		C-Max	C-Max			C-Max	C-Max	
Walk Time (s)	4.0			7.0			7.0	7.0			7.0	7.0	
Flash Dont Walk (s)	24.0			24.0			28.0	28.0			28.0	28.0	
Pedestrian Calls (#/hr)	0			0			0	0			0	0	
Act Effct Green (s)	30.9	35.8		8.6	10.9		67.1	67.1			67.1	67.1	
Actuated g/C Ratio	0.24	0.28		0.07	0.08		0.52	0.52			0.52	0.52	
v/c Ratio	0.89	0.51		0.36	0.57		0.14	0.20			1.12	0.46	
Control Delay	61.7	42.3		65.8	30.2		19.1	17.3			102.8	13.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0	
Total Delay	61.7	42.3		65.8	30.2		19.1	17.3			102.8	13.7	
LOS	E	D		E	C		B	B			F	B	
Approach Delay	56.6			36.4			17.5				56.2		
Approach LOS	E			D			B				E		

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.12

Intersection Signal Delay: 48.5

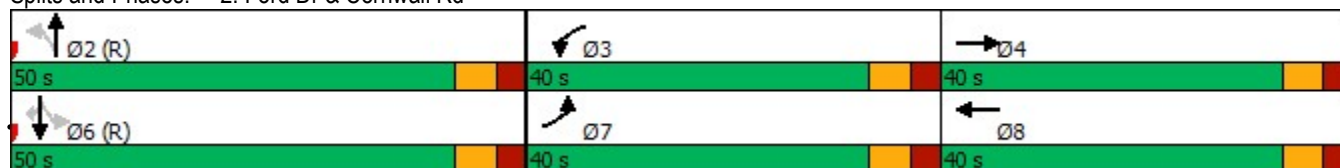
Intersection LOS: D

Intersection Capacity Utilization 107.9%

ICU Level of Service G

Analysis Period (min) 15












Splits and Phases: 2: Ford Dr & Cornwall Rd



Project No. 0756-5105

2032 Future Total PM
3: Winston Churchill Blvd & Beryl Rd

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	198	22	51	317	243	118
Future Volume (vph)	198	22	51	317	243	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.7	3.7	3.5	3.7	3.7	3.7
Storage Length (m)	0.0	0.0	50.0			0.0
Storage Lanes	1	1	1			0
Taper Length (m)	7.6		80.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.956	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1690	1384	1552	1700	1616	0
Flt Permitted	0.950		0.519			
Satd. Flow (perm)	1690	1384	848	1700	1616	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		24			47	
Link Speed (k/h)	60			60	60	
Link Distance (m)	437.2			655.5	190.2	
Travel Time (s)	26.2			39.3	11.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	8%	18%	15%	13%	13%	15%
Adj. Flow (vph)	213	24	55	341	261	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	213	24	55	341	388	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.5	3.5	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.9			4.9	4.9	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	1.01	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	
Detector Template	Left	Right	Left	Thru	Thru	
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	6.1	6.1	6.1	1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)				28.7	28.7	
Detector 2 Size(m)				1.8	1.8	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Prot	Perm	Perm	NA	NA	

2032 Future Total PM
3: Winston Churchill Blvd & Beryl Rd

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Protected Phases	4			2	6	
Permitted Phases		4	2			
Detector Phase	4	4	2	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	25.3	25.3	24.1	24.1	24.1	
Total Split (s)	31.0	31.0	29.0	29.0	29.0	
Total Split (%)	51.7%	51.7%	48.3%	48.3%	48.3%	
Maximum Green (s)	24.7	24.7	22.9	22.9	22.9	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.3	2.3	2.1	2.1	2.1	
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?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	C-Max	C-Max	C-Max	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	12.0	12.0	11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	
Act Effect Green (s)	12.9	12.9	34.7	34.7	34.7	
Actuated g/C Ratio	0.22	0.22	0.58	0.58	0.58	
v/c Ratio	0.59	0.08	0.11	0.35	0.41	
Control Delay	27.1	8.0	7.9	8.9	8.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.1	8.0	7.9	8.9	8.6	
LOS	C	A	A	A	A	
Approach Delay	25.1			8.8	8.6	
Approach LOS	C			A	A	

Intersection Summary

Area Type: Other

Cycle Length: 60

Actuated Cycle Length: 60

Offset: 35 (58%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 50

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 12.5

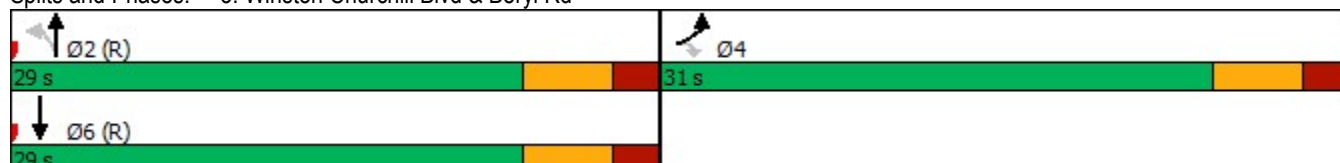
Intersection LOS: B

Intersection Capacity Utilization 50.5%

ICU Level of Service A

Analysis Period (min) 15























Splits and Phases: 3: Winston Churchill Blvd & Beryl Rd



2032 Future Total PM

4: Ford Dr & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	724	101	226	464	235	121	767	251	198	685	99
Future Volume (vph)	230	724	101	226	464	235	121	767	251	198	685	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.98	1.00		0.99
Frt		0.982			0.950				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3124	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.214			0.157			0.229			0.182		
Satd. Flow (perm)	376	3294	0	286	3124	0	410	3510	1498	310	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			66				229			92
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	253	796	111	248	510	258	133	843	276	218	753	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	253	907	0	248	768	0	133	843	276	218	753	109
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Total PM

4: Ford Dr & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	14.0	39.5		25.5	39.5		47.0	47.0	47.0	47.0	47.0	47.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0	50.0	50.0	50.0	50.0
Total Split (%)	30.8%	30.8%		30.8%	30.8%		38.5%	38.5%	38.5%	38.5%	38.5%	38.5%
Maximum Green (s)	33.0	33.0		33.0	33.0		43.0	43.0	43.0	43.0	43.0	43.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	64.6	45.7		62.7	44.8		45.3	45.3	45.3	45.3	45.3	45.3
Actuated g/C Ratio	0.50	0.35		0.48	0.34		0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	0.68	0.78		0.74	0.69		0.94	0.69	0.41	2.02	0.62	0.20
Control Delay	26.8	43.3		35.0	37.7		107.3	51.7	23.3	517.9	38.2	9.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.8	43.3		35.0	37.7		107.3	51.7	23.3	517.9	38.2	9.2
LOS	C	D		D	D		F	D	C	F	D	A
Approach Delay		39.7			37.1			51.4			132.1	
Approach LOS		D			D			D			F	

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.02

Intersection Signal Delay: 64.5

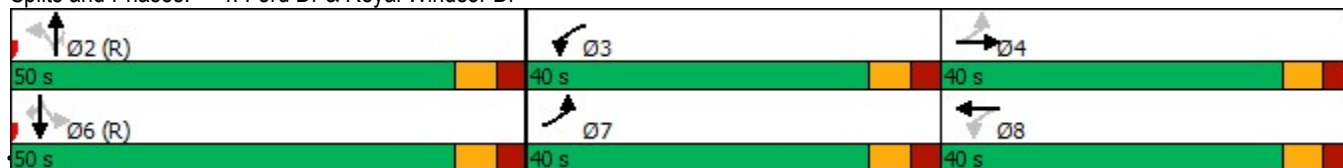
Intersection LOS: E

Intersection Capacity Utilization 104.2%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr



C.F. Crozier and Associates
























Synchro 11 Light Report

Project No. 0756-5105

2032 Future Total PM

5: Winston Churchill Blvd & Royal Windsor Dr













September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	833	57	80	642	418	79	356	149	303	217	188
Future Volume (vph)	343	833	57	80	642	418	79	356	149	303	217	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.990				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3332	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.220			0.203			0.607			0.950		
Satd. Flow (perm)	389	3332	0	356	3411	1468	905	3380	1457	3226	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6				449			94			202
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.92	0.92	0.92	0.93	0.93	0.93
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	369	896	61	86	690	449	86	387	162	326	233	202
Shared Lane Traffic (%)												
Lane Group Flow (vph)	369	957	0	86	690	449	86	387	162	326	233	202
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

2032 Future Total PM

5: Winston Churchill Blvd & Royal Windsor Dr

September 2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
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%
Maximum Green (s)	11.0	63.0		49.0	49.0	49.0	31.7	31.7	31.7	26.0	62.7	62.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	60.4	53.4		39.4	39.4	39.4	47.9	47.9	47.9	19.3	72.3	72.3
Actuated g/C Ratio	0.43	0.38		0.28	0.28	0.28	0.34	0.34	0.34	0.14	0.52	0.52
v/c Ratio	1.24	0.75		0.86	0.72	0.61	0.28	0.33	0.29	0.73	0.13	0.23
Control Delay	162.8	40.8		105.8	49.1	6.7	41.2	37.7	18.5	67.5	19.3	3.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	162.8	40.8		105.8	49.1	6.7	41.2	37.7	18.5	67.5	19.3	3.5
LOS	F	D		F	D	A	D	D	B	E	B	A
Approach Delay		74.7			37.5			33.3			35.7	
Approach LOS		E			D			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.24

Intersection Signal Delay: 49.0

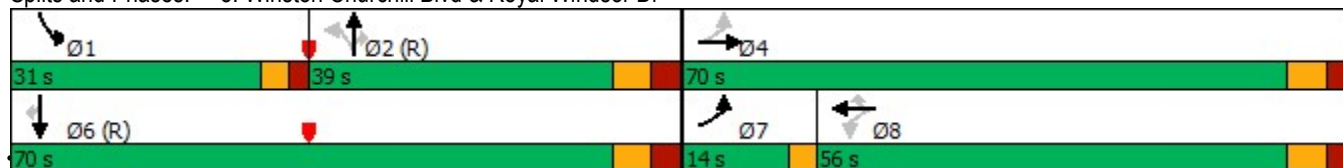
Intersection LOS: D

Intersection Capacity Utilization 87.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



C.F. Crozier and Associates

Synchro 11 Light Report

Project No. 0756-5105

2032 Future Total PM

6: Winston Churchill Blvd & North Site Access

September 2021



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	57	12	13	242	273	13
Future Volume (vph)	57	12	13	242	273	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.977					0.850
Flt Protected	0.960		0.950			
Satd. Flow (prot)	1714	0	1521	1601	1671	1601
Flt Permitted	0.960		0.950			
Satd. Flow (perm)	1714	0	1521	1601	1671	1601
Link Speed (k/h)	50			60	60	
Link Distance (m)	232.0			265.0	655.5	
Travel Time (s)	16.7			15.9	39.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	20%	20%	20%	15%	2%
Adj. Flow (vph)	62	13	14	263	297	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	75	0	14	263	297	14
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	

Intersection Summary












Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 24.9%











ICU Level of Service A

Analysis Period (min) 15

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	57	12	13	242	273	13
Future Volume (Veh/h)	57	12	13	242	273	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	13	14	263	297	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	588	297	311			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	297	311			
tC, single (s)	6.4	6.4	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.5	2.4			
p0 queue free %	87	98	99			
cM capacity (veh/h)	466	702	1154			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	75	14	263	297	14	
Volume Left	62	14	0	0	0	
Volume Right	13	0	0	0	14	
cSH	495	1154	1700	1700	1700	
Volume to Capacity	0.15	0.01	0.15	0.17	0.01	
Queue Length 95th (m)	4.0	0.3	0.0	0.0	0.0	
Control Delay (s)	13.6	8.2	0.0	0.0	0.0	
Lane LOS	B	A				
Approach Delay (s)	13.6	0.4		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			24.9%	ICU Level of Service		A
Analysis Period (min)			15			











2032 Future Total PM
7: Winston Churchill Blvd & South Site Access

September 2021

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (vph)	0	19	0	242	297	7
Future Volume (vph)	0	19	0	242	297	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Fr _t		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1629	0	1601	3041	0
Flt Permitted						
Satd. Flow (perm)	0	1629	0	1601	3041	0
Link Speed (k/h)	50			60	60	
Link Distance (m)	201.0			795.8	265.0	
Travel Time (s)	14.5			47.7	15.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	20%	20%	2%
Adj. Flow (vph)	0	21	0	263	323	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	0	263	331	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	97	97	97			97
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	18.4%			ICU Level of Service A		
Analysis Period (min)	15					

2032 Future Total PM
7: Winston Churchill Blvd & South Site Access

September 2021

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					 	
Traffic Volume (veh/h)	0	19	0	242	297	7
Future Volume (Veh/h)	0	19	0	242	297	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	0	263	323	8
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	590	166	331			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	590	166	331			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	439	850	1225			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	21	263	215	116		
Volume Left	0	0	0	0		
Volume Right	21	0	0	8		
cSH	850	1700	1700	1700		
Volume to Capacity	0.02	0.15	0.13	0.07		
Queue Length 95th (m)	0.6	0.0	0.0	0.0		
Control Delay (s)	9.3	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	9.3	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			18.4%		ICU Level of Service	A
Analysis Period (min)			15			






















Appendix M

Detailed Capacity Analysis – Signal Optimization

Lanes, Volumes, Timings

2: Ford Dr & Cornwall Rd

09/20/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	426	68	29	20	72	75	27	322	31	588	191	85
Future Volume (vph)	426	68	29	20	72	75	27	322	31	588	191	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.98	0.99		1.00	1.00		1.00		0.98
Frt		0.955			0.924			0.987				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1721	0	1767	2959	0	1716	3525	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.624			0.374		
Satd. Flow (perm)	3316	1721	0	1741	2959	0	1124	3525	0	650	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			84			7				140
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	479	76	33	22	81	84	30	362	35	661	215	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	479	109	0	22	165	0	30	397	0	661	215	96
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings

2: Ford Dr & Cornwall Rd

09/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases							2			6		6
Detector Phase	7	4		3	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		6.0	15.0	15.0
Minimum Split (s)	13.0	35.0		13.0	35.0		42.0	42.0		13.0	42.0	42.0
Total Split (s)	28.0	50.0		13.0	35.0		43.0	43.0		34.0	77.0	77.0
Total Split (%)	20.0%	35.7%		9.3%	25.0%		30.7%	30.7%		24.3%	55.0%	55.0%
Maximum Green (s)	21.0	43.0		6.0	28.0		36.0	36.0		31.0	70.0	70.0
Yellow Time (s)	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	3.0		0.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		3.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0		28.0	28.0			28.0	28.0
Pedestrian Calls (#/hr)		0			0		0	0			0	0
Act Effct Green (s)	21.0	31.1		6.0	10.9		36.0	36.0		91.1	87.1	87.1
Actuated g/C Ratio	0.15	0.22		0.04	0.08		0.26	0.26		0.65	0.62	0.62
v/c Ratio	0.96	0.28		0.29	0.54		0.10	0.44		0.86	0.19	0.10
Control Delay	90.2	42.2		75.2	37.0		41.1	44.5		29.7	12.0	0.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	90.2	42.2		75.2	37.0		41.1	44.5		29.7	12.0	0.7
LOS	F	D		E	D		D	D		C	B	A
Approach Delay		81.3			41.5			44.2			22.9	
Approach LOS		F			D			D			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 44.5

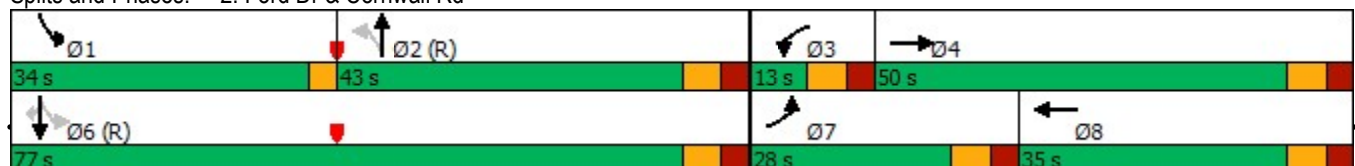
Intersection LOS: D

Intersection Capacity Utilization 104.0%

ICU Level of Service G

Analysis Period (min) 15






















Splits and Phases: 2: Ford Dr & Cornwall Rd



Lanes, Volumes, Timings

2: Ford Dr & Cornwall Rd

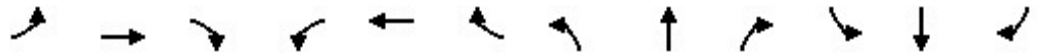
09/20/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	653	165	68	39	76	112	50	300	39	493	407	103
Future Volume (vph)	653	165	68	39	76	112	50	300	39	493	407	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.7	3.5	3.7	3.7	3.5	3.7	3.7	3.5	3.7	3.5
Storage Length (m)	40.0		0.0	20.0		0.0	40.0		0.0	95.0		0.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	25.0			15.0			60.0			35.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor	1.00	0.99		0.99	0.99		1.00	1.00		1.00		0.98
Frt		0.956			0.911			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3330	1723	0	1767	2888	0	1716	3508	0	1652	1861	1547
Flt Permitted	0.950			0.950			0.519			0.384		
Satd. Flow (perm)	3317	1723	0	1745	2888	0	936	3508	0	667	1861	1523
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			114			10				140
Link Speed (k/h)		60			60			60				60
Link Distance (m)		196.7			482.4			183.1			231.1	
Travel Time (s)		11.8			28.9			11.0			13.9	
Confl. Peds. (#/hr)	2		7	7		2	3		1	1		3
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	4%	4%	1%	1%	7%	19%	4%	2%	3%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	14	3	3
Adj. Flow (vph)	666	168	69	40	78	114	51	306	40	503	415	105
Shared Lane Traffic (%)												
Lane Group Flow (vph)	666	237	0	40	192	0	51	346	0	503	415	105
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.0			7.0			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	1.01	1.01	0.99	1.01	0.99	0.99	1.01	0.99	0.99	1.09	1.00	1.03
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	

Lanes, Volumes, Timings

2: Ford Dr & Cornwall Rd

09/20/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA		Prot	NA		Perm	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases							2			6		6
Detector Phase	7	4		3	8		2	2		1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0		6.0	15.0	15.0
Minimum Split (s)	13.0	35.0		13.0	35.0		42.0	42.0		13.0	42.0	42.0
Total Split (s)	38.0	56.0		17.0	35.0		42.0	42.0		25.0	67.0	67.0
Total Split (%)	27.1%	40.0%		12.1%	25.0%		30.0%	30.0%		17.9%	47.9%	47.9%
Maximum Green (s)	31.0	49.0		10.0	28.0		35.0	35.0		18.0	60.0	60.0
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		3.0	3.0		3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max		None	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0			7.0	7.0
Flash Dont Walk (s)		24.0			24.0		28.0	28.0			28.0	28.0
Pedestrian Calls (#/hr)		0			0		0	0			0	0
Act Effect Green (s)	30.3	35.5		8.3	11.0		35.0	35.0		77.7	77.7	77.7
Actuated g/C Ratio	0.22	0.25		0.06	0.08		0.25	0.25		0.56	0.56	0.56
v/c Ratio	0.93	0.53		0.38	0.58		0.22	0.39		0.81	0.40	0.12
Control Delay	73.2	47.7		73.3	32.8		44.7	43.9		44.4	13.2	0.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	73.2	47.7		73.3	32.8		44.7	43.9		44.4	13.2	0.9
LOS	E	D		E	C		D	D		D	B	A
Approach Delay		66.5			39.8			44.0			27.3	
Approach LOS		E			D			D			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 44.9

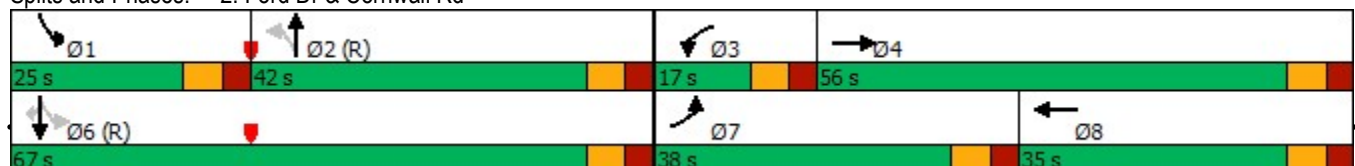
Intersection LOS: D

Intersection Capacity Utilization 107.7%

ICU Level of Service G























Analysis Period (min) 15

Splits and Phases: 2: Ford Dr & Cornwall Rd



Lanes, Volumes, Timings
4: Ford Dr & Royal Windsor Dr













09/20/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	230	724	101	226	464	235	121	767	251	198	685	99
Future Volume (vph)	230	724	101	226	464	235	121	767	251	198	685	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	120.0		0.0	75.0		0.0	60.0		60.0	40.0		40.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	70.0			100.0			50.0			40.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor		1.00		1.00			1.00		0.97	1.00		0.99
Frt		0.982			0.950				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1668	3294	0	1733	3124	0	1700	3510	1536	1623	3510	1426
Flt Permitted	0.188			0.100			0.378			0.129		
Satd. Flow (perm)	330	3294	0	182	3124	0	676	3510	1496	220	3510	1406
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			64				199			86
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		276.3			960.2			231.1			309.9	
Travel Time (s)		16.6			57.6			13.9			18.6	
Confl. Peds. (#/hr)			1	1			2		13	13		2
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	9%	6%	3%	11%	11%	5%	4%	4%	10%	4%	12%
Adj. Flow (vph)	242	762	106	238	488	247	127	807	264	208	721	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	242	868	0	238	735	0	127	807	264	208	721	104
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			3.5			3.5	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

4: Ford Dr & Royal Windsor Dr

09/20/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		15.0	15.0	15.0	6.0	15.0	15.0
Minimum Split (s)	14.0	39.5		14.0	39.5		47.0	47.0	47.0	14.0	47.0	47.0
Total Split (s)	24.0	47.0		25.0	48.0		47.0	47.0	47.0	21.0	68.0	68.0
Total Split (%)	17.1%	33.6%		17.9%	34.3%		33.6%	33.6%	33.6%	15.0%	48.6%	48.6%
Maximum Green (s)	17.0	40.0		18.0	41.0		40.0	40.0	40.0	14.0	61.0	61.0
Yellow Time (s)	4.0	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		3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		4.0			4.0		7.0	7.0	7.0		7.0	7.0
Flash Dont Walk (s)		28.5			28.5		32.0	32.0	32.0		32.0	32.0
Pedestrian Calls (#/hr)		0			0		0	0	0		0	0
Act Effect Green (s)	55.5	39.2		57.4	40.1		41.5	41.5	41.5	62.5	62.5	62.5
Actuated g/C Ratio	0.40	0.28		0.41	0.29		0.30	0.30	0.30	0.45	0.45	0.45
v/c Ratio	0.84	0.93		0.89	0.78		0.64	0.78	0.45	0.87	0.46	0.15
Control Delay	52.4	65.8		94.8	23.2		68.1	62.1	28.8	61.7	28.5	7.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.4	65.8		94.8	23.2		68.1	62.1	28.8	61.7	28.5	7.1
LOS	D	E		F	C		E	E	C	E	C	A
Approach Delay		62.9			40.7			55.4			33.1	
Approach LOS		E			D			E			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 115

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 48.7

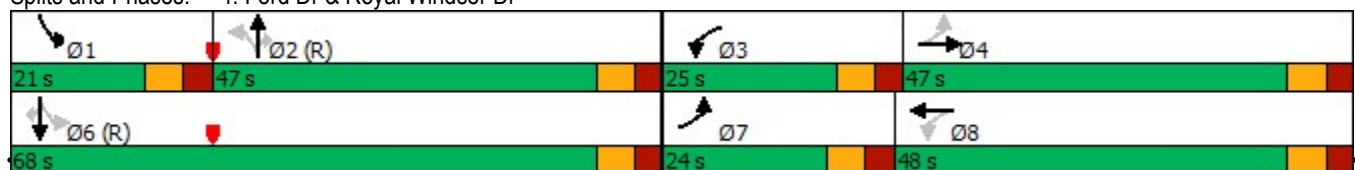
Intersection LOS: D

Intersection Capacity Utilization 104.2%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 4: Ford Dr & Royal Windsor Dr


























2032 Future Total PM OPTIMIZED 4:30 pm 08/27/2032

Synchro 11 Light Report

Page 6

Lanes, Volumes, Timings
5: Winston Churchill Blvd & Royal Windsor Dr













09/20/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	833	57	80	642	418	79	356	149	303	217	188
Future Volume (vph)	343	833	57	80	642	418	79	356	149	303	217	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.7	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Storage Length (m)	80.0		0.0	50.0		165.0	75.0		40.0	75.0		65.0
Storage Lanes	1		0	1		1	1		1	2		1
Taper Length (m)	65.0			65.0			70.0			50.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00					0.98			0.98	1.00		
Frt		0.990				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1684	3331	0	1668	3411	1493	1417	3380	1479	3236	3380	1493
Flt Permitted	0.212			0.305			0.616			0.950		
Satd. Flow (perm)	375	3331	0	536	3411	1468	919	3380	1457	3226	3380	1493
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7				415			102			188
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		960.2			322.9			157.5			249.1	
Travel Time (s)		57.6			19.4			9.5			14.9	
Confl. Peds. (#/hr)	3					3			2	2		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	6%	7%	30%	7%	7%	7%	26%	8%	8%	7%	8%	7%
Adj. Flow (vph)	361	877	60	84	676	440	79	356	149	303	217	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	361	937	0	84	676	440	79	356	149	303	217	188
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.5			3.5			7.0			7.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane					Yes							
Headway Factor	1.01	0.99	0.99	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lanes, Volumes, Timings

5: Winston Churchill Blvd & Royal Windsor Dr

09/20/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8			2		1	6	
Permitted Phases	4			8		8	2		2			6
Detector Phase	7	4		8	8	8	2	2	2	1	6	6
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)	8.0	35.0		35.0	35.0	35.0	15.3	15.3	15.3	13.0	15.3	15.3
Total Split (s)	27.0	78.0		51.0	51.0	51.0	36.0	36.0	36.0	26.0	62.0	62.0
Total Split (%)	19.3%	55.7%		36.4%	36.4%	36.4%	25.7%	25.7%	25.7%	18.6%	44.3%	44.3%
Maximum Green (s)	24.0	71.0		44.0	44.0	44.0	28.7	28.7	28.7	21.0	54.7	54.7
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)	-3.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	0.0	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?	Yes			Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	C-Max	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		11.0		11.0	11.0	11.0	4.0	4.0	4.0		4.0	4.0
Flash Dont Walk (s)		17.0		17.0	17.0	17.0	23.0	23.0	23.0		23.0	23.0
Pedestrian Calls (#/hr)		0		0	0	0	0	0	0		0	0
Act Effect Green (s)	70.2	63.2		36.8	36.8	36.8	39.6	39.6	39.6	17.9	62.5	62.5
Actuated g/C Ratio	0.50	0.45		0.26	0.26	0.26	0.28	0.28	0.28	0.13	0.45	0.45
v/c Ratio	0.83	0.62		0.60	0.76	0.64	0.31	0.37	0.31	0.73	0.14	0.24
Control Delay	23.0	15.8		62.2	52.8	9.1	47.6	43.8	17.6	69.5	24.6	4.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.0	15.8		62.2	52.8	9.1	47.6	43.8	17.6	69.5	24.6	4.4
LOS	C	B		E	D	A	D	D	B	E	C	A
Approach Delay		17.8			37.5			37.7			38.5	
Approach LOS		B			D			D			D	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 104 (74%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 30.9

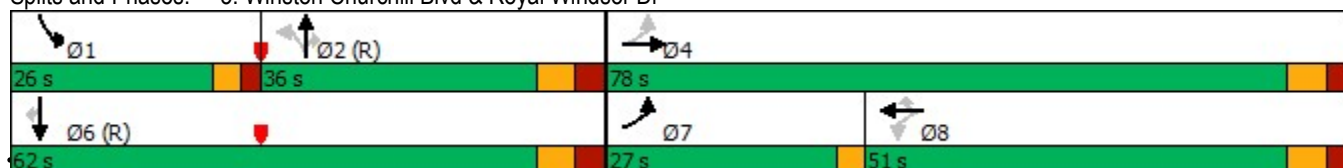
Intersection LOS: C

Intersection Capacity Utilization 87.8%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: Winston Churchill Blvd & Royal Windsor Dr



2032 Future Total PM OPTIMIZED 4:30 pm 08/27/2032

Synchro 11 Light Report

Page 8

Appendix N

Signal Warrants

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION

FUTURE WEEKDAY PEAK HOUR

Analyst	Farah C	Jurisdiction	Town of Oakville
Agency or Company	Crozier	Date	November 11, 2021
Analysis Period	2032 Future Total	East-West Street	North Site Access
Flow Conditions	Restricted flow (urban) ▼	North-South Street	Winston Churchill Blvd
'T' Intersection	Yes ▼	Major Street	North-South ▼
Existing Intersection	No ▼	Approach lanes per direction	1 ▼ Major Street
		Approach lanes per direction	1 ▼ Minor Street
Additional Comments			

TRAFFIC & PEDESTRIAN VOLUMES

Hour Ending	Main Road Approaches							Minor Road Approaches							Pedestrian Crossing Major Road	Pedestrian Crossing Minor Road
	Northbound			Southbound			Total	Eastbound			Westbound			Total		
	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT			
AM Peak Hour	27	215	0	0	325	38	605	15	0	5	0	0	0	20		
PM Peak Hour	13	242	0	0	273	13	541	57	0	12	0	0	0	69		
Total	39	457	0	0	598	52	1145	71	0	17	0	0	0	88	0	0

Parameter	AM	PM	Average Hourly Volume (AHV)
Vehicle volume, all approaches	625	609	308
Vehicle volume, along minor street	20	69	22
Vehicle volume, along major street	605	541	286
Combined vehicle and pedestrian volume crossing from minor streets	15	57	18

NOTES

1. The traffic control signal justification was done as per criteria defined in Ontario Traffic Manual, Book: 12 (March 2012) Justification 7 - Projected Volumes.

2. Traffic crossing MAJOR street defined as:

- a. Left turns from both minor street approaches
- b. The heaviest through volume from the minor street
- c. 50% of the heavier left turn movement from the major street when both of the following are met:
 1. the left turn volume > 120
 2. the left turn volume + opposing volume > 720
- d. Pedestrians crossing the major street

3. Justifications 1 and 2 are required to be met to 120% in the case of an existing intersection and 150% in the case of a new intersection

4. For 'T' intersection, the threshold values to be increased by 50%

AM	PM
14.59501558	56.85085575
0	0
0	0
No	No
No	No
0	0

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION				FUTURE WEEKDAY PEAK HOUR			
Analyst	Farah C	Jurisdiction	Town of Oakville				
Agency or Company	Crozier	Date	November 11, 2021				
Analysis Period	2032 Future Total	East-West Street	North Site Access				
Flow Conditions	Restricted flow (urban)	North-South Street	Winston Churchill Blvd				
'T' Intersection	Yes	Major Street	North-South				
Existing Intersection	No	Approach lanes per direction	1 Major Street				
		Approach lanes per direction	1 Minor Street				
Additional Comments							

Justification 1: Minimum Vehicle Volumes
JUSTIFIED
No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, all approaches		720			308	29%	29%	No
B. Vehicle volume, along minor streets		170			22	9%	9%	No

Justification 2: Delay To Cross Traffic
JUSTIFIED
No

Justification	Guidance Approach Lanes				Compliance			150% Satisfied
	1 Lanes		2 or More Lanes ¹		Sectional		Entire %	
Flow Conditions	Free Flow	Restricted Flow	Free Flow	Restricted Flow	Average Hourly Volumes	%		
A. Vehicle volume, major street		720			286	27%	27%	No
B. Combined vehicle and pedestrian volume crossing artery from minor streets		75			18	16%	16%	No

CONCLUSION

The results of the calculations show that justifications are not met.
Therefore traffic control signal is not justified at this intersection for the horizon year **2032 Future Total**

Note: 1. The minimum volumes were corrected from 120 vehicles and 170 vehicles in OTM, March 2012 to 50 vehicles and 70 vehicles to match Justification 2B.

Appendix O

TTS Results

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: Primary travel mode of trip - mode_prime

Filters:

Age of person - age In 18-99

and

2006 GTA zone of destination - gta06_dest In 4021,4023

and

Start time of trip - start_time In 700-900, 1500-1900

Trip 2016

Table:

,Transit excluding GO rail,Auto driver,GO rail only,Joint GO rail and local transit,Auto passenger,Walk

4021,71,1486,0,56,406,0

4023,43,4440,291,170,404,165

Zone	Transit excluding GO rail	Auto driver	GO rail only	Joint GO rail and local transit	Auto passenger	Walk	Total
4021	71	1486	0	56	406	0	2019
4023	43	4440	291	170	404	165	5513
Total	114	5926	291	226	810	165	7532
	2%	79%	4%	3%	11%	2%	

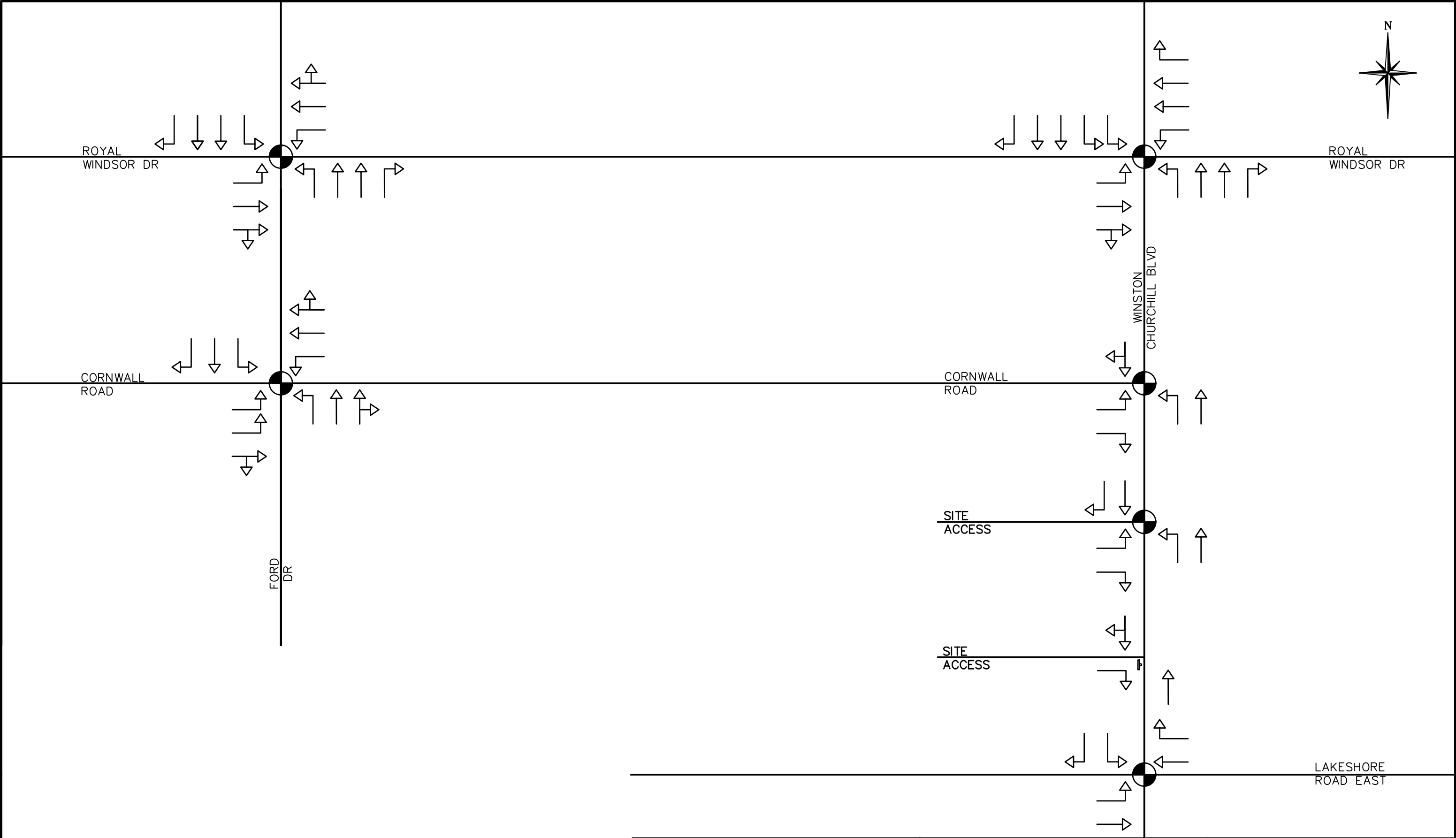
Modal Split	11%
-------------	-----

Mode	Percentage
Transit	2%
Cycling	0%
Auto Driver	79%
Auto Passenger	11%
Walking	2%

FIGURES

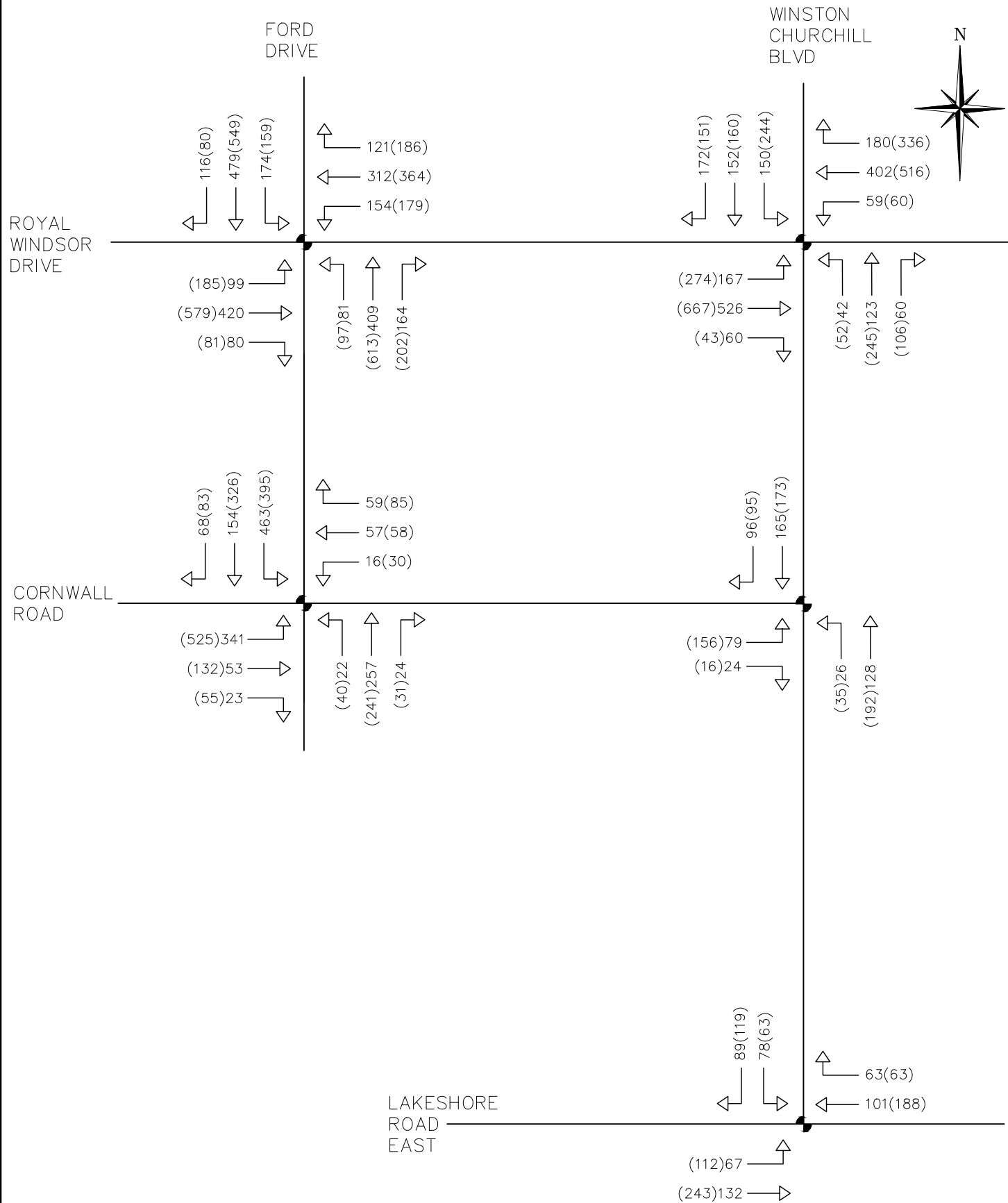


<div>Legend</div> <div><div><div></div></div><div>= SUBJECT LANDS</div></div>	<div>Project</div> <div>WINSTON CHURCHILL BLVD</div>	<div><div><div><div>C</div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div></div><div><div>211 YONGE STREET</div><div>SUITE 301</div><div>TORONTO, ON, M5B 1M4</div><div>416-477-3392 T</div><div>WWW.CFCROZIER.CA</div><div>INFO@CFCROZIER.CA</div></div></div>	
	<div>Drawing</div> <div>SITE LOCATION</div>		<div><div>Drawn By</div><div>R.L.</div><div>Design By</div><div>B.B.B.</div><div>Project</div><div>756-5105</div></div>
	<div><div>Scale</div><div>N.T.S.</div><div>Date</div><div>09/15/2021</div><div>Check By</div><div>F.H.</div><div>Drawing</div><div>FIG 1</div></div>		






NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend ● SIGNAL CONTROL ⊥/△ STOP CONTROL / YEILD CONTROL	Project 560 WINSTON CHURCHILL BOULEVARD TOWN OF OAKVILLE	 CROZIER CONSULTING ENGINEERS 211 YONGE STREET SUITE 600 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CFCROZIER.CA INFO@CFCROZIER.CA											
	Drawing STUDY ROADWAYS		<table border="1"><tr><td>Drawn By</td><td>R.L.</td><td>Design By</td><td>F.C.</td><td>Project</td><td>756-5105</td></tr><tr><td>Scale</td><td>N.T.S.</td><td>Date</td><td>JUN/17/2022</td><td>Check By</td><td>B.B.</td></tr></table> FIG 2	Drawn By	R.L.	Design By	F.C.	Project	756-5105	Scale	N.T.S.	Date	JUN/17/2022
Drawn By	R.L.	Design By	F.C.	Project	756-5105								
Scale	N.T.S.	Date	JUN/17/2022	Check By	B.B.								



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

<div>Legend</div> <div><div> SIGNAL CONTROL</div><div> STOP CONTROL</div><div>xx(yy) WEEKDAY A.M. (WEEKDAY P.M.) PEAK HOUR VOLUMES</div></div>	<div>Project</div> <div>WINSTON CHURCHILL BLVD</div>	<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div><div>211 YONGE STREET SUITE 301 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CFCROZIER.CA INFO@CFCROZIER.CA</div></div></div>	
	<div>Drawing</div> <div>2021 EXISTING TRAFFIC VOLUMES</div>		<div>Drawn By</div> <div>R.L.</div> <div>Design By</div> <div>B.B.B.</div> <div>Project</div> <div>756-5105</div>
			<div>Scale</div> <div>N.T.S.</div> <div>Date</div> <div>09/15/2021</div> <div>Check By</div> <div>F.H.</div> <div>Drawing</div> <div>FIG 3</div>

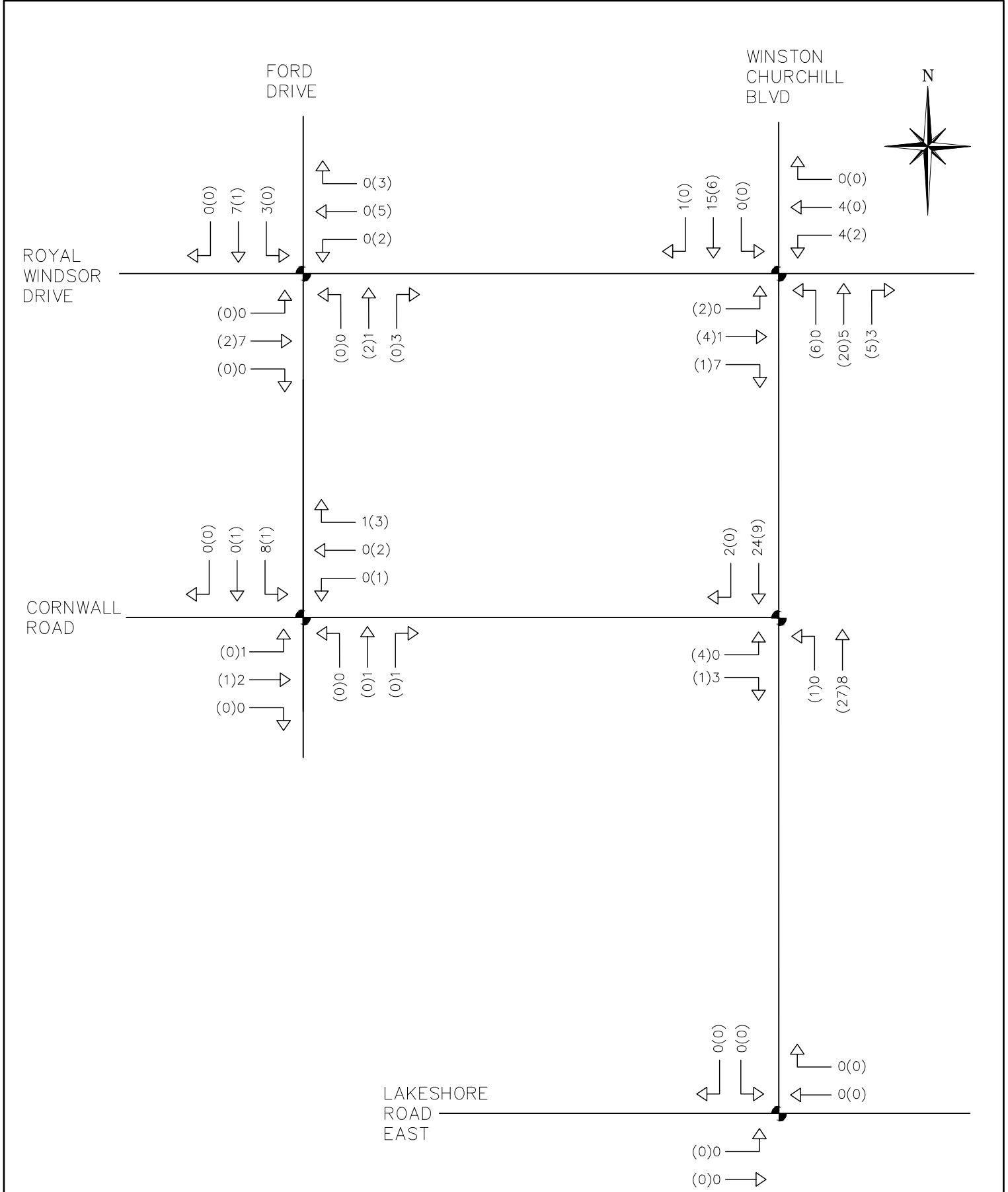


NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend	
	SIGNAL CONTROL
	STOP CONTROL / YEILD CONTROL
1	772 WINSTON CHURCHILL BOULEVARD
2	2395 CORNWALL ROAD

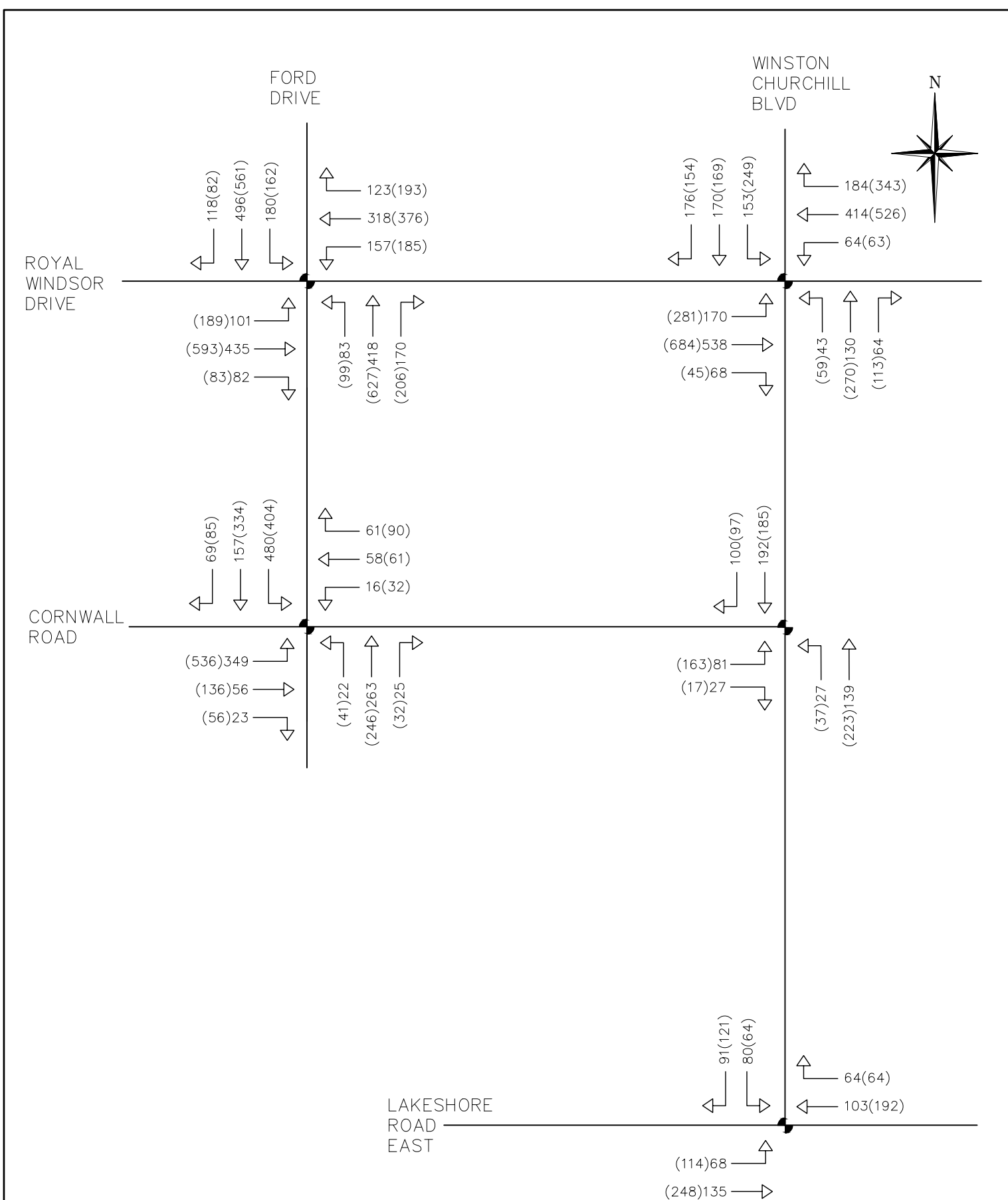
Project	
560 WINSTON CHURCHILL BOULEVARD TOWN OF OAKVILLE	
Drawing	
BACKGROUND DEVELOPMENT LOCATIONS	

		211 YONGE STREET SUITE 600 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CROZIER-CA INFO@CROZIER-CA	
Drawn By	R.L.	Design By	F.C.
Scale	N.T.S.	Date	JUN/17/2022
Project		Check By	B.B.
756-5105		FIG 4	



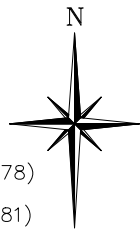
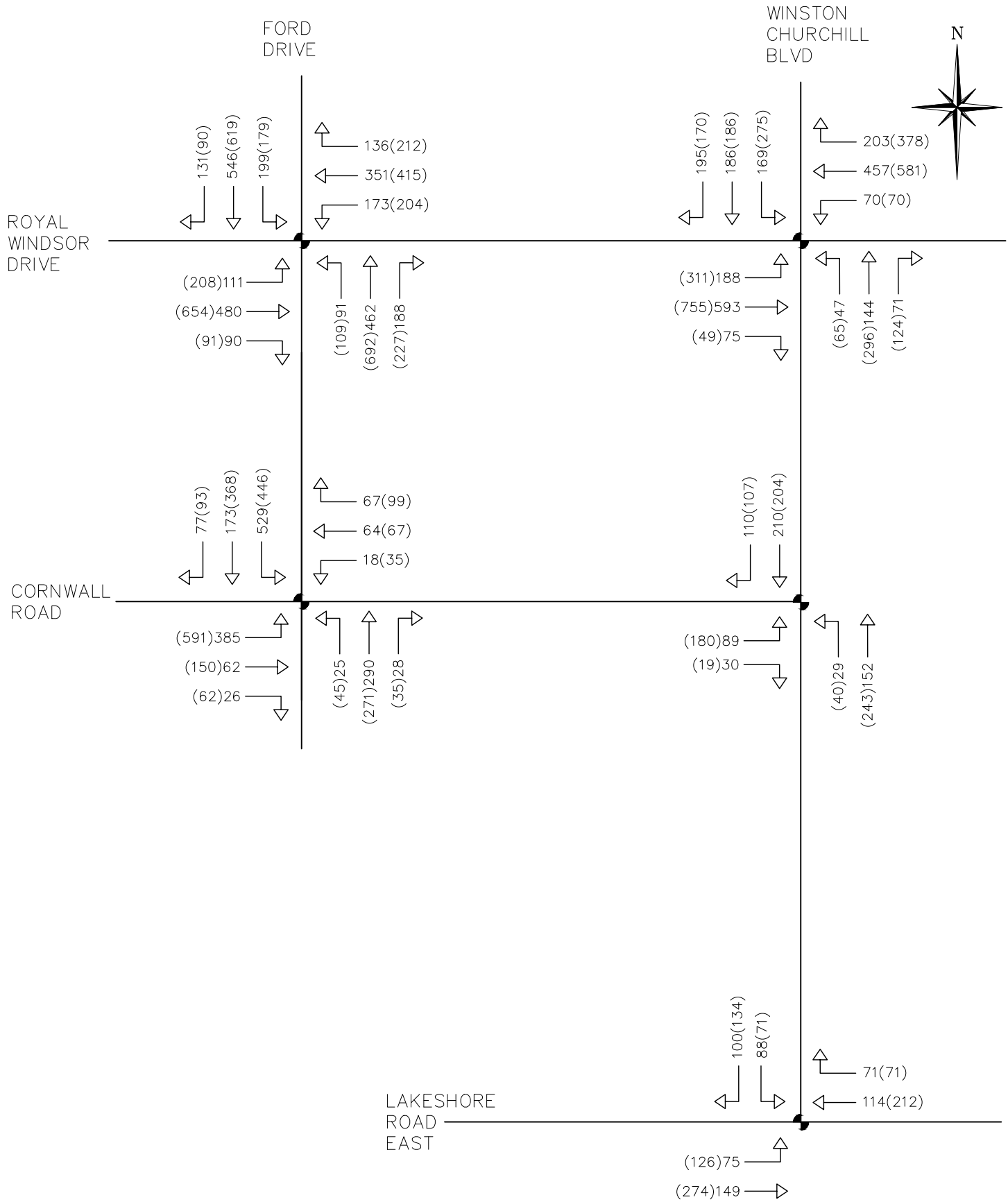
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend SIGNAL CONTROL STOP CONTROL xx(yy) WEEKDAY A.M. (WEEKDAY P.M.) PEAK HOUR VOLUMES	Project Winston Churchill Blvd	<div> 211 YONGE STREET SUITE 301 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CFCROZIER.CA INFO@CFCROZIER.CA </div>			
	Drawing BACKGROUND DEVELOPMENT TRAFFIC	Drawn By R.L.	Design By B.B.B.	Project 756-5105	Scale N.T.S.
		Date 09/15/2021	Check By F.H.	Drawing FIG 5	



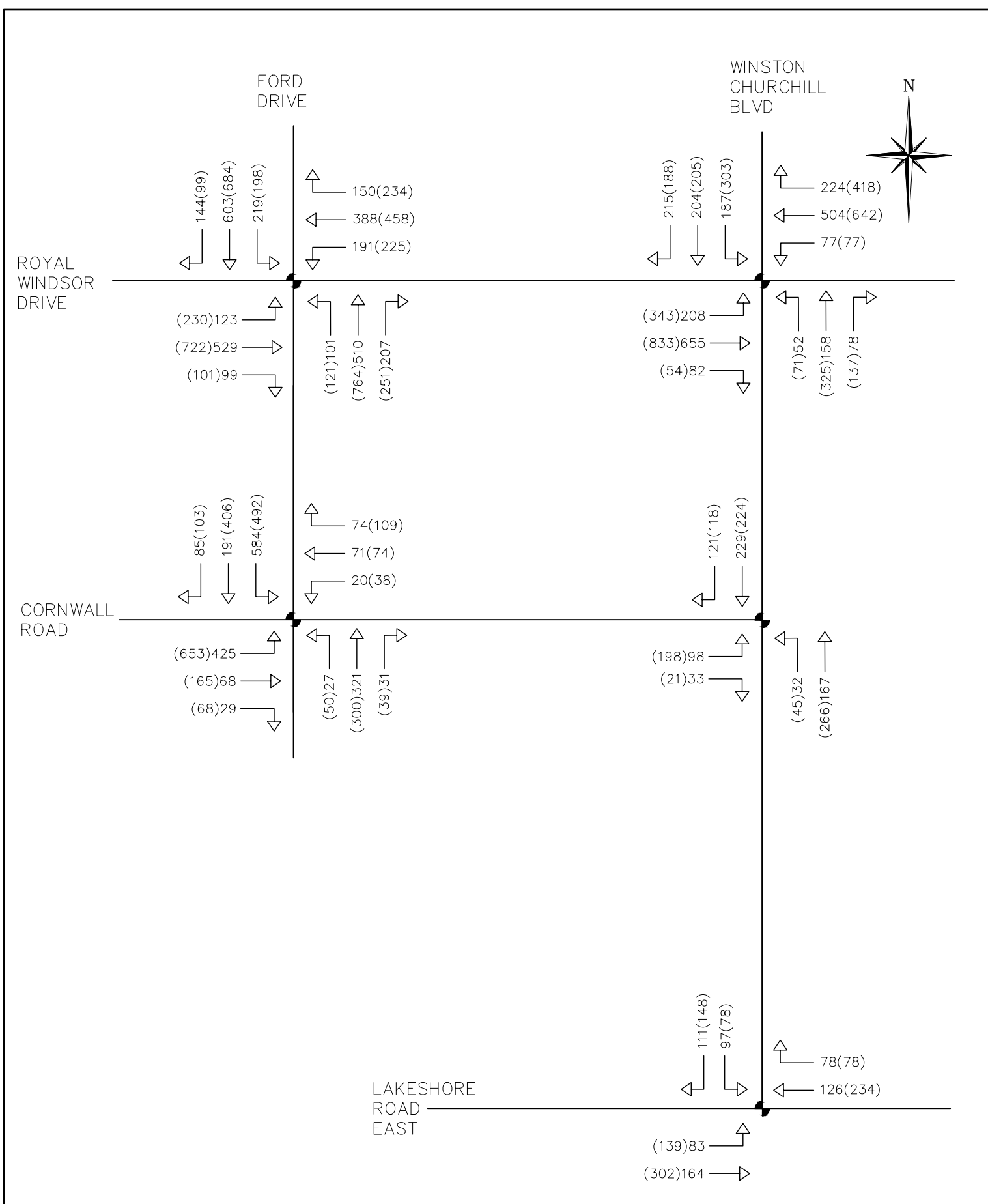
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend SIGNAL CONTROL STOP CONTROL xx(yy) WEEKDAY A.M. (WEEKDAY P.M.) PEAK HOUR VOLUMES	Project WINSTON CHURCHILL BLVD	CROZIER CONSULTING ENGINEERS 211 YONGE STREET SUITE 301 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
	Drawing 2022 FUTURE BACKGROUND TRAFFIC VOLUMES	Drawn By R.L. Design By B.B.B. Project 756-5105	Scale N.T.S. Date 09/15/2021 Check By F.H. Drawing FIG 6






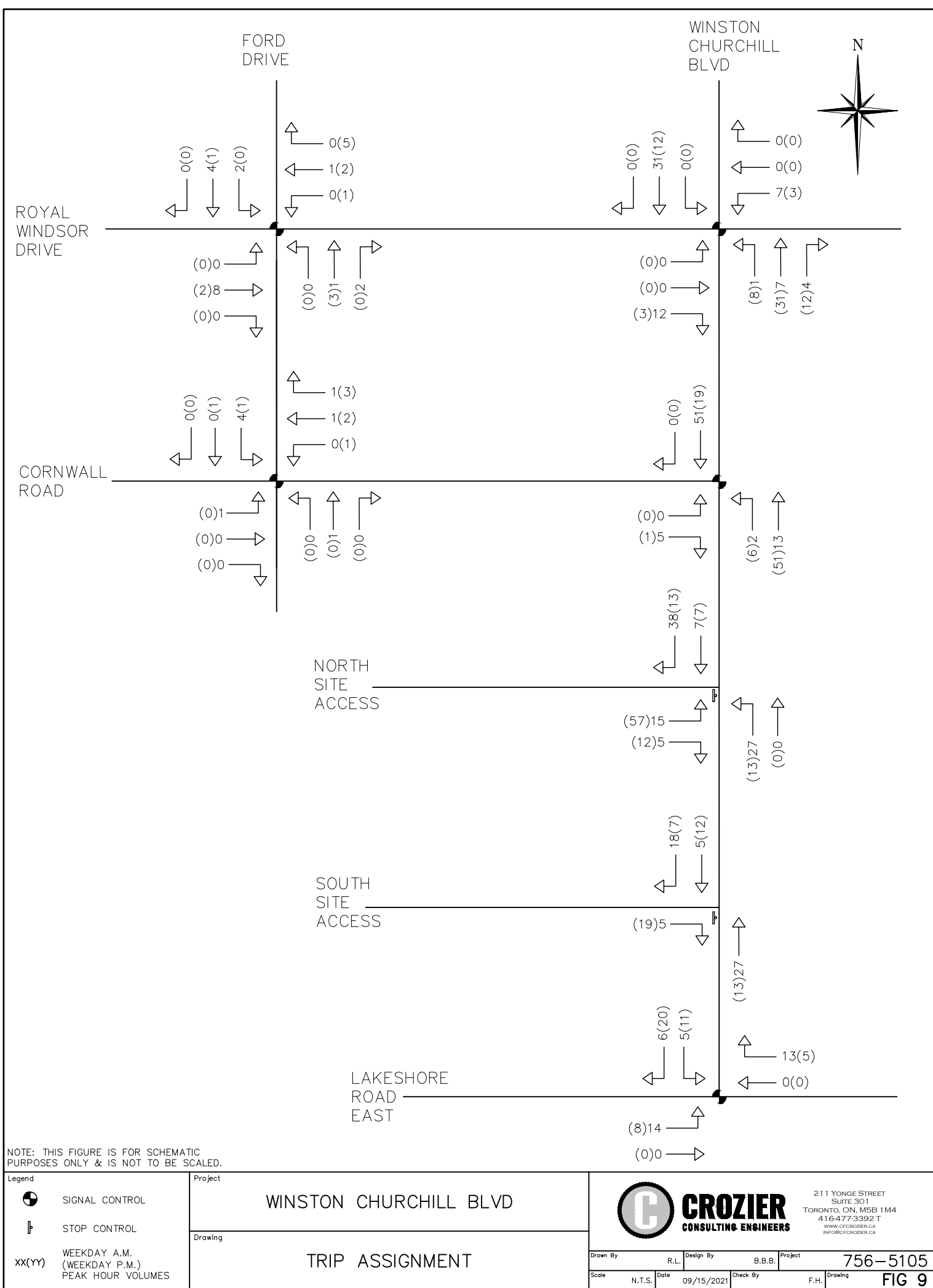
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

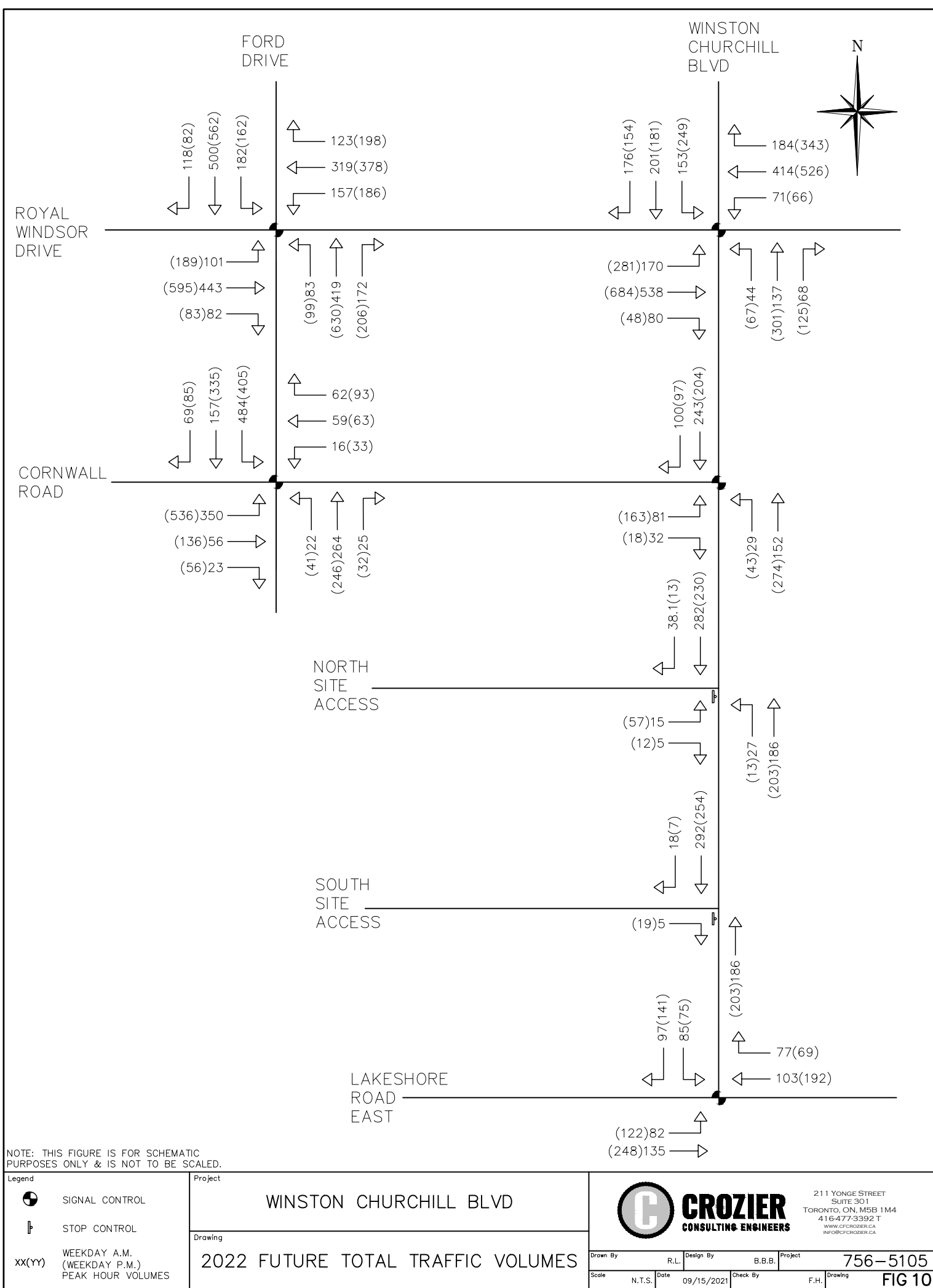
<div>Legend</div> <div><div> SIGNAL CONTROL</div><div> STOP CONTROL</div><div>xx(yy) WEEKDAY A.M. (WEEKDAY P.M.) PEAK HOUR VOLUMES</div></div>		<div>Project</div> <div>WINSTON CHURCHILL BLVD</div>	<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div>211 YONGE STREET SUITE 301 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CFCROZIER.CA INFO@CFCROZIER.CA</div></div>						
		<div>Drawing</div> <div>2027 FUTURE BACKGROUND TRAFFIC VOLUMES</div>							
		Drawn By		R.L.	Design By	B.B.B.	Project	756-5105	
		Scale	N.T.S.	Date	09/15/2021	Check By	F.H.	Drawing	FIG 7



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

<div>Legend</div> <div><div> SIGNAL CONTROL</div><div> STOP CONTROL</div><div>xx(yy) WEEKDAY A.M. (WEEKDAY P.M.) PEAK HOUR VOLUMES</div></div>		<div>Project</div> <div>WINSTON CHURCHILL BLVD</div> <div>Drawing</div> <div>2032 FUTURE BACKGROUND TRAFFIC VOLUMES</div>	<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div><div>211 YONGE STREET SUITE 301 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CFCROZIER.CA INFO@CFCROZIER.CA</div></div></div> <div><div>Drawn By</div><div>R.L.</div><div>Design By</div><div>B.B.B.</div><div>Project</div><div>756-5105</div></div> <div><div>Scale</div><div>N.T.S.</div><div>Date</div><div>09/15/2021</div><div>Check By</div><div>F.H.</div><div>Drawing</div><div>FIG 8</div></div>
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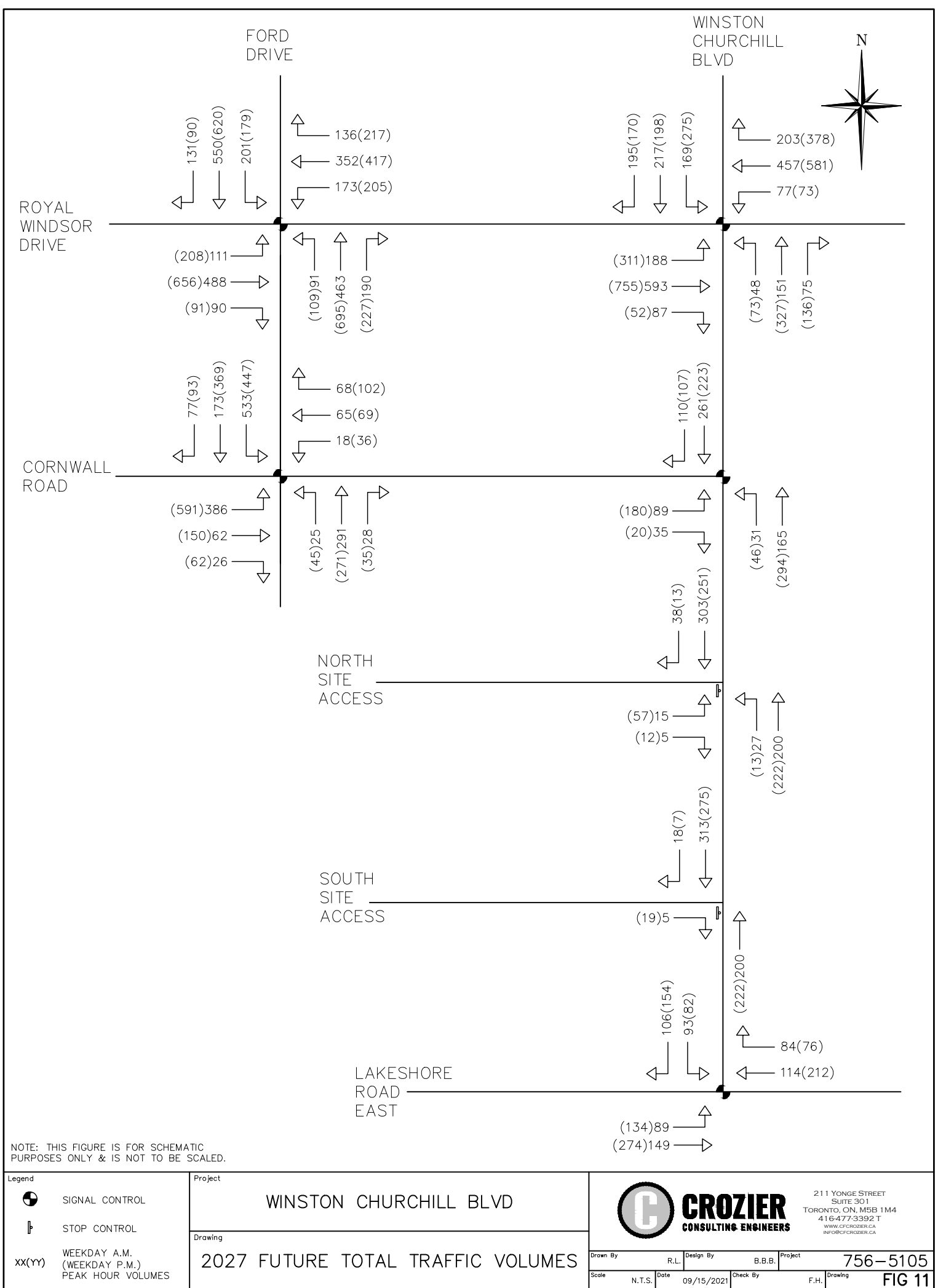


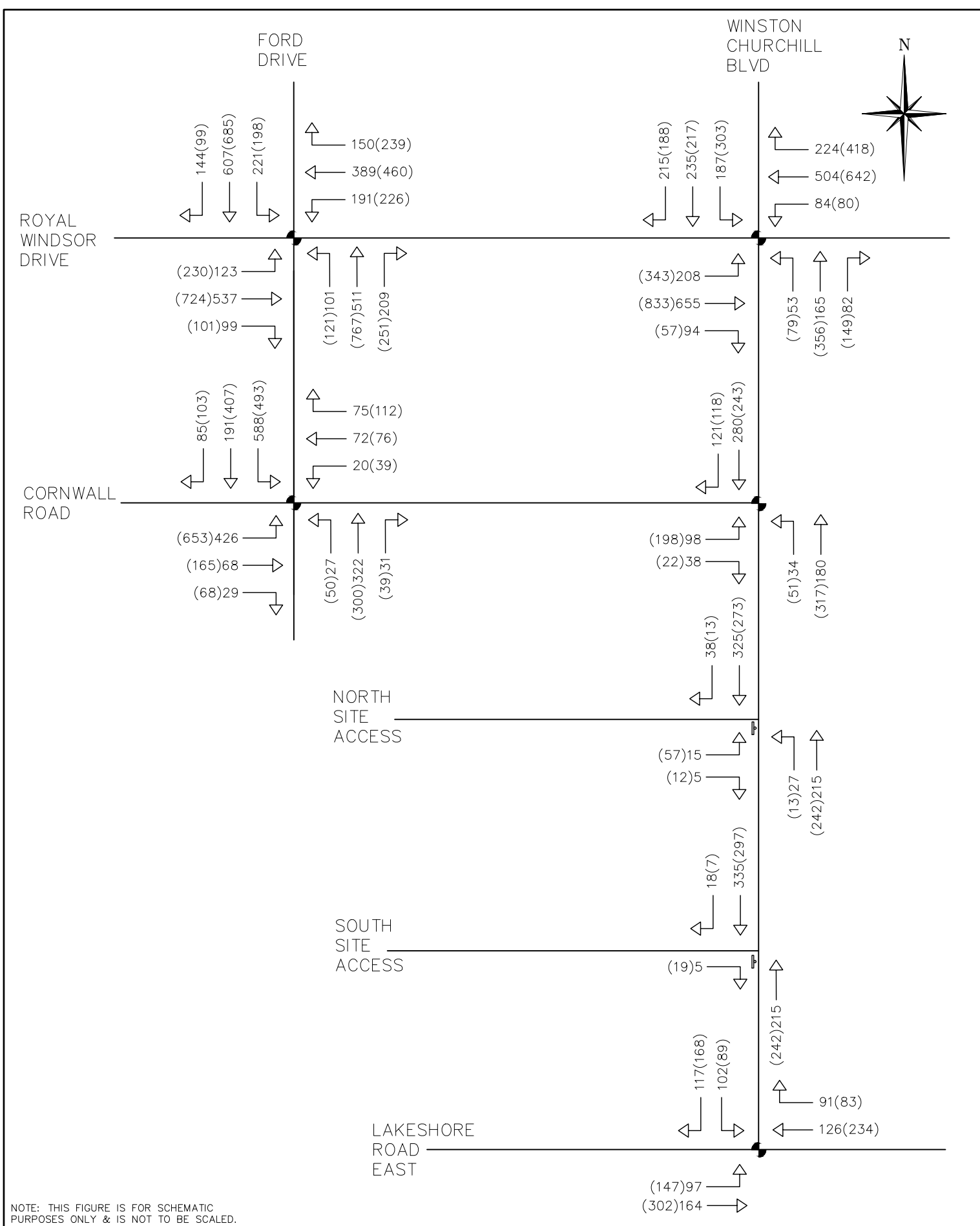


211 YONGE STREET
SUITE 301
TORONTO, ON, M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	R.L.	Design By	B.B.B.	Project	756-5105
Scale	N.T.S.	Date	09/15/2021	Check By	F.H.
					Drawing

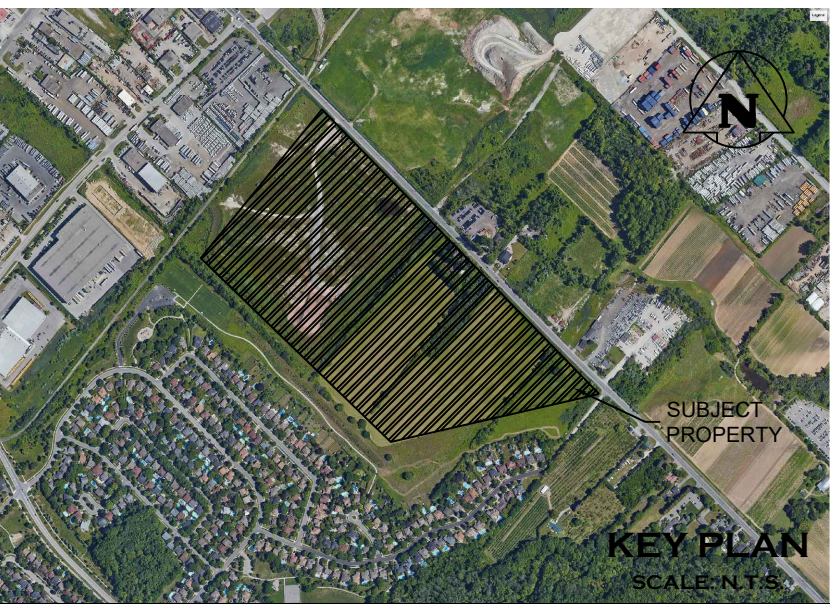
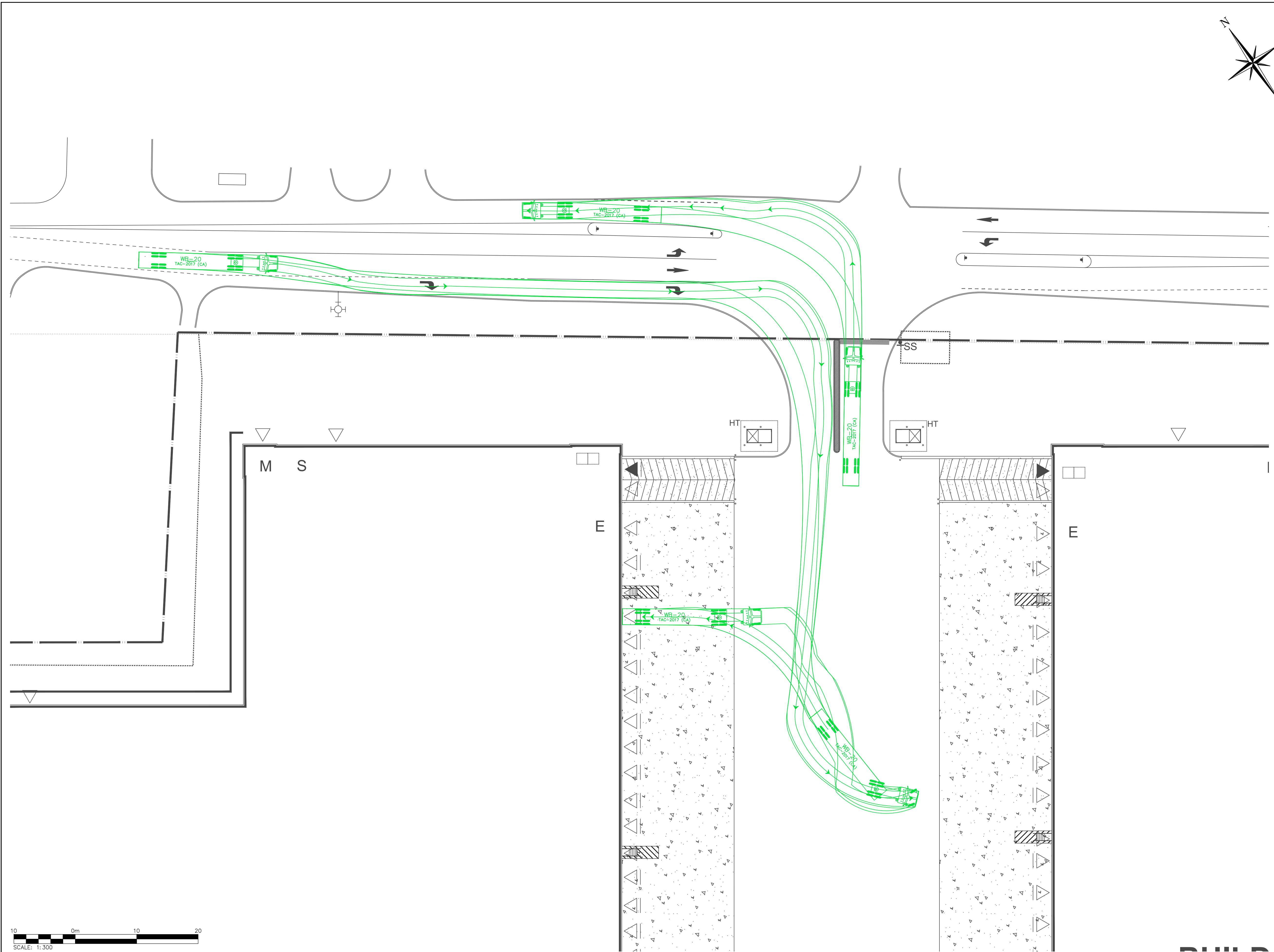
FIG 10



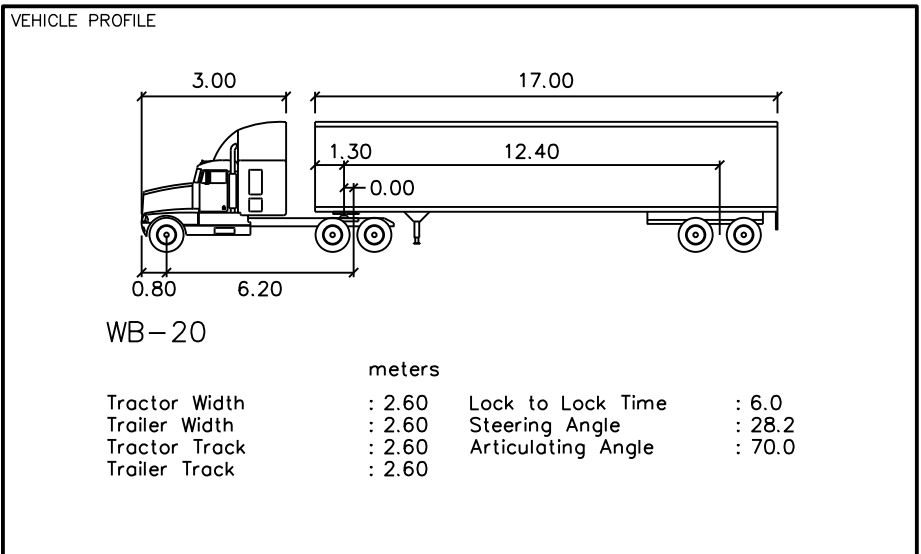
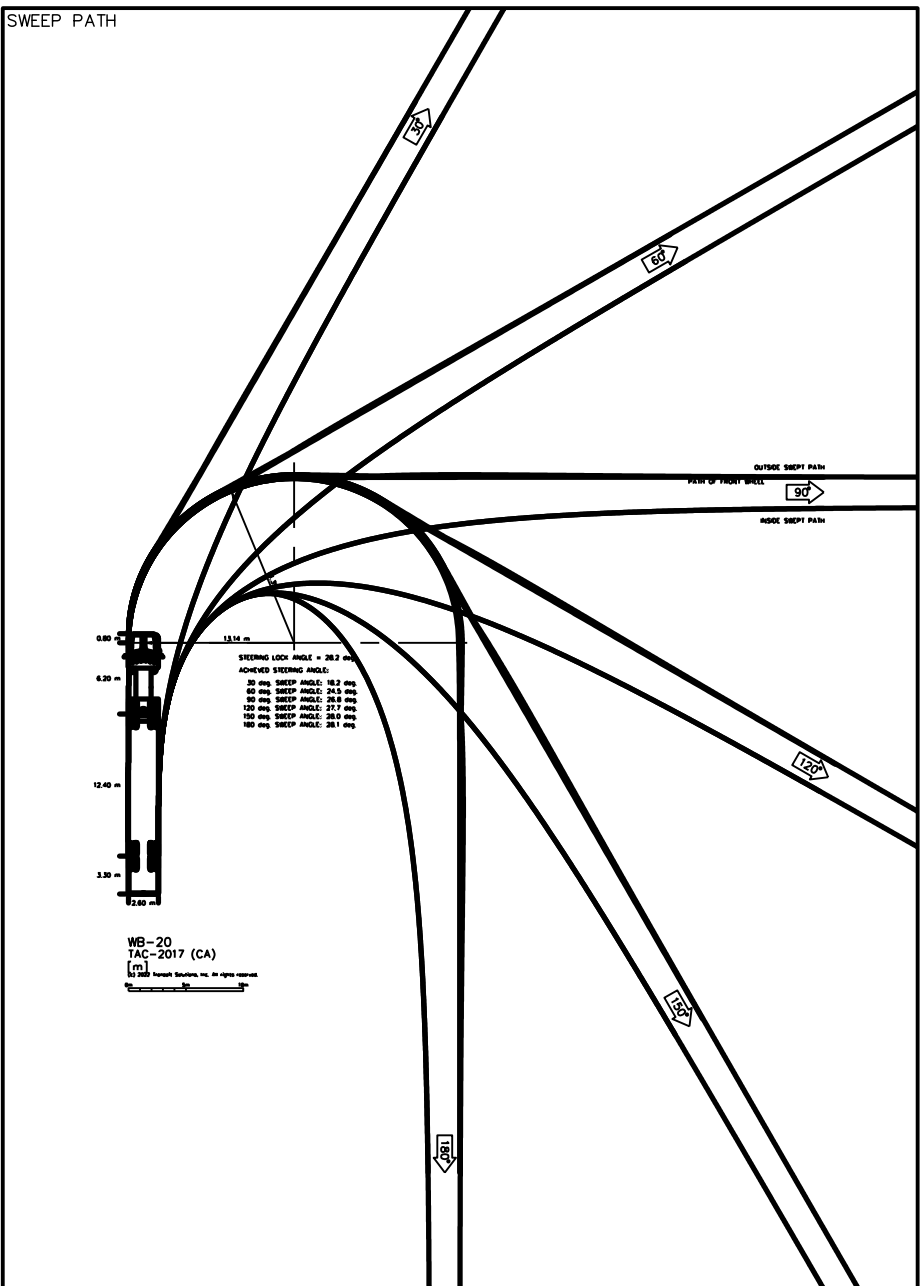


NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend SIGNAL CONTROL STOP CONTROL xx(yy) WEEKDAY A.M. (WEEKDAY P.M.) PEAK HOUR VOLUMES	Project WINSTON CHURCHILL BLVD	CROZIER CONSULTING ENGINEERS 211 YONGE STREET SUITE 301 TORONTO, ON, M5B 1M4 416-477-3392 T WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
	Drawing 2032 FUTURE TOTAL TRAFFIC VOLUMES	Drawn By R.L. Design By B.B.B. Project 756-5105 Scale N.T.S. Date 09/15/2021 Check By F.H. Drawing FIG 12	




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0	ISSUED FOR INTERNAL REVIEW	02/09/2021
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Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

Drawing
TRUCK TURNING ANALYSIS
WB-20

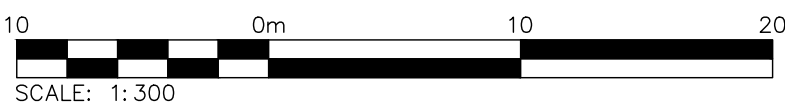


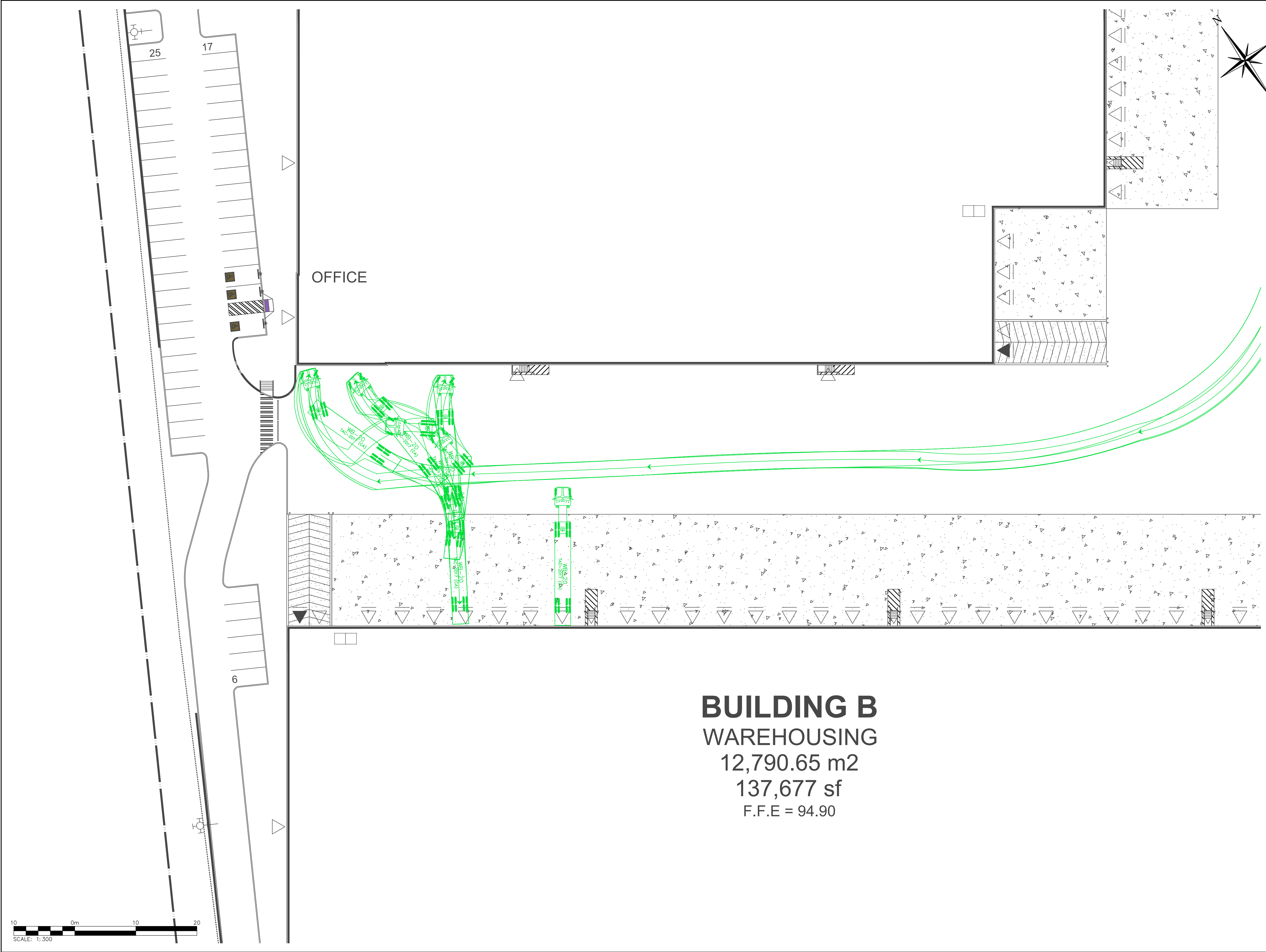
CROZIER
CONSULTING ENGINEERS

THE HARBOUREdge BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

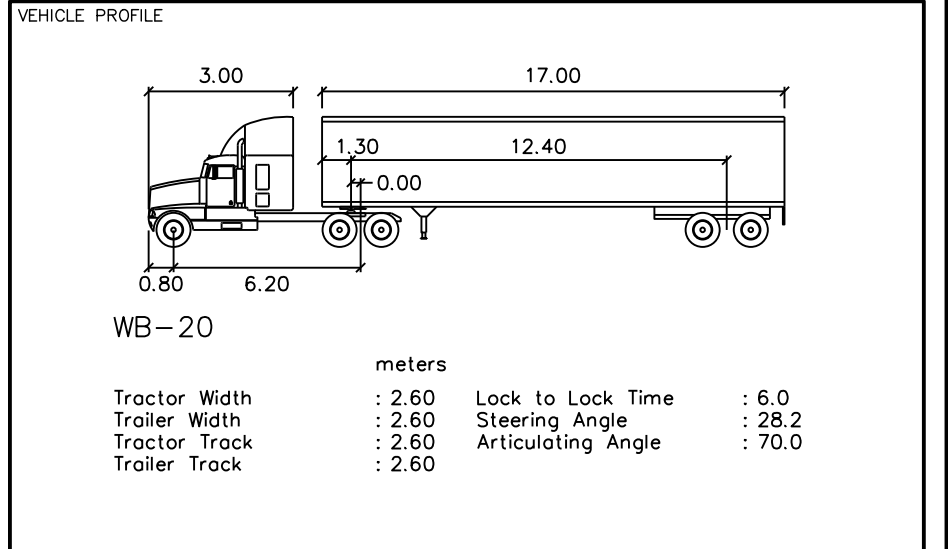
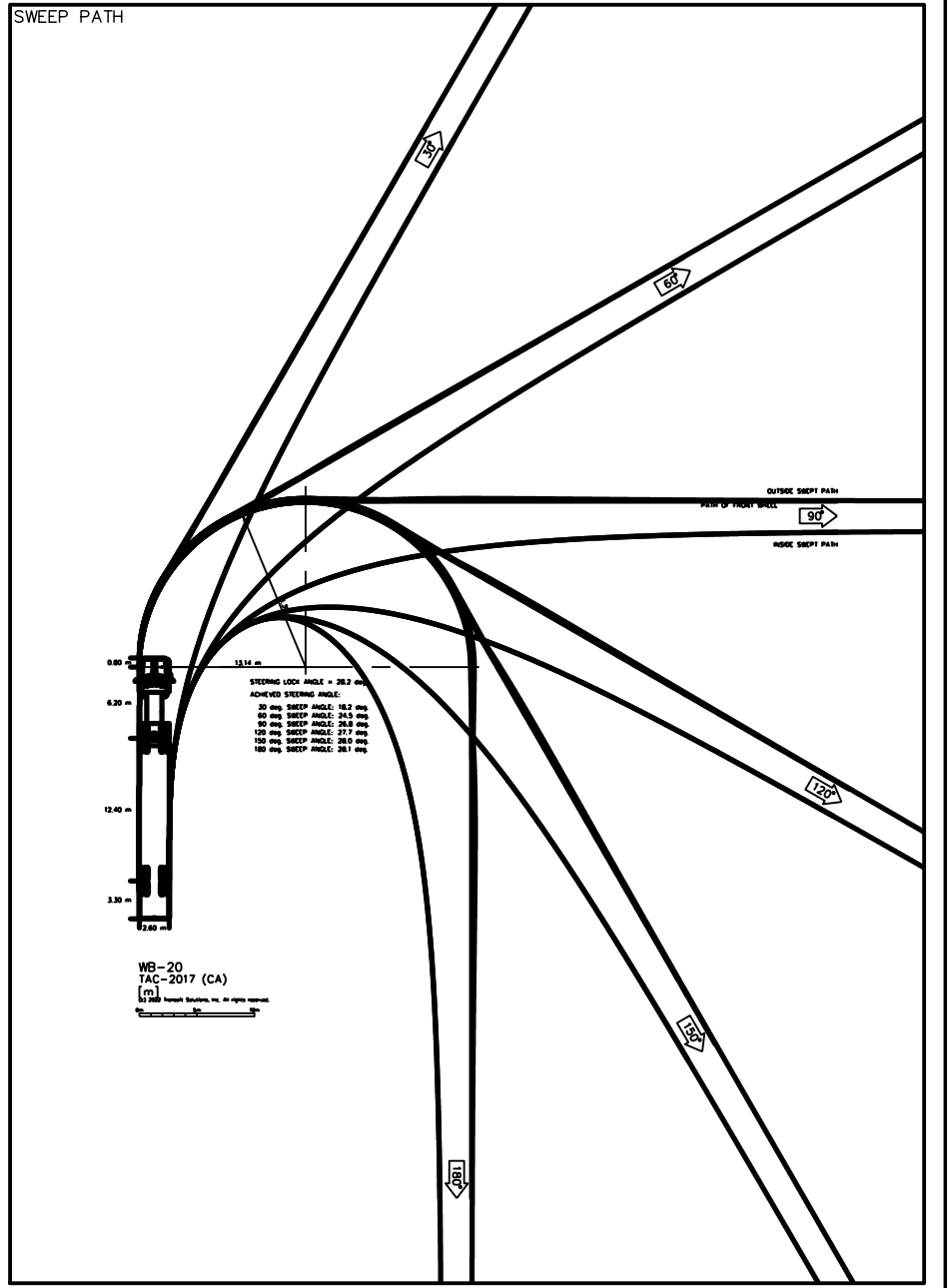
Drawn By	S.K./A.D.	Design By	Project	756-5105
Check By	F.C.	Check By	A.W.	Scale 1:300
				Drawing

TT 01 A






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0	ISSUED FOR INTERNAL REVIEW	02/09/2021
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Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

Drawing
TRUCK TURNING ANALYSIS
WB-20

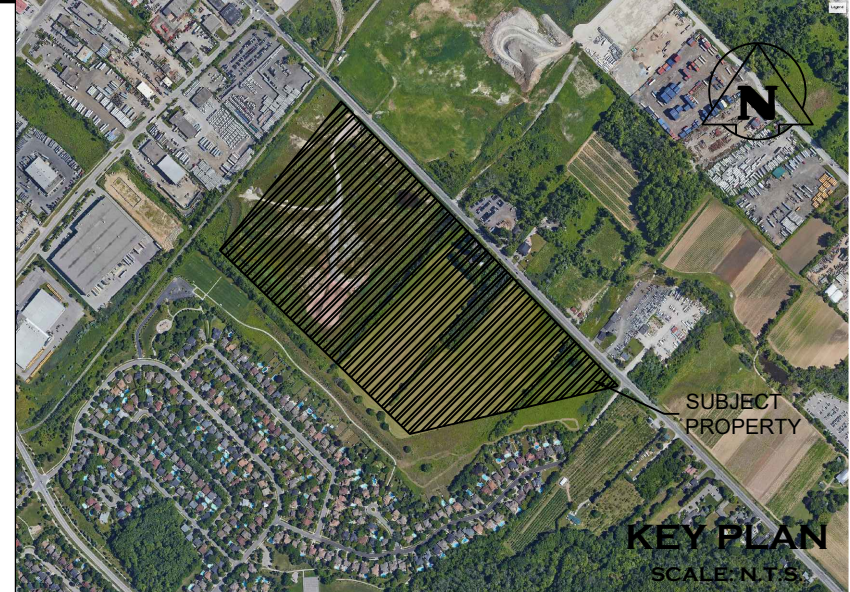
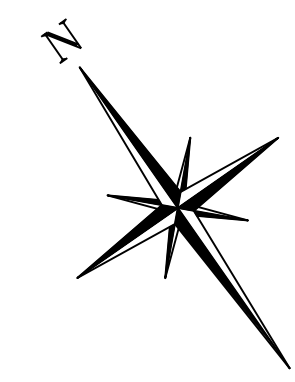
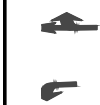


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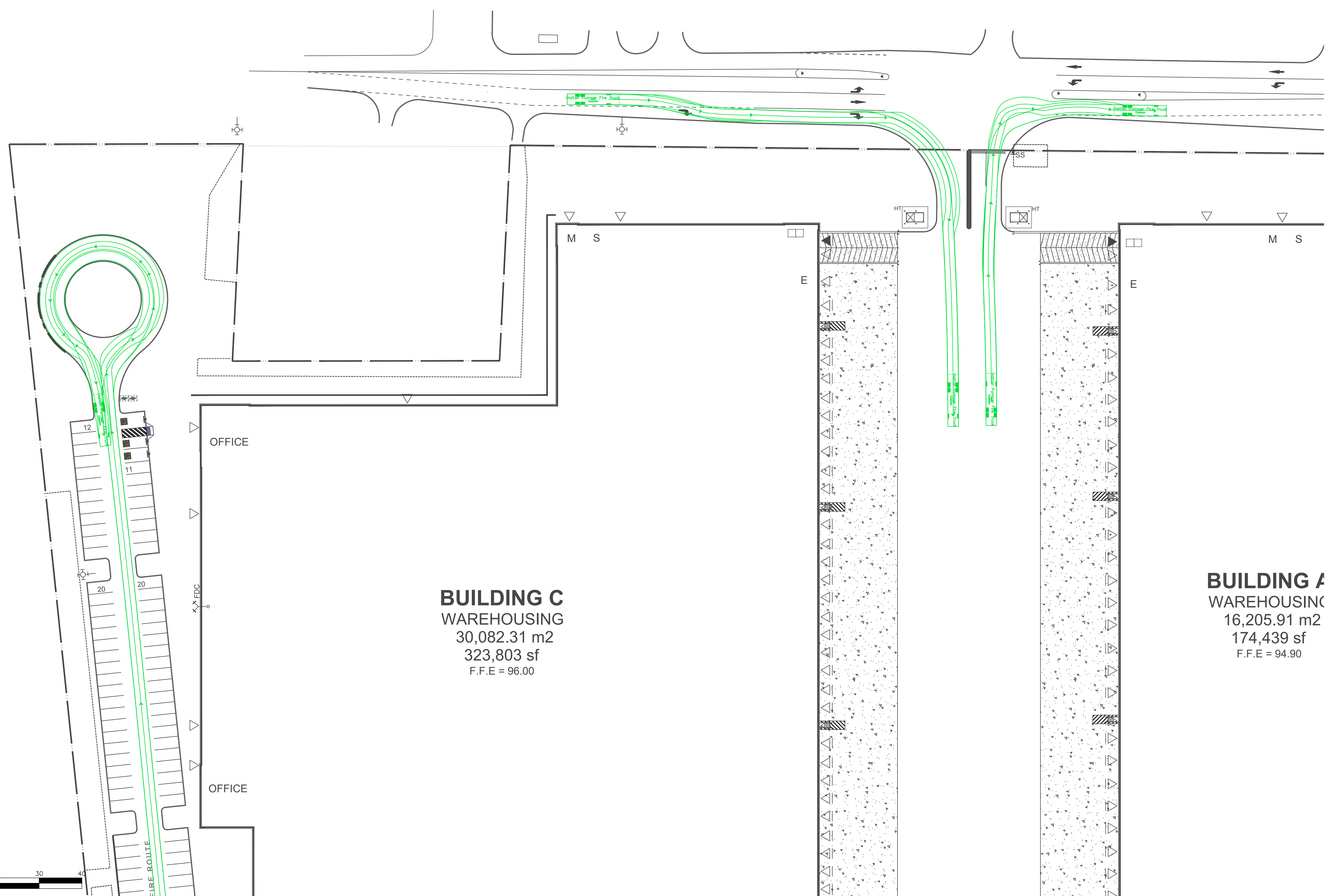
THE HARBOUREdge BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	S.K./A.D.	Design By	Project	756-5105
Check By	F.C.	Check By	Scale	1:300
		A.W.	Drawing	TT 01 B



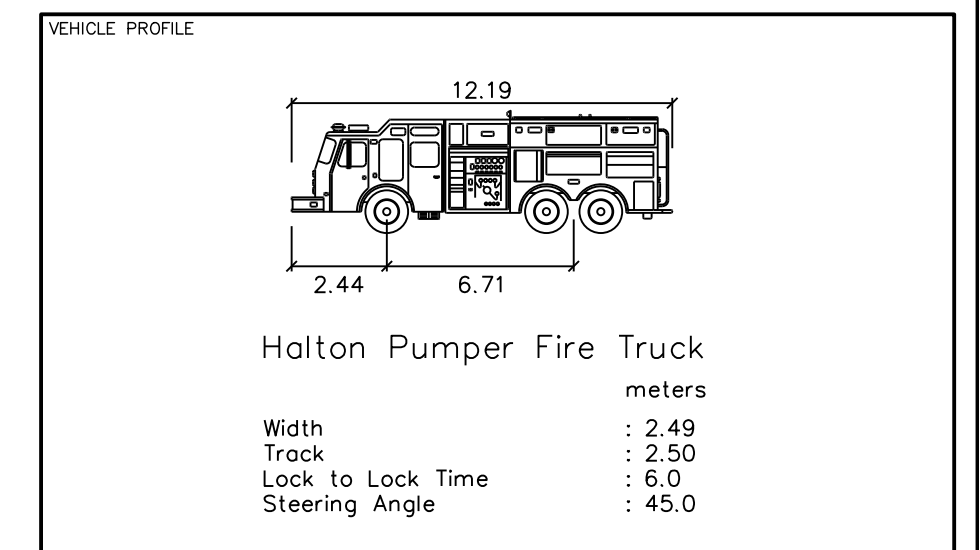
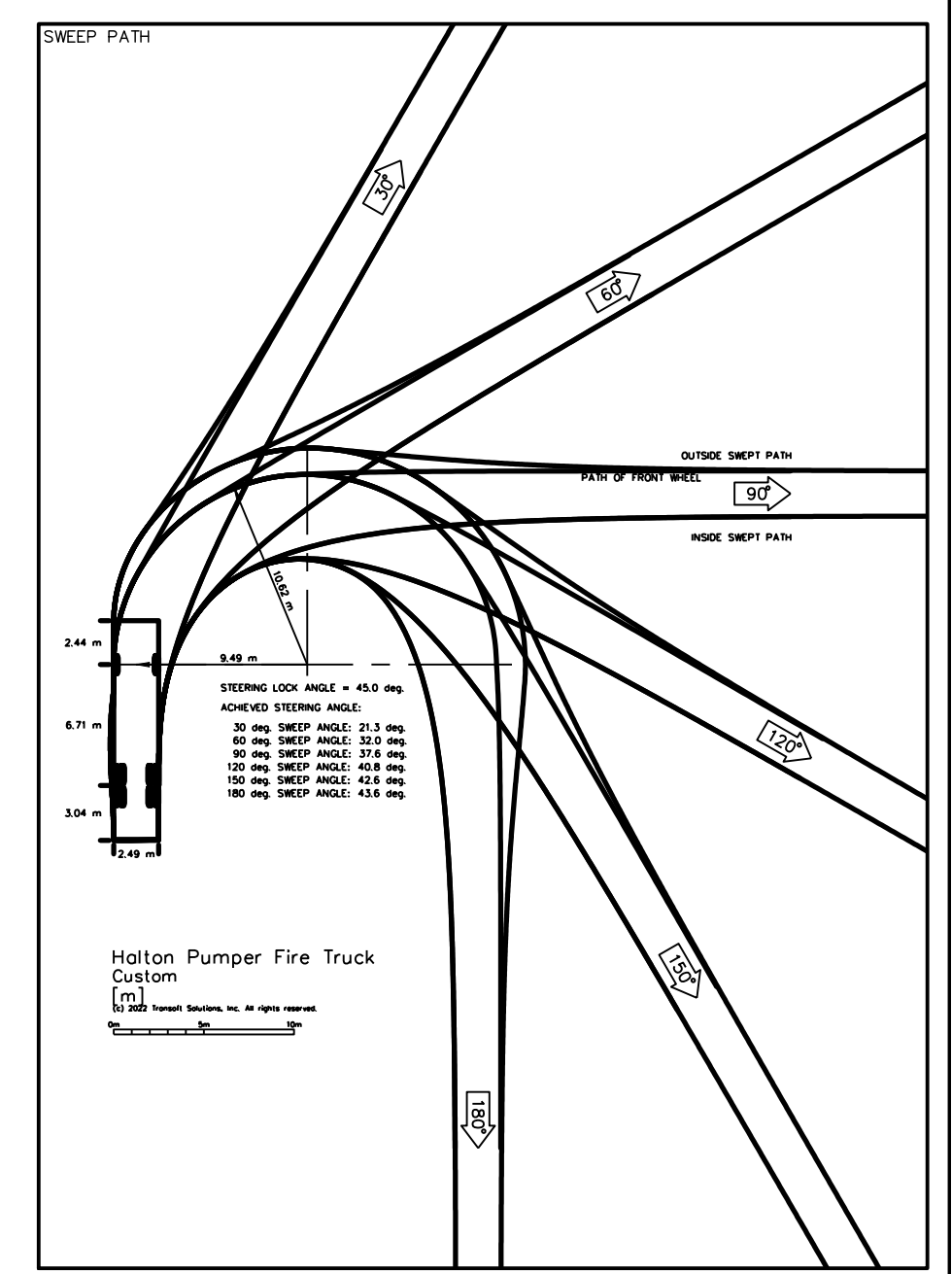


PRELIMINARY
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BUILDING C
WAREHOUSING
30,082.31 m²
323,803 sf
F.F.E = 96.00


BUILDING A
WAREHOUSING
16,205.91 m²
174,439 sf
F.F.E = 94.90



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Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

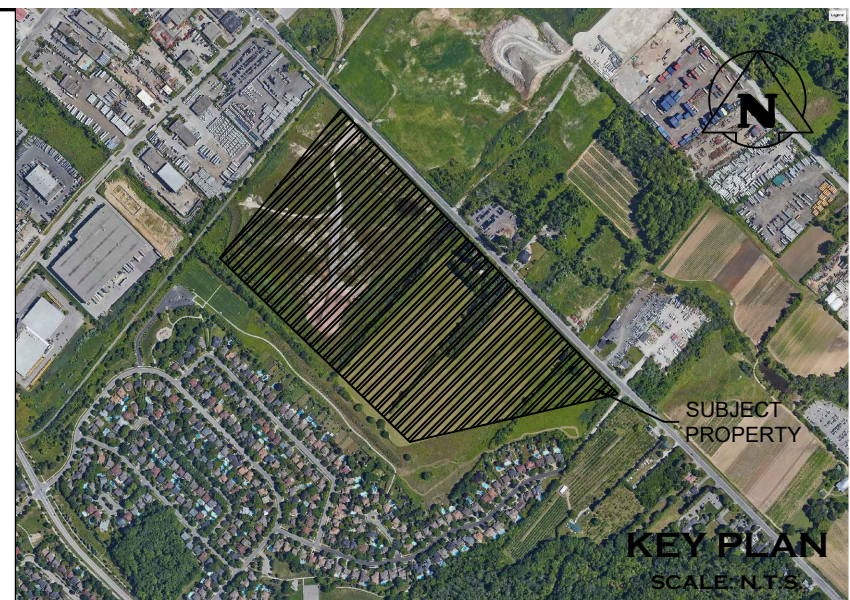
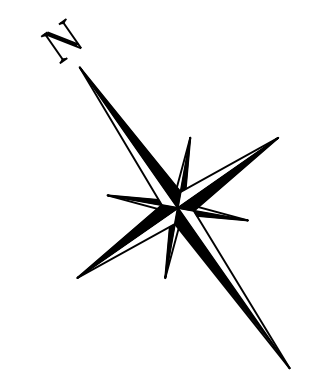
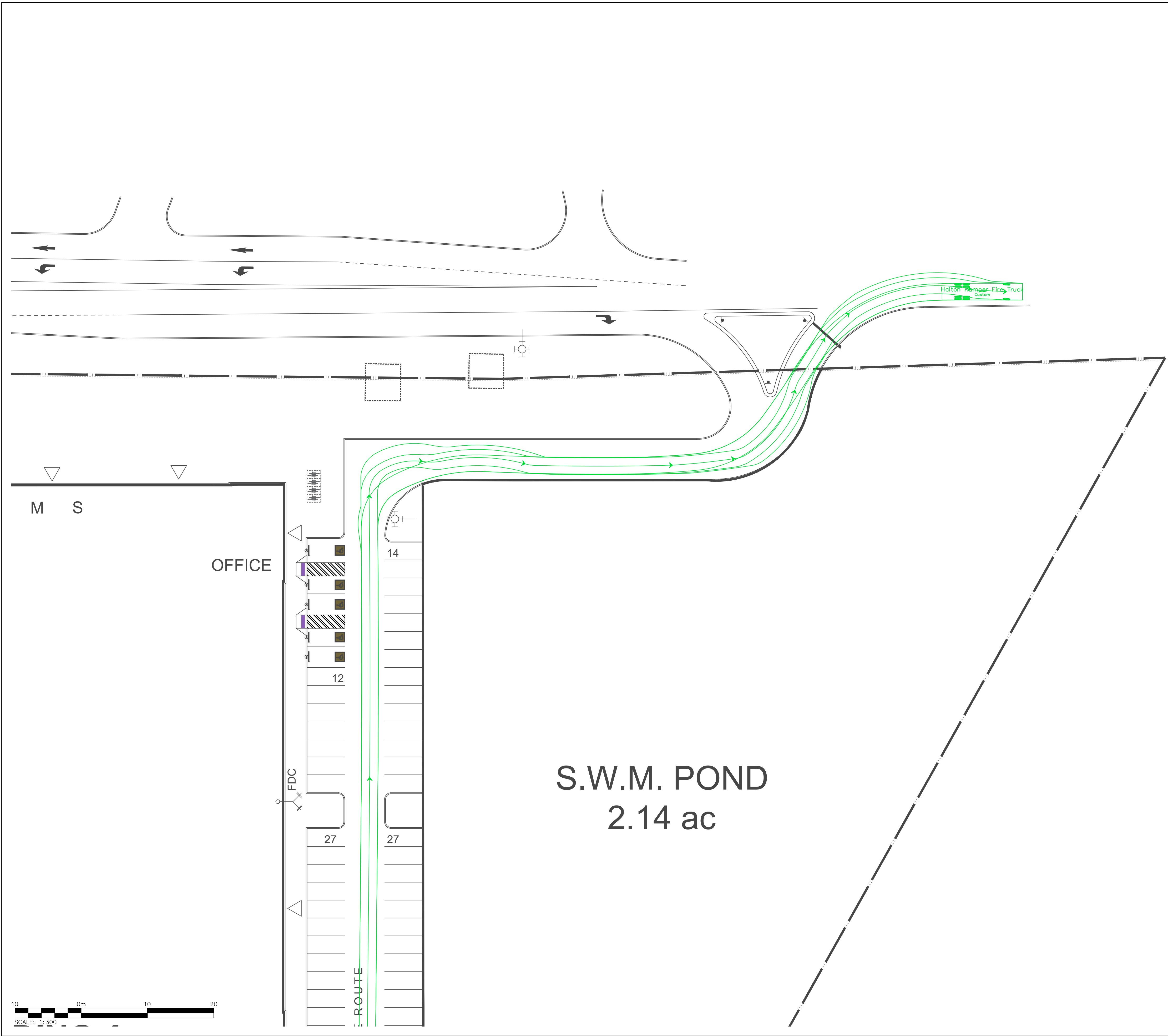
Drawing
TRUCK TURNING ANALYSIS
FIRE TRUCK

**CROZIER**
CONSULTING ENGINEERS

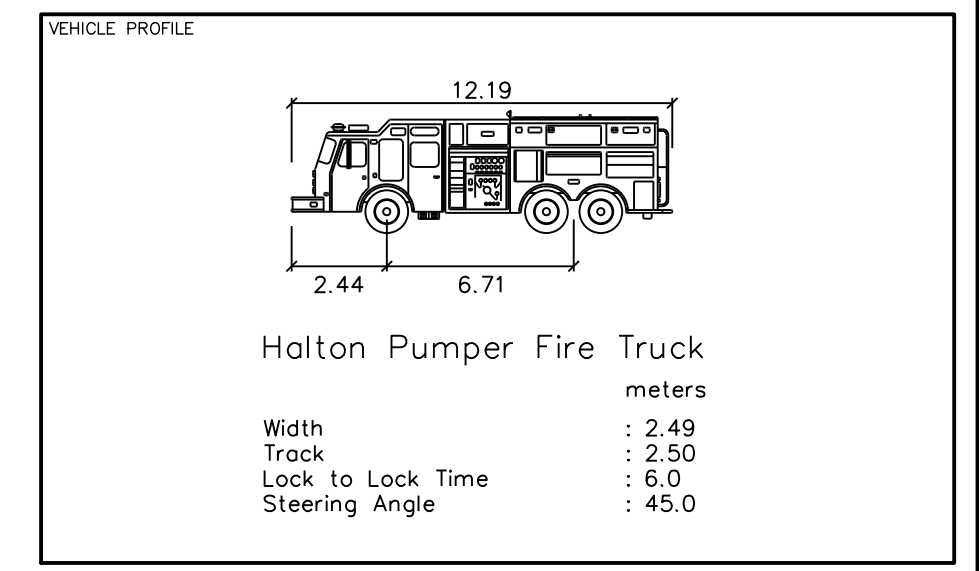
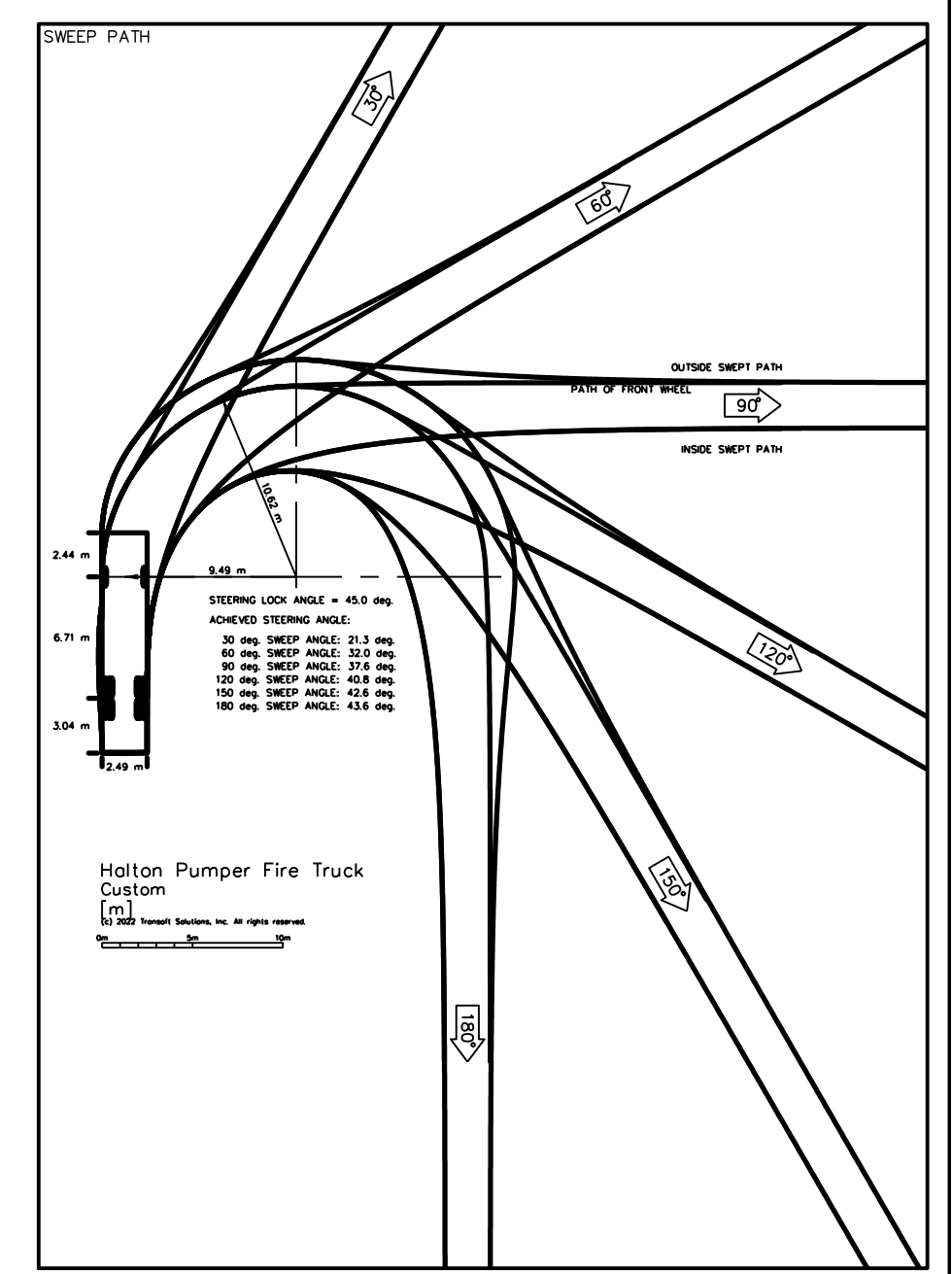
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	S.K./A.D.	Design By		Project	756-5105
Check By	F.C.	Check By	A.W.	Scale	1:500
				Drawing	TT 02 A






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Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

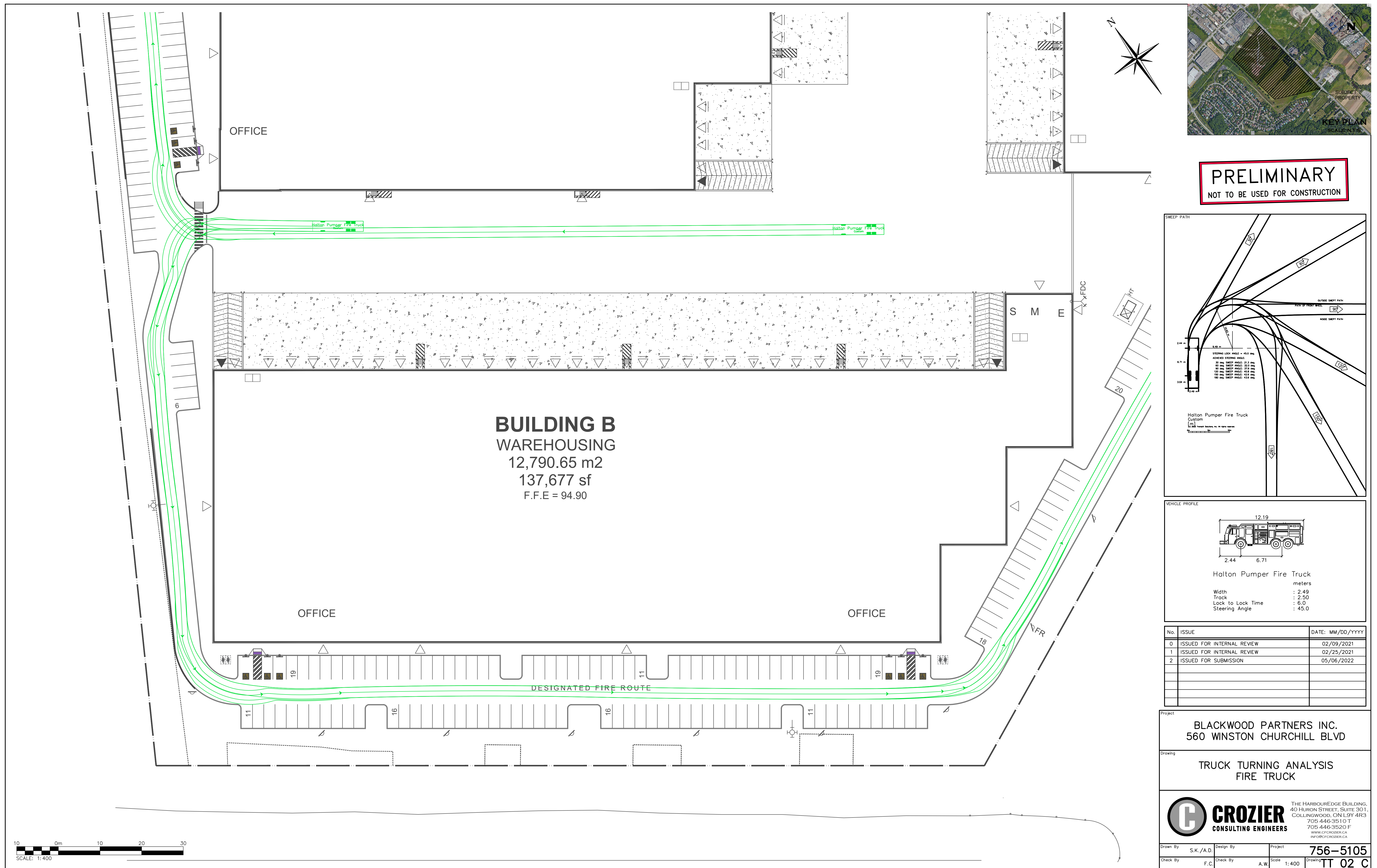
Drawing
TRUCK TURNING ANALYSIS
FIRE TRUCK

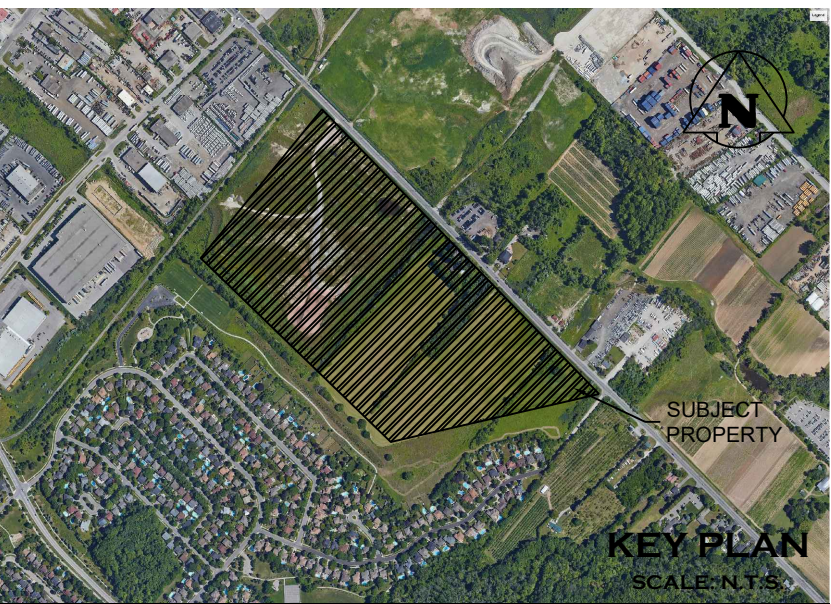
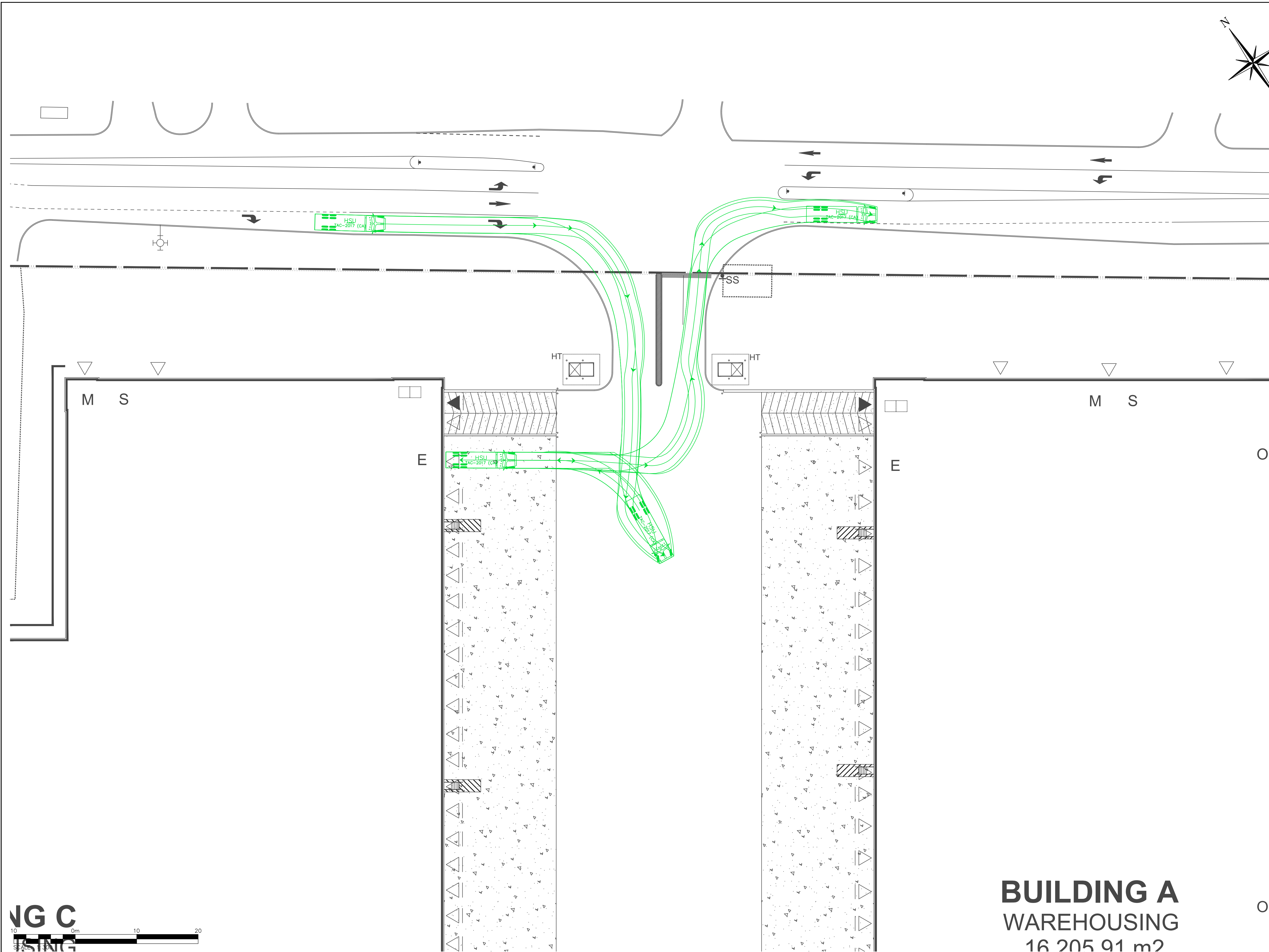


CROZIER
CONSULTING ENGINEERS

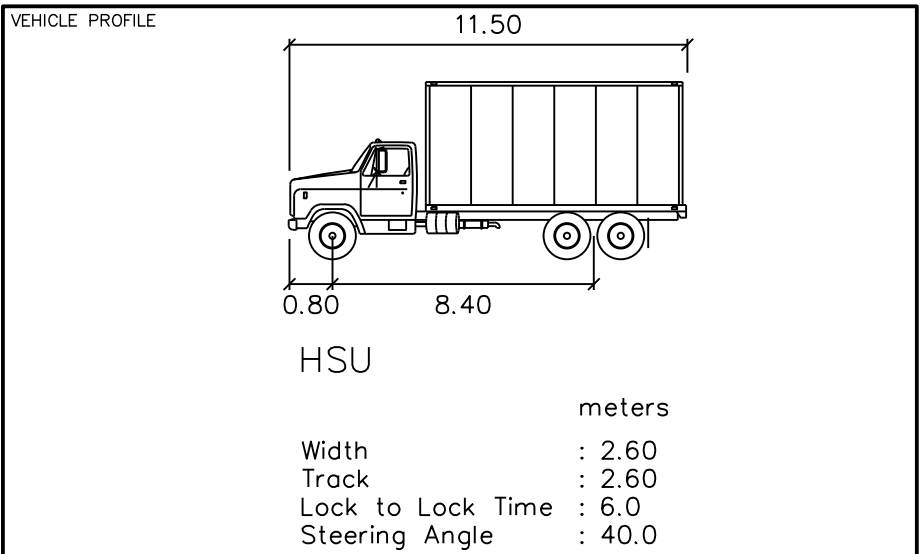
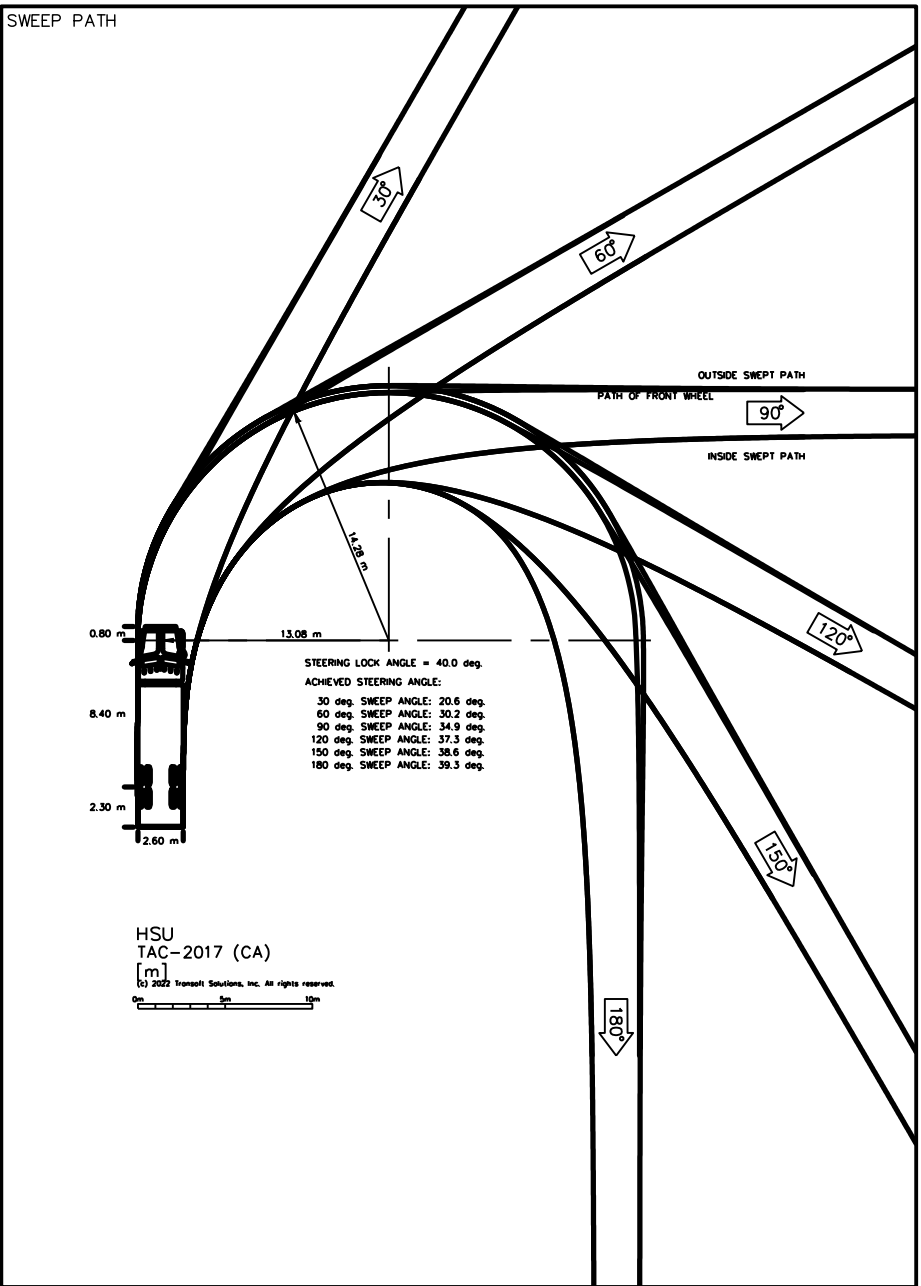
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	S.K./A.D.	Design By		Project	756-5105
Check By	F.C.	Check By	A.W.	Scale	1:300
				Drawing	TT 02 B





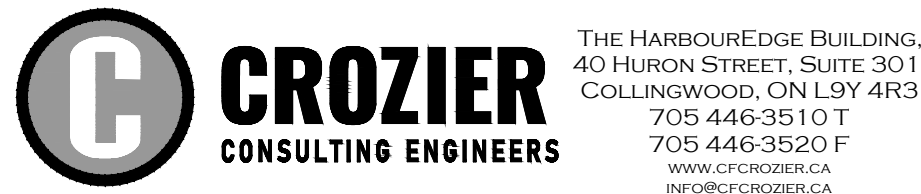
PRELIMINARY
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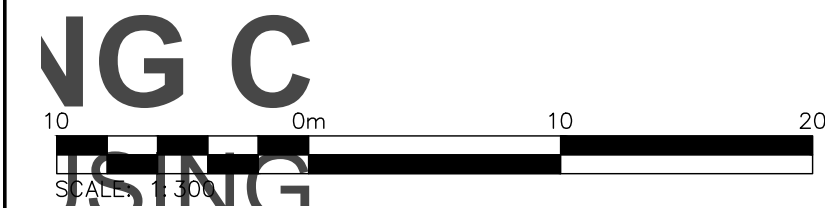
No.	ISSUE	DATE: MM/DD/YYYY
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Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

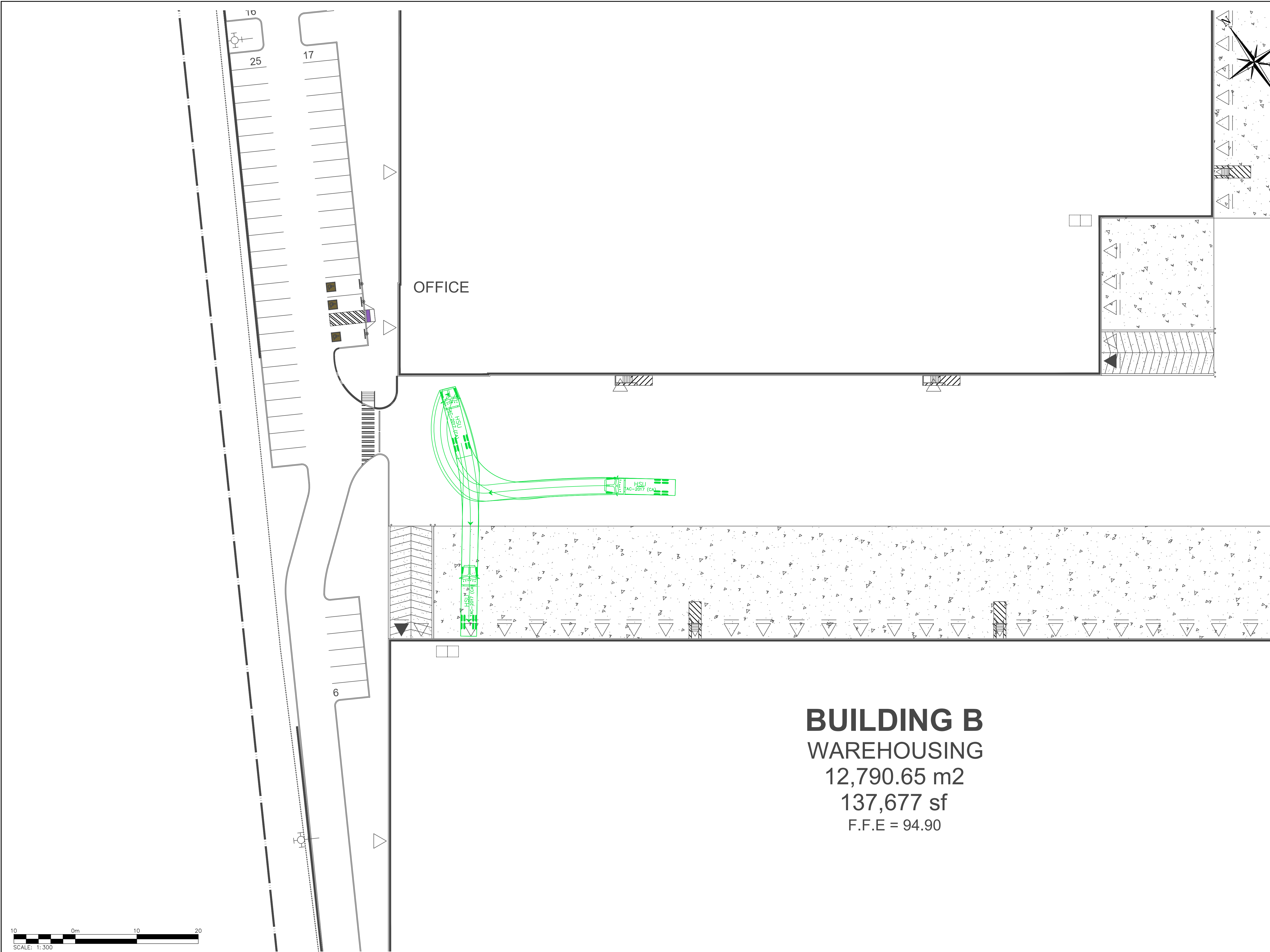
Drawing
TRUCK TURNING ANALYSIS
HSU



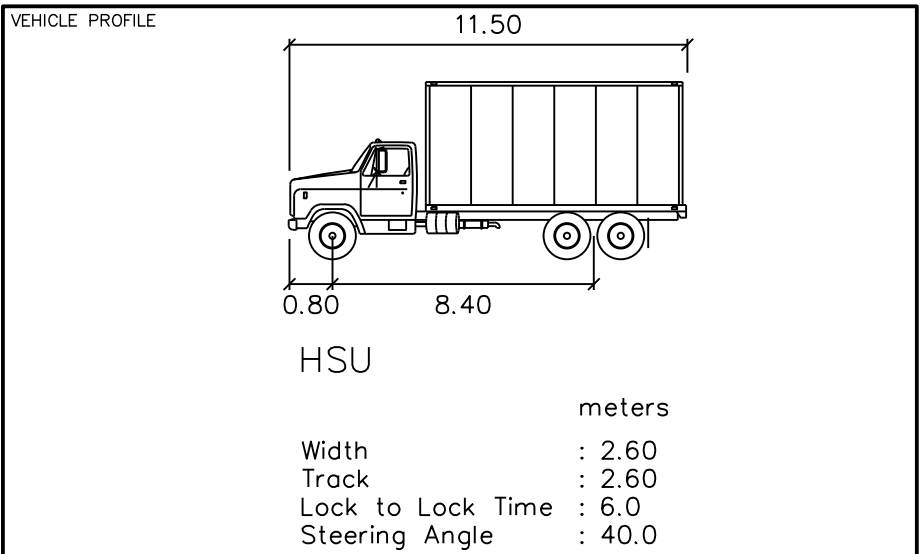
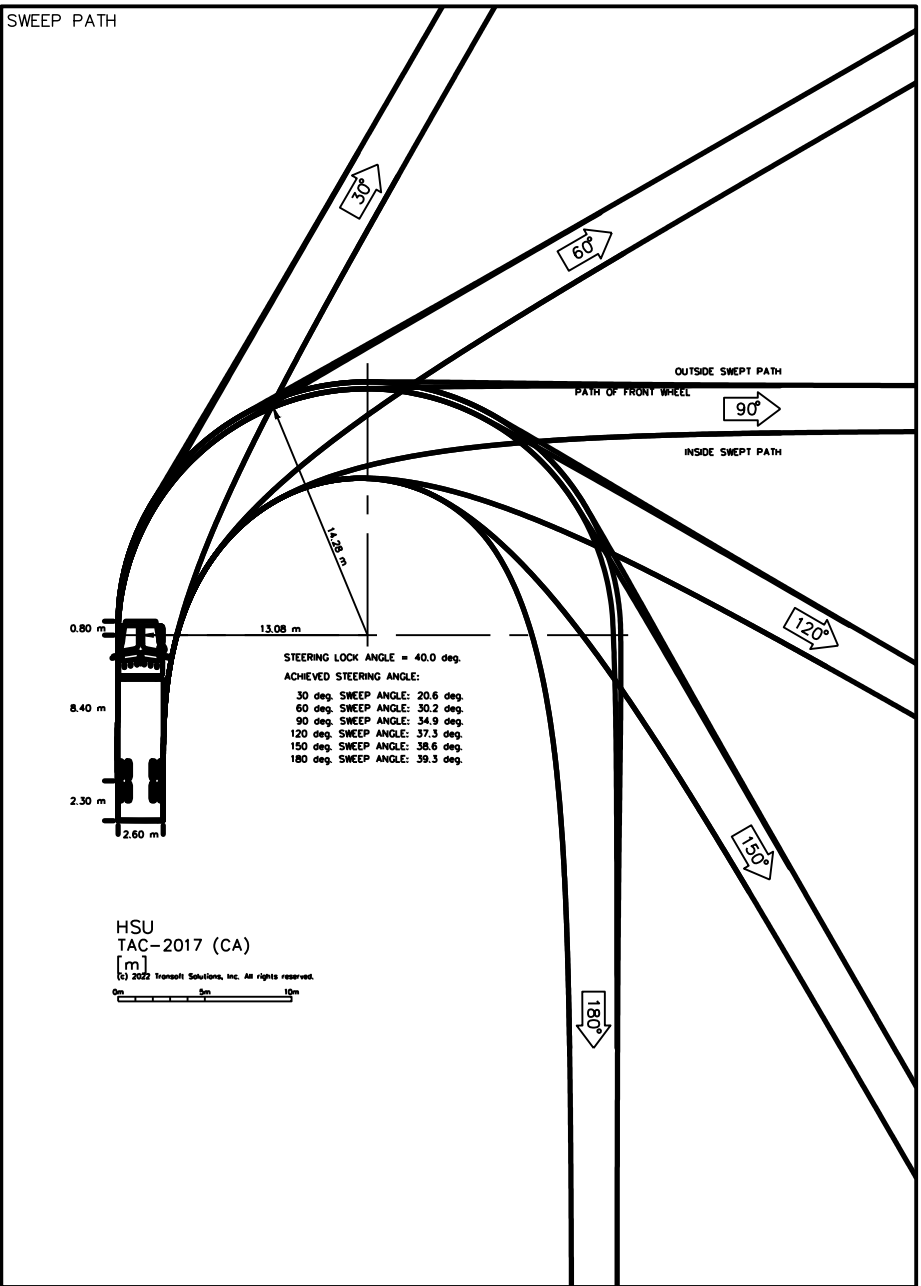
Drawn By	S.K./A.D.	Design By		Project	756-5105
Check By	F.C.	Check By	A.W.	Scale	1:300
				Drawing	TT 04 A



BUILDING A
WAREHOUSING
16 205 91 m2



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0	ISSUED FOR INTERNAL REVIEW	02/09/2021
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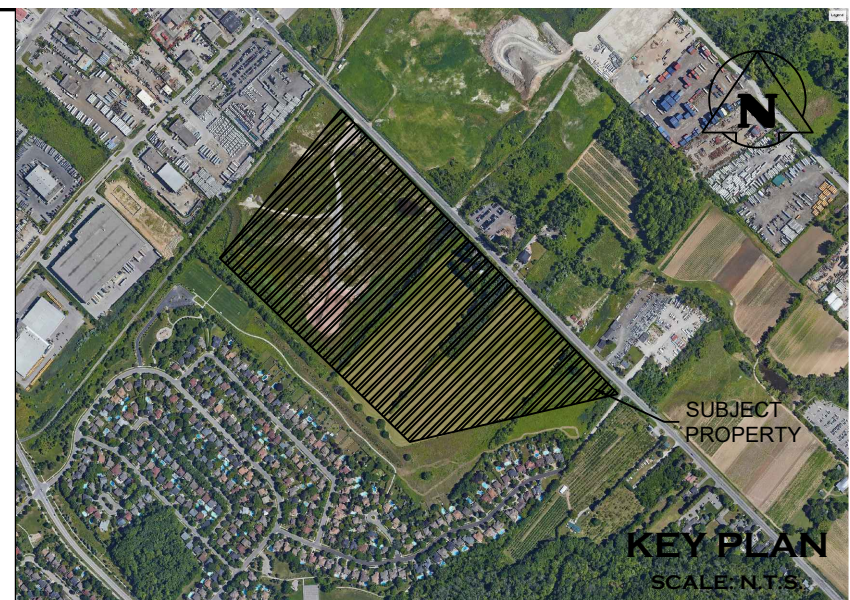
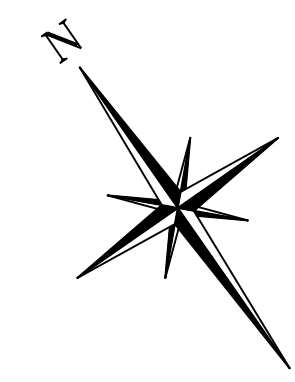
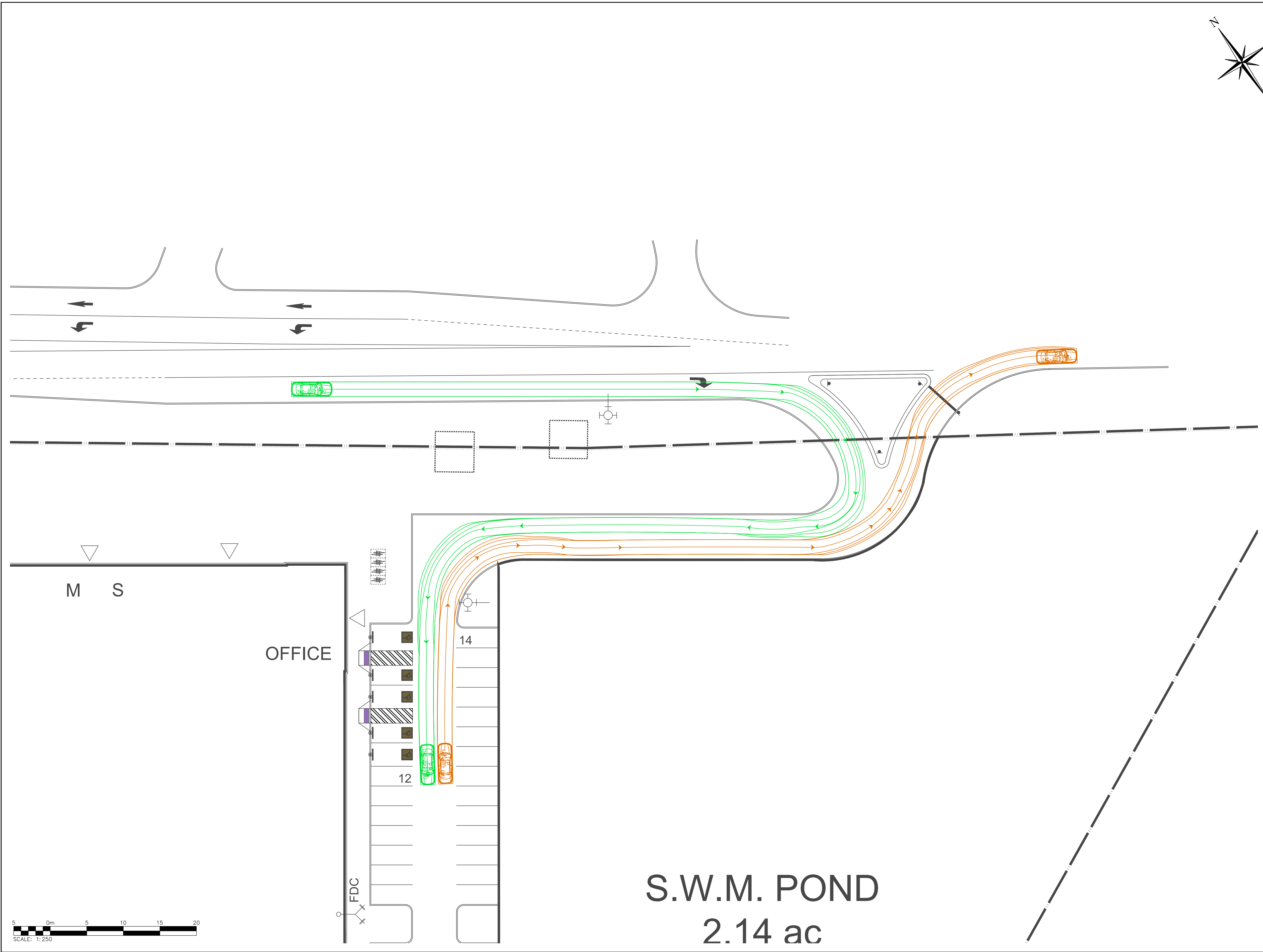
Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

Drawing
TRUCK TURNING ANALYSIS
HSU

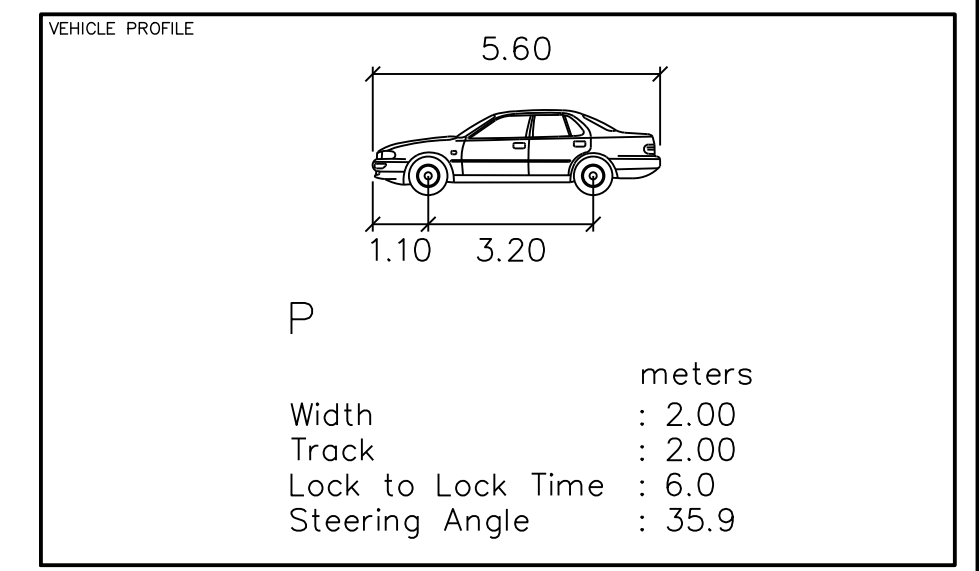
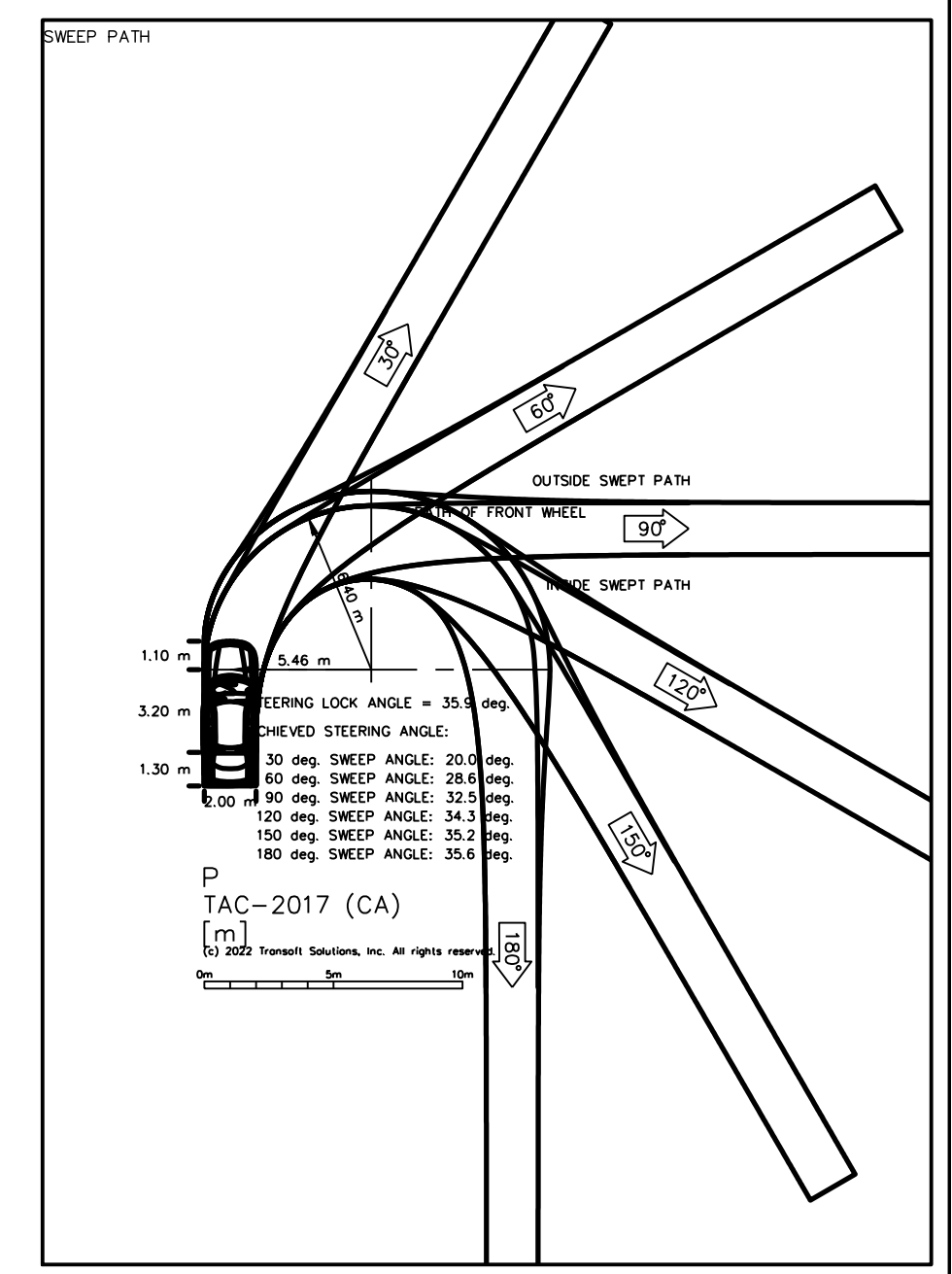
CROZIER
CONSULTING ENGINEERS

THE HARBOUREdge BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705.446.3510 T
705.446.3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By S.K./A.D. Design By Project 756-5105
Check By F.C. Check By A.W. Scale 1:300 Drawing TT 04 B




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Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

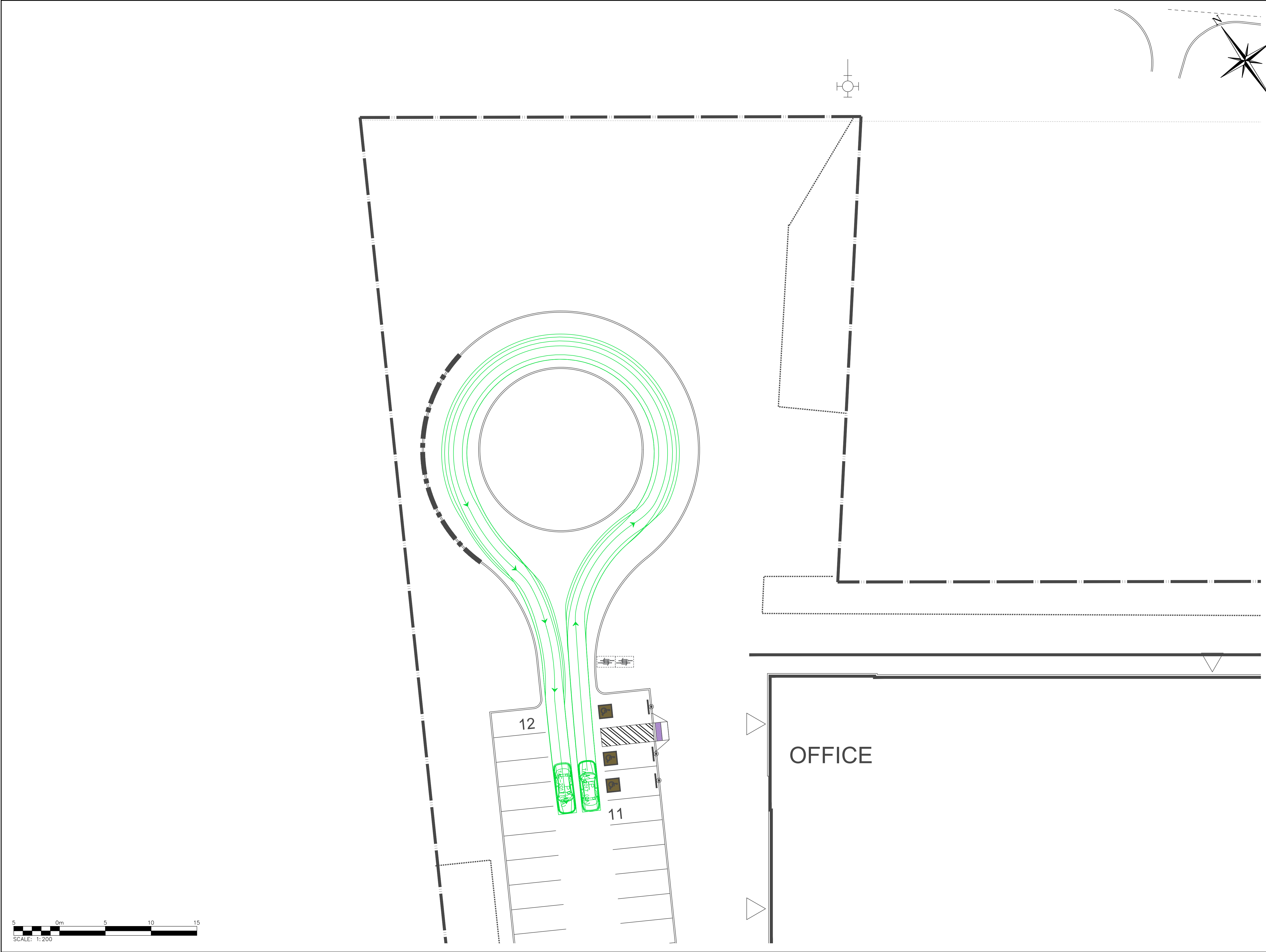
Drawing
TRUCK TURNING ANALYSIS
P CAR



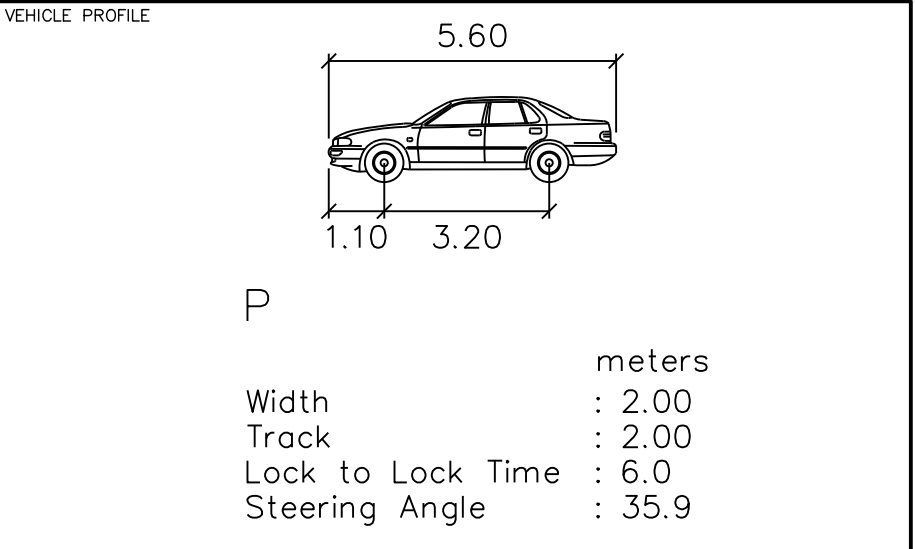
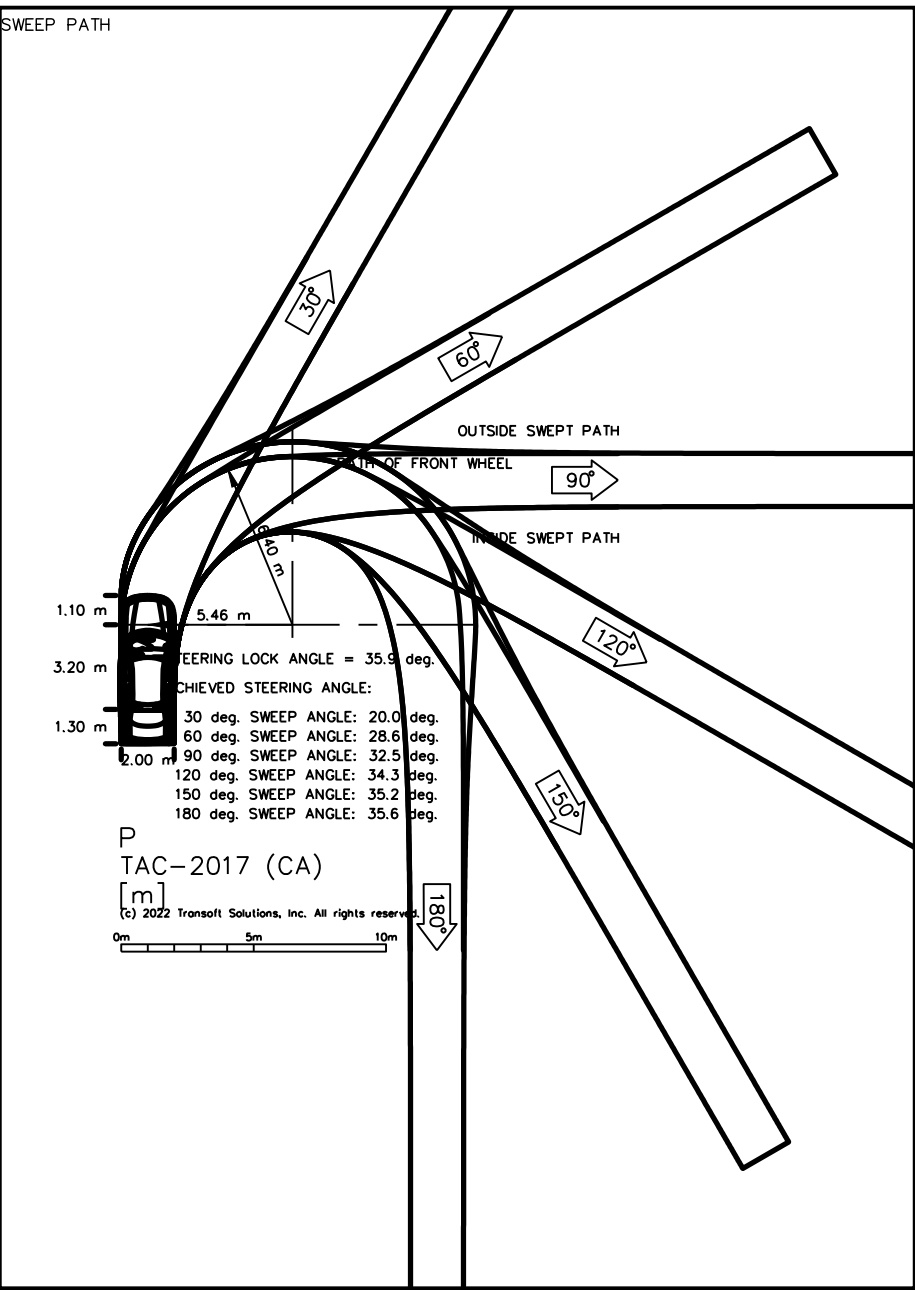
CROZIER
CONSULTING ENGINEERS

THE HARBOUREdge BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705.446.3510 F
705.446.3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	S.K./A.D.	Design By	Project	756-5105
Check By	F.C.	Check By	A.W.	Scale 1:250
Drawing				TT 05 A



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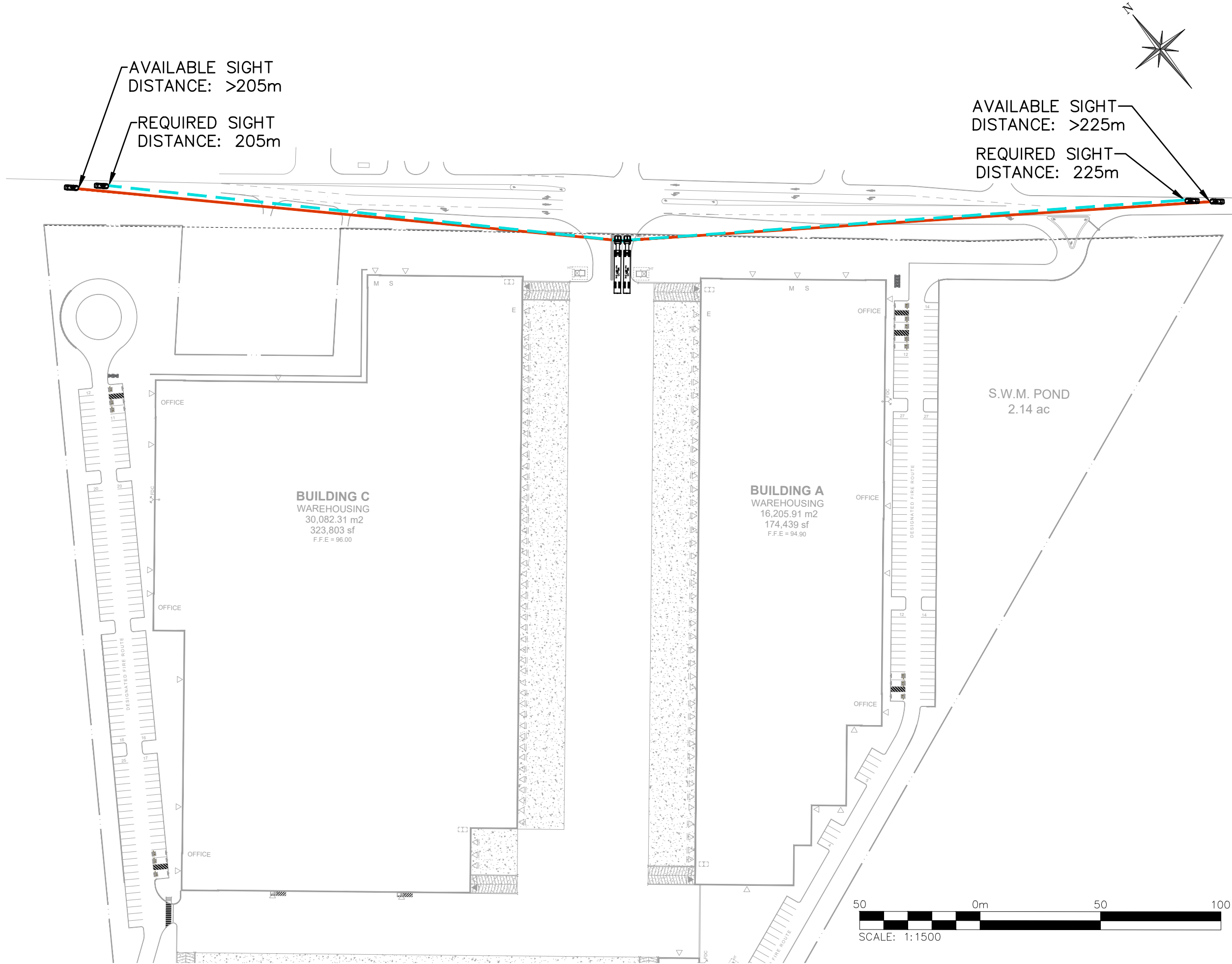
Project
BLACKWOOD PARTNERS INC.
560 WINSTON CHURCHILL BLVD

Drawing
TRUCK TURNING ANALYSIS
P CAR

CROZIER
CONSULTING ENGINEERS

THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 F
705 446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	S.K./A.D.	Design By		Project	756-5105
Check By	F.C.	Check By	A.W.	Scale	1:200
				Drawing	TT 05 B



LEGEND:

	AVAILABLE SIGHT DISTANCE
	REQUIRED SIGHT DISTANCE
	WB-20 COMBINATION TRUCK
	PASSENGER VEHICLE

Sight Distance Calculation

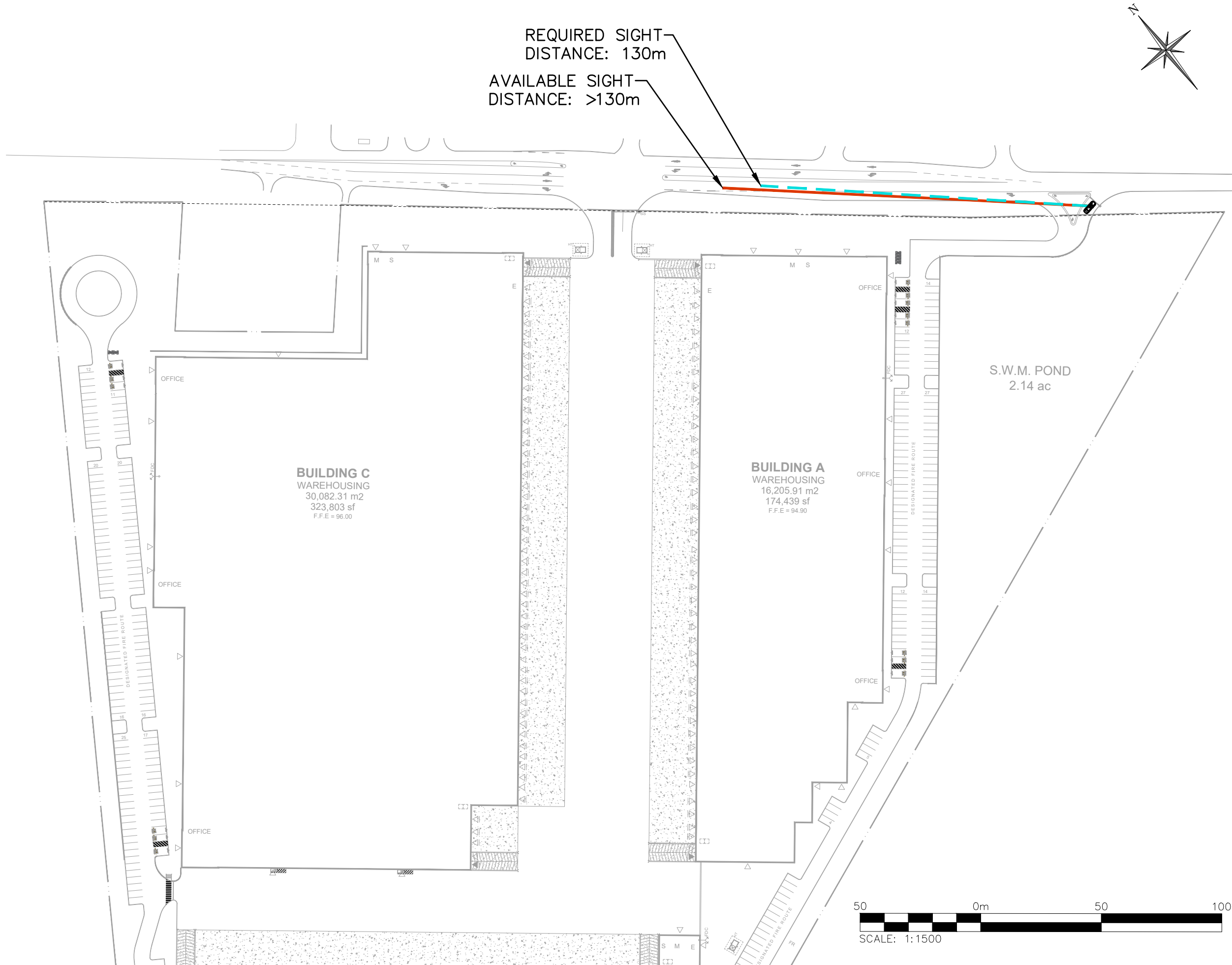
Feature	Truck Access
Access Type	Full-Moves
Posted Speed Limit	60 km/h
Assumed Design Speed	70 km/h
Base Time Gap ¹	10.5s (right), 11.5s (left)
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Straight
Required Sight Distance (right turn) ²	205 m
Required Sight Distance (left turn) ²	225 m

Note 1: The critical time gap is the largest time gap required for the permissible movements at the access. The time gap is for left or right-turning combination trucks (WB-19 or WB-20) from a stop onto a two-lane highway with no median and with a grade less than 3%. Values from Table 9.9.3 and 9.9.5 in the TAC-GDGCR, respectively.

Note 2: Sight Distance values calculated from equation 9.9.1 in the GDGCR.

FOR REVIEW

A ISSUED FOR 1st SUBMISSION		2022/JUN/03
No. ISSUE / REVISION		YYYY/MMM/DD
Project BLACKWOOD PARTNERS INC. 560 WINSTON CHURCHILL BOULEVARD TOWN OF OAKVILLE		
Drawing SIGHT DISTANCE ANALYSIS TRUCK ACCESS		
CROZIER CONSULTING ENGINEERS		
2800 HIGH POINT DRIVE SUITE 100 MILTON, ON L9T 6P4 905-875-0026 T 905-875-4915 F WWW.CFCROZIER.CA		
Drawn R.L.	Design F.C.	Project No. 756-5105
Check F.C.	Check B.B.	Check 1:1500
		Dep. S-01



LEGEND:

	AVAILABLE SIGHT DISTANCE
	REQUIRED SIGHT DISTANCE
	WB-20 COMBINATION TRUCK
	PASSENGER VEHICLE

Sight Distance Calculation

Feature	Passenger Access
Access Type	Right-in/Right-out
Posted Speed Limit	60 km/h
Assumed Design Speed	70 km/h
Base Time Gap ¹	6.5s (right)
Grade of Roadway	Less than 3%
Horizontal Alignment of Roadway	Straight
Required Sight Distance (right turn) ²	130 m

Note 1: The critical time gap is the largest time gap required for the permissible movements at the access. The time gap is for right-turning vehicles from a stop onto a two-lane highway with no median and with a grade less than 3%. Value from Table 9.9.3 in the TAC-GDGCR.

Note 2: Sight Distance values calculated from equation 9.9.1 in the GDGCR.

FOR REVIEW

A		ISSUED FOR 1st SUBMISSION	2022/JUN/03
No.		ISSUE / REVISION	YYYY/MM/DD
Project			
BLACKWOOD PARTNERS INC. 560 WINSTON CHURCHILL BOULEVARD TOWN OF OAKVILLE			
Drawing			
SIGHT DISTANCE ANALYSIS PASSENGER ACCESS			
		2800 HIGH POINT DRIVE SUITE 100 MILTON, ON L9T 6P4 905-875-0026 T 905-875-4915 F WWW.CFCROZIER.CA	
Drawn	R.L.	Design	Project No. 756-5105
Check	F.C.	Check B.B.	Dwg. S-02