

Appendix B – Traffic Reports



407 TRANSITWAY – WEST OF BRANT STREET TO WEST OF HURONTARIO STREET
MINISTRY OF TRANSPORTATION - CENTRAL REGION



Final Report

Dundas Station Traffic Impact Study

Highway 407 Transitway-4



Prepared for Ministry of Transportation, Ontario
by IBI Group

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ORIGINATOR:	Gary Yeung, Joshua Lee
REVIEWER:	Josh Wilson, Scott Johnston
AUTHORIZATION:	Scott Johnston
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1 Introduction

This report is a traffic impact study for the proposed 407 Transitway Station located near the interchange of Highway 407 and Dundas Street in Burlington, Ontario. This report was prepared as part of the Environmental Assessment of the 407 Transitway, Brant Street to West of Hurontario Street.

The purpose of this report is to provide an assessment of traffic, transit, walking and cycling access to the proposed station. The assessment includes operations analysis and review of local road network configuration to identify needs and opportunities for transportation-related changes and coordination to accommodate the station.

1.1 Transitway Overview

The Highway 407 Transitway is a rapid transit facility planned within the Greater Toronto and Hamilton Area (GTHA). The Transitway will be fully grade-separated with an exclusive right-of-way and will run parallel along the Highway 407 corridor. This Transitway project supports the Province's Growth Plan by meeting increased travel demands through alternative transportation modes, providing increased mobility for a wide variety of users, and supporting transit-oriented development and associated land uses. The Transitway is initially designed to support busway service (BRT) with provisions for future conversion to light-rail transit (LRT) technology.

The section under the current EA spans approximately 43 kilometres from Brant Street in Burlington to west of Hurontario Street (west of proposed Hurontario Station) in Mississauga. This section of the Transitway provides opportunities to connect numerous Urban Growth Centres (e.g. Hamilton, Oakville, Milton and Mississauga City Centres) as well as to a number of higher order transit systems, supporting development within both the Region of Halton and Peel. The transitway is being planned to the 2041 horizon. Traffic analysis is to the 2031 horizon due to uncertainties in development levels and traffic trends beyond 2031.

1.2 Study Area

The proposed station is located north of Dundas Street just east of the Highway 407 and Dundas Street interchange in Burlington as shown in Exhibit 1-1. This location was developed through consultation with the City of Burlington and accommodates the Transitway alignment north of the Highway 407 but keeps the station on the south side. There is an existing GO Transit park-and-ride lot located just south of the proposed station. The study area includes these intersections:

- Dundas Street & Guelph Line (*signalized*);
- Dundas Street & Highway 407 WB Off-Ramp (*signalized*);
- Dundas Street & Highway 407 EB Off-Ramp (*signalized*);
- Dundas Street & Northampton Boulevard / Palladium Way (*signalized*);
- Dundas Street & Walkers Line (*signalized*); and,
- Walkers Line and Palladium Way (*unsignalized*).

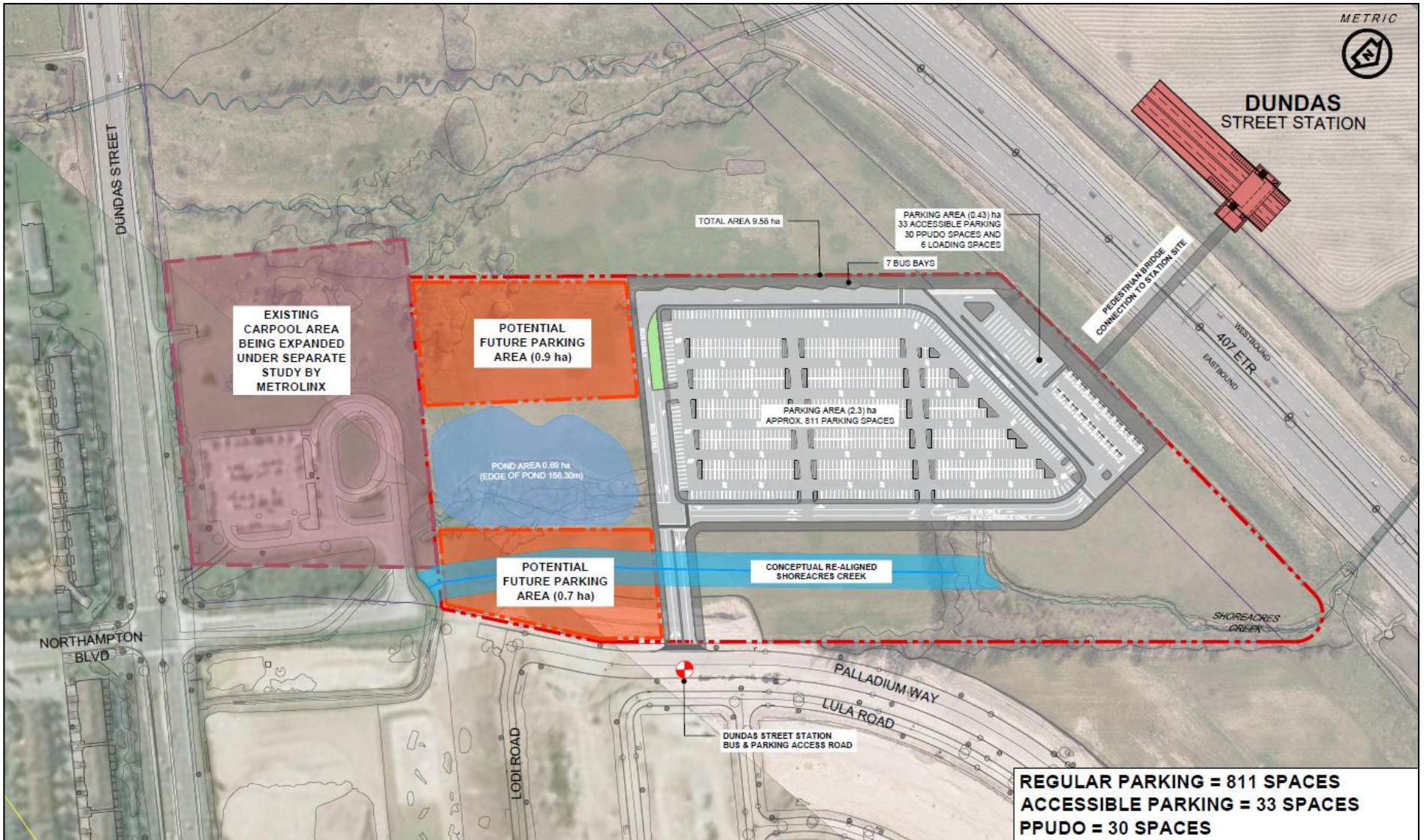
1.3 Station Plan

The proposed station site layout is provided in Exhibit 1-2. The site plan illustrates that the station connects to Palladium Way north of the existing GO lot. Further commentary on station layout and internal circulation is provided in Section 3 of this report.

Exhibit 1-1: Study Area



Exhibit 1-2: Proposed Station Layout



2 Existing Conditions

2.1 Road Network

Dundas Street is an east-west major arterial road that spans from the City of Hamilton to the City of Toronto. Within the study area, it is under the jurisdiction of Halton Region and has four lanes. Between Guelph Line and Northampton Boulevard, Dundas Street speed limit alternates between 80km/h through the interchange and 60km/h in the more developed areas. The *Halton Region Budget and Business Plan (2019)* identifies that Dundas Street will be widened from four lanes to six lanes. This widening is with the provision for four general traffic lanes and two lanes for transit / high occupancy vehicles.

Northampton Boulevard/ Palladium Way is a short north-south collector road that connects Headon Forest Drive to Dundas Street. It primarily serves to provide access to residential properties. It is assumed to have a posted speed limit of 50 km/h. The road is being extended to the north to connect to Palladium Way which intersects with Walkers Line. Palladium Way is the primary access road for the proposed station.

Walkers Line is a north-south minor arterial road that spans within the City of Burlington, starting from Lakeshore Road and ends northwards at Derry Road. Within the study area, Walkers Line has four lanes and a posted speed limit of 60 km/h.

Guelph Line is a north-south major arterial regional road within Halton Region that starts at Lakeshore Road and continues beyond the north border of Halton. Within the study area, Guelph Line has a posted speed limit of 60km/h. It is a four lane road south of Dundas Street and transitions to a two lane road north of Dundas. Additionally, from the Region's Transportation Master Plan (2011), Guelph Line will undergo widening from a four lane to six lane road from Upper Middle Road to Dundas Street.

2.2 Transit

The Highway 407 carpool parking lot serves as a terminal for several bus routes for Burlington Transit (BT), Oakville Transit (OT), and GO Transit. The following services are currently in operation:

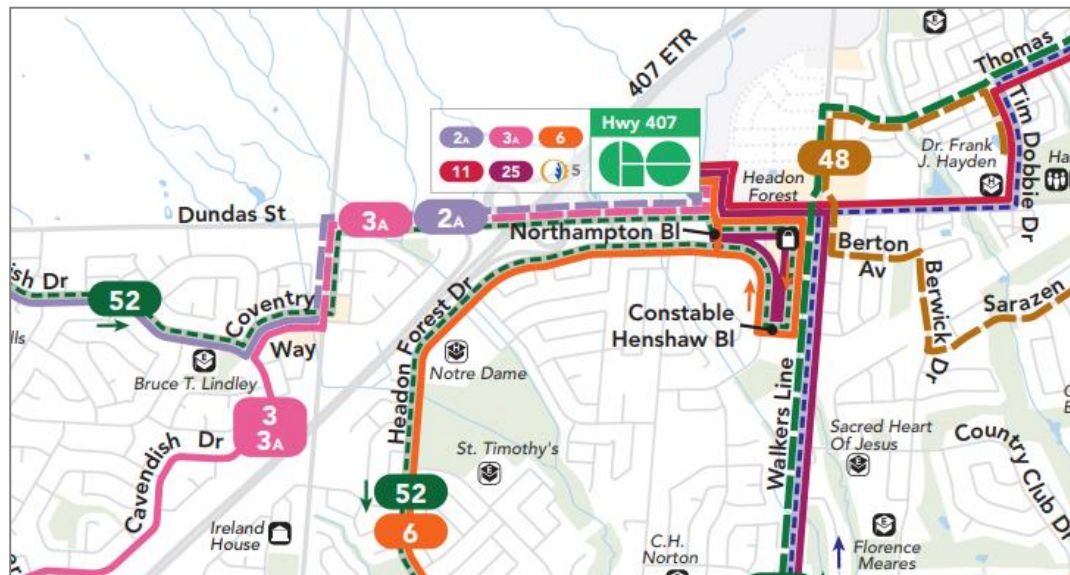
- **BT Route 2A (Brant)** – connects Highway 407 Carpool to Burlington GO Station. Route 2A operates on weekdays only with 30 minute headways and transitions to 3A at 407 Carpool.
- **BT Route 3A (Guelph-Downtown)** – connects 407 Carpool to Burlington GO Station. Route 3A is a weekday route with 30 minute headways and transitions to 2A at 407 Carpool.
- **BT Route 6 (Headon)** – connects 407 Carpool to Burlington GO Station with 30 minute headways. Route 6 transitions to Route 11 at 407 Carpool.
- **BT Route 11 (Sutton-Alton)** – connects 407 Carpool to Appleby GO station with 30 minute headways. Route 11 transitions to BT Route 6 at 407 Carpool.
- **BT Route 25 (Walkers)** – connects 407 Carpool to Burlington GO Station with 30 minute headways.
- **BT Route 52 (Burlington Northwest)** – A late night service routes that starts and ends at Burlington GO Station and travels clockwise around northwest Burlington. Within the

study area, Route 52 travels eastbound on Dundas Street from Guelph Line to Walkers Line only. Route 52 operates with one hour headways.

- **OT Route 5/5A (Dundas)** – connects 407 Carpool to Oakville GO station via Dundas Street with 30 minute headways.
- **GO Route 12 (Niagara Falls Train Meet Service)** – serves between 407 Carpool to Niagara Falls Bus Terminal with stops at Burlington GO Station, Grimsby, St. Catharines and Niagara-on-the-Lake via Highway 407 and QEW. Route 12 operates with approximately one hour headways.
- **GO Route 47 (407 West)** – serves between York University (Toronto) and Hamilton GO Centre with stops at Highway 407 Bus Terminal (Vaughan), Bramalea GO (Brampton), Square One (Mississauga), Dundas Street Park & Ride, McMaster University (Hamilton). Route 47 operates with 10 minute headways at peak hours.

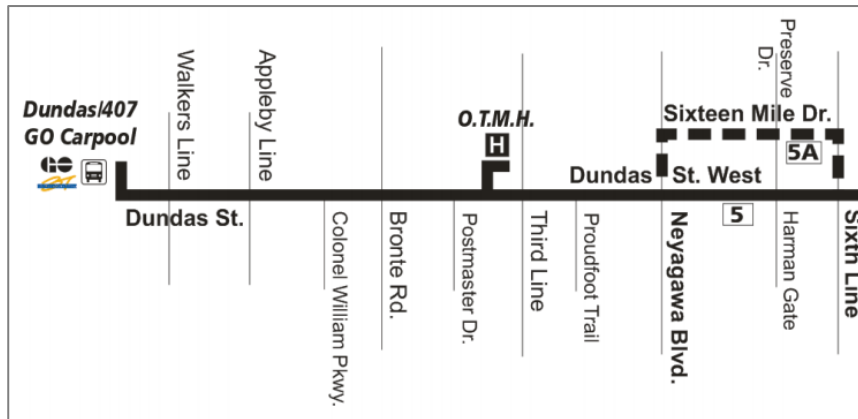
Exhibit 2-1, Exhibit 2-2, and Exhibit 2-3 provides maps of BT, OT, and GO Transit bus routes within the study area.

Exhibit 2-1: Burlington Transit Bus Routes within Study Area



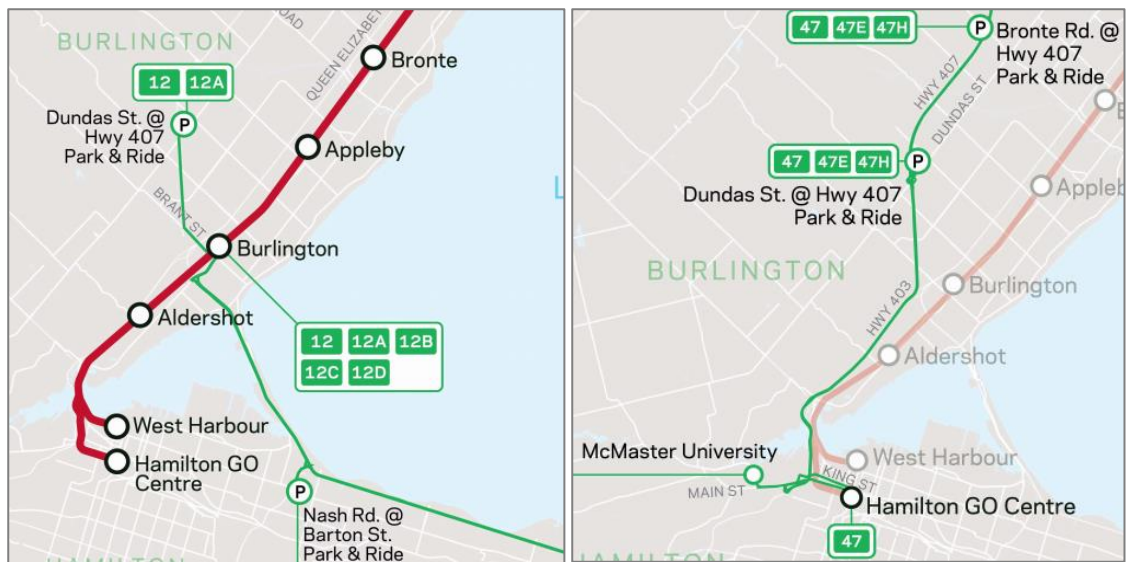
Source: Burlington Transit System Map (2019)

Exhibit 2-2: Oakville Transit Route 5/5A within Study Area



Source: Oakville Transit Route Maps (2019)

Exhibit 2-3: GO Transit Routes 12 (left) and 47 (right) within Study Area



Source: GO Transit Route Maps (2019)

2.3 Active Transportation

The station is located in a green-field site not currently accessible by active transportation. However the City's Long Term Cycling Master Plan identifies Palladium Way as a road with planned bike lanes. The plan also identifies Dundas Street as planned cycle tracks.

2.4 Traffic Conditions

2.4.1 Traffic Counts & Signal Timing Data

Traffic count data and signal timing information was provided from the Region of Halton, 407 ETR, and from Ministry of Transportation Ontario. Turning movement counts (TMCs) for the two highway off-ramps were collected by Ontario Traffic Inc. (OTI), as they were not made available.

All turning movement counts modelled for the purposes of this study were conducted within the past two years and should reflect current traffic patterns within the study area. Exhibit 2-4 provides a summary of dates on which this information was collected/recorded.

Exhibit 2-4: Traffic Count and Signal Timing Data

INTERSECTION	CONTROL TYPE	DATE OF TMC	DATE OF SIGNAL TIMING DATA
Dundas Street & Guelph Line	Signalized	2017-04-05	2015-05-13
Dundas Street & Highway 407 WB Off-Ramp	Signalized	2018-12-04	N/a
Dundas Street & Highway 407 EB Off-Ramp	Signalized	2018-10-25	N/a
Dundas Street & Northampton Boulevard	Signalized	2017-04-05	2013-09-19
Dundas Street & Walkers Line	Signalized	2017-04-05	2015-05-20
Walkers Line and Palladium Way	Unsignalized	n/a (new leg to west)	N/a

2.4.2 Approach

Traffic analysis was conducted using Synchro (version 9) software and follows Highway Capacity Manual (HCM 2000) methodologies of intersection operation analysis. Critical movements were defined as follows.

For signalized intersections,

- V/C ratios for overall intersection operations, through movements or shared through/turning movements equal 0.80 or above;
- V/C ratios for exclusive movements equal 0.85 or above; or,
- Queues for an individual movement are projected to exceed available turning lane storage.

For unsignalized intersections,

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

Level-of-service (LOS) is a measure of performance based on control delay, defined as follows in Exhibit 2-5.

Exhibit 2-5: Intersection LOS Reference

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The Synchro traffic models were calibrated to better represent measured field conditions. This was accomplished by adjusting the lane utilization factor and via lost time adjustment. The “lane utilization factor” (LUF) was altered when calibrating through movements. This parameter is used to dictate the distribution of traffic across the available lanes, with a value of 1.0 representing a uniform distribution across all lanes. During non-congested periods, there is often more traffic distributed amongst the right-most lanes as compared to the left-most lanes. However, in over-saturated conditions, the distribution of traffic is typically more evenly split, as drivers quickly fill any available gap in traffic.

In existing models, the LUF was adjusted to a value of 1.0 for all through movements initially identified as having a v/c greater than 1.0. These adjustments were then carried forward to their respective movements to the future models (for the same peak period). Additionally, because the above-mentioned driver behaviour is quite predictable, this adjustment was also made to any new critical through movements (having a v/c ratio > 1.0) identified in the future models.

The “lost time adjustment” (LTA) was also altered in order to calibrate left-turn movements. Adjusting this parameter to negative value effectively increases the clearance time available for left-turning traffic to clear the intersection during the amber and/or all-red signal phases.

During oversaturated conditions where left-turn queues are excessively long and/or there are limited gap available in the opposing traffic to make the left-turn (under permissive phasing), drivers are typically more aggressive and willing to turn during the amber/all-red phases.

In existing models, the LTA was changed for all left-turn movements identified as being well over capacity – defined as having a v/c greater than 1.2 – since these turning volumes were explicitly measured in the field. Values were assigned based on the initial v/c ratio for that movement:

- If the v/c ratio was between 1.2 and 1.5, the LTA was set to ‘-1’; and,
- If the v/c ratio exceeded 1.5, the LTA was set to ‘-2’.

Subsequently, all adjustments made to the LTA in the existing models were carried forward to the respective movements in the future models (for the same peak periods). However, because this driving behaviour is believed to be less predictable, no additional LTA changes were made to “new critical left-turn movements (having a v/c ratio > 1.2) identified in the future model, which did not exist previously in the existing models.

2.4.3 Model Calibration

The existing traffic models were calibrated to better reflect measured field conditions accomplished by adjusting the lane utilization factor (LUF) and/or lost time adjustment (LTA) for certain movements.

The adjustments made to the existing models are outlined in Exhibit 2-6.

Exhibit 2-6: Existing Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Dundas Street & Guelph Line	WBL	LTA	-1 seconds
		NBT	LUF	1.0
	Dundas Street & Walkers Line	EBT	LUF	1.0
PM Peak	Dundas Street & Guelph Line	WBL	LTA	-1 seconds
	Dundas Street & Walkers Line	WBT	LUF	1.0

2.4.4 Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the existing conditions. An annual compound growth rate of 1.0% was applied to all count volumes obtained in years prior to 2019 in order to bring all counts to a consistent base year. Existing conditions traffic volumes are shown in Exhibit 2-7, with detailed Synchro reports provided in Appendix A. The study intersections are currently operating as follows:

- Dundas Street & Guelph Line is operating at LOS E during both peak hours. In the a.m. peak, the EBT movement is high with limited gaps in traffic, causing the opposing WBL movement to operate at LOS F. Due to green time being prioritized to E-W movements, the NBT movement is also overcapacity and operate at LOS F. In the p.m. peak, due to high EBT and WBL demands, the WBL movement is operating well above capacity. The NBL movement is also expected to experience significant delays and operate at LOS F.
- The two Highway 407 off-ramps are currently operating well during both peak hours, operating at LOS C or better.
- Dundas Street & Northampton Boulevard is operating well at LOS C in the a.m. peak hour and LOS B in the p.m. peak hour. In the a.m. peak, the heavy EBT and NBR demands causes the NBR movement to operate at LOS F.
- Dundas Street & Walkers Line is operating at LOS E during both peak hours. In the morning peak period, due to high EBT demands, conflicting movements and movements from minor approaches are critical, operating at LOS D or worse. In the afternoon peak period, the WBT movement is prioritized, where movements from the northbound and southbound approaches are critical.
- Walkers Line & Palladium Way is currently operating well with no critical movements in either peak periods.

Exhibit 2-7: Existing Traffic Volumes in the AM (PM) Peak Hour

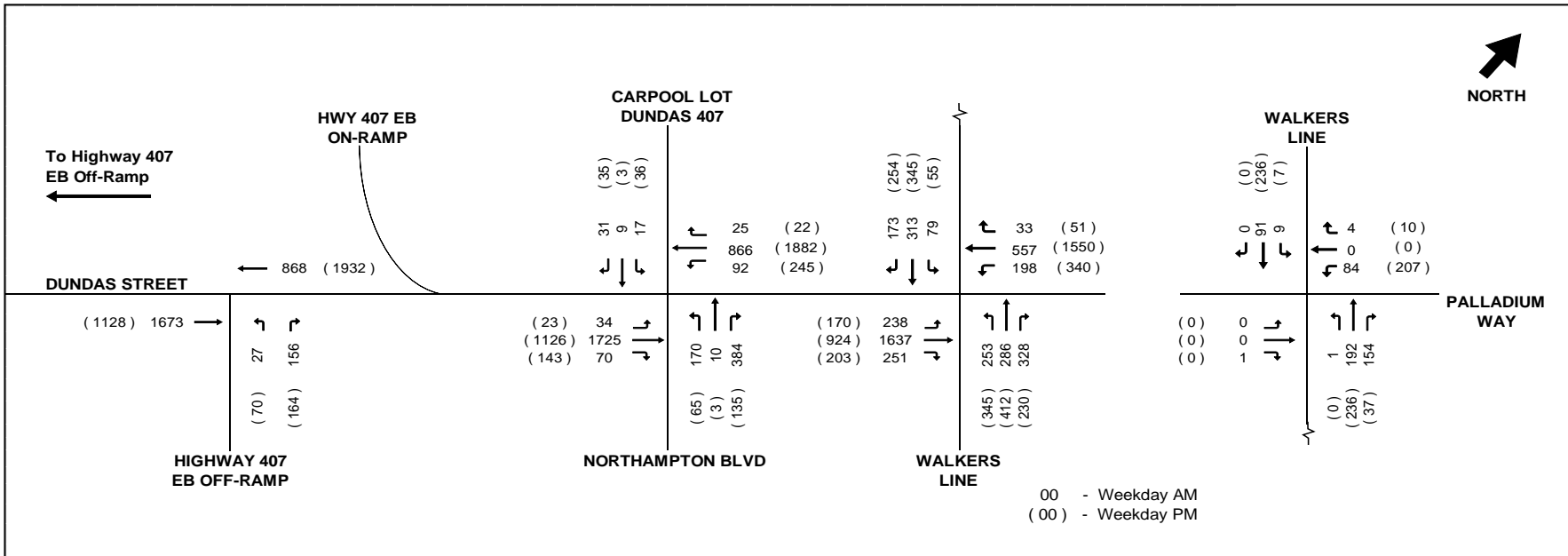
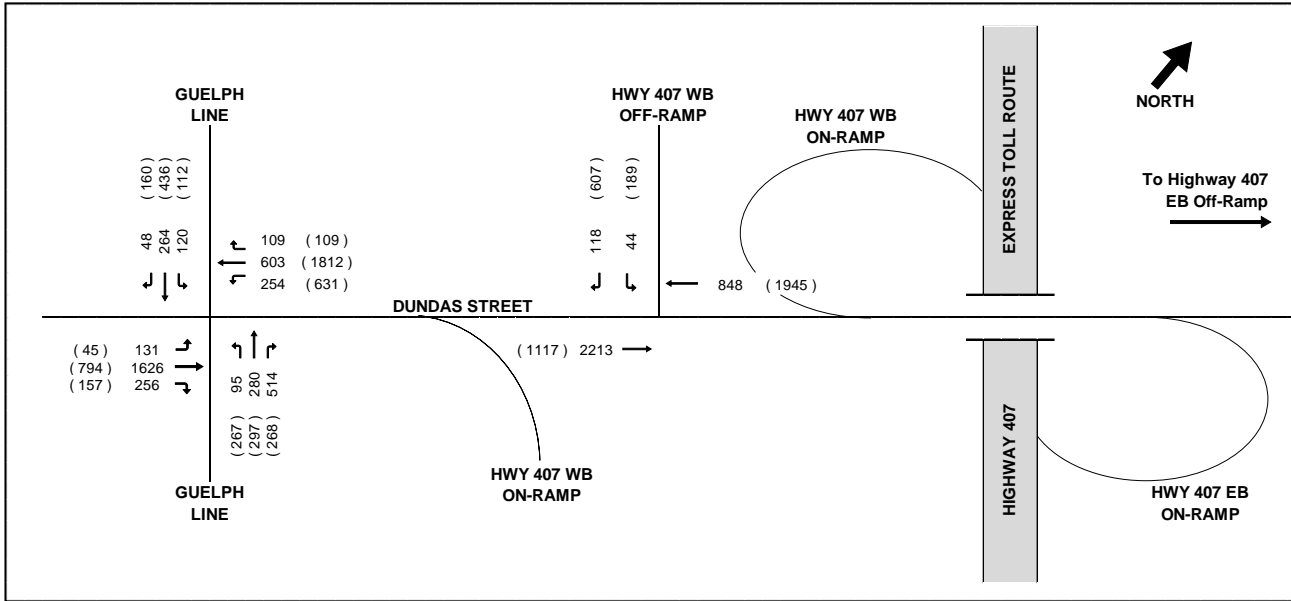


Exhibit 2-8: Synchro Analysis: Existing Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Dundas Street & Guelph Line <i>(signalized)</i>	E	EBT WBL NBL NBT SBL SBT SBR	E F D F D D D	1.04 1.21 0.31 1.13 0.64 0.38 0.04	304 134 34 144 42 51 2	E	EBL EBT EBR WBL WBT NBL NBT SBL SBT SBR	F D D F D F E D E D	0.91 0.78 0.11 1.23 0.98 1.12 0.81 0.61 0.77 0.35	39 139 16 293 361 118 90 39 84 42
Dundas Street & Highway 407 WB Off-Ramp <i>(signalized)</i>	B	SBL SBR	D D	0.09 0.05	13 13	C	WBT SBL SBR	C D E	0.91 0.65 0.88	294 86 152
Dundas Street & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	NBL NBR	D D	0.32 0.47	19 32	A	NBL NBR	D D	0.33 0.06	19 17
Dundas Street & Northampton Boulevard <i>(signalized)</i>	C	EBT WBL NBT NBR SBT	C E D F D	0.87 0.67 0.65 0.94 0.14	265 29 76 149 19	B	NBT NBR SBT	E E E	0.60 0.09 0.58	35 19 33
Dundas Street & Walkers Line <i>(signalized)</i>	E	EBT WBL NBL NBT SBL SBT	E D F E D D	1.09 0.68 1.02 0.81 0.59 0.50	323 91 98 89 28 56	E	EBL EBT WBL WBT NBL NBT SBL SBT SBR	D D D E F D D D D	0.67 0.90 0.76 1.05 1.18 0.77 0.37 0.52 0.47	73 173 147 311 149 101 20 60 55
Walkers Line & Palladium Way <i>(unsignalized)</i>	-	No critical movements				-	No critical movements			

3 Future Conditions

This section documents the future traffic conditions with considerations to background traffic growth and traffic expected to be generated from the Transitway station.

3.1 Future Road Network

The future horizon year of 2031 has several changes in the road network within the study area according to the *Halton Region Budget and Business Plan (2019)*. On the west limit, Guelph Line is planned to be widened from four to six lanes from Mainway to Dundas Street by year 2031. Dundas Street is expected to be widened from four to six lanes of travel from Appleby Line to Northampton Boulevard in year 2019 and from Northampton Boulevard to Guelph Line in year

2021. This widening is with the provision for four general traffic lanes and two lanes for transit / high occupancy vehicles. As per the *Dundas Corridor Study – Brant Street to Bronte Road Environmental Assessment Study (2015)* completed by MMM Group, the study corridor is planned to undergo the following geometric changes (in addition to the six travel lanes) and are assumed for the current study:

- Dundas Street & Guelph Line – A dedicated WBR lane, dual EBL lanes, dual WBL lanes, and converting existing EBR channel to dedicated EBR lane;
- Dundas Street & Northampton Boulevard – A dedicated WBR lane, dedicated SBL and SBR lanes; and
- Dundas Street & Walkers Line – Dual EBL lanes, dual WBL lanes, dual NBL lanes, dedicated NBR lane, and dual SBL lanes.

These widening assumptions were incorporated into the future conditions analysis.

3.2 Transit

Metrolinx Regional Transportation Plan identifies Dundas Street as a future ‘Priority Bus’ corridor. As discussed above, this is captured in the EA as future HOV lanes along the corridor as part of the widening to six lanes. Other background transit initiatives are broadly captured in the study through the ridership forecasts and background traffic growth rates.¹

3.3 Active Transportation

The City of Burlington Official Plan has Palladium Way with bike lanes and Dundas Street with cycletracks. Active transportation conditions will be documented in detail as part of the station layout.²

The Dundas Street Environmental Assessment Study also recommends two multi-use paths along the corridor. The south multi-use path extends from the west limits of the study area connecting to the Northampton Boulevard intersection and extending to Bronte Road. Similarly, the north multi-use path begins at the Northampton Boulevard intersection and extending to Bronte Road.

3.4 Station Traffic

Traffic to and from the station consists of park-and-ride traffic and pick-up and drop-off traffic. Site traffic was estimated using the park-and-ride forecasts from the Systems Planning component of the Environmental Assessment.

3.4.1 Station Trip Generation

Ridership forecasts were provided by MTO and sourced from MTO’s Greater Golden Horseshoe Travel Demand Model V4. The model is an advanced state-of-practice multi-modal travel demand model that estimates future travel demands within the Greater Golden Horseshoe. The GGHM was developed to forecast peak period demand in support of the Growth Plan policies and has the capability of predicting mode shifts resulting from new public transit infrastructure. It can also be used to test network response to changes in link characteristics such as transit vehicle frequency, operating speed, station location, and parking availability.

The GGH model accounts for planned and committed road and transit projects sourced from Metrolinx Regional Transportation Plan and local transportation plans. While it is possible that

¹ Metrolinx Regional Transportation Plan, accessed via <http://www.metrolinx.com/en/regionalplanning/rtp/>

² Burlington Official Plan, Appendix A Schedule 2, accessed via <https://www.burlington.ca/en/services-for-you/Official-Plan.asp>

additional projects will be funded over the upcoming years, this model represents a conservative approach.

With input from the MTO, a horizon year of 2031 was selected as the baseline for determining road and intersection requirements as part of this traffic impact study. As MTO's GGH model is to a 2041 horizon, ridership projections for 2031 were not available. Therefore the 2041 demands were carried forward on the basis that entry and exit volumes would be conservative (the resulting turning lanes and queue storage would accommodate 2031 demand) as provided in Exhibit 3-1.

Exhibit 3-1: 2041 AM Peak Period (2-hr) Boardings

STATION	TOTAL 2-HR BOARDINGS	2-HR PARK-AND-RIDE	2-HR WALK / TRANSIT	% PARK-AND-RIDE	% WALK / TRANSIT
Dundas	923	510	413	55%	45%
Appleby	227	207	20	91%	9%
Bronte	306	90	216	29%	71%
Trafalgar	3,095	436	2,659	14%	86%
Britannia	523	136	387	26%	74%
Derry	911	334	577	37%	63%
Mississauga	982	82	900	8%	92%
Total:	6,967	1,795	5,172	26%	74%

From the above exhibit, two hour park-and-ride boardings were equated to two hour inbound vehicle trips at an assumed factor of 10:11, or 1.1 riders per park-and-ride vehicle. To convert to a.m. inbound peak hour volumes, a factor of 0.56 was applied. This factor was developed through a review of existing travel patterns using Transportation Tomorrow Survey (TTS 2016) data. The resulting a.m. peak hour inbound vehicle flow is 259 vph and rounded to 260 vph.

Further processing of forecasts was required to estimate a.m. outbound traffic, associated with kiss-n-ride drop off trips, and p.m. peak hour traffic. The ITE Trip Generation Manual (9th edition) provided ratios of inbound to outbound and a.m. to p.m. traffic for typical park-and-ride bus stations. Average trip generation rates for bus stations with park-and-ride lots are indicated in Exhibit 3-2. Using the ratios provided, Exhibit 3-3 lists the estimated station traffic generated give the above assumptions.

Exhibit 3-2: Trip Generation Rates for Park-and-Ride Lots

LAND USE (CODE)	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		Trip Rate	Inbound / Outbound	Trip Rate	Inbound / Outbound
Park-and-ride with bus service (090)	/ parking space	0.71	79% / 21%	0.62	25% / 75%

Exhibit 3-3: Estimated Vehicle Trips Generated by Station

AM PEAK TRIPS		PM PEAK TRIPS	
Inbound	Outbound	Inbound	Outbound
260*	69	72	216

** Calculated based on forecasted 2031 a.m. park-and-ride 2 hrs boardings, at a factor 1.0 inbound vehicles per 1.1 boardings. To convert to a.m. peak hour trips, a factor of 0.56 was multiplied.*

3.4.2 Trip Distribution

A map showing the origin of park-and-ride trips destined to Dundas station was extracted from the 2031 GGHM and can found attached in Appendix E. Using this map, inbound trips were tabulated in terms of general direction of origin (i.e. north, south, east, and west) and assigned to the study area intersections as a percentage of total inbound trips. Distribution of outbound trips was assumed to be the same as inbound trips. Resulting trip assignments are illustrated in Exhibit 3-4. Site generated traffic was assigned to study area intersections and is indicated in Exhibit 3-5

Exhibit 3-4: Trip Distribution in AM and PM Peak Hours

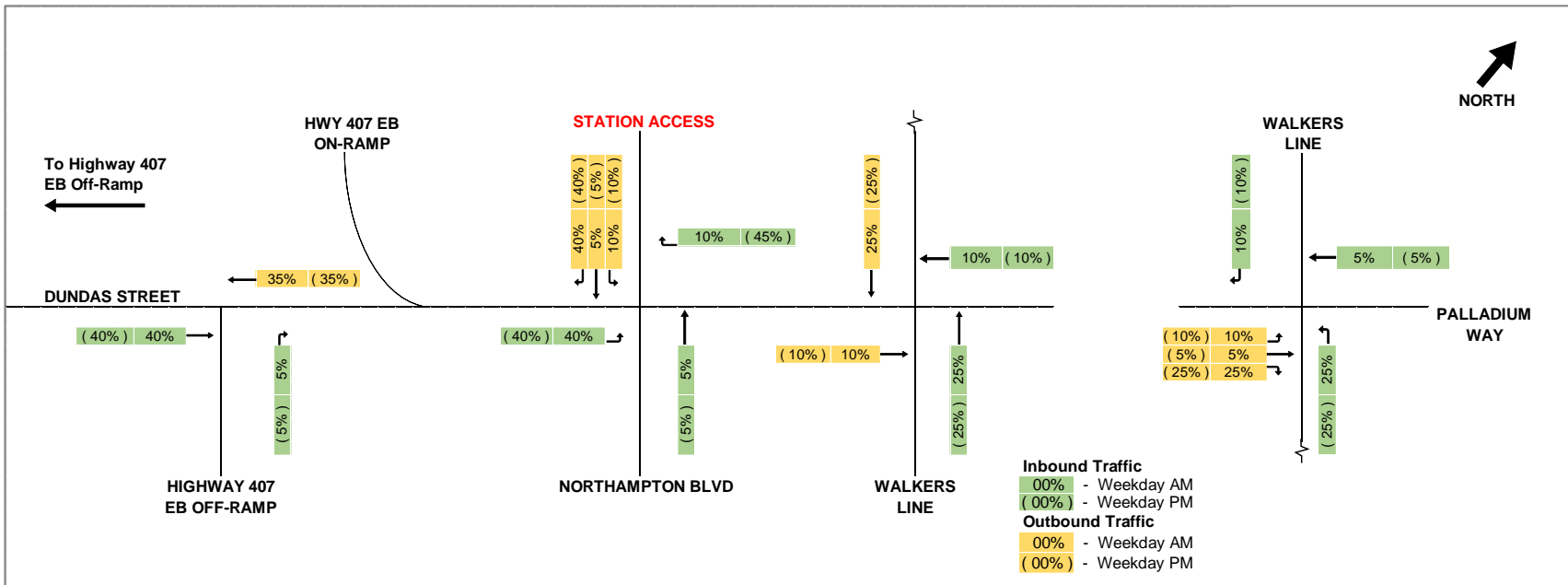
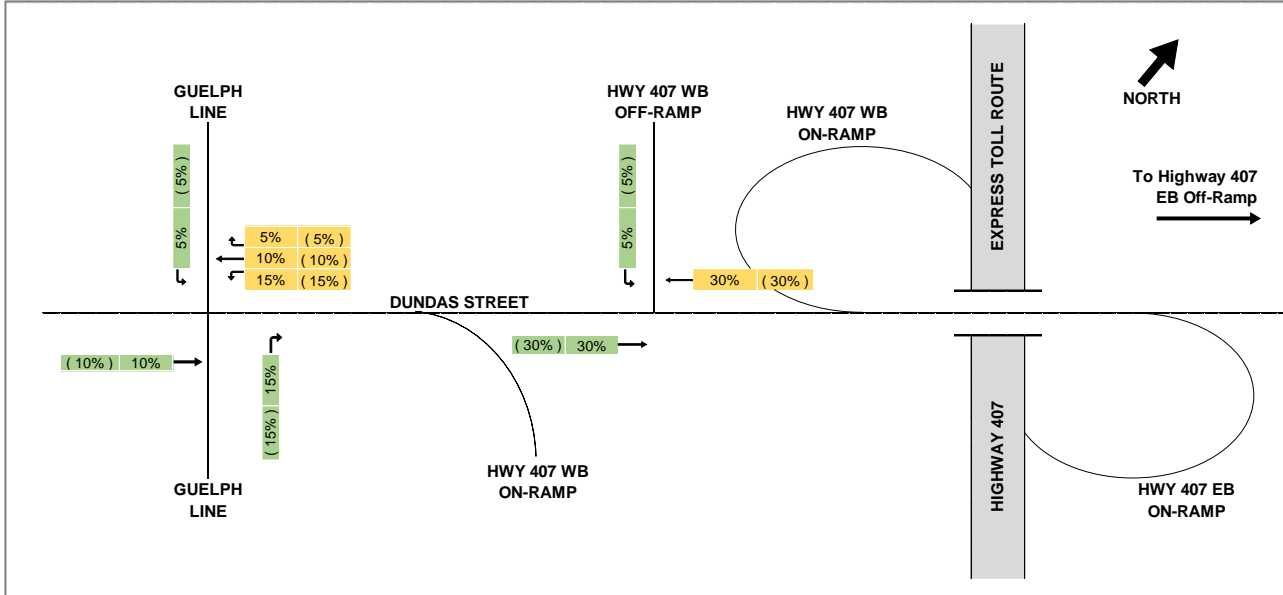
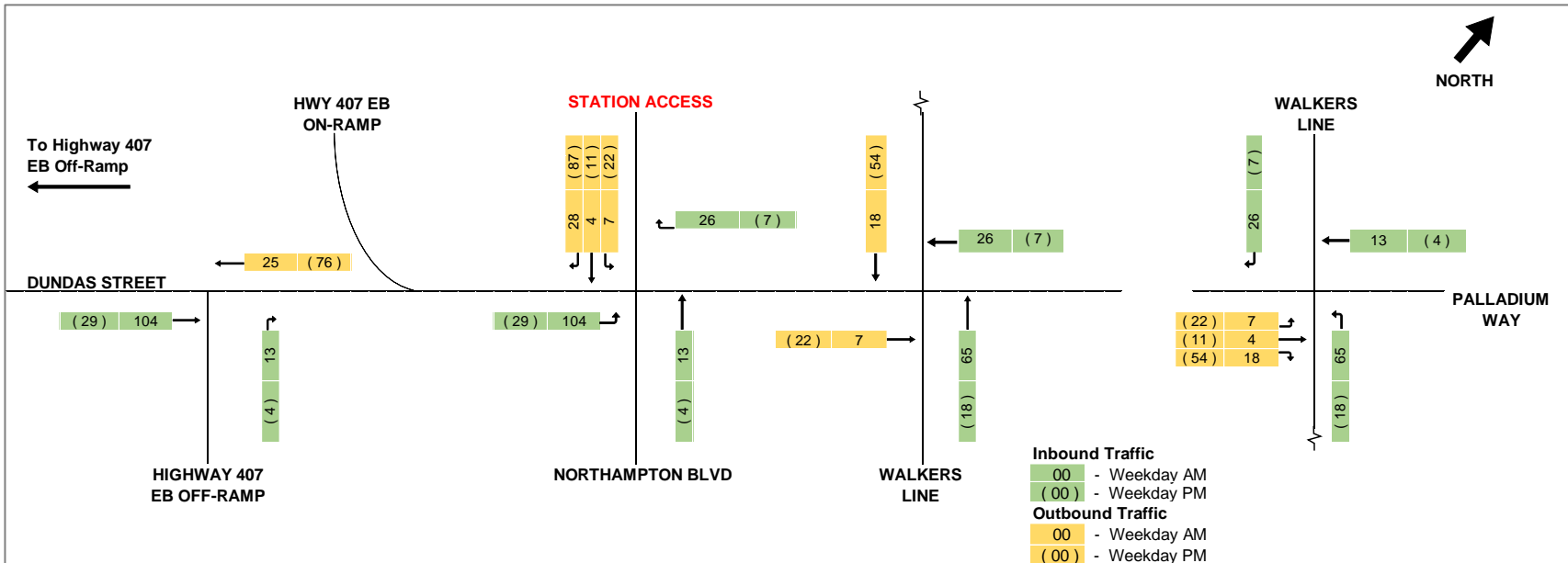
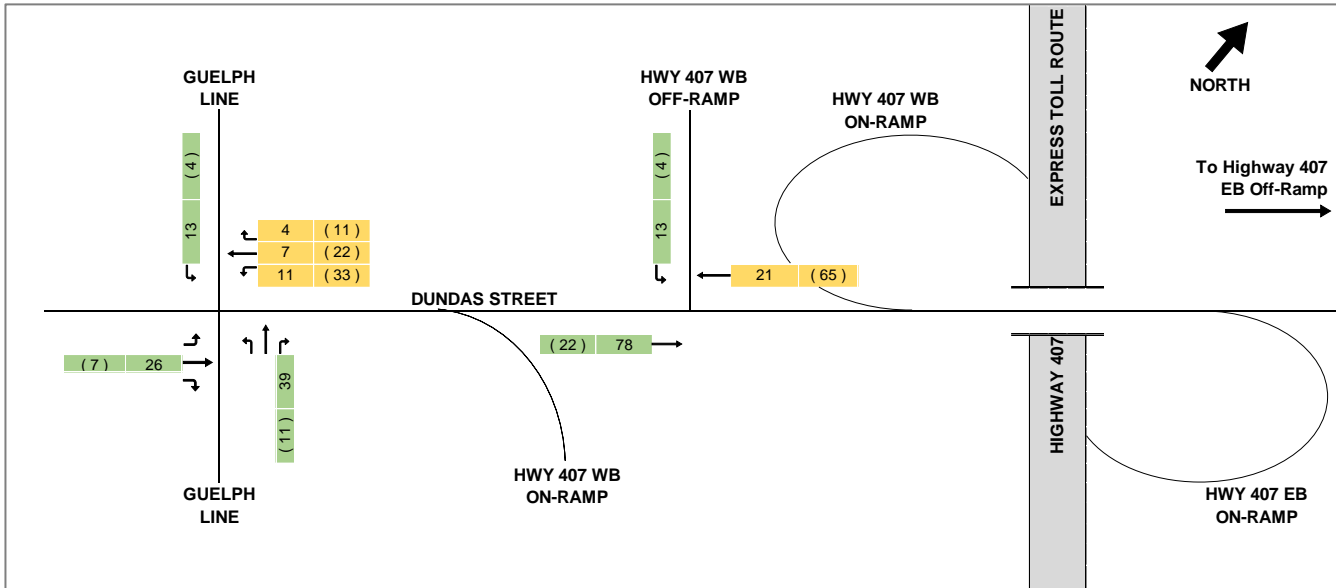


Exhibit 3-5: Site Generated Traffic in AM Peak Hour and PM Peak Hour



3.4.3 Parking Demands

Part of the scope of the traffic study was to provide a recommended parking lot size for each station. This was developed using the ratio of ridership to parking lot sizes taken from GO transit stations. The intent of this approach is to account for typical daily utilization of the lot for a robust and nearly full transit service with low but non-zero spare capacity across the system. The following provides the approach:

- The average number of inbound vehicle trips (auto drivers) made to each of these GO stations during the a.m. peak period (defined as 6:30-9:30 am) were determined using 2016 Transportation Tomorrow Survey (TTS) data.
- Parking data for the GO transit stations was obtained from the GO Rail Station Access Plan (2016) prepared by Metrolinx. The report notes the total capacity and average utilization of each GO station parking lot, which were used to calculate average parking demands.
- A “parking rate” or ratio between demand and auto driver trips was determined. These values are indicated in the below Exhibit 3-6.

Exhibit 3-6: Parking Demand Factors for nearby GO Transit Stations

2016 TTS AM PEAK PERIOD		2016 GO STATION PARKING *			PARKING RATE (Spaces / Driver)
GO Station	Auto Drivers *	Lot Capacity **	Lot Utilization **	Demand	
Brampton	861	863	96%	828	0.962
Bramalea	1,360	2,371	86%	2,039	1.499
Malton	580	698	96%	670	1.155
Erindale	1,370	2,183	76%	1,659	1.211
Burlington	1,270	2,076	86%	1,785	1.406
Appleby	2,080	2,818	86%	2,423	1.165
Bronte	2,460	2,971	86%	2,555	1.039
Oakville	2,820	4,401	86%	3,785	1.342
Lisgar	350	715	66%	472	1.348
Milton	1,330	1,472	100%	1,472	1.107
Meadowvale	1,080	1,652	96%	1,586	1.468
Streetsville	1,650	1,541	96%	1,479	0.897
Clarkson	2,520	3,800	86%	3,268	1.159
Aldershot	870	1,640	96%	1,574	1.810
<i>Total</i>	<i>20,601</i>	<i>29,201</i>	<i>88%</i>	<i>25,597</i>	1.243

* AM peak period inbound vehicles estimated using 2016 TTS data, and rounded to the nearest 10.

** GO parking data obtained from "GO Rail Station Access Plan" (2016) and dated December 2016

This “parking factor” was then applied to the a.m. peak period inbound trips estimated at each Transitway station. Note that park-and-ride (2-hrs) forecasts (and congruently, estimated inbound vehicle trips) for the a.m. peak two hours can be converted to a.m. peak period forecasts by applying a factor of 1.370, as analysis of the TTS indicate that 73% of 3-hour a.m. peak period trips occur within the two a.m. peak hour.

The resulting estimated parking demands at each Transitway station are provided in Exhibit 3-7. Parking demands are provided for the 2041 horizon, representing the “ultimate” conditions. The recommended parking lot size for Dundas Station is 800 spaces. It is noted that protection for future expansion beyond 2041, carpool spaces, and park-and-ride for other transit services are not included in the parking lot size, but may be considered in the development of the station area (property) and station layout.

Exhibit 3-7: Estimated Parking Demands for each Transitway Station

STATION	GGHM INBOUND TRIPS *		PARKING LOT SIZE ***
	AM Peak 2-Hour*	AM Peak Period **	
	2041	2041	2041
Dundas	460	640	800
Appleby	190	260	320
Bronte	80	110	140
Trafalgar	400	540	680
Britannia	120	170	210
Derry	300	420	520
Mississauga	70	100	128

* Calculated based on forecasted a.m. park-and-ride boardings, at a factor 1.0 inbound vehicles per 1.1 boardings.

** Peak hour trips can be converted to peak period trips at a factor of 2.174.

*** Parking lot size calculated by multiplying estimated a.m. peak period inbound trips by a factor of 1.243.

3.5 Background Traffic Growth

Future background traffic volumes were estimated for the study area using MTO’s GGHM (discussed in Section 3.4.1) demand model output, provided by MTO, and supplemented with manual refinements considering local conditions. Macro models can be limited with respect to specific hourly forecasts, and the 2011 base-year model (used in the comparative analysis) is also aging, therefore refinements included review of municipal transportation master plans (TMPs), land-use, background population and employment growth, and adjustments for local developments or changes to the road network.

On Dundas Street, the GGHM demand model growth from 2011 base to 2031 has peak direction link flow of 1,545vph to 1,778vph or 0.7% annual compound growth rate. Model output figures are provided in Appendix E.

The City of Burlington and Region of Halton population and employment forecasts were considered in the development of traffic growth rates. Relevant documents are listed as follows:

- Greater Toronto and Hamilton Area – “Growth Plan for the Greater Golden Horseshoe” (2017); and
- Halton Region – “Halton Region Transportation Master Plan” (2011).

Examination of the above documents showed that population growth is estimated to be between 0.3% to 0.4% per year between 2011-2031, while employment are forecasted to increase between 0.4% to 0.5% per year during that same period.

A background review on the *Dundas Street Class EA Study* was also conducted. The EA study analyzed historical traffic growth trends, anticipated transit mode share and also reviewed available development traffic impact study reports. The results suggest that growth in the area is higher in the short term (from 2011 to 2021) period but will be relatively stable to beyond 2031

as development in the area reaches a more mature state. The report recommends a 2% growth resulting in a cumulative growth of approximately 27% to 2031 relative to existing conditions.

In summary, based on the information presented, an annual compound growth of 2% was selected as a best-fit with available information, to be applied to existing traffic volumes on Dundas Street corridor. This rate was applied to all 'major' movements, which is defined as all through movements along arterial roads or turning movements between two arterial roads.

3.5.1 Nearby Developments

The proposed station is located on greenfield lands west of Palladium Way. East of Palladium Way low-density residential development is ongoing. West and north of Palladium Way and at the station location, per the City's Official Plan, lands are designated future commercial/employment. No detailed traffic information related to development plans was made available, therefore background development flows at Dundas Street and Palladium Way were estimated per the following.

Exhibit 3-8: Adjacent Development Areas



Trip distribution was estimated broadly towards background traffic patterns and development catchment with destined/originating from:

- 30% to Dundas Street (west);
- 30% to Dundas Street (east);
- 30% to Walkers Line (south); and
- 5% to Palladium Way (east); and
- 5% to Walkers Line (north).

Traffic forecasts were included in future background assumptions.

Exhibit 3-9: Trip Generation Rates (top) and Trips (Bottom) for Adjacent Development

Land use	Area (Ha)	ITE Category	AM Trip Rate	Inbound / Outbound (%)	PM Trip Rate	Inbound / Outbound (%)
Commercial	8.74	770	46.58	85% / 15%	41.59	20% / 80%
Residential	17.4	210	5.08	31% / 69%	6.77	66% / 34%

Land Use	AM Trips		PM Trips	
	Inbound	Outbound	Inbound	Outbound
Commercial	346	61	73	291
Residential	27	61	78	40
Total	373	122	150	331

3.6 Future Model Calibration

The future Synchro models were calibrated to better reflect expected conditions accomplished by adjusting either the Lane Utilization Factor (LUF) or Lost Time Adjustments (LTA) for certain movements.

Adjustments made to the future traffic models are summarized in Exhibit 3-10.

Exhibit 3-10: Future Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Dundas Street & Guelph Line	WBL	LTA	-2 seconds
		SBL	LTA	-2 seconds
		NBT	LUF	1.0
	Dundas Street & Northampton Boulevard / Station Access	EBL	LTA	-2 seconds
PM Peak	Dundas Street & Guelph Line	NBL	LTA	-2 seconds
		WBL	LTA	-1 seconds
	Dundas Street & Walkers Line	NBL	LTA	-1 seconds
	Dundas Street & Northampton Boulevard / Station Access	EBL	LTA	-2 seconds

In addition to the above, due to the widening of Dundas Street and the introduction of two high occupancy vehicle (HOV) lanes, a LUF of 0.90 was applied to the study corridor to capture the lower flow rate for all EBT and WBT movements along Dundas Street.

3.7 Future Background Operations

To analyze future background conditions, the existing traffic volumes were grown using the growth rates discussed in Section 3.5. Future background conditions include planned improvements discussed in Section 3.1. Exhibit 3-11 illustrates future background traffic volumes during the a.m. and p.m. peak hours.

A summary of critical movements identified during the future background condition analysis is provided in Exhibit 3-12, with detailed output of the Synchro analysis provided in Appendix B.

Exhibit 3-11: Future Background Traffic Volumes for the AM (PM) Peak Hour

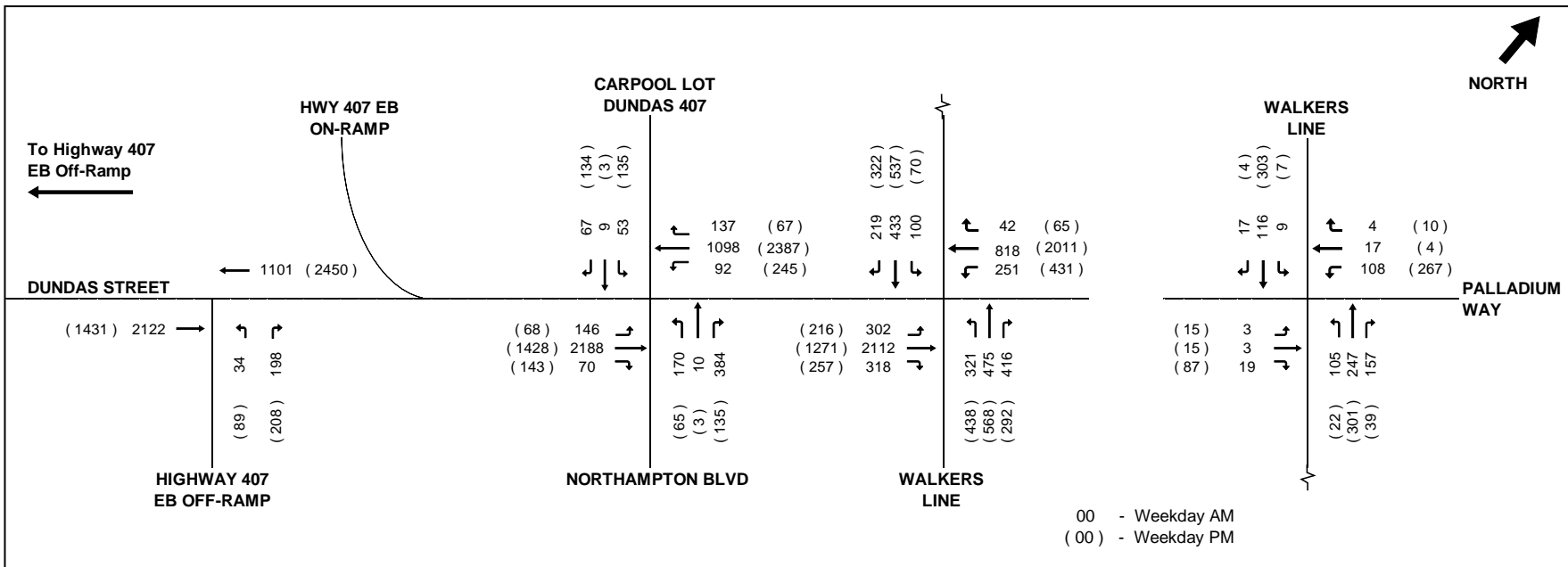
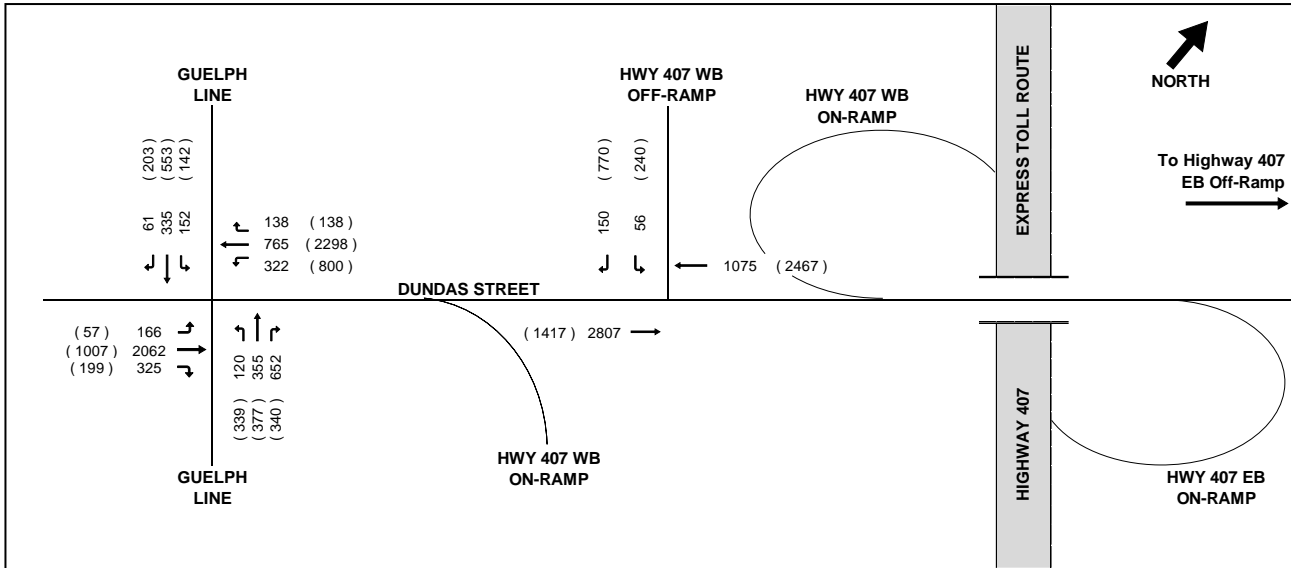


Exhibit 3-12: Synchro Analysis: Future Background Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Dundas Street & Guelph Line <i>(signalized)</i>	D	EBL	E	0.66	38	E	EBL	E	0.42	16
		EBT	D	0.93	236		EBT	D	0.75	119
		WBL	F	0.94	80		EBR	D	0.20	30
		NBL	D	0.49	44		WBL	E	0.99	177
		NBT	F	1.63	118		WBT	D	1.00	307
		SBL	F	0.94	72		NBL	F	1.28	161
		SBT	D	0.55	65		NBT	D	0.65	74
		SBR	D	0.04	6		SBL	D	0.66	46
							SBT	E	0.81	103
							SBR	D	0.36	48
Dundas Street & Highway 407 WB Off-Ramp <i>(signalized)</i>	C	EBT	C	0.91	272	C	WBT	C	0.90	262
		SBL	D	0.11	16		SBL	D	0.85	103
		SBR	D	0.06	14		SBR	E	0.93	186
Dundas Street & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	NBL	D	0.40	26	A	NBL	D	0.54	32
		NBR	E	0.62	46		NBR	E	0.51	39
Dundas Street & Northampton Boulevard <i>(signalized)</i>	C	EBL	E	0.86	84	B	EBL	D	0.67	32
		WBL	E	0.71	35		WBL	D	0.75	49
		NBT	D	0.64	76		NBT	D	0.33	32
		NBR	F	0.96	158		NBR	D	0.09	17
		SBL	D	0.38	28		SBL	E	0.80	61
		SBT	D	0.02	7		SBT	D	0.01	3
		SBR	D	0.07	13		SBR	D	0.18	22
Dundas Street & Walkers Line <i>(signalized)</i>	E	EBL	E	0.75	62	E	EBL	E	0.65	69
		EBT	E	1.06	287		EBT	D	0.79	126
		WBL	E	0.75	74		EBR	D	0.25	44
		NBL	F	1.19	91		WBL	E	0.82	102
		NBT	D	0.57	79		WBT	F	1.07	277
		NBR	E	0.86	122		NBL	F	1.12	112
		SBL	E	0.62	26		NBT	D	0.59	90
		SBT	D	0.61	76		NBR	D	0.44	61
							SBL	E	0.43	19
							SBT	E	0.75	95
							SBR	D	0.66	83
Walkers Line & Palladium Way <i>(unsignalized)</i>	-	No critical movements				-	No critical movements			

With background growth added, the study intersections are expected to operate as follows:

- Dundas Street & Guelph Line is expected to improve in the a.m. peak (because of road widening assumption), operating at LOS D, and operate at LOS E in the p.m. peak which is similar to current conditions. The critical EBT and WBT movements operate under capacity. During the a.m. peak hour, the NBT is congested with no dedicated right turn lane. During the p.m. peak, the NBL movement is also operating past capacity, with expected long queues and delays.
- The two Highway 407 off-ramps are expected to operate well at LOS C or better during both peak periods. Generally vehicles traveling at the WB Off-Ramp (west intersection) experiences higher delays. As a result, the EBT movement in the a.m.

peak and the WBT movement in the p.m. peak are approaching capacity. In the p.m. peak, the ramp movements are also critical when turning onto Dundas Street.

- Dundas Street & Northampton Boulevard will continue to operate well at LOS C in the a.m. peak hour and LOS B in the p.m. peak hour. Due to low cross road demands volumes, both the EBT and WBT movements are operating well with sufficient residual capacity.
- Dundas Street & Walkers Line will continue to operate at LOS E during both peak periods. EBT and WBT movements are operating at capacity. Due to high demands, the NBL movement is also operating overcapacity during both peaks.
- Walkers Line and Palladium Way operates well with no critical movements.

3.8 Future Total Operations

Future total volumes were calculated adding the station-generated traffic to the future volumes with background growth applied. The future scenarios accounts for all vehicular traffic that is estimated to year 2031 following implementation of the Transitway. Future total volumes are illustrated in Exhibit 3-13.

A summary of critical movements identified during the future total condition analysis is provided in Exhibit 3-14 with detailed output of the Synchro analysis provided in Appendix C. The study intersections are expected to operate as follows:

- Dundas Street & Guelph Line is expected to deteriorate to LOS E in the a.m. peak hour and remain at LOS E in the p.m. peak hour, though operations are not drastically different than background conditions provided above. For the two peaks, a moderate amount of EBT, WBT, NBR and WBL traffic is added to their already critical movements. This causes several movements to operate worse, particularly the NBT movement in the a.m. peak.
- The two Highway 407 off-ramps are expected to continue to operate satisfactorily at LOS C or better during both peak periods. For the WB Off-ramp intersection and with higher directional traffic added from the station, the EBT in the a.m. and the WBT in the p.m. are approaching capacity, operating with v/c at 0.98 and 0.95 respectively and with 95th percentile queues extending past 300m. In the p.m. peak, the vehicles turning from the ramp will experience significant delays.
- Dundas Street & Northampton Boulevard / Station Access is expected to deteriorate to LOS D and C in the a.m. and p.m. peak hours, respectively. The corresponding movements into and out of the station are operating as critical (i.e. EBL, WBR, SBL, SBT, SBR). During the two peaks, EBL under permissive phasing will not sufficiently accommodate demands due to limited gaps from high conflicting WBT demands. Therefore a protected phasing (advance left turn) was modeled. With this phasing, the EBL is operating under capacity in the a.m. but at capacity during the p.m. peak. Overall, given the high growth rates used, it is anticipated that the site access is well served and that no improvements are required.
- Dundas Street and Walkers Line will continue to operate at LOS E during both peak periods. Some station demands are originating from and destined to the east, with traffic added to the already congested EBT and WBT movements.
- Walkers Line and Palladium Way operates well with no critical movements, despite moderate amounts of traffic added to the intersection.

Overall traffic impacts are moderate but noticeable along Dundas Street where movements are at or near capacity have a small negative impact caused by the addition of site traffic.

Exhibit 3-13: Future Total Traffic Volumes for the AM (PM) Peak Hour

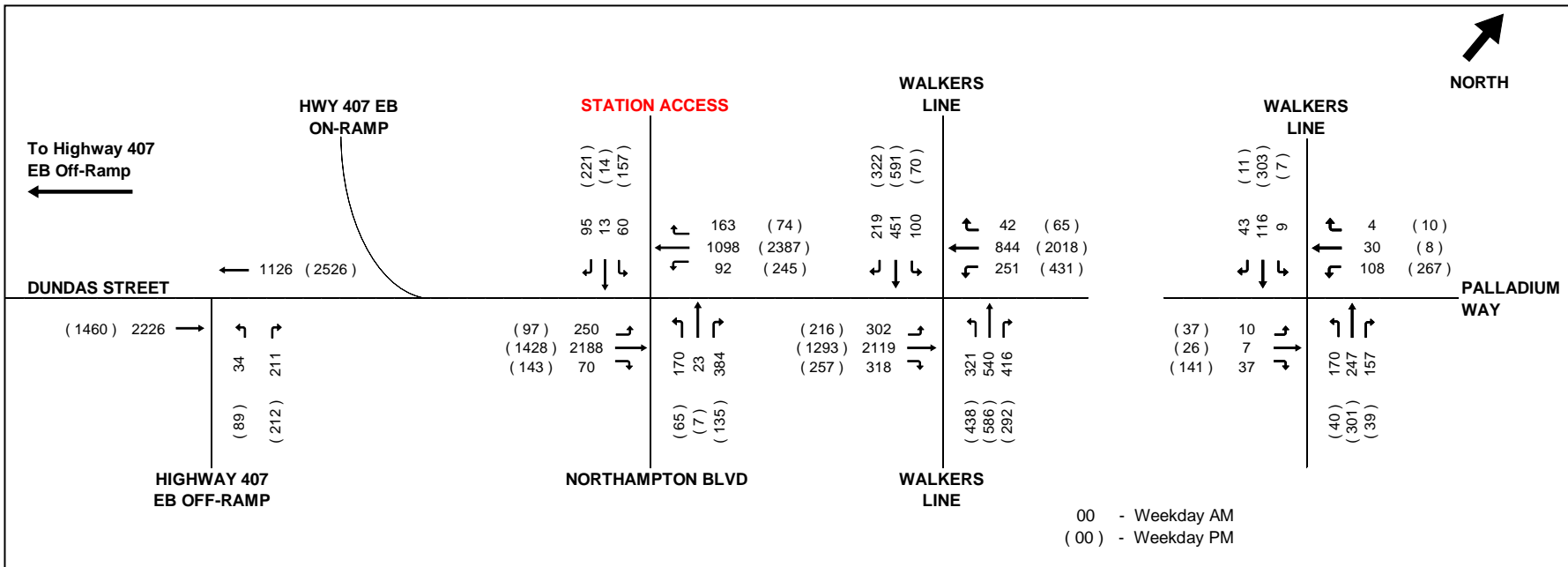
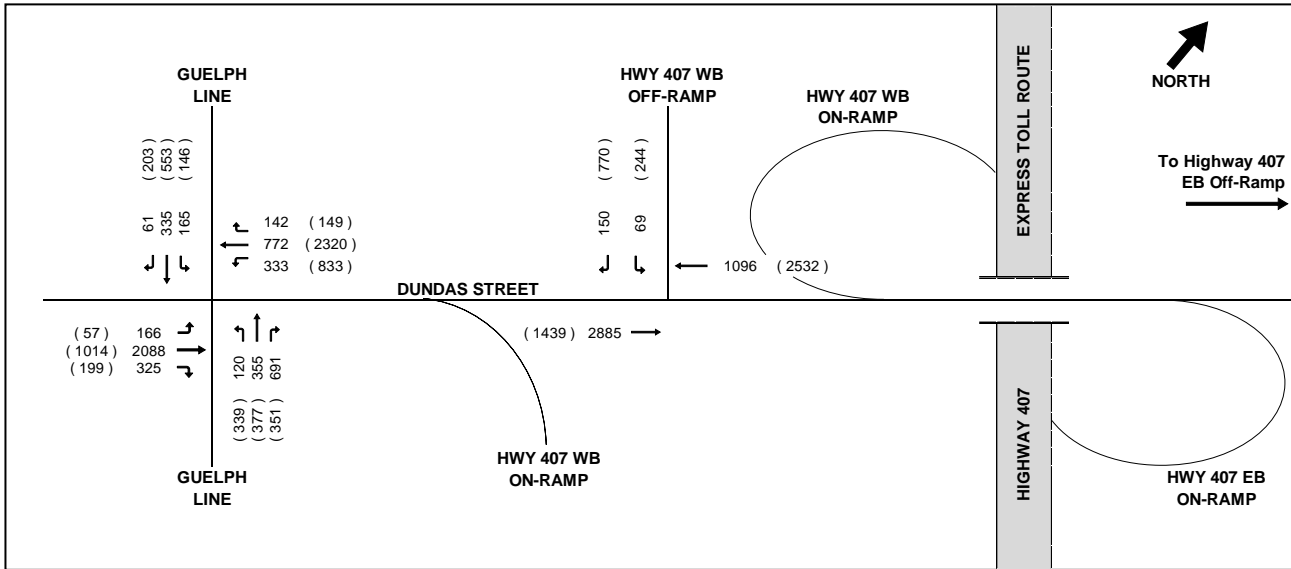


Exhibit 3-14: Synchro Analysis: Future Total Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Dundas Street & Guelph Line <i>(signalized)</i>	E	EBL EBT WBL NBL NBT SBL SBT SBR	E D F D F F D D	0.66 0.95 0.98 0.49 1.73 1.02 0.55 0.04	38 242 84 44 127 81 65 6	E	EBL EBT EBR WBL WBT NBL NBT SBL SBT SBR	E D D F D F D D E D	0.42 0.75 0.21 1.03 1.01 1.28 0.66 0.69 0.81 0.36	16 120 31 188 312 160 75 47 103 48
Dundas Street & Highway 407 WB Off-Ramp <i>(signalized)</i>	C	EBT SBL SBR	C D D	0.94 0.13 0.06	292 18 14	C	WBT SBL SBR	C D E	0.92 0.85 0.93	277 104 186
Dundas Street & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	NBL NBR	D E	0.41 0.64	27 49	A	NBL NBR	D E	0.54 0.53	33 40
Dundas Street & Northampton Boulevard / New Station Access <i>(signalized)</i>	D	EBL WBT WBR NBT NBR SBL SBT SBR	D D F D E D D D	0.80 0.52 0.14 0.67 0.87 0.44 0.03 0.09	74 129 37 77 119 29 8 14	C	EBL WBL NBT NBR SBL SBT SBR	E D D D F D E	0.81 0.76 0.33 0.09 0.84 0.04 0.60	55 49 34 17 74 9 58
Dundas Street & Walkers Line <i>(signalized)</i>	E	EBL EBT WBL NBL NBT NBR SBL SBT SBR	E E E F D E E D D	0.75 1.07 0.75 1.19 0.64 0.85 0.62 0.63 0.15	55 289 74 91 91 122 26 79 20	E	EBL EBT EBR WBL WBT NBL NBT NBR SBL SBT SBR	E D E E F F D D D E D	0.73 0.83 0.25 0.85 1.08 1.12 0.58 0.44 0.43 0.78 0.63	68 128 44 102 279 112 93 63 19 105 83
Walkers Line & Palladium Way / New Station Access <i>(unsignalized)</i>	-	No critical movements				-	No critical movements			

3.9 Potential Improvement Measures

3.9.1 Transit

As stated previously, the Metrolinx Regional Transportation Plan identifies Dundas Street in Burlington as a priority bus corridor connecting to a dedicated BRT in Mississauga. Because of the proposed station layout with a pedestrian connection to the Transitway north of Highway 407, the station terminal is likely to be 500-600m from a bus stop on Dundas Street. This distance is an undesirable long walking distance between rapid transit services, however the gap could be addressed by service planning of the Dundas Street priority bus where buses enter the station and drive to the bus bays. Future transit operators will need to weigh the time lost through providing a direct connection versus having buses stop only on Dundas Street. It is likely that longer distance express buses would enter the station and more local services could remain on Dundas Street.

3.9.2 Active Transportation

As described in Section 3.3, Palladium Way and Dundas Street are both identified as active transportation facilities in Burlington's long term plans. The station layout provides a walking and cycling connection to Palladium Way.

3.9.3 Traffic

Given future total traffic operations and consideration of planned future road widening, no additional road improvements were identified for intersections along Palladium Way at Dundas Street and Walkers Line. Improvements are mainly driven by high background traffic which were explored at Dundas Street & Guelph Line, and signal timing changes at Dundas Street & Walkers Line.

Dundas Street & Guelph Line

A dedicated northbound right turn lane (with overlap) and optimized signal timings were analyzed in Synchro, with results presented in Exhibit 3-15. The following was observed:

- Implementing a dedicated NBR lane with overlap phase will reduce delays to the current shared NBTR movement.
- In the p.m. peak, a shorter required signal phase for the SBT movement, which allows for additional green time to be allocated to the NBL movement.
- Average v/c is increased in both peak periods.

Despite higher average intersection v/c, implementing a dedicated right turn lane is likely warranted, as the shared NBTR movement (v/c = 1.81) in the a.m. peak period is not anticipated to sufficiently accommodate station and background traffic. This improvement will also add capacity to the N-S approaches which is expected to free up available green time for the Dundas Street corridor. As previously mentioned, Guelph Line being widened from four lanes to six lanes, it is recommended that further feasibility review be conducted during the preliminary design component of this EA to ensure that proper spacing requirements is met for the planned improvements on Guelph Line.

Exhibit 3-15: Analysis of Improvements to Dundas Street & Guelph Line

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Dundas Street & Guelph Line (<i>planned configuration*</i>)	0.99	EBL	E	0.66	38	1.04	EBL	E	0.42	16
		EBT	D	0.95	242		EBT	D	0.75	120
		WBL	F	0.98	84		EBR	D	0.21	31
		NBL	D	0.49	44		WBL	F	1.03	188
		NBT	F	1.73	127		WBT	D	1.01	312
		SBL	F	1.02	81		NBL	F	1.28	160
		SBT	D	0.55	65		NBT	D	0.66	75
		SBR	D	0.04	6		SBL	D	0.69	47
		SBR	D	0.04	6		SBT	E	0.81	103
						SBR	D	0.36	48	
Dundas Street & Guelph Line (<i>with improvements</i>)	1.16	EBL	E	0.66	38	1.1	EBL	E	0.44	16
		EBT	E	1.04	279		EBT	D	0.77	122
		EBR	C	0.37	61		EBR	D	0.21	32
		WBL	D	0.40	57		WBL	F	1.07	184
		NBL	F	0.96	55		WBT	E	1.04	312
		NBT	E	0.81	49		NBL	F	1.11	155
		NBR	F	1.20	300		NBT	D	0.30	43
		SBL	F	1.02	74		SBL	D	0.56	47
		SBT	F	1.04	89		SBT	E	0.89	115
SBR	E	0.04	-	SBR	D	0.31	41			

*refer to Future Roadway Network (Section 3.1)

Dundas Street & Walkers Line

Improvements at this intersection were limited to optimizing signal splits, with results presented in Exhibit 3-16. Average volume to capacity ratio was reduced slightly by the refined timings.

Exhibit 3-16: Analysis of Improvements to Dundas Street & Walkers Line

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Dundas Street & Walkers Line (<i>planned configuration*</i>)	1.01	EBL	E	0.75	55	0.99	EBL	E	0.73	68
		EBT	E	1.07	289		EBT	D	0.83	128
		WBL	E	0.75	74		EBR	E	0.25	44
		NBL	F	1.19	91		WBL	E	0.85	102
		NBT	D	0.64	91		WBT	F	1.08	279
		NBR	E	0.85	122		NBL	F	1.12	112
		SBL	E	0.62	26		NBT	D	0.58	93
		SBT	D	0.63	79		NBR	D	0.44	63
		SBR	D	0.15	20		SBL	E	0.43	19
		SBR	D	0.63	83		SBT	E	0.78	105
SBR	D	0.63	83	SBR	D	0.63	83			
Dundas Street & Walkers Line (<i>with improvements</i>)	0.98	EBL	E	0.75	55	0.98	EBL	F	0.90	68
		EBT	E	1.08	289		EBT	D	0.84	128
		WBL	E	0.75	74		EBR	E	0.26	44
		NBL	F	0.89	77		WBL	E	0.91	102
		NBT	D	0.63	91		WBT	F	1.08	279
		NBR	E	0.84	122		NBL	E	0.92	97
		SBL	E	0.62	26		NBT	D	0.55	93
		SBT	E	0.70	82		NBR	D	0.42	63
		SBR	D	0.15	21		SBL	E	0.43	19
		SBR	D	0.65	86		SBT	E	0.81	109
SBR	D	0.65	86	SBR	D	0.65	86			

*refer to Future Roadway Network (Section 4.1)

4 Summary and Recommendations

This report provides an analysis of traffic operations for the proposed Highway 407 Transitway station located on Dundas Street in the City of Burlington. The report also includes commentary on transit and active transportation access to the proposed station site.

The traffic analysis found that current conditions along Dundas Street are approaching capacity with several intersections and movements operating with moderate to long delays.

Future conditions forecasts were developed for the study area considering background growth and nearby developments. Future traffic forecasts to and from the station were developed using ridership (park-and-ride) forecasts from the Systems Planning component of the EA. The study accounts for the planned widening of Dundas Street from four lanes to six lanes (2019-2021), which will include two lanes for transit / high occupancy vehicles and four general traffic lanes. The study also accounts for the future widening of Guelph Line from four lanes to six lanes with construction happening prior to the 2031 horizon year.

The study indicates that even with background widening, future 2031 background traffic operations have several movements nearing or at capacity on Dundas Street at Guelph Line and at Walkers Line. The addition of station traffic causes a small increase to delays for several movements, particularly at Dundas Street and Guelph Line. A dedicated northbound right turn lane was recommended. The intersections providing access to the station at Palladium Way and Dundas Street, and Palladium Way and Walkers Line, are expected to operate well.























Transit access to the station is somewhat hampered by its location away from Dundas Street. It was noted that the station plan includes bus bays, which will give local transit operators opportunities to connect directly to the station and minimize walking distance. Metrolinx identifies Dundas Street as a bus priority corridor potentially providing a high quality connection between the Transitway and destinations along Dundas Street.

Walking and cycling access to the station will be provided via access to Palladium Way, which is a designated cycling route in Burlington's cycling plan. Dundas Street is also identified as an active transportation corridor which station patrons will have access to via Palladium Way.

Appendix A-: Existing Conditions Synchro Output

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	1626	256	254	603	109	95	280	514	120	264	48
Future Volume (vph)	131	1626	256	254	603	109	95	280	514	120	264	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	105.0		105.0	145.0		0.0	100.0		0.0	75.0		90.0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.95	0.95	1.00	*1.00	0.95	1.00	0.95	1.00
Frt			0.850		0.977			0.903				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	3767	1601	1674	3321	0	1706	3336	0	1738	3510	1484
Flt Permitted	0.359			0.060			0.534			0.134		
Satd. Flow (perm)	663	3767	1601	106	3321	0	959	3336	0	245	3510	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218		25			217				94
Link Speed (k/h)		80			80			60				60
Link Distance (m)		243.3			423.0			244.1				225.7
Travel Time (s)		10.9			19.0			14.6				13.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	9%	6%	15%	7%	4%	4%	5%	4%	10%
Adj. Flow (vph)	142	1767	278	276	655	118	103	304	559	130	287	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	142	1767	278	276	773	0	103	863	0	130	287	52
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2		1	6		7	4		3		8

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			4			8		8
Detector Phase	2	2	2	1	6		7	4		3	8	8
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0		7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	46.0	46.0	46.0	11.0	46.0		11.0	15.0		11.0	15.0	15.0
Total Split (s)	70.0	70.0	70.0	18.0	88.0		18.0	34.0		18.0	34.0	34.0
Total Split (%)	50.0%	50.0%	50.0%	12.9%	62.9%		12.9%	24.3%		12.9%	24.3%	24.3%
Maximum Green (s)	63.0	63.0	63.0	14.0	81.0		14.0	27.0		14.0	27.0	27.0
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		4.0	7.0		4.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0	7.0		7.0							
Flash Dont Walk (s)	32.0	32.0	32.0		32.0							
Pedestrian Calls (#/hr)	0	0	0		0							
Act Effct Green (s)	63.0	63.0	63.0	85.0	81.0		43.0	28.9		45.0	29.9	29.9
Actuated g/C Ratio	0.45	0.45	0.45	0.61	0.58		0.31	0.21		0.32	0.21	0.21
v/c Ratio	0.48	1.04	0.33	1.19	0.40		0.29	1.13dr		0.63	0.38	0.13
Control Delay	33.6	71.5	6.9	156.1	16.3		34.8	72.4		46.7	49.5	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	33.6	71.5	6.9	156.1	16.3		34.8	72.4		46.7	49.5	1.6
LOS	C	E	A	F	B		C	E		D	D	A
Approach Delay		60.8			53.1			68.4			43.4	
Approach LOS		E			D			E			D	
Queue Length 50th (m)	27.1	~264.1	9.3	~76.5	57.2		19.9	~101.2		25.5	36.2	0.0
Queue Length 95th (m)	48.4	#304.0	27.2	#133.6	71.0		34.1	#143.7		41.7	51.4	1.6
Internal Link Dist (m)		219.3			399.0			220.1			201.7	
Turn Bay Length (m)	105.0		105.0	145.0			100.0			75.0		90.0
Base Capacity (vph)	298	1695	840	232	1931		387	861		230	749	390
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.48	1.04	0.33	1.19	0.40		0.27	1.00		0.57	0.38	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	59 (42%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	135
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.19
Intersection Signal Delay:	58.9
Intersection LOS:	E
Intersection Capacity Utilization:	108.3%
ICU Level of Service:	G
Analysis Period (min):	15

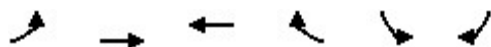
- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Guelph Line & Dundas St

↙ Ø1	↘ Ø2 (R)	↙ Ø3	↕ Ø4
18 s	70 s	18 s	34 s
↙ Ø6 (R)	↘ Ø7	↙ Ø7	↕ Ø8
88 s	18 s	18 s	34 s

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑		↓↓↓	↓
Traffic Volume (vph)	0	2213	848	0	44	118
Future Volume (vph)	0	2213	848	0	44	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.91	0.95	1.00	0.97	0.91
Frt					0.914	0.850
Flt Protected					0.979	
Satd. Flow (prot)	0	5092	3318	0	2944	1292
Flt Permitted					0.979	
Satd. Flow (perm)	0	5092	3318	0	2944	1292
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					64	64
Link Speed (k/h)		80	80		60	
Link Distance (m)		242.0	124.9		392.8	
Travel Time (s)		10.9	5.6		23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	10%	0%	11%	15%
Adj. Flow (vph)	0	2405	922	0	48	128
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	2405	922	0	112	64
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		98.0	98.0		42.0	42.0
Total Split (%)		70.0%	70.0%		30.0%	30.0%
Maximum Green (s)		91.0	91.0		36.0	36.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		91.0	91.0		34.0	34.0
Actuated g/C Ratio		0.66	0.66		0.25	0.25
v/c Ratio		0.72	0.42		0.14	0.17
Control Delay		16.7	11.8		19.2	10.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.7	11.8		19.2	10.3
LOS		B	B		B	B
Approach Delay		16.7	11.8		16.0	
Approach LOS		B	B		B	
Queue Length 50th (m)		144.6	58.1		5.2	0.0
Queue Length 95th (m)		160.2	70.8		12.9	12.8
Internal Link Dist (m)		218.0	100.9		368.8	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3357	2187		815	384
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.72	0.42		0.14	0.17

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	138
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	15.4
Intersection Capacity Utilization	81.9%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	D

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp

→ Ø2	↖ Ø4
98 s	42 s
← Ø6	
98 s	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

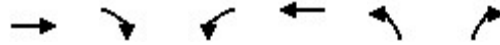
AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↑↑↑	↑
Traffic Volume (vph)	1673	0	0	868	27	156
Future Volume (vph)	1673	0	0	868	27	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.91	0.97	0.91
Frt					0.888	0.850
Flt Protected					0.987	
Satd. Flow (prot)	3510	0	0	4812	3059	1429
Flt Permitted					0.987	
Satd. Flow (perm)	3510	0	0	4812	3059	1429
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					27	27
Link Speed (k/h)	80			80	60	
Link Distance (m)	146.5			232.3	320.5	
Travel Time (s)	6.6			10.5	19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	0%	9%	15%	4%
Adj. Flow (vph)	1818	0	0	943	29	170
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	1818	0	0	943	114	85
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	32.0			32.0	33.0	33.0
Total Split (s)	100.0			100.0	40.0	40.0
Total Split (%)	71.4%			71.4%	28.6%	28.6%
Maximum Green (s)	93.0			93.0	34.0	34.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	94.9			94.9	10.8	10.8
Actuated g/C Ratio	0.80			0.80	0.09	0.09
v/c Ratio	0.65			0.25	0.38	0.55
Control Delay	6.6			3.3	41.5	49.0
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.6			3.3	41.5	49.0
LOS	A			A	D	D
Approach Delay	6.6			3.3	44.7	
Approach LOS	A			A	D	
Queue Length 50th (m)	71.7			15.5	9.7	14.0
Queue Length 95th (m)	113.2			24.6	18.6	31.7
Internal Link Dist (m)	122.5			208.3	296.5	
Turn Bay Length (m)						80.0
Base Capacity (vph)	2806			3847	895	428
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.65			0.25	0.13	0.20

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	118.7
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	8.1
Intersection Capacity Utilization:	63.7%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	B

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

→ Ø2	↖ Ø8
100 s	40 s
← Ø6	
100 s	

Lanes, Volumes, Timings
 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	1725	70	92	866	25	170	10	384	17	9	31
Future Volume (vph)	34	1725	70	92	866	25	170	10	384	17	9	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	155.0		0.0	0.0		50.0	0.0		0.0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.96		1.00			0.98	0.99		0.98	
Frt			0.850		0.996				0.850		0.926	
Flt Protected	0.950			0.950				0.955			0.986	
Satd. Flow (prot)	1323	3579	1617	1772	3475	0	0	1781	1601	0	1259	0
Flt Permitted	0.296			0.046				0.731			0.880	
Satd. Flow (perm)	412	3579	1557	86	3475	0	0	1336	1579	0	1123	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62		4				109			34
Link Speed (k/h)		80			60			50				50
Link Distance (m)		383.1			410.9			142.3				131.7
Travel Time (s)		17.2			24.7			10.2				9.5
Confl. Peds. (#/hr)	1		6	6		1	16		1	1		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	38%	2%	1%	3%	4%	24%	2%	20%	2%	47%	0%	42%
Adj. Flow (vph)	37	1875	76	100	941	27	185	11	417	18	10	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	1875	76	100	968	0	0	196	417	0	62	0
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)		3.7			3.7			0.0				0.0
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1		2
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left		Thru
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1	6.1		30.5
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	6.1	1.8		6.1	1.8	6.1	6.1		1.8
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8				4
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1	6		8	8	8	4		4
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	6.0	8.0		8.0	8.0	8.0	8.0		8.0
Minimum Split (s)	36.0	36.0	36.0	11.0	31.0		38.0	38.0	38.0	38.0		38.0
Total Split (s)	88.0	88.0	88.0	12.0	100.0		40.0	40.0	40.0	40.0		40.0
Total Split (%)	62.9%	62.9%	62.9%	8.6%	71.4%		28.6%	28.6%	28.6%	28.6%		28.6%
Maximum Green (s)	82.0	82.0	82.0	8.0	94.0		33.0	33.0	33.0	33.0		33.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		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)	6.0	6.0	6.0	4.0	6.0			7.0	7.0			7.0
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	C-Max	C-Max	C-Max	None	C-Max		None	None	None	None		None
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	17.0		17.0		22.0	22.0	22.0	22.0		22.0
Pedestrian Calls (#/hr)	0	0	0		0		0	0	0	0		0
Act Effct Green (s)	83.9	83.9	83.9	97.5	95.5			31.5	31.5			31.5
Actuated g/C Ratio	0.60	0.60	0.60	0.70	0.68			0.22	0.22			0.22
v/c Ratio	0.15	0.87	0.08	0.66	0.41			0.65	0.95			0.22
Control Delay	15.2	29.9	4.2	49.6	8.1			60.2	71.1			24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0
Total Delay	15.2	29.9	4.2	49.6	8.1			60.2	71.1			24.6
LOS	B	C	A	D	A			E	E			C
Approach Delay		28.7			12.0			67.6				24.6
Approach LOS		C			B			E				C
Queue Length 50th (m)	4.5	227.8	1.6	15.3	49.0			49.0	87.4			6.1
Queue Length 95th (m)	10.7	265.4	8.3	m28.7	m47.3			76.3	#148.5			18.8
Internal Link Dist (m)		359.1			386.9			118.3				107.7
Turn Bay Length (m)	85.0		90.0	155.0					50.0			
Base Capacity (vph)	247	2146	958	156	2372			314	455			290
Starvation Cap Reductn	0	0	0	0	0			0	0			0
Spillback Cap Reductn	0	0	0	0	0			0	0			0
Storage Cap Reductn	0	0	0	0	0			0	0			0
Reduced v/c Ratio	0.15	0.87	0.08	0.64	0.41			0.62	0.92			0.21

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 30.2
 Intersection LOS: C

Lanes, Volumes, Timings
 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 102.1% ICU Level of Service G

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

























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

Splits and Phases: 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St



Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	1637	251	198	557	33	253	286	328	79	313	173
Future Volume (vph)	238	1637	251	198	557	33	253	286	328	79	313	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		180.0	155.0		225.0	85.0		0.0	40.0		55.0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	1.00		0.97			0.98	1.00	0.99		1.00		0.98
Frt			0.850			0.850		0.920				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3730	1570	1738	3411	1458	1772	3224	0	1825	3544	1617
Flt Permitted	0.422			0.062			0.405			0.149		
Satd. Flow (perm)	792	3730	1529	113	3411	1428	752	3224	0	286	3544	1584
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			273			94			165			188
Link Speed (k/h)		60			60			60				60
Link Distance (m)		410.9			222.4			234.7				422.9
Travel Time (s)		24.7			13.3			14.1				25.4
Confl. Peds. (#/hr)	7		12	12		7	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	4%	5%	7%	12%	3%	2%	4%	0%	3%	1%
Adj. Flow (vph)	259	1779	273	215	605	36	275	311	357	86	340	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	259	1779	273	215	605	36	275	668	0	86	340	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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	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	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	6.1	1.8	6.1	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	custom
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		6
Detector Phase	5	2	2	1	6	6	7	4		3	8	6
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0		11.0	44.0	42.0
Total Split (s)	13.0	66.0	66.0	15.0	68.0	68.0	13.0	48.0		11.0	46.0	68.0
Total Split (%)	9.3%	47.1%	47.1%	10.7%	48.6%	48.6%	9.3%	34.3%		7.9%	32.9%	48.6%
Maximum Green (s)	9.0	59.0	59.0	11.0	61.0	61.0	9.0	41.0		7.0	39.0	61.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0			30.0	28.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	77.0	60.9	60.9	88.4	69.0	69.0	40.9	28.9		36.9	26.9	69.0
Actuated g/C Ratio	0.55	0.44	0.44	0.63	0.49	0.49	0.29	0.21		0.26	0.19	0.49
v/c Ratio	0.49	1.10	0.33	0.68	0.36	0.05	0.96	0.84		0.57	0.50	0.21
Control Delay	12.7	78.3	3.3	45.1	23.9	0.1	88.8	49.4		48.7	52.2	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.7	78.3	3.3	45.1	23.9	0.1	88.8	49.4		48.7	52.2	3.7
LOS	B	E	A	D	C	A	F	D		D	D	A
Approach Delay		62.1			28.2			60.9			36.9	
Approach LOS		E			C			E			D	
Queue Length 50th (m)	22.1	~280.0	1.4	39.6	53.9	0.0	62.6	72.7		17.4	44.7	0.0
Queue Length 95th (m)	m34.7	#323.4	m9.0	#91.0	75.2	0.0	#97.6	88.8		28.0	56.0	13.7
Internal Link Dist (m)		386.9			198.4			210.7			398.9	
Turn Bay Length (m)	90.0		180.0	155.0		225.0	85.0			40.0		55.0
Base Capacity (vph)	527	1623	819	316	1681	751	285	1060		152	987	876
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.49	1.10	0.33	0.68	0.36	0.05	0.96	0.63		0.57	0.34	0.21

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	20 (14%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.10
Intersection Signal Delay:	52.4
Intersection LOS:	D

Intersection Capacity Utilization 101.8% ICU Level of Service G

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	1	84	0	4	1	192	154	9	91	0
Future Volume (vph)	0	0	1	84	0	4	1	192	154	9	91	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	45.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.850			0.850			0.933				
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1883	1601	0	1789	1601	0	1789	3339	0	1789	1883	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1883	1601	0	1789	1601	0	1789	3339	0	1789	1883	0
Link Speed (k/h)		48			48			48			60	
Link Distance (m)		161.1			156.6			422.9			122.0	
Travel Time (s)		12.1			11.7			31.7			7.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1	91	0	4	1	209	167	10	99	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1	0	91	4	0	1	376	0	10	99	0
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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 28.2%

ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

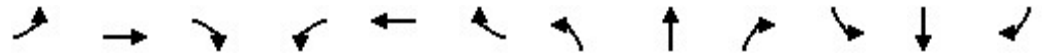
PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	794	157	631	1812	109	267	297	268	112	436	160
Future Volume (vph)	45	794	157	631	1812	109	267	297	268	112	436	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	105.0		105.0	145.0		0.0	100.0		0.0	75.0		90.0
Storage Lanes	1		1	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor								0.99		1.00		
Frt			0.850		0.992			0.929				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3614	1617	1772	3546	0	1789	3288	0	1738	3579	1617
Flt Permitted	0.093			0.128			0.228			0.167		
Satd. Flow (perm)	179	3614	1617	239	3546	0	429	3288	0	305	3579	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			171		7			145				94
Link Speed (k/h)		80			80			60				60
Link Distance (m)		243.2			474.9			244.1				225.7
Travel Time (s)		10.9			21.4			14.6				13.5
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	3%	2%	4%	2%	1%	4%	5%	2%	1%
Adj. Flow (vph)	49	863	171	686	1970	118	290	323	291	122	474	174
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	863	171	686	2088	0	290	614	0	122	474	174
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases		2		1	6		7	4		3	8	
Permitted Phases	2		2	6			4			8		8
Detector Phase	2	2	2	1	6		7	4		3	8	8
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0		7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	46.0	46.0	46.0	11.5	46.0		11.5	39.0		11.5	39.0	39.0
Total Split (s)	50.0	50.0	50.0	38.0	88.0		18.0	34.0		18.0	34.0	34.0
Total Split (%)	35.7%	35.7%	35.7%	27.1%	62.9%		12.9%	24.3%		12.9%	24.3%	24.3%
Maximum Green (s)	43.0	43.0	43.0	34.0	81.0		14.0	27.0		14.0	27.0	27.0
Yellow Time (s)	5.0	5.0	5.0	3.0	5.0		3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	3.0	7.0		4.0	7.0		4.0	7.0	7.0
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0	7.0		7.0			7.0			7.0	7.0
Flash Dont Walk (s)	32.0	32.0	32.0		32.0			25.0			25.0	25.0
Pedestrian Calls (#/hr)	0	0	0		0			0			0	0
Act Effct Green (s)	43.0	43.0	43.0	88.0	84.0		42.7	26.0		39.0	24.0	24.0
Actuated g/C Ratio	0.31	0.31	0.31	0.63	0.60		0.30	0.19		0.28	0.17	0.17
v/c Ratio	0.91	0.78	0.28	1.21	0.98		1.09	0.84		0.59	0.77	0.49
Control Delay	147.0	49.9	6.1	144.9	43.1		119.4	53.1		46.0	64.2	28.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	147.0	49.9	6.1	144.9	43.1		119.4	53.1		46.0	64.2	28.2
LOS	F	D	A	F	D		F	D		D	E	C
Approach Delay		47.4			68.3			74.4			53.2	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	13.0	114.6	0.0	~212.8	289.6		~70.3	67.3		24.3	65.8	19.3
Queue Length 95th (m)	#39.4	139.2	16.4	#293.0	#361.4		#118.2	89.8		39.4	84.0	42.1
Internal Link Dist (m)		219.2			450.9			220.1			201.7	
Turn Bay Length (m)	105.0		105.0	145.0			100.0			75.0		90.0
Base Capacity (vph)	54	1110	615	565	2129		266	751		232	690	387
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0
Reduced v/c Ratio	0.91	0.78	0.28	1.21	0.98		1.09	0.82		0.53	0.69	0.45

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	108 (77%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.21
Intersection Signal Delay:	63.1
Intersection LOS:	E

Lanes, Volumes, Timings
 1: Guelph Line & Dundas St

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 107.9% ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

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

Splits and Phases: 1: Guelph Line & Dundas St

 Ø1 38 s	 Ø2 (R) 50 s	 Ø3 18 s	 Ø4 34 s
 Ø6 (R) 88 s	 Ø7 (R) 18 s	 Ø7 18 s	 Ø8 34 s

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑		↓↓↓	↓
Traffic Volume (vph)	0	1117	1945	0	189	607
Future Volume (vph)	0	1117	1945	0	189	607
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.91	0.95	1.00	0.97	0.91
Frt					0.907	0.850
Flt Protected					0.981	
Satd. Flow (prot)	0	5142	3544	0	3212	1429
Flt Permitted					0.981	
Satd. Flow (perm)	0	5142	3544	0	3212	1429
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					13	13
Link Speed (k/h)		80	80		60	
Link Distance (m)		190.2	108.5		410.5	
Travel Time (s)		8.6	4.9		24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	0%	2%	4%
Adj. Flow (vph)	0	1214	2114	0	205	660
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	1214	2114	0	535	330
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		98.0	98.0		42.0	42.0
Total Split (%)		70.0%	70.0%		30.0%	30.0%
Maximum Green (s)		91.0	91.0		36.0	36.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		91.0	91.0		35.3	35.3
Actuated g/C Ratio		0.65	0.65		0.25	0.25
v/c Ratio		0.36	0.91		0.65	0.89
Control Delay		11.4	28.4		49.6	74.1
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.4	28.4		49.6	74.1
LOS		B	C		D	E
Approach Delay		11.4	28.4		58.9	
Approach LOS		B	C		E	
Queue Length 50th (m)		52.8	250.7		66.7	93.4
Queue Length 95th (m)		61.2	293.8		85.9	#152.3
Internal Link Dist (m)		166.2	84.5		386.5	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3359	2315		839	379
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.36	0.91		0.64	0.87

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	139.3
Natural Cycle:	110
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	29.8
Intersection LOS:	C
Intersection Capacity Utilization:	92.9%
ICU Level of Service:	F
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

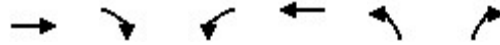
Queue shown is maximum after two cycles.

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

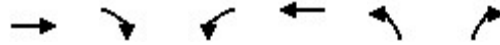
PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑↑	↑↑↑	↑
Traffic Volume (vph)	1128	0	0	1932	70	164
Future Volume (vph)	1128	0	0	1932	70	164
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.91	0.97	0.91
Frt					0.919	0.850
Flt Protected					0.977	
Satd. Flow (prot)	3579	0	0	5193	3208	1457
Flt Permitted					0.977	
Satd. Flow (perm)	3579	0	0	5193	3208	1457
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					89	89
Link Speed (k/h)	80			80	60	
Link Distance (m)	103.7			180.7	413.3	
Travel Time (s)	4.7			8.1	24.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	7%	2%
Adj. Flow (vph)	1226	0	0	2100	76	178
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	1226	0	0	2100	165	89
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	33.0			33.0	35.0	35.0
Total Split (s)	100.0			100.0	40.0	40.0
Total Split (%)	71.4%			71.4%	28.6%	28.6%
Maximum Green (s)	93.0			93.0	34.0	34.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	94.2			94.2	9.0	9.0
Actuated g/C Ratio	0.81			0.81	0.08	0.08
v/c Ratio	0.42			0.50	0.50	0.46
Control Delay	3.7			4.0	29.5	18.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	3.7			4.0	29.5	18.3
LOS	A			A	C	B
Approach Delay	3.7			4.0	25.6	
Approach LOS	A			A	C	
Queue Length 50th (m)	31.5			41.5	8.5	0.0
Queue Length 95th (m)	46.3			57.0	18.9	16.8
Internal Link Dist (m)	79.7			156.7	389.3	
Turn Bay Length (m)						80.0
Base Capacity (vph)	2901			4210	1002	489
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.42			0.50	0.16	0.18

Intersection Summary

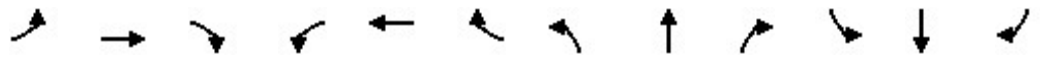
Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	116.2
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	5.5
Intersection Capacity Utilization	54.8%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

→ Ø2	↖ Ø8
100 s	40 s
← Ø6	
100 s	

Lanes, Volumes, Timings
 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St

PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	1126	143	245	1882	22	65	3	135	36	3	35
Future Volume (vph)	23	1126	143	245	1882	22	65	3	135	36	3	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	155.0		0.0	0.0		50.0	0.0		0.0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97		1.00			0.99	0.99		0.99	
Frt			0.850		0.998				0.850		0.936	
Flt Protected	0.950			0.950				0.954			0.976	
Satd. Flow (prot)	1201	3579	1617	1825	3595	0	0	1784	1633	0	1369	0
Flt Permitted	0.079			0.178				0.686			0.808	
Satd. Flow (perm)	100	3579	1566	342	3595	0	0	1272	1611	0	1132	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155		2				147			18
Link Speed (k/h)		80			60			48				48
Link Distance (m)		434.8			410.9			142.2				131.7
Travel Time (s)		19.6			24.7			10.7				9.9
Confl. Peds. (#/hr)	5		4	4		5	7		1	1		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	52%	2%	1%	0%	1%	27%	0%	67%	0%	22%	0%	34%
Adj. Flow (vph)	25	1224	155	266	2046	24	71	3	147	39	3	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	1224	155	266	2070	0	0	74	147	0	80	0
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)		3.7			3.7			0.0				0.0
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1		2
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left		Thru
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5	6.1	6.1		30.5
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	6.1	1.8		6.1	1.8	6.1	6.1		1.8
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St

PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		2		1	6			8				4
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1	6		8	8	8	4		4
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	6.0	8.0		5.0	5.0	5.0	8.0		8.0
Minimum Split (s)	31.0	31.0	31.0	11.0	31.0		38.0	38.0	38.0	38.0		38.0
Total Split (s)	89.0	89.0	89.0	13.0	102.0		38.0	38.0	38.0	38.0		38.0
Total Split (%)	63.6%	63.6%	63.6%	9.3%	72.9%		27.1%	27.1%	27.1%	27.1%		27.1%
Maximum Green (s)	83.0	83.0	83.0	9.0	96.0		31.0	31.0	31.0	31.0		31.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0		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)	6.0	6.0	6.0	4.0	6.0			7.0	7.0			7.0
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	C-Max	C-Max	C-Max	None	C-Max		None	None	None	None		None
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0	7.0	7.0		7.0
Flash Dont Walk (s)	17.0	17.0	17.0		17.0		22.0	22.0	22.0	22.0		22.0
Pedestrian Calls (#/hr)	0	0	0		0		0	0	0	0		0
Act Effct Green (s)	96.4	96.4	96.4	115.4	113.4			13.6	13.6			13.6
Actuated g/C Ratio	0.69	0.69	0.69	0.82	0.81			0.10	0.10			0.10
v/c Ratio	0.37	0.50	0.14	0.63	0.71			0.60	0.51			0.63
Control Delay	31.7	12.1	1.8	19.6	7.3			79.3	14.6			68.0
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0
Total Delay	31.7	12.1	1.8	19.6	7.3			79.3	14.6			68.0
LOS	C	B	A	B	A			E	B			E
Approach Delay		11.4			8.7			36.2				68.0
Approach LOS		B			A			D				E
Queue Length 50th (m)	2.6	75.0	0.0	23.6	63.3			20.0	0.0			16.8
Queue Length 95th (m)	15.7	121.3	8.6	m26.0	m66.1			35.1	19.2			33.3
Internal Link Dist (m)		410.8			386.9			118.2				107.7
Turn Bay Length (m)	85.0		90.0	155.0					50.0			
Base Capacity (vph)	68	2463	1126	419	2912			281	471			264
Starvation Cap Reductn	0	0	0	0	0			0	0			0
Spillback Cap Reductn	0	0	0	0	0			0	0			0
Storage Cap Reductn	0	0	0	0	0			0	0			0
Reduced v/c Ratio	0.37	0.50	0.14	0.63	0.71			0.26	0.31			0.30

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 126 (90%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 12.3
 Intersection LOS: B

Lanes, Volumes, Timings
 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St

PM Peak Period
 09-18-2019

























Intersection Capacity Utilization 89.2% ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Northampton Blvd/Hwy 407 Park & Ride & Dundas St



Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	924	203	340	1550	51	345	412	230	55	345	254
Future Volume (vph)	170	924	203	340	1550	51	345	412	230	55	345	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		180.0	155.0		225.0	85.0		0.0	40.0		55.0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	*1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor			0.98			0.98	1.00	0.99		0.99		0.98
Frt			0.850			0.850		0.946				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3579	1585	1807	3767	1633	1807	3418	0	1825	3614	1633
Flt Permitted	0.092			0.084			0.350			0.191		
Satd. Flow (perm)	175	3579	1555	160	3767	1596	663	3418	0	365	3614	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			221			94		81				159
Link Speed (k/h)		60			60			60				60
Link Distance (m)		410.9			222.3			234.9				400.1
Travel Time (s)		24.7			13.3			14.1				24.0
Confl. Peds. (#/hr)	9		6	6		9	7		15	15		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	1%	0%	0%	0%	1%	0%
Adj. Flow (vph)	185	1004	221	370	1685	55	375	448	250	60	375	276
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	1004	221	370	1685	55	375	698	0	60	375	276
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	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	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	6.1	1.8	6.1	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4			8		8
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0		11.0	44.0	44.0
Total Split (s)	13.0	50.0	50.0	25.0	62.0	62.0	17.0	52.0		13.0	48.0	48.0
Total Split (%)	9.3%	35.7%	35.7%	17.9%	44.3%	44.3%	12.1%	37.1%		9.3%	34.3%	34.3%
Maximum Green (s)	9.0	43.0	43.0	21.0	55.0	55.0	13.0	45.0		9.0	41.0	41.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0			30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	64.9	44.5	44.5	84.9	60.5	60.5	47.1	34.0		38.4	27.1	27.1
Actuated g/C Ratio	0.46	0.32	0.32	0.61	0.43	0.43	0.34	0.24		0.27	0.19	0.19
v/c Ratio	0.65	0.88	0.34	0.76	1.04	0.07	1.14	0.78		0.32	0.54	0.63
Control Delay	50.2	48.3	5.5	46.2	70.9	1.0	130.9	50.1		34.3	52.6	26.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	50.2	48.3	5.5	46.2	70.9	1.0	130.9	50.1		34.3	52.6	26.8
LOS	D	D	A	D	E	A	F	D		C	D	C
Approach Delay		41.8			64.7			78.4			41.0	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	35.8	141.6	0.0	77.1	~258.3	0.0	~100.4	87.0		11.3	49.2	29.2
Queue Length 95th (m)	#72.9	#173.4	16.7	#147.3	#311.3	1.9	#148.5	101.2		19.7	60.3	55.1
Internal Link Dist (m)		386.9			198.3			210.9			376.1	
Turn Bay Length (m)	90.0		180.0	155.0		225.0	85.0			40.0		55.0
Base Capacity (vph)	283	1137	644	489	1628	743	329	1153		195	1058	581
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.65	0.88	0.34	0.76	1.04	0.07	1.14	0.61		0.31	0.35	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 134 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.14
 Intersection Signal Delay: 58.2
 Intersection LOS: E

Intersection Capacity Utilization 103.7% ICU Level of Service G

Analysis Period (min) 15

* User Entered Value

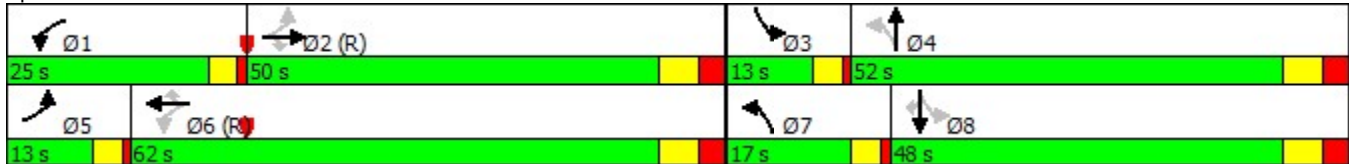
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	207	0	10	0	236	37	7	236	0
Future Volume (vph)	0	0	0	207	0	10	0	236	37	7	236	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	45.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt					0.850			0.980				
Flt Protected				0.950						0.950		
Satd. Flow (prot)	1883	1883	0	1789	1601	0	1883	3507	0	1789	1883	0
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	1883	1883	0	1789	1601	0	1883	3507	0	1789	1883	0
Link Speed (k/h)		48			48			48			60	
Link Distance (m)		171.2			232.0			400.1			144.9	
Travel Time (s)		12.8			17.4			30.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	225	0	11	0	257	40	8	257	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	225	11	0	0	297	0	8	257	0
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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	


































Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.6%
Analysis Period (min)	15
	ICU Level of Service A

Appendix B-: Future Background Conditions Synchro Output

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  		 		
Traffic Volume (vph)	166	2062	325	322	765	138	120	355	652	152	335	61
Future Volume (vph)	166	2062	325	322	765	138	120	355	652	152	335	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	120.0		75.0	100.0		0.0	75.0		75.0
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	1.00	*1.00	0.91	1.00	0.95	1.00
Frt			0.850			0.850		0.903				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3404	5085	1601	3248	4893	1420	1706	5004	0	1738	3510	1484
Flt Permitted	0.950			0.950			0.396			0.151		
Satd. Flow (perm)	3404	5085	1601	3248	4893	1420	711	5004	0	276	3510	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			184			150		165				94
Link Speed (k/h)		80			80			60				60
Link Distance (m)		243.3			423.0			244.1				225.7
Travel Time (s)		10.9			19.0			14.6				13.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	9%	6%	15%	7%	4%	4%	5%	4%	10%
Adj. Flow (vph)	180	2241	353	350	832	150	130	386	709	165	364	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	180	2241	353	350	832	150	130	1095	0	165	364	66
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	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	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	6.1	1.8	6.1	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6	4			8		8
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	11.0	46.0	46.0	11.0	46.0	46.0	11.0	15.0		11.0	15.0	15.0
Total Split (s)	16.0	73.0	73.0	19.0	76.0	76.0	15.0	34.0		14.0	33.0	33.0
Total Split (%)	11.4%	52.1%	52.1%	13.6%	54.3%	54.3%	10.7%	24.3%		10.0%	23.6%	23.6%
Maximum Green (s)	12.0	66.0	66.0	15.0	69.0	69.0	11.0	27.0		10.0	26.0	26.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	3.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0						
Flash Dont Walk (s)		32.0	32.0		32.0	32.0						
Pedestrian Calls (#/hr)		0	0		0	0						
Act Effct Green (s)	11.3	66.0	66.0	16.0	69.7	69.7	40.5	27.0		39.5	26.5	26.5
Actuated g/C Ratio	0.08	0.47	0.47	0.11	0.50	0.50	0.29	0.19		0.28	0.19	0.19
v/c Ratio	0.66	0.93	0.41	0.94	0.34	0.19	0.46	1.63dr		0.91	0.55	0.19
Control Delay	74.3	43.6	12.5	95.5	21.9	3.4	41.8	74.1		85.7	55.1	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	74.3	43.6	12.5	95.5	21.9	3.4	41.8	74.1		85.7	55.1	4.7
LOS	E	D	B	F	C	A	D	E		F	E	A
Approach Delay		41.6			39.1			70.6			58.0	
Approach LOS		D			D			E			E	
Queue Length 50th (m)	25.2	213.1	28.2	50.3	50.9	0.0	26.8	88.7		34.6	48.7	0.0
Queue Length 95th (m)	37.8	236.3	52.1	#79.7	61.1	11.2	43.8	#118.4		#71.6	65.3	6.3
Internal Link Dist (m)		219.3			399.0			220.1			201.7	
Turn Bay Length (m)	130.0		60.0	120.0		75.0	100.0			75.0		75.0
Base Capacity (vph)	291	2397	852	371	2436	782	286	1098		182	663	356
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.62	0.93	0.41	0.94	0.34	0.19	0.45	1.00		0.91	0.55	0.19

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	48.7
Intersection LOS:	D
Intersection Capacity Utilization:	97.3%
ICU Level of Service:	F
Analysis Period (min):	15

- * User Entered Value
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Guelph Line & Dundas St



Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↓↓↓	↓
Traffic Volume (vph)	0	2807	1075	0	56	150
Future Volume (vph)	0	2807	1075	0	56	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	*0.90	*0.90	1.00	0.97	0.91
Frt					0.914	0.850
Flt Protected					0.979	
Satd. Flow (prot)	0	5036	4715	0	2944	1292
Flt Permitted					0.979	
Satd. Flow (perm)	0	5036	4715	0	2944	1292
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					82	81
Link Speed (k/h)		80	80		60	
Link Distance (m)		242.0	124.9		392.8	
Travel Time (s)		10.9	5.6		23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	10%	0%	11%	15%
Adj. Flow (vph)	0	3051	1168	0	61	163
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	3051	1168	0	143	81
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		100.0	100.0		40.0	40.0
Total Split (%)		71.4%	71.4%		28.6%	28.6%
Maximum Green (s)		93.0	93.0		34.0	34.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		93.0	93.0		34.0	34.0
Actuated g/C Ratio		0.66	0.66		0.24	0.24
v/c Ratio		0.91	0.37		0.18	0.22
Control Delay		25.4	10.9		19.2	9.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		25.4	10.9		19.2	9.9
LOS		C	B		B	A
Approach Delay		25.4	10.9		15.9	
Approach LOS		C	B		B	
Queue Length 50th (m)		248.4	49.8		6.8	0.0
Queue Length 95th (m)		272.4	58.0		15.6	14.3
Internal Link Dist (m)		218.0	100.9		368.8	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3345	3132		777	375
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.91	0.37		0.18	0.22

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Natural Cycle:	110
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.91
Intersection Signal Delay:	21.1
Intersection Capacity Utilization	93.4%
Analysis Period (min)	15
* User Entered Value	
Intersection LOS:	C
ICU Level of Service	F

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp

→ Ø2	↘ Ø4
100 s	40 s
← Ø6	
100 s	

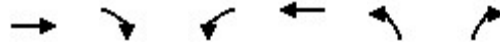
Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

AM Peak Period
09-18-2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	2122	0	0	1101	34	198
Future Volume (vph)	2122	0	0	1101	34	198
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	*0.90	1.00	1.00	*0.90	0.97	0.91
Frt					0.888	0.850
Flt Protected					0.987	
Satd. Flow (prot)	4988	0	0	4759	3058	1429
Flt Permitted					0.987	
Satd. Flow (perm)	4988	0	0	4759	3058	1429
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					11	11
Link Speed (k/h)	80			80	60	
Link Distance (m)	146.5			232.3	320.5	
Travel Time (s)	6.6			10.5	19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	0%	9%	15%	4%
Adj. Flow (vph)	2307	0	0	1197	37	215
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	2307	0	0	1197	145	107
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	32.0			32.0	33.0	33.0
Total Split (s)	104.0			104.0	36.0	36.0
Total Split (%)	74.3%			74.3%	25.7%	25.7%
Maximum Green (s)	97.0			97.0	30.0	30.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	97.5			97.5	13.7	13.7
Actuated g/C Ratio	0.79			0.79	0.11	0.11
v/c Ratio	0.59			0.32	0.42	0.64
Control Delay	6.5			4.4	50.7	64.5
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.5			4.4	50.7	64.5
LOS	A			A	D	E
Approach Delay	6.5			4.4	56.6	
Approach LOS	A			A	E	
Queue Length 50th (m)	69.1			25.7	15.8	24.8
Queue Length 95th (m)	102.2			39.8	25.9	45.6
Internal Link Dist (m)	122.5			208.3	296.5	
Turn Bay Length (m)						80.0
Base Capacity (vph)	3915			3735	747	353
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.59			0.32	0.19	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	124.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	9.2
Intersection Capacity Utilization:	46.9%
Analysis Period (min):	15
* User Entered Value	
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

<p>→ Ø2</p>	<p>↖ Ø8</p>
<p>104 s</p>	<p>36 s</p>
<p>← Ø6</p>	
<p>104 s</p>	

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

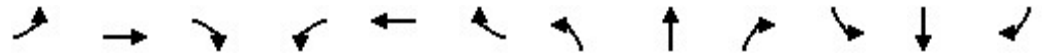
AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	2188	70	92	1098	137	170	10	384	53	9	67
Future Volume (vph)	146	2188	70	92	1098	137	170	10	384	53	9	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	75.0		75.0	0.0		50.0	30.0		30.0
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*0.90	1.00	1.00	*0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.96			0.98		0.98	0.99	1.00		0.97
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950				0.955		0.950		
Satd. Flow (prot)	1323	5085	1617	1772	4988	1317	0	1781	1601	1242	1921	1150
Fl _t Permitted	0.221			0.046				0.731		0.513		
Satd. Flow (perm)	307	5085	1557	86	4988	1287	0	1334	1579	670	1921	1110
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70			149			89			73
Link Speed (k/h)		80			60			50				50
Link Distance (m)		383.1			410.9			142.3				135.8
Travel Time (s)		17.2			24.7			10.2				9.8
Confl. Peds. (#/hr)	1		6	6		1	16		1	1		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	38%	2%	1%	3%	4%	24%	2%	20%	2%	47%	0%	42%
Adj. Flow (vph)	159	2378	76	100	1193	149	185	11	417	58	10	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	2378	76	100	1193	149	0	196	417	58	10	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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	2	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	36.0	36.0	36.0	11.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (s)	89.0	89.0	89.0	11.0	100.0	100.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	63.6%	63.6%	63.6%	7.9%	71.4%	71.4%	28.6%	28.6%	28.6%	28.6%	28.6%	28.6%
Maximum Green (s)	83.0	83.0	83.0	7.0	94.0	94.0	33.0	33.0	33.0	33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	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	0.0
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0		7.0	7.0	7.0	7.0	7.0
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	3.0	3.0
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0		17.0	17.0	22.0	22.0	22.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)	0	0	0		0	0	0	0	0	0	0	0
Act Effct Green (s)	83.9	83.9	83.9	96.8	94.8	94.8		32.2	32.2	32.2	32.2	32.2
Actuated g/C Ratio	0.60	0.60	0.60	0.69	0.68	0.68		0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.86	0.78	0.08	0.70	0.35	0.16		0.64	0.97	0.38	0.02	0.23
Control Delay	65.9	23.7	3.3	58.4	10.5	3.5		59.1	77.4	53.4	41.4	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	65.9	23.7	3.3	58.4	10.5	3.5		59.1	77.4	53.4	41.4	11.0
LOS	E	C	A	E	B	A		E	E	D	D	B
Approach Delay		25.6			13.1			71.5				30.6
Approach LOS		C			B			E				C
Queue Length 50th (m)	35.5	178.2	0.7	19.4	44.6	4.7		49.0	93.6	13.6	2.2	0.0
Queue Length 95th (m)	#84.4	197.2	7.2	m#34.8	m50.5	m8.4		76.3	#157.5	28.1	6.9	12.8
Internal Link Dist (m)		359.1			386.9			118.3				111.8
Turn Bay Length (m)	85.0		90.0	75.0		75.0			50.0	30.0		30.0
Base Capacity (vph)	184	3045	960	143	3377	919		314	440	157	452	317
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.86	0.78	0.08	0.70	0.35	0.16		0.62	0.95	0.37	0.02	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 27.9
 Intersection LOS: C

Lanes, Volumes, Timings
 9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 96.7% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.


































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

Splits and Phases: 9: Northampton Blvd/Station Access & Dundas St

Ø1 Ø2 (R)	Ø4
11 s 89 s	40 s
Ø6 (M)	Ø8
100 s	40 s

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 	 	
Traffic Volume (vph)	302	2112	318	251	818	42	321	475	416	100	433	219
Future Volume (vph)	302	2112	318	251	818	42	321	475	416	100	433	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00		0.97	1.00		0.98	1.00		0.98	1.00		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	5036	1570	3372	4848	1458	3437	3579	1570	3541	3544	1617
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3457	5036	1529	3369	4848	1428	3423	3579	1539	3527	3544	1585
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			197			156			158			238
Link Speed (k/h)		60			60			60				60
Link Distance (m)		410.9			222.4			234.7				489.7
Travel Time (s)		24.7			13.3			14.1				29.4
Confl. Peds. (#/hr)	7		12	12		7	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	4%	5%	7%	12%	3%	2%	4%	0%	3%	1%
Adj. Flow (vph)	328	2296	346	273	889	46	349	516	452	109	471	238
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	2296	346	273	889	46	349	516	452	109	471	238
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0	44.0	11.0	44.0	44.0
Total Split (s)	24.0	66.0	66.0	14.0	56.0	56.0	16.0	49.0	49.0	11.0	44.0	44.0
Total Split (%)	17.1%	47.1%	47.1%	10.0%	40.0%	40.0%	11.4%	35.0%	35.0%	7.9%	31.4%	31.4%
Maximum Green (s)	20.0	59.0	59.0	10.0	49.0	49.0	12.0	42.0	42.0	7.0	37.0	37.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	17.7	60.4	60.4	15.2	57.9	57.9	12.0	35.4	35.4	7.0	30.4	30.4
Actuated g/C Ratio	0.13	0.43	0.43	0.11	0.41	0.41	0.09	0.25	0.25	0.05	0.22	0.22
v/c Ratio	0.75	1.06	0.45	0.74	0.44	0.07	1.19	0.57	0.89	0.62	0.61	0.45
Control Delay	75.7	63.3	10.5	73.2	31.9	0.2	166.2	47.5	52.6	80.5	52.3	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.7	63.3	10.5	73.2	31.9	0.2	166.2	47.5	52.6	80.5	52.3	7.5
LOS	E	E	B	E	C	A	F	D	D	F	D	A
Approach Delay		58.5			40.0			80.7			43.0	
Approach LOS		E			D			F			D	
Queue Length 50th (m)	48.6	~258.0	12.1	38.7	67.4	0.0	~59.7	64.4	81.7	15.5	61.1	0.0
Queue Length 95th (m)	m62.2	m#287.0	m30.9	#73.9	86.2	0.0	#91.1	78.8	122.2	25.6	75.8	20.1
Internal Link Dist (m)		386.9			198.4			210.7			465.7	
Turn Bay Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Base Capacity (vph)	495	2172	771	367	2004	682	294	1073	572	177	936	593
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	1.06	0.45	0.74	0.44	0.07	1.19	0.48	0.79	0.62	0.50	0.40

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 20 (14%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.19
 Intersection Signal Delay: 57.6
 Intersection LOS: E

Lanes, Volumes, Timings
 10: Walkers Line & Dundas St

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 91.4% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	3	19	108	17	4	105	247	157	9	116	17
Future Volume (vph)	3	3	19	108	17	4	105	247	157	9	116	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.869			0.973			0.942			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1637	0	1789	1833	0	1789	3371	0	1789	1848	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1789	1637	0	1789	1833	0	1789	3371	0	1789	1848	0
Link Speed (k/h)		48			48			48			60	
Link Distance (m)		231.7			259.9			489.7			140.2	
Travel Time (s)		17.4			19.5			36.7			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	3	3	21	117	18	4	114	268	171	10	126	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	24	0	117	22	0	114	439	0	10	144	0
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other


































Control Type: Unsignalized

Intersection Capacity Utilization 37.8% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  		  		
Traffic Volume (vph)	57	1007	199	800	2298	138	339	377	340	142	553	203
Future Volume (vph)	57	1007	199	800	2298	138	339	377	340	142	553	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	120.0		75.0	100.0		0.0	75.0		75.0
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Ped Bike Factor								0.99		1.00		
Fr _t			0.850			0.850		0.929				0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	5136	1617	3437	5085	1570	1789	4724	0	1738	3579	1617
Fl _t Permitted	0.950			0.950			0.190			0.197		
Satd. Flow (perm)	3541	5136	1617	3437	5085	1570	358	4724	0	360	3579	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			170			94			150			125
Link Speed (k/h)		80			80			60				60
Link Distance (m)		243.2			474.9			244.1				225.7
Travel Time (s)		10.9			21.4			14.6				13.5
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	3%	2%	4%	2%	1%	4%	5%	2%	1%
Adj. Flow (vph)	62	1095	216	870	2498	150	368	410	370	154	601	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	1095	216	870	2498	150	368	780	0	154	601	221
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	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	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	6.1	1.8	6.1	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6	4			8		8
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	11.0	46.0	46.0	11.0	46.0	46.0	11.0	39.0		11.0	39.0	39.0
Total Split (s)	11.0	47.0	47.0	36.0	72.0	72.0	18.0	39.0		18.0	39.0	39.0
Total Split (%)	7.9%	33.6%	33.6%	25.7%	51.4%	51.4%	12.9%	27.9%		12.9%	27.9%	27.9%
Maximum Green (s)	7.0	40.0	40.0	32.0	65.0	65.0	14.0	32.0		14.0	32.0	32.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	0.0	0.0	-2.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	3.0	7.0	7.0	2.0	7.0		4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		32.0	32.0		32.0	32.0		25.0			25.0	25.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	7.2	40.0	40.0	35.9	70.0	70.0	50.8	30.3		44.9	29.1	29.1
Actuated g/C Ratio	0.05	0.29	0.29	0.26	0.50	0.50	0.36	0.22		0.32	0.21	0.21
v/c Ratio	0.34	0.75	0.37	0.99	0.98	0.18	1.26	0.68		0.64	0.81	0.51
Control Delay	69.6	49.2	11.8	78.8	49.3	9.1	171.1	43.7		43.8	61.9	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	69.6	49.2	11.8	78.8	49.3	9.1	171.1	43.7		43.8	61.9	24.6
LOS	E	D	B	E	D	A	F	D		D	E	C
Approach Delay		44.2			54.9			84.5			50.6	
Approach LOS		D			D			F			D	
Queue Length 50th (m)	8.6	102.2	9.4	~131.1	~276.4	8.4	~100.8	59.7		29.6	83.3	22.6
Queue Length 95th (m)	16.4	119.4	30.3	#177.3	#307.1	21.3	#160.5	73.6		45.8	103.0	47.6
Internal Link Dist (m)		219.2			450.9			220.1			201.7	
Turn Bay Length (m)	130.0		60.0	120.0		75.0	100.0			75.0		75.0
Base Capacity (vph)	181	1467	583	882	2540	831	293	1195		256	818	466
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.34	0.75	0.37	0.99	0.98	0.18	1.26	0.65		0.60	0.73	0.47

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.26
Intersection Signal Delay:	57.0
Intersection LOS:	E

Lanes, Volumes, Timings
 1: Guelph Line & Dundas St

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 102.6% ICU Level of Service G

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Guelph Line & Dundas St

Ø1 36 s		Ø2 (R) 47 s		Ø3 18 s		Ø4 39 s	
Ø5 11 s		Ø6 (R) 72 s		Ø7 18 s		Ø8 39 s	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↓↓↓	↓
Traffic Volume (vph)	0	1417	2467	0	240	770
Future Volume (vph)	0	1417	2467	0	240	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	*0.90	*0.90	1.00	0.97	0.91
Frt					0.908	0.850
Flt Protected					0.981	
Satd. Flow (prot)	0	5085	5036	0	3216	1429
Flt Permitted					0.981	
Satd. Flow (perm)	0	5085	5036	0	3216	1429
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					2	2
Link Speed (k/h)		80	80		60	
Link Distance (m)		190.2	108.5		410.5	
Travel Time (s)		8.6	4.9		24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	0%	2%	4%
Adj. Flow (vph)	0	1540	2682	0	261	837
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	1540	2682	0	680	418
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		88.0	88.0		52.0	52.0
Total Split (%)		62.9%	62.9%		37.1%	37.1%
Maximum Green (s)		81.0	81.0		46.0	46.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		81.1	81.1		42.9	42.9
Actuated g/C Ratio		0.59	0.59		0.31	0.31
v/c Ratio		0.51	0.90		0.85dr	0.93
Control Delay		17.5	30.2		44.5	74.2
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.5	30.2		44.5	74.2
LOS		B	C		D	E
Approach Delay		17.5	30.2		55.8	
Approach LOS		B	C		E	
Queue Length 50th (m)		91.5	237.9		82.3	120.0
Queue Length 95th (m)		104.1	262.0		103.0	#186.0
Internal Link Dist (m)		166.2	84.5		386.5	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3010	2981		1082	481
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.51	0.90		0.63	0.87

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	137
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	31.8
Intersection LOS:	C
Intersection Capacity Utilization:	76.7%
ICU Level of Service:	D
Analysis Period (min):	15
* User Entered Value	

Lanes, Volumes, Timings
 4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
 09-18-2019

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

PM Peak Period
09-18-2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	1431	0	0	2450	89	208
Future Volume (vph)	1431	0	0	2450	89	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	*0.90	1.00	1.00	*0.90	0.97	0.91
Fr _t					0.919	0.850
Fl _t Protected					0.977	
Satd. Flow (prot)	5085	0	0	5136	3208	1457
Fl _t Permitted					0.977	
Satd. Flow (perm)	5085	0	0	5136	3208	1457
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					43	43
Link Speed (k/h)	80			80	60	
Link Distance (m)	103.7			180.7	413.3	
Travel Time (s)	4.7			8.1	24.8	
Peak Hour Factor	0.85	0.92	0.92	0.85	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	7%	2%
Adj. Flow (vph)	1684	0	0	2882	97	226
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	1684	0	0	2882	210	113
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	33.0			33.0	35.0	35.0
Total Split (s)	105.0			105.0	35.0	35.0
Total Split (%)	75.0%			75.0%	25.0%	25.0%
Maximum Green (s)	98.0			98.0	29.0	29.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	98.2			98.2	12.3	12.3
Actuated g/C Ratio	0.80			0.80	0.10	0.10
v/c Ratio	0.42			0.71	0.59	0.62
Control Delay	4.4			7.5	48.7	47.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	4.4			7.5	48.7	47.7
LOS	A			A	D	D
Approach Delay	4.4			7.5	48.4	
Approach LOS	A			A	D	
Queue Length 50th (m)	37.0			96.7	20.1	17.9
Queue Length 95th (m)	51.0			124.1	32.3	38.9
Internal Link Dist (m)	79.7			156.7	389.3	
Turn Bay Length (m)						80.0
Base Capacity (vph)	4043			4083	786	375
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.42			0.71	0.27	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	123.5
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	9.1
Intersection LOS:	A
Intersection Capacity Utilization:	64.8%
ICU Level of Service:	C
Analysis Period (min):	15
* User Entered Value	

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

→ Ø2	↖ Ø8
105 s	35 s
← Ø6	
105 s	

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	1428	143	245	2387	67	65	3	135	135	3	134
Future Volume (vph)	68	1428	143	245	2387	67	65	3	135	135	3	134
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	75.0		75.0	0.0		50.0	30.0		30.0
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*0.90	1.00	1.00	*0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97			0.97		0.99	0.99	1.00		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950				0.954		0.950		
Satd. Flow (prot)	1201	5085	1617	1825	5136	1286	0	1784	1633	1496	1921	1219
Fl _t Permitted	0.049			0.106				0.733		0.709		
Satd. Flow (perm)	62	5085	1566	204	5136	1242	0	1358	1611	1115	1921	1192
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			66			147			133
Link Speed (k/h)		80			60			48				48
Link Distance (m)		434.8			410.9			142.2				132.3
Travel Time (s)		19.6			24.7			10.7				9.9
Confl. Peds. (#/hr)	5		4	4		5	7		1	1		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	52%	2%	1%	0%	1%	27%	0%	67%	0%	22%	0%	34%
Adj. Flow (vph)	74	1552	155	266	2595	73	71	3	147	147	3	146
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	1552	155	266	2595	73	0	74	147	147	3	146
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	6.0	8.0	8.0	5.0	5.0	5.0	8.0	8.0	8.0
Minimum Split (s)	9.5	31.0	31.0	11.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (s)	15.0	74.0	74.0	28.0	87.0	87.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	10.7%	52.9%	52.9%	20.0%	62.1%	62.1%	27.1%	27.1%	27.1%	27.1%	27.1%	27.1%
Maximum Green (s)	10.5	68.0	68.0	24.0	81.0	81.0	31.0	31.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	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	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.0	6.0	6.0		7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0	17.0		17.0	17.0	22.0	22.0	22.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)		0	0		0	0	0	0	0	0	0	0
Act Effct Green (s)	92.3	82.0	82.0	105.8	90.5	90.5		23.2	23.2	23.2	23.2	23.2
Actuated g/C Ratio	0.66	0.59	0.59	0.76	0.65	0.65		0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.66	0.52	0.16	0.74	0.78	0.09		0.33	0.38	0.80	0.01	0.47
Control Delay	57.5	19.7	3.1	41.3	10.3	2.1		53.5	9.6	84.7	44.3	14.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	57.5	19.7	3.1	41.3	10.3	2.1		53.5	9.6	84.7	44.3	14.8
LOS	E	B	A	D	B	A		D	A	F	D	B
Approach Delay		19.8			12.9			24.3				49.8
Approach LOS		B			B			C				D
Queue Length 50th (m)	9.4	92.6	0.0	50.5	69.6	0.8		18.2	0.0	39.4	0.7	3.1
Queue Length 95th (m)	#31.5	131.1	11.5	m49.1	m68.4	m0.8		31.6	17.4	60.6	3.3	21.7
Internal Link Dist (m)		410.8			386.9			118.2				108.3
Turn Bay Length (m)	85.0		90.0	75.0		75.0			50.0	30.0		30.0
Base Capacity (vph)	129	2978	981	432	3321	826		300	471	246	425	367
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.57	0.52	0.16	0.62	0.78	0.09		0.25	0.31	0.60	0.01	0.40

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 17.8
 Intersection LOS: B

Lanes, Volumes, Timings
 9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 81.1% ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

























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

Splits and Phases: 9: Northampton Blvd/Station Access & Dundas St



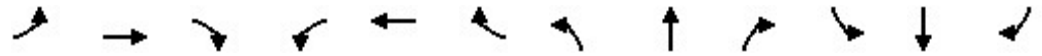
Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	1271	257	431	2011	65	438	568	292	70	537	322
Future Volume (vph)	216	1271	257	431	2011	65	438	568	292	70	537	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.97	0.99		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3506	5085	1585	3506	5085	1633	3506	3650	1633	3541	3614	1633
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3503	5085	1555	3499	5085	1596	3493	3650	1586	3515	3614	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			224			125			162			156
Link Speed (k/h)		60			60			60				60
Link Distance (m)		410.9			222.3			234.9				475.8
Travel Time (s)		24.7			13.3			14.1				28.5
Confl. Peds. (#/hr)	9		6	6		9	7		15	15		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	1%	0%	0%	0%	1%	0%
Adj. Flow (vph)	235	1382	279	468	2186	71	476	617	317	76	584	350
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	1382	279	468	2186	71	476	617	317	76	584	350
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0	44.0	11.0	44.0	44.0
Total Split (s)	12.0	52.0	52.0	23.0	63.0	63.0	21.0	54.0	54.0	11.0	44.0	44.0
Total Split (%)	8.6%	37.1%	37.1%	16.4%	45.0%	45.0%	15.0%	38.6%	38.6%	7.9%	31.4%	31.4%
Maximum Green (s)	8.0	45.0	45.0	19.0	56.0	56.0	17.0	47.0	47.0	7.0	37.0	37.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	14.4	47.9	47.9	22.9	56.4	56.4	17.0	40.2	40.2	7.0	30.2	30.2
Actuated g/C Ratio	0.10	0.34	0.34	0.16	0.40	0.40	0.12	0.29	0.29	0.05	0.22	0.22
v/c Ratio	0.65	0.79	0.41	0.82	1.07	0.10	1.12	0.59	0.56	0.43	0.75	0.75
Control Delay	69.7	43.9	14.9	68.6	80.9	0.3	134.9	44.8	23.0	72.4	57.4	37.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.7	43.9	14.9	68.6	80.9	0.3	134.9	44.8	23.0	72.4	57.4	37.9
LOS	E	D	B	E	F	A	F	D	C	E	E	D
Approach Delay		42.8			76.7			70.3			51.8	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	34.0	71.2	3.5	63.7	~248.7	0.0	~77.9	77.2	35.7	10.7	80.2	51.8
Queue Length 95th (m)	#68.7	125.8	44.2	#102.1	#276.8	0.3	#112.2	90.0	61.4	19.2	94.7	82.8
Internal Link Dist (m)		386.9			198.3			210.9			451.8	
Turn Bay Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Base Capacity (vph)	361	1739	678	574	2048	717	425	1225	640	177	955	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.79	0.41	0.82	1.07	0.10	1.12	0.50	0.50	0.43	0.61	0.65

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	134 (96%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.12
Intersection Signal Delay:	62.7
Intersection LOS:	E

Intersection Capacity Utilization 94.0% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.






















Queue shown is maximum after two cycles.

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	15	87	267	4	10	22	301	39	7	303	4
Future Volume (vph)	15	15	87	267	4	10	22	301	39	7	303	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Frt		0.872			0.890			0.984				0.998
Flt Protected	0.950			0.950				0.997		0.950		
Satd. Flow (prot)	1789	1642	0	1789	1676	0	0	3511	0	1700	1786	0
Flt Permitted	0.950			0.950				0.997		0.950		
Satd. Flow (perm)	1789	1642	0	1789	1676	0	0	3511	0	1700	1786	0
Link Speed (k/h)		48			48			48				60
Link Distance (m)		389.3			185.8			475.8				150.0
Travel Time (s)		29.2			13.9			35.7				9.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	16	95	290	4	11	24	327	42	8	329	4
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	16	111	0	290	15	0	0	393	0	7	334	0
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	



































Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.5%
ICU Level of Service	A
Analysis Period (min)	15

Appendix C-: Future Total Conditions Synchro Output

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  			 	
Traffic Volume (vph)	166	2088	325	333	772	142	120	355	691	165	335	61
Future Volume (vph)	166	2088	325	333	772	142	120	355	691	165	335	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	120.0		75.0	100.0		0.0	75.0		75.0
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	1.00	*1.00	0.91	1.00	0.95	1.00
Frt			0.850			0.850		0.901				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3404	5085	1601	3248	4893	1420	1706	4993	0	1738	3510	1484
Flt Permitted	0.950			0.950			0.396			0.151		
Satd. Flow (perm)	3404	5085	1601	3248	4893	1420	711	4993	0	276	3510	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			182			154		162				94
Link Speed (k/h)		80			80			60				60
Link Distance (m)		243.3			423.0			244.1				225.7
Travel Time (s)		10.9			19.0			14.6				13.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	9%	6%	15%	7%	4%	4%	5%	4%	10%
Adj. Flow (vph)	180	2270	353	362	839	154	130	386	751	179	364	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	180	2270	353	362	839	154	130	1137	0	179	364	66
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	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	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	6.1	1.8	6.1	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3		8

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6	4			8		8
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	11.0	46.0	46.0	11.0	46.0	46.0	11.0	15.0		11.0	15.0	15.0
Total Split (s)	16.0	73.0	73.0	19.0	76.0	76.0	15.0	34.0		14.0	33.0	33.0
Total Split (%)	11.4%	52.1%	52.1%	13.6%	54.3%	54.3%	10.7%	24.3%		10.0%	23.6%	23.6%
Maximum Green (s)	12.0	66.0	66.0	15.0	69.0	69.0	11.0	27.0		10.0	26.0	26.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	3.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0						
Flash Dont Walk (s)		32.0	32.0		32.0	32.0						
Pedestrian Calls (#/hr)		0	0		0	0						
Act Effct Green (s)	11.3	66.0	66.0	16.0	69.7	69.7	40.5	27.0		39.5	26.5	26.5
Actuated g/C Ratio	0.08	0.47	0.47	0.11	0.50	0.50	0.29	0.19		0.28	0.19	0.19
v/c Ratio	0.66	0.95	0.42	0.98	0.34	0.20	0.46	1.73dr		0.98	0.55	0.19
Control Delay	74.3	45.1	12.7	102.2	21.9	3.4	41.8	84.7		103.5	55.1	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	74.3	45.1	12.7	102.2	21.9	3.4	41.8	84.7		103.5	55.1	4.7
LOS	E	D	B	F	C	A	D	F		F	E	A
Approach Delay		42.9			41.2			80.3			63.9	
Approach LOS		D			D			F			E	
Queue Length 50th (m)	25.2	218.0	28.5	52.3	51.4	0.0	26.8	~100.2		37.9	48.7	0.0
Queue Length 95th (m)	37.8	#242.4	52.5	#83.9	61.7	11.3	43.8	#127.2		#81.3	65.3	6.3
Internal Link Dist (m)		219.3			399.0			220.1			201.7	
Turn Bay Length (m)	130.0		60.0	120.0		75.0	100.0			75.0		75.0
Base Capacity (vph)	291	2397	850	371	2436	784	286	1093		182	663	356
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.62	0.95	0.42	0.98	0.34	0.20	0.45	1.04		0.98	0.55	0.19

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	115
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.04
Intersection Signal Delay:	52.5
Intersection LOS:	D
Intersection Capacity Utilization:	99.8%
ICU Level of Service:	F
Analysis Period (min):	15

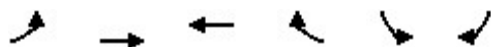
- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 1: Guelph Line & Dundas St

↙ Ø1	↘ Ø2 (R)	↙ Ø3	↕ Ø4
19 s	73 s	14 s	34 s
↙ Ø5	↘ Ø6 (R)	↙ Ø7	↕ Ø8
16 s	76 s	15 s	33 s

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↑↑↑	↑
Traffic Volume (vph)	0	2885	1096	0	69	150
Future Volume (vph)	0	2885	1096	0	69	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	*0.90	*0.90	1.00	0.97	0.91
Frt					0.922	0.850
Flt Protected					0.977	
Satd. Flow (prot)	0	5036	4715	0	2969	1292
Flt Permitted					0.977	
Satd. Flow (perm)	0	5036	4715	0	2969	1292
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					82	81
Link Speed (k/h)		80	80		60	
Link Distance (m)		242.0	124.9		392.8	
Travel Time (s)		10.9	5.6		23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	10%	0%	11%	15%
Adj. Flow (vph)	0	3136	1191	0	75	163
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	3136	1191	0	157	81
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		100.0	100.0		40.0	40.0
Total Split (%)		71.4%	71.4%		28.6%	28.6%
Maximum Green (s)		93.0	93.0		34.0	34.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		93.0	93.0		34.0	34.0
Actuated g/C Ratio		0.66	0.66		0.24	0.24
v/c Ratio		0.94	0.38		0.20	0.22
Control Delay		27.9	11.0		20.8	9.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		27.9	11.0		20.8	9.9
LOS		C	B		C	A
Approach Delay		27.9	11.0		17.1	
Approach LOS		C	B		B	
Queue Length 50th (m)		266.6	51.0		8.4	0.0
Queue Length 95th (m)		292.4	59.4		17.6	14.3
Internal Link Dist (m)		218.0	100.9		368.8	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3345	3132		783	375
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.94	0.38		0.20	0.22

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Natural Cycle:	120
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	22.9
Intersection Capacity Utilization	94.9%
Analysis Period (min)	15
* User Entered Value	
Intersection LOS:	C
ICU Level of Service	F

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp

→ Ø2 100 s	↘ Ø4 40 s
← Ø6 100 s	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

AM Peak Period
09-18-2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	2226	0	0	1126	34	211
Future Volume (vph)	2226	0	0	1126	34	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	*0.90	1.00	1.00	*0.90	0.97	0.91
Frt					0.887	0.850
Flt Protected					0.988	
Satd. Flow (prot)	4988	0	0	4759	3062	1429
Flt Permitted					0.988	
Satd. Flow (perm)	4988	0	0	4759	3062	1429
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					9	9
Link Speed (k/h)	80			80	60	
Link Distance (m)	146.5			232.3	320.5	
Travel Time (s)	6.6			10.5	19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	0%	9%	15%	4%
Adj. Flow (vph)	2420	0	0	1224	37	229
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	2420	0	0	1224	152	114
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	32.0			32.0	33.0	33.0
Total Split (s)	104.0			104.0	36.0	36.0
Total Split (%)	74.3%			74.3%	25.7%	25.7%
Maximum Green (s)	97.0			97.0	30.0	30.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	97.4			97.4	14.5	14.5
Actuated g/C Ratio	0.78			0.78	0.12	0.12
v/c Ratio	0.62			0.33	0.42	0.66
Control Delay	7.2			4.6	51.2	66.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	7.2			4.6	51.2	66.3
LOS	A			A	D	E
Approach Delay	7.2			4.6	57.7	
Approach LOS	A			A	E	
Queue Length 50th (m)	78.8			27.5	17.0	27.3
Queue Length 95th (m)	116.1			42.5	27.2	48.6
Internal Link Dist (m)	122.5			208.3	296.5	
Turn Bay Length (m)						80.0
Base Capacity (vph)	3890			3711	743	350
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.62			0.33	0.20	0.33

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	124.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	9.8
Intersection Capacity Utilization	48.0%
Analysis Period (min)	15
* User Entered Value	
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

→ Ø2	↖ Ø8
104 s	36 s
← Ø6	
104 s	

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
09-18-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	2188	70	92	1098	163	170	23	384	60	13	95
Future Volume (vph)	250	2188	70	92	1098	163	170	23	384	60	13	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	75.0		75.0	0.0		50.0	30.0		30.0
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*0.90	1.00	1.00	*0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96			0.98		0.98	0.99	1.00		0.97
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950				0.958		0.950		
Satd. Flow (prot)	1323	5085	1617	1772	4988	1317	0	1767	1601	1242	1921	1150
Fl _t Permitted	0.146			0.062				0.741		0.489		
Satd. Flow (perm)	203	5085	1557	116	4988	1287	0	1340	1579	638	1921	1110
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62			169			125			103
Link Speed (k/h)		80			60			50				50
Link Distance (m)		383.1			410.9			142.3				135.8
Travel Time (s)		17.2			24.7			10.2				9.8
Confl. Peds. (#/hr)	1		6	6		1	16		1	1		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	38%	2%	1%	3%	4%	24%	2%	20%	2%	47%	0%	42%
Adj. Flow (vph)	272	2378	76	100	1193	177	185	25	417	65	14	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	272	2378	76	100	1193	177	0	210	417	65	14	103
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	36.0	36.0	11.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (s)	40.9	81.0	81.0	13.0	53.1	53.1	46.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	29.2%	57.9%	57.9%	9.3%	37.9%	37.9%	32.9%	32.9%	32.9%	32.9%	32.9%	32.9%
Maximum Green (s)	36.4	75.0	75.0	9.0	47.1	47.1	39.0	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.5	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	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	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.0	6.0	6.0		7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0	17.0		17.0	17.0	22.0	22.0	22.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)		0	0		0	0	0	0	0	0	0	0
Act Effct Green (s)	95.8	82.3	82.3	74.1	64.1	64.1		32.7	32.7	32.7	32.7	32.7
Actuated g/C Ratio	0.68	0.59	0.59	0.53	0.46	0.46		0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.79	0.80	0.08	0.64	0.52	0.26		0.67	0.90	0.44	0.03	0.31
Control Delay	38.2	26.3	5.1	44.2	46.5	23.2		58.9	58.4	53.6	38.0	9.3
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	38.2	26.3	5.1	44.2	46.5	23.2		58.9	58.4	53.6	38.0	9.3
LOS	D	C	A	D	D	C		E	E	D	D	A
Approach Delay		26.9			43.5			58.6			27.3	
Approach LOS		C			D			E			C	
Queue Length 50th (m)	41.3	189.7	1.6	17.5	102.0	14.9		52.3	81.3	15.2	3.0	0.0
Queue Length 95th (m)	73.9	228.2	9.4	m27.3	m129.4	m36.9		76.9	119.1	29.3	8.4	14.1
Internal Link Dist (m)		359.1			386.9			118.3			111.8	
Turn Bay Length (m)	85.0		90.0	75.0		75.0			50.0	30.0		30.0
Base Capacity (vph)	429	2989	940	168	2283	680		373	530	177	535	383
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.63	0.80	0.08	0.60	0.52	0.26		0.56	0.79	0.37	0.03	0.27

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.90
Intersection Signal Delay:	35.7
Intersection LOS:	D

Lanes, Volumes, Timings
 9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 96.7% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value



































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

Splits and Phases: 9: Northampton Blvd/Station Access & Dundas St



Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  		 	 		 	 	
Traffic Volume (vph)	302	2119	318	251	844	42	321	540	416	100	451	219
Future Volume (vph)	302	2119	318	251	844	42	321	540	416	100	451	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00		0.97	1.00		0.98	1.00		0.98	1.00		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	5036	1570	3372	4848	1458	3437	3579	1570	3541	3544	1617
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3458	5036	1529	3369	4848	1428	3424	3579	1539	3528	3544	1585
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			196			156			158			238
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.9			222.4			234.7			489.7	
Travel Time (s)		24.7			13.3			14.1			29.4	
Confl. Peds. (#/hr)	7		12	12		7	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	4%	5%	7%	12%	3%	2%	4%	0%	3%	1%
Adj. Flow (vph)	328	2303	346	273	917	46	349	587	452	109	490	238
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	2303	346	273	917	46	349	587	452	109	490	238
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)		7.4			7.4			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0	44.0	11.0	44.0	44.0
Total Split (s)	24.0	66.0	66.0	14.0	56.0	56.0	16.0	49.0	49.0	11.0	44.0	44.0
Total Split (%)	17.1%	47.1%	47.1%	10.0%	40.0%	40.0%	11.4%	35.0%	35.0%	7.9%	31.4%	31.4%
Maximum Green (s)	20.0	59.0	59.0	10.0	49.0	49.0	12.0	42.0	42.0	7.0	37.0	37.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	17.7	60.2	60.2	15.1	57.5	57.5	12.0	35.8	35.8	7.0	30.8	30.8
Actuated g/C Ratio	0.13	0.43	0.43	0.11	0.41	0.41	0.09	0.26	0.26	0.05	0.22	0.22
v/c Ratio	0.75	1.06	0.45	0.75	0.46	0.07	1.19	0.64	0.89	0.62	0.63	0.45
Control Delay	76.1	63.4	4.0	74.0	32.4	0.2	166.2	49.2	51.4	80.5	52.5	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.1	63.4	4.0	74.0	32.4	0.2	166.2	49.2	51.4	80.5	52.5	7.5
LOS	E	E	A	E	C	A	F	D	D	F	D	A
Approach Delay		57.9			40.4			79.3			43.3	
Approach LOS		E			D			E			D	
Queue Length 50th (m)	41.4	~266.1	14.9	38.9	70.6	0.0	~59.7	74.5	81.1	15.5	63.4	0.0
Queue Length 95th (m)	m54.7	#288.7	m11.1	#73.9	89.4	0.0	#91.1	90.5	122.2	25.6	79.1	20.1
Internal Link Dist (m)		386.9			198.4			210.7			465.7	
Turn Bay Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Base Capacity (vph)	495	2164	768	362	1990	678	294	1073	572	177	936	593
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	1.06	0.45	0.75	0.46	0.07	1.19	0.55	0.79	0.62	0.52	0.40

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 20 (14%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.19
 Intersection Signal Delay: 57.3
 Intersection LOS: E

Intersection Capacity Utilization 91.9% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.























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

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	7	37	108	30	4	170	247	157	9	116	43
Future Volume (vph)	10	7	37	108	30	4	170	247	157	9	116	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.875			0.984			0.942			0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1648	0	1789	1853	0	1789	3371	0	1789	1806	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1789	1648	0	1789	1853	0	1789	3371	0	1789	1806	0
Link Speed (k/h)		48			48			48			60	
Link Distance (m)		231.7			259.9			489.7			140.2	
Travel Time (s)		17.4			19.5			36.7			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	8	40	117	33	4	185	268	171	10	126	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	48	0	117	37	0	185	439	0	10	173	0
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

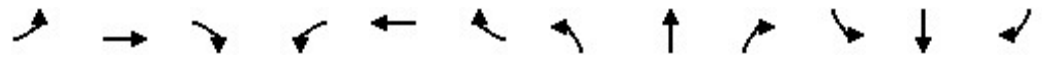
Control Type: Unsignalized

Intersection Capacity Utilization 40.8% ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↖	↑↑↑	↗	↖↖	↑↑↑	↗	↖	↑↑↑		↗	↑↑	↗
Traffic Volume (vph)	57	1015	199	833	2320	149	339	377	351	146	553	203
Future Volume (vph)	57	1015	199	833	2320	149	339	377	351	146	553	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	120.0		75.0	100.0		0.0	75.0		75.0
Storage Lanes	2		1	2		1	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Ped Bike Factor								0.99		1.00		
Fr _t			0.850			0.850		0.928				0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	5136	1617	3437	5085	1570	1789	4717	0	1738	3579	1617
Fl _t Permitted	0.950			0.950			0.191			0.188		
Satd. Flow (perm)	3541	5136	1617	3437	5085	1570	360	4717	0	344	3579	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			169			94			155			125
Link Speed (k/h)		80			80			60				60
Link Distance (m)		243.2			474.9			244.1				225.7
Travel Time (s)		10.9			21.4			14.6				13.5
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	3%	2%	4%	2%	1%	4%	5%	2%	1%
Adj. Flow (vph)	62	1103	216	905	2522	162	368	410	382	159	601	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	1103	216	905	2522	162	368	792	0	159	601	221
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	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	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	6.1	1.8	6.1	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6	4			8		8
Detector Phase	5	2	2	1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0		7.0	8.0	8.0
Minimum Split (s)	11.0	46.0	46.0	11.0	46.0	46.0	11.0	39.0		11.0	39.0	39.0
Total Split (s)	11.0	47.0	47.0	36.0	72.0	72.0	18.0	39.0		18.0	39.0	39.0
Total Split (%)	7.9%	33.6%	33.6%	25.7%	51.4%	51.4%	12.9%	27.9%		12.9%	27.9%	27.9%
Maximum Green (s)	7.0	40.0	40.0	32.0	65.0	65.0	14.0	32.0		14.0	32.0	32.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	3.0		1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	0.0	0.0	-2.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	3.0	7.0	7.0	2.0	7.0		4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		32.0	32.0		32.0	32.0		25.0			25.0	25.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	7.2	40.0	40.0	35.9	70.0	70.0	50.8	30.2		45.0	29.1	29.1
Actuated g/C Ratio	0.05	0.29	0.29	0.26	0.50	0.50	0.36	0.22		0.32	0.21	0.21
v/c Ratio	0.34	0.75	0.37	1.03	0.99	0.19	1.26	0.70		0.67	0.81	0.51
Control Delay	69.6	49.3	12.0	87.7	51.4	9.9	171.1	43.8		45.4	61.9	24.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	69.6	49.3	12.0	87.7	51.4	9.9	171.1	43.8		45.4	61.9	24.6
LOS	E	D	B	F	D	A	F	D		D	E	C
Approach Delay		44.4			58.7			84.2			50.8	
Approach LOS		D			E			F			D	
Queue Length 50th (m)	8.6	103.2	9.6	~141.4	~281.5	10.2	~100.5	60.6		30.6	83.3	22.6
Queue Length 95th (m)	16.4	120.3	30.6	#187.9	#312.0	23.9	#160.2	74.5		47.2	103.0	47.6
Internal Link Dist (m)		219.2			450.9			220.1			201.7	
Turn Bay Length (m)	130.0		60.0	120.0		75.0	100.0			75.0		75.0
Base Capacity (vph)	181	1467	582	882	2540	831	293	1197		252	818	466
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.34	0.75	0.37	1.03	0.99	0.19	1.26	0.66		0.63	0.73	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.26
 Intersection Signal Delay: 59.0
 Intersection LOS: E

Lanes, Volumes, Timings
 1: Guelph Line & Dundas St

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 103.1% ICU Level of Service G

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Guelph Line & Dundas St

Ø1 36 s		Ø2 (R) 47 s		Ø3 18 s		Ø4 39 s	
Ø5 11 s		Ø6 (R) 72 s		Ø7 18 s		Ø8 39 s	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↓↓↓	↓
Traffic Volume (vph)	0	1439	2532	0	244	770
Future Volume (vph)	0	1439	2532	0	244	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	*0.90	*0.90	1.00	0.97	0.91
Frt					0.908	0.850
Flt Protected					0.981	
Satd. Flow (prot)	0	5085	5036	0	3216	1429
Flt Permitted					0.981	
Satd. Flow (perm)	0	5085	5036	0	3216	1429
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					1	1
Link Speed (k/h)		80	80		60	
Link Distance (m)		190.2	108.5		410.5	
Travel Time (s)		8.6	4.9		24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	0%	2%	4%
Adj. Flow (vph)	0	1564	2752	0	265	837
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	1564	2752	0	684	418
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		88.0	88.0		52.0	52.0
Total Split (%)		62.9%	62.9%		37.1%	37.1%
Maximum Green (s)		81.0	81.0		46.0	46.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		81.1	81.1		42.9	42.9
Actuated g/C Ratio		0.59	0.59		0.31	0.31
v/c Ratio		0.52	0.92		0.85dr	0.93
Control Delay		17.6	32.2		44.7	74.4
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.6	32.2		44.7	74.4
LOS		B	C		D	E
Approach Delay		17.6	32.2		56.0	
Approach LOS		B	C		E	
Queue Length 50th (m)		93.7	251.6		83.0	120.3
Queue Length 95th (m)		106.3	276.8		103.9	#186.4
Internal Link Dist (m)		166.2	84.5		386.5	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3010	2980		1081	481
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.52	0.92		0.63	0.87

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	137
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	32.8
Intersection Capacity Utilization	77.1%
Analysis Period (min)	15
* User Entered Value	
Intersection LOS:	C
ICU Level of Service	D

Lanes, Volumes, Timings
 4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
 09-18-2019

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

PM Peak Period
09-18-2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	1460	0	0	2526	89	212
Future Volume (vph)	1460	0	0	2526	89	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	*0.90	1.00	1.00	*0.90	0.97	0.91
Frt					0.919	0.850
Flt Protected					0.978	
Satd. Flow (prot)	5085	0	0	5136	3212	1457
Flt Permitted					0.978	
Satd. Flow (perm)	5085	0	0	5136	3212	1457
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					40	40
Link Speed (k/h)	80			80	60	
Link Distance (m)	103.7			180.7	413.3	
Travel Time (s)	4.7			8.1	24.8	
Peak Hour Factor	0.85	0.92	0.92	0.85	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	7%	2%
Adj. Flow (vph)	1718	0	0	2972	97	230
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	1718	0	0	2972	212	115
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	33.0			33.0	35.0	35.0
Total Split (s)	105.0			105.0	35.0	35.0
Total Split (%)	75.0%			75.0%	25.0%	25.0%
Maximum Green (s)	98.0			98.0	29.0	29.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	98.2			98.2	12.6	12.6
Actuated g/C Ratio	0.79			0.79	0.10	0.10
v/c Ratio	0.43			0.73	0.58	0.62
Control Delay	4.6			8.1	49.3	49.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	4.6			8.1	49.3	49.4
LOS	A			A	D	D
Approach Delay	4.6			8.1	49.4	
Approach LOS	A			A	D	
Queue Length 50th (m)	38.6			105.1	20.7	19.2
Queue Length 95th (m)	53.9			135.4	33.0	40.4
Internal Link Dist (m)	79.7			156.7	389.3	
Turn Bay Length (m)						80.0
Base Capacity (vph)	4032			4073	783	372
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.43			0.73	0.27	0.31

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	123.8
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	9.6
Intersection Capacity Utilization	66.3%
Analysis Period (min)	15
* User Entered Value	
Intersection LOS:	A
ICU Level of Service	C

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

→ Ø2	↖ Ø8
105 s	35 s
← Ø6	
105 s	

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	1428	143	245	2387	75	65	7	135	157	14	221
Future Volume (vph)	97	1428	143	245	2387	75	65	7	135	157	14	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	75.0		75.0	0.0		50.0	30.0		30.0
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*0.90	1.00	1.00	*0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97			0.97		0.99	0.99	1.00		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950				0.957		0.950		
Satd. Flow (prot)	1201	5085	1617	1825	5136	1286	0	1722	1633	1496	1921	1219
Fl _t Permitted	0.050			0.103				0.737		0.706		
Satd. Flow (perm)	63	5085	1566	198	5136	1242	0	1314	1611	1110	1921	1192
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			66			147			133
Link Speed (k/h)		80			60			48				48
Link Distance (m)		434.8			410.9			142.2				132.3
Travel Time (s)		19.6			24.7			10.7				9.9
Confl. Peds. (#/hr)	5		4	4		5	7		1	1		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	52%	2%	1%	0%	1%	27%	0%	67%	0%	22%	0%	34%
Adj. Flow (vph)	105	1552	155	266	2595	82	71	8	147	171	15	240
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	1552	155	266	2595	82	0	79	147	171	15	240
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	6.0	8.0	8.0	5.0	5.0	5.0	8.0	8.0	8.0
Minimum Split (s)	9.5	31.0	31.0	11.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (s)	15.0	74.0	74.0	28.0	87.0	87.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	10.7%	52.9%	52.9%	20.0%	62.1%	62.1%	27.1%	27.1%	27.1%	27.1%	27.1%	27.1%
Maximum Green (s)	10.5	68.0	68.0	24.0	81.0	81.0	31.0	31.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	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	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.0	6.0	6.0		7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0	17.0		17.0	17.0	22.0	22.0	22.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)		0	0		0	0	0	0	0	0	0	0
Act Effct Green (s)	91.9	79.5	79.5	102.7	85.9	85.9		25.7	25.7	25.7	25.7	25.7
Actuated g/C Ratio	0.66	0.57	0.57	0.73	0.61	0.61		0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.81	0.54	0.16	0.76	0.82	0.10		0.33	0.35	0.84	0.04	0.73
Control Delay	77.0	21.2	3.2	43.6	11.4	2.5		51.8	9.1	87.2	44.3	36.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	77.0	21.2	3.2	43.6	11.4	2.5		51.8	9.1	87.2	44.3	36.6
LOS	E	C	A	D	B	A		D	A	F	D	D
Approach Delay		22.9			14.1			24.0			57.2	
Approach LOS		C			B			C			E	
Queue Length 50th (m)	17.5	98.2	0.0	51.4	70.4	1.1		19.0	0.0	45.7	3.4	28.2
Queue Length 95th (m)	#54.6	131.1	11.5	m49.2	m67.7	m1.1		33.5	17.4	#74.2	9.3	57.7
Internal Link Dist (m)		410.8			386.9			118.2			108.3	
Turn Bay Length (m)	85.0		90.0	75.0		75.0			50.0	30.0		30.0
Base Capacity (vph)	133	2886	956	425	3152	787		290	471	245	425	367
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.79	0.54	0.16	0.63	0.82	0.10		0.27	0.31	0.70	0.04	0.65

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	20.8
Intersection LOS:	C

Lanes, Volumes, Timings
 9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 84.1% ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 9: Northampton Blvd/Station Access & Dundas St



Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	216	1293	257	431	2019	65	438	586	292	70	591	322
Future Volume (vph)	216	1293	257	431	2019	65	438	586	292	70	591	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.97	0.99		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3506	5085	1585	3506	5085	1633	3506	3650	1633	3541	3614	1633
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3503	5085	1555	3500	5085	1596	3494	3650	1586	3516	3614	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			221			125			157			156
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.9			222.3			234.9			475.8	
Travel Time (s)		24.7			13.3			14.1			28.5	
Confl. Peds. (#/hr)	9		6	6		9	7		15	15		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	1%	0%	0%	0%	1%	0%
Adj. Flow (vph)	235	1405	279	468	2195	71	476	637	317	76	642	350
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	1405	279	468	2195	71	476	637	317	76	642	350
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)		7.4			7.4			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0	44.0	11.0	44.0	44.0
Total Split (s)	12.0	52.0	52.0	23.0	63.0	63.0	21.0	54.0	54.0	11.0	44.0	44.0
Total Split (%)	8.6%	37.1%	37.1%	16.4%	45.0%	45.0%	15.0%	38.6%	38.6%	7.9%	31.4%	31.4%
Maximum Green (s)	8.0	45.0	45.0	19.0	56.0	56.0	17.0	47.0	47.0	7.0	37.0	37.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	12.9	46.8	46.8	22.1	56.0	56.0	17.0	42.1	42.1	7.0	32.1	32.1
Actuated g/C Ratio	0.09	0.33	0.33	0.16	0.40	0.40	0.12	0.30	0.30	0.05	0.23	0.23
v/c Ratio	0.73	0.83	0.42	0.85	1.08	0.10	1.12	0.58	0.54	0.43	0.77	0.72
Control Delay	73.9	47.5	16.8	72.1	85.2	0.4	134.9	43.4	22.8	72.4	57.2	35.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.9	47.5	16.8	72.1	85.2	0.4	134.9	43.4	22.8	72.4	57.2	35.4
LOS	E	D	B	E	F	A	F	D	C	E	E	D
Approach Delay		46.3			80.7			69.3			51.1	
Approach LOS		D			F			E			D	
Queue Length 50th (m)	34.1	80.2	7.0	64.9	~250.6	0.0	~77.9	78.4	36.1	10.7	88.0	50.7
Queue Length 95th (m)	#68.0	128.1	44.0	#102.1	#278.7	0.3	#112.2	93.2	62.7	19.2	105.1	82.8
Internal Link Dist (m)		386.9			198.3			210.9			451.8	
Turn Bay Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Base Capacity (vph)	322	1699	666	553	2034	713	425	1225	636	177	955	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.83	0.42	0.85	1.08	0.10	1.12	0.52	0.50	0.43	0.67	0.65

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 134 (96%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.12
 Intersection Signal Delay: 64.8
 Intersection LOS: E

Intersection Capacity Utilization 95.4% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	26	141	267	8	10	40	301	39	7	303	12
Future Volume (vph)	37	26	141	267	8	10	40	301	39	7	303	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Frt		0.873			0.917			0.985			0.994	
Flt Protected	0.950			0.950				0.995		0.950		
Satd. Flow (prot)	1789	1644	0	1789	1727	0	0	3507	0	1700	1779	0
Flt Permitted	0.950			0.950				0.995		0.950		
Satd. Flow (perm)	1789	1644	0	1789	1727	0	0	3507	0	1700	1779	0
Link Speed (k/h)		48			48			48			60	
Link Distance (m)		389.3			185.8			475.8			150.0	
Travel Time (s)		29.2			13.9			35.7			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	28	153	290	9	11	43	327	42	8	329	13
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	40	181	0	290	20	0	0	412	0	7	343	0
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	



































Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.0%
ICU Level of Service	C
Analysis Period (min)	15

Appendix D-: Future Improvement Conditions Synchro Output

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  			 	
Traffic Volume (vph)	166	2088	325	333	772	142	120	355	691	165	335	61
Future Volume (vph)	166	2088	325	333	772	142	120	355	691	165	335	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	120.0		75.0	100.0		0.0	75.0		75.0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	1.00	*1.00	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3404	5085	1601	3248	4893	1420	1706	5542	1570	1738	3510	1484
Flt Permitted	0.950			0.950			0.333			0.348		
Satd. Flow (perm)	3404	5085	1601	3248	4893	1420	598	5542	1570	637	3510	1484
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168			154			62			125
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		243.3			423.0			244.1			225.7	
Travel Time (s)		10.9			19.0			14.6			13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	9%	6%	15%	7%	4%	4%	5%	4%	10%
Adj. Flow (vph)	180	2270	353	362	839	154	130	386	751	179	364	66
Shared Lane Traffic (%)												
Lane Group Flow (vph)	180	2270	353	362	839	154	130	386	751	179	364	66
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)		7.4			7.4			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4	1	3	8	

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

AM Peak Period
09-18-2019





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			2			6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	1	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	7.0	7.0	8.0	8.0
Minimum Split (s)	11.0	46.0	46.0	11.0	46.0	46.0	11.0	15.0	11.0	11.0	15.0	15.0
Total Split (s)	16.0	67.0	67.0	41.0	92.0	92.0	11.0	19.0	41.0	13.0	21.0	21.0
Total Split (%)	11.4%	47.9%	47.9%	29.3%	65.7%	65.7%	7.9%	13.6%	29.3%	9.3%	15.0%	15.0%
Maximum Green (s)	12.0	60.0	60.0	37.0	85.0	85.0	7.0	12.0	37.0	9.0	14.0	14.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	3.0	1.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	-2.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	2.0	7.0	7.0	4.0	7.0	2.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0						
Flash Dont Walk (s)		32.0	32.0		32.0	32.0						
Pedestrian Calls (#/hr)		0	0		0	0						
Act Effct Green (s)	11.3	60.0	60.0	39.0	85.7	85.7	22.0	12.0	58.0	26.0	14.0	14.0
Actuated g/C Ratio	0.08	0.43	0.43	0.28	0.61	0.61	0.16	0.09	0.41	0.19	0.10	0.10
v/c Ratio	0.66	1.04	0.45	0.40	0.28	0.17	0.87	0.81	1.09	0.95	1.04	0.25
Control Delay	74.3	70.2	16.1	42.6	13.1	2.1	97.7	77.0	98.9	105.1	118.0	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.3	70.2	16.1	42.6	13.1	2.1	97.7	77.0	98.9	105.1	118.0	2.3
LOS	E	E	B	D	B	A	F	E	F	F	F	A
Approach Delay		63.7			19.7			92.1				101.7
Approach LOS		E			B			F				F
Queue Length 50th (m)	25.2	~251.1	34.3	42.1	38.8	0.0	31.5	35.6	~224.0	44.6	~57.0	0.0
Queue Length 95th (m)	37.8	#278.7	60.7	56.7	46.5	8.5	#55.0	#49.3	#300.3	#73.7	#89.3	0.0
Internal Link Dist (m)		219.3			399.0			220.1				201.7
Turn Bay Length (m)	130.0		60.0	120.0		75.0	100.0			75.0		75.0
Base Capacity (vph)	291	2179	782	904	2995	928	149	475	686	189	351	260
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	1.04	0.45	0.40	0.28	0.17	0.87	0.81	1.09	0.95	1.04	0.25

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	85
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.09
Intersection Signal Delay:	63.6
Intersection LOS:	E
Intersection Capacity Utilization:	104.8%
ICU Level of Service:	G
Analysis Period (min):	15

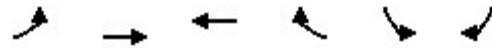
- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Guelph Line & Dundas St

 Ø1 41 s		 Ø2 (R) 67 s		 Ø3 13 s		 Ø4 19 s	
 Ø5 16 s		 Ø6 (R) 92 s		 Ø7 11 s		 Ø8 21 s	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↓↓↓	↓
Traffic Volume (vph)	0	2885	1096	0	69	150
Future Volume (vph)	0	2885	1096	0	69	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	*0.90	*0.90	1.00	0.97	0.91
Frt					0.922	0.850
Flt Protected					0.977	
Satd. Flow (prot)	0	5036	4715	0	2969	1292
Flt Permitted					0.977	
Satd. Flow (perm)	0	5036	4715	0	2969	1292
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					82	81
Link Speed (k/h)		80	80		60	
Link Distance (m)		242.0	124.9		392.8	
Travel Time (s)		10.9	5.6		23.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	10%	0%	11%	15%
Adj. Flow (vph)	0	3136	1191	0	75	163
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	3136	1191	0	157	81
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		100.0	100.0		40.0	40.0
Total Split (%)		71.4%	71.4%		28.6%	28.6%
Maximum Green (s)		93.0	93.0		34.0	34.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		93.0	93.0		34.0	34.0
Actuated g/C Ratio		0.66	0.66		0.24	0.24
v/c Ratio		0.94	0.38		0.20	0.22
Control Delay		27.9	11.0		20.8	9.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		27.9	11.0		20.8	9.9
LOS		C	B		C	A
Approach Delay		27.9	11.0		17.1	
Approach LOS		C	B		B	
Queue Length 50th (m)		266.6	51.0		8.4	0.0
Queue Length 95th (m)		292.4	59.4		17.6	14.3
Internal Link Dist (m)		218.0	100.9		368.8	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3345	3132		783	375
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.94	0.38		0.20	0.22

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Natural Cycle:	120
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	22.9
Intersection Capacity Utilization	94.9%
Analysis Period (min)	15
* User Entered Value	
Intersection LOS:	C
ICU Level of Service	F

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp

→ Ø2 100 s	↘ Ø4 40 s
← Ø6 100 s	

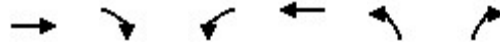
Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

AM Peak Period
09-18-2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	2226	0	0	1126	34	211
Future Volume (vph)	2226	0	0	1126	34	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	*0.90	1.00	1.00	*0.90	0.97	0.91
Frt					0.887	0.850
Flt Protected					0.988	
Satd. Flow (prot)	4988	0	0	4759	3062	1429
Flt Permitted					0.988	
Satd. Flow (perm)	4988	0	0	4759	3062	1429
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					9	9
Link Speed (k/h)	80			80	60	
Link Distance (m)	146.5			232.3	320.5	
Travel Time (s)	6.6			10.5	19.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	0%	0%	9%	15%	4%
Adj. Flow (vph)	2420	0	0	1224	37	229
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	2420	0	0	1224	152	114
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	32.0			32.0	33.0	33.0
Total Split (s)	104.0			104.0	36.0	36.0
Total Split (%)	74.3%			74.3%	25.7%	25.7%
Maximum Green (s)	97.0			97.0	30.0	30.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	97.4			97.4	14.5	14.5
Actuated g/C Ratio	0.78			0.78	0.12	0.12
v/c Ratio	0.62			0.33	0.42	0.66
Control Delay	7.2			4.6	51.2	66.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	7.2			4.6	51.2	66.3
LOS	A			A	D	E
Approach Delay	7.2			4.6	57.7	
Approach LOS	A			A	E	
Queue Length 50th (m)	78.8			27.5	17.0	27.3
Queue Length 95th (m)	116.1			42.5	27.2	48.6
Internal Link Dist (m)	122.5			208.3	296.5	
Turn Bay Length (m)						80.0
Base Capacity (vph)	3890			3711	743	350
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.62			0.33	0.20	0.33

Intersection Summary





























Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	124.9
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.66
Intersection Signal Delay:	9.8
Intersection Capacity Utilization	48.0%
Analysis Period (min)	15
* User Entered Value	
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

→ Ø2	↖ Ø8
104 s	36 s
← Ø6	
104 s	

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  						 	
Traffic Volume (vph)	250	2188	70	92	1098	163	170	23	384	60	13	95
Future Volume (vph)	250	2188	70	92	1098	163	170	23	384	60	13	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	75.0		75.0	0.0		50.0	30.0		30.0
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*0.90	1.00	1.00	*0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.96			0.98		0.98	0.99	1.00		0.97
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950				0.958		0.950		
Satd. Flow (prot)	1323	5085	1617	1772	4988	1317	0	1767	1601	1242	1921	1150
Fl _t Permitted	0.146			0.062				0.741		0.489		
Satd. Flow (perm)	203	5085	1557	116	4988	1287	0	1340	1579	638	1921	1110
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			62			169			125			103
Link Speed (k/h)		80			60			50				50
Link Distance (m)		383.1			410.9			142.3				135.8
Travel Time (s)		17.2			24.7			10.2				9.8
Confl. Peds. (#/hr)	1		6	6		1	16		1	1		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	38%	2%	1%	3%	4%	24%	2%	20%	2%	47%	0%	42%
Adj. Flow (vph)	272	2378	76	100	1193	177	185	25	417	65	14	103
Shared Lane Traffic (%)												
Lane Group Flow (vph)	272	2378	76	100	1193	177	0	210	417	65	14	103
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	9.5	36.0	36.0	11.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (s)	40.9	81.0	81.0	13.0	53.1	53.1	46.0	46.0	46.0	46.0	46.0	46.0
Total Split (%)	29.2%	57.9%	57.9%	9.3%	37.9%	37.9%	32.9%	32.9%	32.9%	32.9%	32.9%	32.9%
Maximum Green (s)	36.4	75.0	75.0	9.0	47.1	47.1	39.0	39.0	39.0	39.0	39.0	39.0
Yellow Time (s)	3.5	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	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	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.0	6.0	6.0		7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0	17.0		17.0	17.0	22.0	22.0	22.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)		0	0		0	0	0	0	0	0	0	0
Act Effct Green (s)	95.8	82.3	82.3	74.1	64.1	64.1		32.7	32.7	32.7	32.7	32.7
Actuated g/C Ratio	0.68	0.59	0.59	0.53	0.46	0.46		0.23	0.23	0.23	0.23	0.23
v/c Ratio	0.79	0.80	0.08	0.64	0.52	0.26		0.67	0.90	0.44	0.03	0.31
Control Delay	38.2	26.3	5.1	45.3	46.2	22.9		58.9	58.4	53.6	38.0	9.3
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	38.2	26.3	5.1	45.3	46.2	22.9		58.9	58.4	53.6	38.0	9.3
LOS	D	C	A	D	D	C		E	E	D	D	A
Approach Delay		26.9			43.3			58.6				27.3
Approach LOS		C			D			E				C
Queue Length 50th (m)	41.3	189.7	1.6	17.5	102.0	13.9		52.3	81.3	15.2	3.0	0.0
Queue Length 95th (m)	73.9	228.2	9.4	m28.6	137.3	m38.7		76.9	119.1	29.3	8.4	14.1
Internal Link Dist (m)		359.1			386.9			118.3				111.8
Turn Bay Length (m)	85.0		90.0	75.0		75.0			50.0	30.0		30.0
Base Capacity (vph)	429	2989	940	168	2283	680		373	530	177	535	383
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.63	0.80	0.08	0.60	0.52	0.26		0.56	0.79	0.37	0.03	0.27

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.90
Intersection Signal Delay:	35.7
Intersection LOS:	D

Lanes, Volumes, Timings
 9: Northampton Blvd/Station Access & Dundas St

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 96.7% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

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

Splits and Phases: 9: Northampton Blvd/Station Access & Dundas St



Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	2119	318	251	844	42	321	540	416	100	451	219
Future Volume (vph)	302	2119	318	251	844	42	321	540	416	100	451	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00		0.97	1.00		0.98	1.00		0.98	1.00		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	5036	1570	3372	4848	1458	3437	3579	1570	3541	3544	1617
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3458	5036	1529	3369	4848	1428	3424	3579	1539	3528	3544	1585
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			196			156			158			238
Link Speed (k/h)		60			60			60				60
Link Distance (m)		410.9			222.4			234.7				489.7
Travel Time (s)		24.7			13.3			14.1				29.4
Confl. Peds. (#/hr)	7		12	12		7	7		7	7		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	4%	5%	7%	12%	3%	2%	4%	0%	3%	1%
Adj. Flow (vph)	328	2303	346	273	917	46	349	587	452	109	490	238
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	2303	346	273	917	46	349	587	452	109	490	238
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0	44.0	11.0	44.0	44.0
Total Split (s)	24.0	66.0	66.0	14.0	56.0	56.0	20.0	49.0	49.0	11.0	40.0	40.0
Total Split (%)	17.1%	47.1%	47.1%	10.0%	40.0%	40.0%	14.3%	35.0%	35.0%	7.9%	28.6%	28.6%
Maximum Green (s)	20.0	59.0	59.0	10.0	49.0	49.0	16.0	42.0	42.0	7.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	17.7	59.4	59.4	15.1	56.8	56.8	15.9	36.5	36.5	7.0	27.5	27.5
Actuated g/C Ratio	0.13	0.42	0.42	0.11	0.41	0.41	0.11	0.26	0.26	0.05	0.20	0.20
v/c Ratio	0.75	1.08	0.45	0.75	0.47	0.07	0.89	0.63	0.87	0.62	0.70	0.47
Control Delay	75.6	68.8	4.2	73.9	32.7	0.2	86.3	48.4	49.6	80.5	57.6	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.6	68.8	4.2	73.9	32.7	0.2	86.3	48.4	49.6	80.5	57.6	8.3
LOS	E	E	A	E	C	A	F	D	D	F	E	A
Approach Delay		62.0			40.6			58.4			46.6	
Approach LOS		E			D			E			D	
Queue Length 50th (m)	41.4	~266.1	14.9	38.9	70.6	0.0	49.8	74.5	81.1	15.5	66.0	0.0
Queue Length 95th (m)	m54.7	#288.7	m11.1	#73.9	89.4	0.0	#76.5	90.5	122.2	25.6	82.3	21.0
Internal Link Dist (m)		386.9			198.4			210.7			465.7	
Turn Bay Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Base Capacity (vph)	495	2138	761	363	1966	672	392	1073	572	177	835	555
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	1.08	0.45	0.75	0.47	0.07	0.89	0.55	0.79	0.62	0.59	0.43

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	20 (14%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.08
Intersection Signal Delay:	55.1
Intersection LOS:	E

Intersection Capacity Utilization 91.9% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

AM Peak Period
09-18-2019



































Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	7	37	108	30	4	170	247	157	9	116	43
Future Volume (vph)	10	7	37	108	30	4	170	247	157	9	116	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	40.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.875			0.984			0.942			0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1648	0	1789	1853	0	1789	3371	0	1789	1806	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1789	1648	0	1789	1853	0	1789	3371	0	1789	1806	0
Link Speed (k/h)		48			48			48			60	
Link Distance (m)		231.7			259.9			489.7			140.2	
Travel Time (s)		17.4			19.5			36.7			8.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	8	40	117	33	4	185	268	171	10	126	47
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	48	0	117	37	0	185	439	0	10	173	0
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  			 	
Traffic Volume (vph)	57	1015	199	833	2320	149	339	377	351	146	553	203
Future Volume (vph)	57	1015	199	833	2320	149	339	377	351	146	553	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	130.0		60.0	120.0		75.0	100.0		0.0	75.0		75.0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	1.00	0.91	1.00	1.00	0.95	1.00
Ped Bike Factor									0.99	1.00		
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3541	5136	1617	3437	5085	1570	1789	5193	1570	1738	3579	1617
Fl _t Permitted	0.950			0.950			0.156			0.503		
Satd. Flow (perm)	3541	5136	1617	3437	5085	1570	294	5193	1547	919	3579	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			125			68			156
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		243.2			474.9			244.1			225.7	
Travel Time (s)		10.9			21.4			14.6			13.5	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	3%	2%	4%	2%	1%	4%	5%	2%	1%
Adj. Flow (vph)	62	1103	216	905	2522	162	368	410	382	159	601	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	62	1103	216	905	2522	162	368	410	382	159	601	221
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)		7.4			7.4			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
1: Guelph Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4	1	3	8	
Permitted Phases			2			6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	1	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	7.0	7.0	8.0	8.0
Minimum Split (s)	11.0	46.0	46.0	11.0	46.0	46.0	11.0	39.0	11.0	11.0	39.0	39.0
Total Split (s)	11.0	46.0	46.0	37.0	72.0	72.0	23.0	44.0	37.0	13.0	34.0	34.0
Total Split (%)	7.9%	32.9%	32.9%	26.4%	51.4%	51.4%	16.4%	31.4%	26.4%	9.3%	24.3%	24.3%
Maximum Green (s)	7.0	39.0	39.0	33.0	65.0	65.0	19.0	37.0	33.0	9.0	27.0	27.0
Yellow Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	4.0	3.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	3.0	1.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	-1.0	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	3.0	7.0	7.0	2.0	7.0	4.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		32.0	32.0		32.0	32.0		25.0			25.0	25.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	7.0	39.0	39.0	34.6	67.8	67.8	54.4	36.4	73.0	38.4	26.4	26.4
Actuated g/C Ratio	0.05	0.28	0.28	0.25	0.48	0.48	0.39	0.26	0.52	0.27	0.19	0.19
v/c Ratio	0.35	0.77	0.38	1.07	1.02	0.20	1.09	0.30	0.45	0.52	0.89	0.51
Control Delay	70.0	50.8	12.6	99.7	60.5	6.6	110.2	42.2	17.0	39.5	71.7	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.0	50.8	12.6	99.7	60.5	6.6	110.2	42.2	17.0	39.5	71.7	20.4
LOS	E	D	B	F	E	A	F	D	B	D	E	C
Approach Delay		45.6			68.0			55.5			54.9	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	8.7	104.4	10.1	~144.3	~285.4	5.5	~93.0	33.4	48.8	29.9	85.8	15.3
Queue Length 95th (m)	16.4	121.7	31.5	#184.3	#312.0	18.3	#155.3	43.4	72.8	47.2	#114.8	41.0
Internal Link Dist (m)		219.2			450.9			220.1			201.7	
Turn Bay Length (m)	130.0		60.0	120.0		75.0	100.0			75.0		75.0
Base Capacity (vph)	177	1430	570	849	2462	824	338	1372	844	304	690	437
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.77	0.38	1.07	1.02	0.20	1.09	0.30	0.45	0.52	0.87	0.51

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.09
 Intersection Signal Delay: 59.8
 Intersection LOS: E

Lanes, Volumes, Timings
 1: Guelph Line & Dundas St

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 103.1% ICU Level of Service G

Analysis Period (min) 15

* User Entered Value

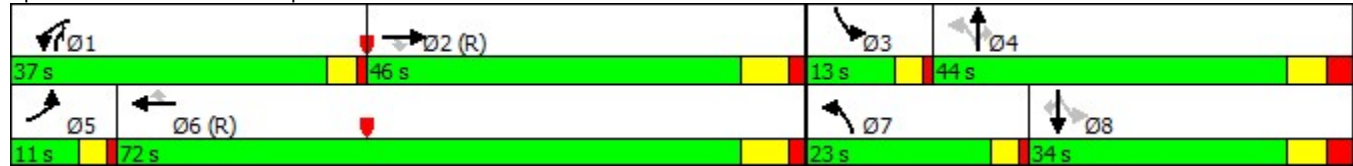
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Guelph Line & Dundas St



Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑		↑↑↑	↑
Traffic Volume (vph)	0	1439	2532	0	244	770
Future Volume (vph)	0	1439	2532	0	244	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	20.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	*0.90	*0.90	1.00	0.97	0.91
Frt					0.908	0.850
Flt Protected					0.981	
Satd. Flow (prot)	0	5085	5036	0	3216	1429
Flt Permitted					0.981	
Satd. Flow (perm)	0	5085	5036	0	3216	1429
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)					1	1
Link Speed (k/h)		80	80		60	
Link Distance (m)		190.2	108.5		410.5	
Travel Time (s)		8.6	4.9		24.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	0%	2%	4%
Adj. Flow (vph)	0	1564	2752	0	265	837
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	0	1564	2752	0	684	418
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	6		4	

Lanes, Volumes, Timings
4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	6		4	4
Switch Phase						
Minimum Initial (s)		8.0	8.0		34.0	34.0
Minimum Split (s)		33.0	33.0		40.0	40.0
Total Split (s)		88.0	88.0		52.0	52.0
Total Split (%)		62.9%	62.9%		37.1%	37.1%
Maximum Green (s)		81.0	81.0		46.0	46.0
Yellow Time (s)		5.0	5.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0		3.0	3.0
Recall Mode		Max	Max		None	None
Walk Time (s)		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		18.0	18.0		20.0	20.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		81.1	81.1		42.9	42.9
Actuated g/C Ratio		0.59	0.59		0.31	0.31
v/c Ratio		0.52	0.92		0.85dr	0.93
Control Delay		17.6	32.2		44.7	74.4
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.6	32.2		44.7	74.4
LOS		B	C		D	E
Approach Delay		17.6	32.2		56.0	
Approach LOS		B	C		E	
Queue Length 50th (m)		93.7	251.6		83.0	120.3
Queue Length 95th (m)		106.3	276.8		103.9	#186.4
Internal Link Dist (m)		166.2	84.5		386.5	
Turn Bay Length (m)						20.0
Base Capacity (vph)		3010	2980		1081	481
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.52	0.92		0.63	0.87

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	137
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	32.8
Intersection Capacity Utilization:	77.1%
Analysis Period (min):	15
* User Entered Value	
Intersection LOS:	C
ICU Level of Service:	D

Lanes, Volumes, Timings
 4: Dundas St & Hwy 407 WB Off-Ramp

PM Peak Period
 09-18-2019

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 4: Dundas St & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

PM Peak Period
09-18-2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑↑	↘↘↘	↗
Traffic Volume (vph)	1460	0	0	2526	89	212
Future Volume (vph)	1460	0	0	2526	89	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	*0.90	1.00	1.00	*0.90	0.97	0.91
Frt					0.919	0.850
Flt Protected					0.978	
Satd. Flow (prot)	5085	0	0	5136	3212	1457
Flt Permitted					0.978	
Satd. Flow (perm)	5085	0	0	5136	3212	1457
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)					40	40
Link Speed (k/h)	80			80	60	
Link Distance (m)	103.7			180.7	413.3	
Travel Time (s)	4.7			8.1	24.8	
Peak Hour Factor	0.85	0.92	0.92	0.85	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	7%	2%
Adj. Flow (vph)	1718	0	0	2972	97	230
Shared Lane Traffic (%)						50%
Lane Group Flow (vph)	1718	0	0	2972	212	115
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			6	8	

Lanes, Volumes, Timings
7: Hwy 407 EB Off-Ramp & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						8
Detector Phase	2			6	8	8
Switch Phase						
Minimum Initial (s)	8.0			8.0	8.0	8.0
Minimum Split (s)	33.0			33.0	35.0	35.0
Total Split (s)	105.0			105.0	35.0	35.0
Total Split (%)	75.0%			75.0%	25.0%	25.0%
Maximum Green (s)	98.0			98.0	29.0	29.0
Yellow Time (s)	5.0			5.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	7.0			7.0	7.0	7.0
Flash Dont Walk (s)	18.0			18.0	20.0	20.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	98.2			98.2	12.6	12.6
Actuated g/C Ratio	0.79			0.79	0.10	0.10
v/c Ratio	0.43			0.73	0.58	0.62
Control Delay	4.6			8.1	49.3	49.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	4.6			8.1	49.3	49.4
LOS	A			A	D	D
Approach Delay	4.6			8.1	49.4	
Approach LOS	A			A	D	
Queue Length 50th (m)	38.6			105.1	20.7	19.2
Queue Length 95th (m)	53.9			135.4	33.0	40.4
Internal Link Dist (m)	79.7			156.7	389.3	
Turn Bay Length (m)						80.0
Base Capacity (vph)	4032			4073	783	372
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.43			0.73	0.27	0.31

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	123.8
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	9.6
Intersection Capacity Utilization:	66.3%
Analysis Period (min):	15
* User Entered Value	
Intersection LOS:	A
ICU Level of Service:	C

Splits and Phases: 7: Hwy 407 EB Off-Ramp & Dundas St

→ Ø2	↖ Ø8
105 s	35 s
← Ø6	
105 s	

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	1428	143	245	2387	75	65	7	135	157	14	221
Future Volume (vph)	97	1428	143	245	2387	75	65	7	135	157	14	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		90.0	75.0		75.0	0.0		50.0	30.0		30.0
Storage Lanes	1		1	1		1	0		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*0.90	1.00	1.00	*0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.97			0.97		0.99	0.99	1.00		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950				0.957		0.950		
Satd. Flow (prot)	1201	5085	1617	1825	5136	1286	0	1722	1633	1496	1921	1219
Fl _t Permitted	0.050			0.103				0.737		0.706		
Satd. Flow (perm)	63	5085	1566	198	5136	1242	0	1314	1611	1110	1921	1192
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			155			66			147			133
Link Speed (k/h)		80			60			48				48
Link Distance (m)		434.8			410.9			142.2				132.3
Travel Time (s)		19.6			24.7			10.7				9.9
Confl. Peds. (#/hr)	5		4	4		5	7		1	1		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	52%	2%	1%	0%	1%	27%	0%	67%	0%	22%	0%	34%
Adj. Flow (vph)	105	1552	155	266	2595	82	71	8	147	171	15	240
Shared Lane Traffic (%)												
Lane Group Flow (vph)	105	1552	155	266	2595	82	0	79	147	171	15	240
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2		2	6		6	8		8	4		4
Detector Phase	5	2	2	1	6	6	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	6.0	8.0	8.0	5.0	5.0	5.0	8.0	8.0	8.0
Minimum Split (s)	9.5	31.0	31.0	11.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (s)	15.0	74.0	74.0	28.0	87.0	87.0	38.0	38.0	38.0	38.0	38.0	38.0
Total Split (%)	10.7%	52.9%	52.9%	20.0%	62.1%	62.1%	27.1%	27.1%	27.1%	27.1%	27.1%	27.1%
Maximum Green (s)	10.5	68.0	68.0	24.0	81.0	81.0	31.0	31.0	31.0	31.0	31.0	31.0
Yellow Time (s)	3.5	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	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	0.0
Total Lost Time (s)	4.5	6.0	6.0	4.0	6.0	6.0		7.0	7.0	7.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0	17.0		17.0	17.0	22.0	22.0	22.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)		0	0		0	0	0	0	0	0	0	0
Act Effct Green (s)	91.9	79.5	79.5	102.7	85.9	85.9		25.7	25.7	25.7	25.7	25.7
Actuated g/C Ratio	0.66	0.57	0.57	0.73	0.61	0.61		0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.81	0.54	0.16	0.76	0.82	0.10		0.33	0.35	0.84	0.04	0.73
Control Delay	77.0	21.2	3.2	43.2	11.0	2.0		51.8	9.1	87.2	44.3	36.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	77.0	21.2	3.2	43.2	11.0	2.0		51.8	9.1	87.2	44.3	36.6
LOS	E	C	A	D	B	A		D	A	F	D	D
Approach Delay		22.9			13.6			24.0			57.2	
Approach LOS		C			B			C			E	
Queue Length 50th (m)	17.5	98.2	0.0	51.3	70.5	1.0		19.0	0.0	45.7	3.4	28.2
Queue Length 95th (m)	#54.6	131.1	11.5	m50.8	m69.4	m0.7		33.5	17.4	#74.2	9.3	57.7
Internal Link Dist (m)		410.8			386.9			118.2			108.3	
Turn Bay Length (m)	85.0		90.0	75.0		75.0			50.0	30.0		30.0
Base Capacity (vph)	133	2886	956	425	3152	787		290	471	245	425	367
Starvation Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.79	0.54	0.16	0.63	0.82	0.10		0.27	0.31	0.70	0.04	0.65

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 20.6
 Intersection LOS: C

Lanes, Volumes, Timings
 9: Northampton Blvd/Station Access & Dundas St

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 84.1% ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.







































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

Splits and Phases: 9: Northampton Blvd/Station Access & Dundas St



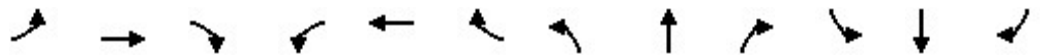
Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  	 	  	  	 	 	 	 	 	 	
Traffic Volume (vph)	216	1293	257	431	2019	65	438	586	292	70	591	322
Future Volume (vph)	216	1293	257	431	2019	65	438	586	292	70	591	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.97	*0.90	1.00	0.97	*0.90	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.97	0.99		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3506	5085	1585	3506	5085	1633	3506	3650	1633	3541	3614	1633
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3503	5085	1555	3500	5085	1596	3494	3650	1586	3516	3614	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			221			125			157			156
Link Speed (k/h)		60			60			60				60
Link Distance (m)		410.9			222.3			234.9				475.8
Travel Time (s)		24.7			13.3			14.1				28.5
Confl. Peds. (#/hr)	9		6	6		9	7		15	15		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	2%	3%	1%	2%	0%	1%	0%	0%	0%	1%	0%
Adj. Flow (vph)	235	1405	279	468	2195	71	476	637	317	76	642	350
Shared Lane Traffic (%)												
Lane Group Flow (vph)	235	1405	279	468	2195	71	476	637	317	76	642	350
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Walkers Line & Dundas St

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0	7.0	8.0	8.0
Minimum Split (s)	11.0	42.0	42.0	11.0	42.0	42.0	11.0	44.0	44.0	11.0	44.0	44.0
Total Split (s)	12.0	52.0	52.0	23.0	63.0	63.0	25.0	54.0	54.0	11.0	40.0	40.0
Total Split (%)	8.6%	37.1%	37.1%	16.4%	45.0%	45.0%	17.9%	38.6%	38.6%	7.9%	28.6%	28.6%
Maximum Green (s)	8.0	45.0	45.0	19.0	56.0	56.0	21.0	47.0	47.0	7.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		28.0	28.0		28.0	28.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	10.5	46.0	46.0	20.5	56.0	56.0	20.8	44.5	44.5	7.0	30.7	30.7
Actuated g/C Ratio	0.08	0.33	0.33	0.15	0.40	0.40	0.15	0.32	0.32	0.05	0.22	0.22
v/c Ratio	0.90	0.84	0.42	0.91	1.08	0.10	0.92	0.55	0.52	0.43	0.81	0.74
Control Delay	94.7	48.6	16.9	81.7	85.2	0.4	81.9	41.2	21.7	72.4	60.5	37.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.7	48.6	16.9	81.7	85.2	0.4	81.9	41.2	21.7	72.4	60.5	37.6
LOS	F	D	B	F	F	A	F	D	C	E	E	D
Approach Delay		49.6			82.4			50.4			53.9	
Approach LOS		D			F			D			D	
Queue Length 50th (m)	~37.7	80.2	7.0	67.2	~250.6	0.0	67.7	75.2	34.6	10.7	88.2	50.8
Queue Length 95th (m)	#68.0	128.1	44.0	#102.1	#278.7	0.3	#97.4	93.2	62.7	19.2	109.4	86.4
Internal Link Dist (m)		386.9			198.3			210.9			451.8	
Turn Bay Length (m)	120.0		75.0	155.0		130.0	40.0		25.0	40.0		55.0
Base Capacity (vph)	262	1670	658	513	2034	713	525	1225	636	177	851	496
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.84	0.42	0.91	1.08	0.10	0.91	0.52	0.50	0.43	0.75	0.71

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	134 (96%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.08
Intersection Signal Delay:	62.9
Intersection LOS:	E

Intersection Capacity Utilization 95.4% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Walkers Line & Dundas St



Lanes, Volumes, Timings
12: Palladium Way & Walkers Line

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	26	141	267	8	10	40	301	39	7	303	12
Future Volume (vph)	37	26	141	267	8	10	40	301	39	7	303	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	40.0		0.0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00
Frt		0.873			0.917			0.985			0.994	
Flt Protected	0.950			0.950				0.995		0.950		
Satd. Flow (prot)	1789	1644	0	1789	1727	0	0	3507	0	1700	1779	0
Flt Permitted	0.950			0.950				0.995		0.950		
Satd. Flow (perm)	1789	1644	0	1789	1727	0	0	3507	0	1700	1779	0
Link Speed (k/h)		48			48			48			60	
Link Distance (m)		389.3			185.8			475.8			150.0	
Travel Time (s)		29.2			13.9			35.7			9.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	28	153	290	9	11	43	327	42	8	329	13
Shared Lane Traffic (%)										10%		
Lane Group Flow (vph)	40	181	0	290	20	0	0	412	0	7	343	0
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

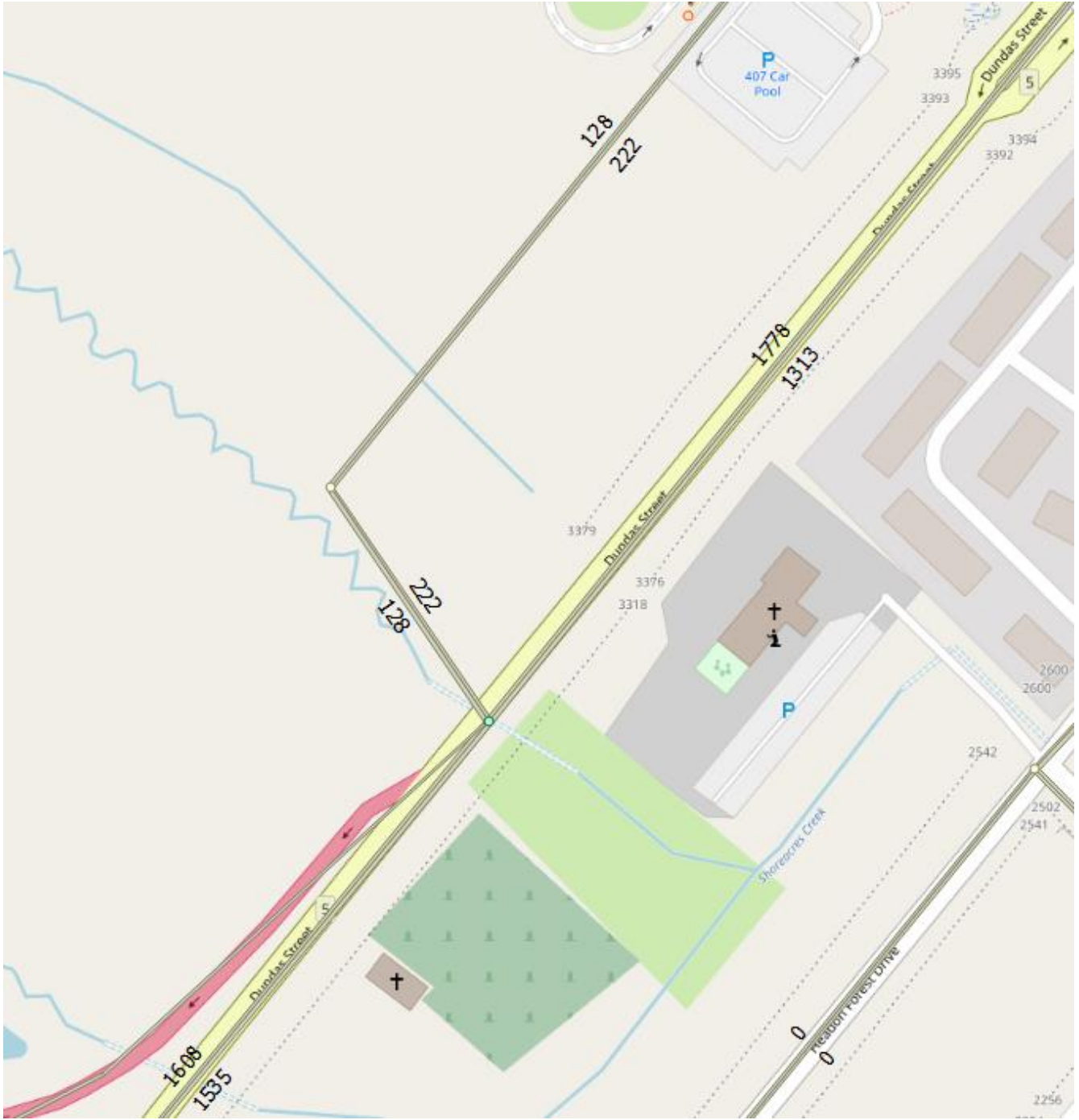
Control Type: Unsignalized

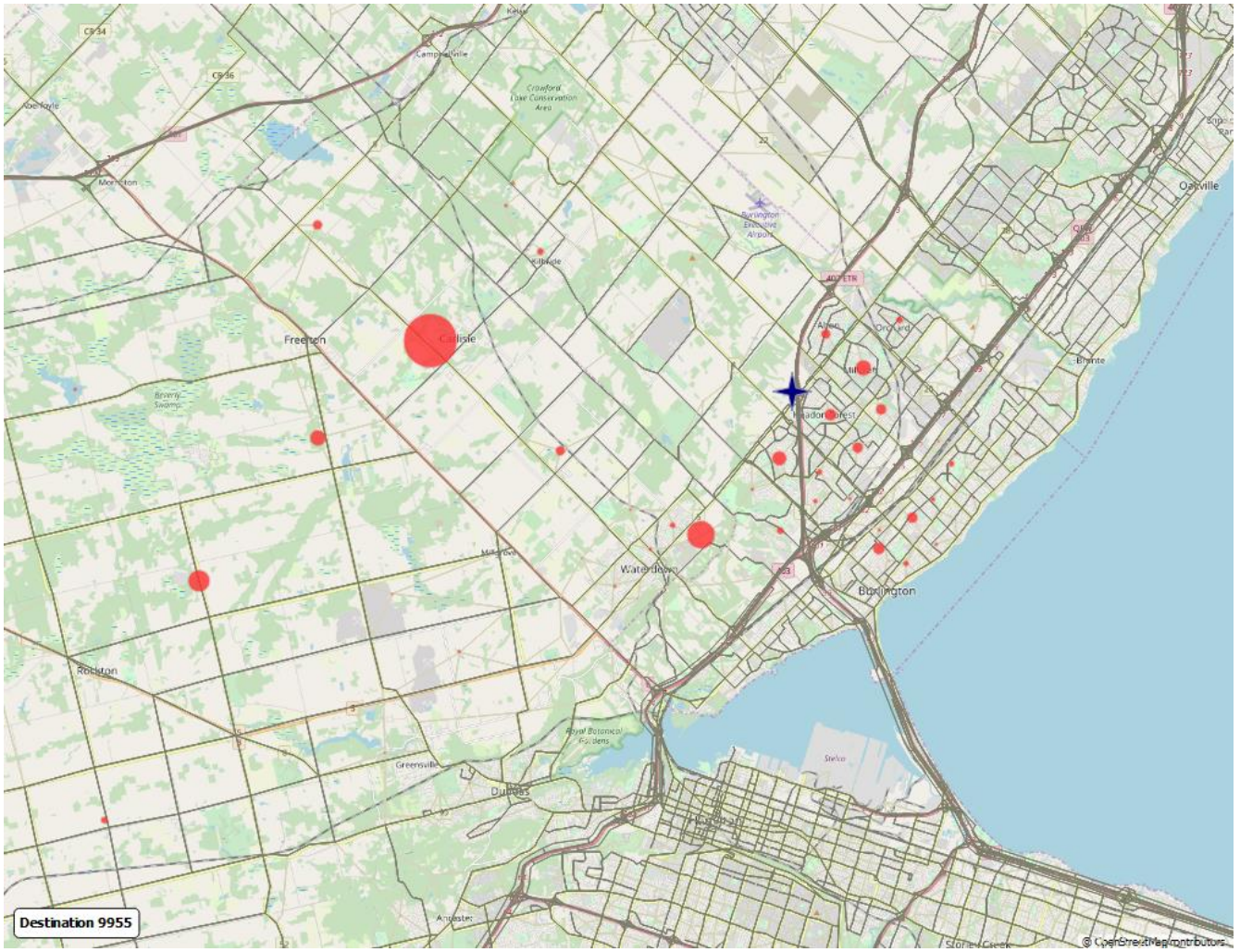
Intersection Capacity Utilization 65.0% ICU Level of Service C

Analysis Period (min) 15

Appendix E-: EMME Output









Final Report

Appleby Station Traffic Impact Study

Highway 407 Transitway-4



Prepared for Ministry of Transportation, Ontario
by IBI Group
November 15, 2019

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1 Introduction

This report is a traffic impact study for the proposed 407 Transitway Station located near the interchange of Highway 407 and Appleby Line in Burlington, Ontario. This report was prepared as part of the Environmental Assessment of the 407 Transitway, Brant Street to West of Hurontario Street.

The purpose of this report is to provide an assessment of traffic, transit, walking and cycling access to the proposed station. The assessment includes operations analysis and review of local road network configuration to identify needs and opportunities for transportation-related changes and coordination to accommodate the station.

1.1 Transitway Overview

The Highway 407 Transitway is a rapid transit facility planned within the Greater Toronto and Hamilton Area (GTHA). The Transitway will be fully grade-separated with an exclusive right-of-way and will run parallel along the Highway 407 corridor. This Transitway project supports the Province's Growth Plan by meeting increased travel demands through alternative transportation modes, providing increased mobility for a wide variety of users, and supporting transit-oriented development and associated land uses. The Transitway is initially designed to support busway service (BRT) with provisions for future conversion to light-rail transit (LRT) technology.

The section under the current EA spans approximately 43 kilometres from Brant Street in Burlington to west of Hurontario Street (west of proposed Hurontario Station) in Mississauga. This section of the Transitway provides opportunities to connect numerous Urban Growth Centres (e.g. Hamilton, Oakville, Milton and Mississauga City Centres) as well as to a number of higher order transit systems, supporting development within both the Region of Halton and Peel. The transitway is being planned to the 2041 horizon. Traffic analysis is to the 2031 horizon due to uncertainties in development levels and traffic trends beyond 2031.

1.2 Study Area

The proposed station is located west of Appleby Line just north of Highway 407 in Burlington as shown in Exhibit 1-1. This location was developed through consultation with the City of Burlington and accommodates the Transitway alignment north of the Highway 407. There is an existing carpool lot located within the proposed area. The plans are to maintain the carpool lot with the Transitway station located immediately west. The study area includes the following intersections:

- Appleby Line & 1 Side Road (*unsignalized*);
- Appleby Line & Highway 407 WB Off-Ramp / Carpool Lot (*signalized*);
- Appleby Line & Highway 407 EB Off-Ramp (*signalized*); and
- Appleby Line & Palladium Way / Harrison Crescent (*signalized*).

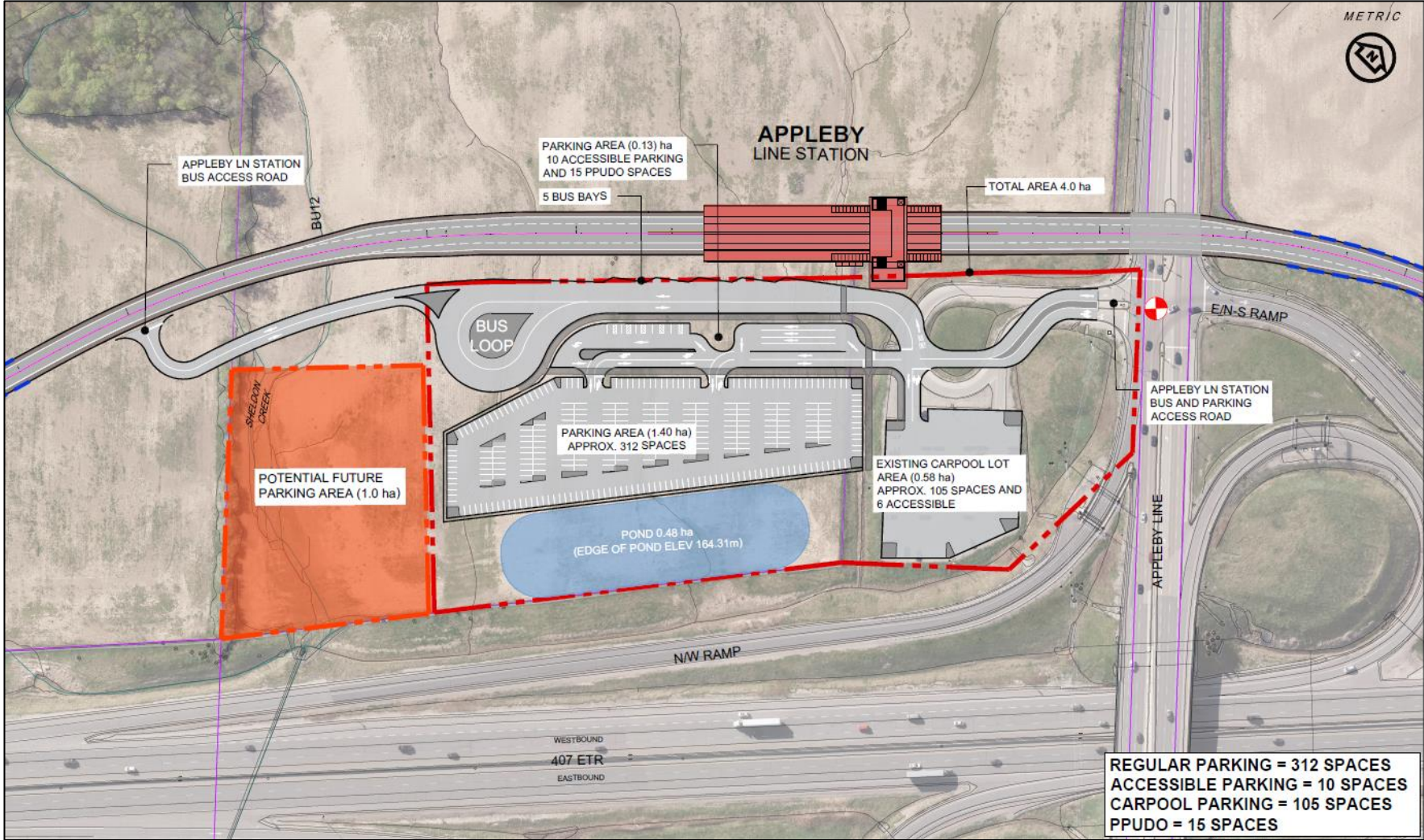
1.3 Station Plan

The proposed station layout is provided Exhibit 1-2. The site plan illustrates that the station will connect to the current access for the carpool lot, located opposite of the Highway 407 WB Off-Ramp. Further commentary on station layout and internal circulation is provided in Section 4 of this report.

Exhibit 1-1: Study Area



Exhibit 1-2: Proposed Station Layout



2 Existing Conditions

This section documents the existing road network, facilities, and weekday peak hour operations at the studied intersections.

2.1 Existing Road Network

Appleby Line is a major north-south arterial road in Halton Region. It has six lanes south of Highway 407 and transitions to two lanes to the north. Appleby Line starts at Lakeshore Road in the City of Burlington and extends northwards beyond the City's border to the Town of Milton. Within the study area, Appleby Line has a posted speed limit of 70 km/h between 1 Side Road and Palladium Way/Harrison Crescent.

Highway 407 is a tolled 400-series highway with a six lane cross section. It connects the City of Burlington to the City of Pickering. 400-series highways have a speed limit of 100 km/h. A full interchange is located at Highway 407 and Appleby Line.

1 Side Road is a two lane east-west collector road in the City of Burlington within Halton Region. It provides access to farmland and some residential houses. Within the study area, 1 Side Road has a speed limit of 60 km/h.

Palladium Way is a three lane east-west (two lanes eastbound) collector road in the City of Burlington. It connects Appleby Line to Walkers Line and provides access to residential properties, commercial offices and schools. It has a speed limit of 60 km/h.

2.2 Transit

Burlington Transit operate routes south of the study area on Appleby Line and Thomas Alton Boulevard.

- **Route 15 A/B (Appleby – Walkers)** is a circular route that starts and ends at Appleby GO station. It operates along Fairview Street, Walkers Line, Thomas Alton Boulevard and Appleby Line. 15A operates during morning service and travels northbound through the study area only. 15B operates during afternoon service and travels southbound through the study area only. Both routes operate at approximately 20 minute frequencies.
- **Route 11 (Sutton – Alton)** connects 407 Carpool to Appleby GO station via Appleby Line between Dundas Street and Thomas Alton Boulevard, and operates at approximately 30 minute frequencies.
- **Route 51 (Burlington Northeast)** is a late night service route that starts and ends at Burlington GO station and travels clockwise around northeast Burlington. This route travels southbound on Appleby Line only between Thomas Alton Boulevard and Dundas Street and operates at approximately one hour frequencies.
- **Route 12 (Upper Middle)** is a regular service bus route that has a southern terminal point on Brant Street at Highway 403, and a northern terminal point at the Dundas-Walmart Plaza, just north of the intersection of Dundas Street and Appleby Line, within the study area. The route travels north on Brant Street, east on Mount Forest Drive, along Upper Middle Road via Augustine Drive and Fisher Avenue, and then north on Appleby Line to the Dundas-Walmart plaza. It also traverses this route southbound, and operates at 30 minute frequencies.

Exhibit 2-1 provides a map of BT routes within the study area.

Exhibit 2-1: Burlington Transit Routes within the Study Area



Source: *Burlington Transit System Map (2019)*

2.3 Active Transportation

Currently, there are no active transportation facilities adjacent to the station area, including sidewalks and bike lanes. The surrounding area is predominantly rural with no nearby walkable destinations or points of interest.

2.4 Traffic Conditions

2.4.1 Traffic Counts & Signal Timing Data

Traffic count data and signal timing information was collected from Halton Region and 407 ETR. All turning movement counts modelled for the purposes of this study were conducted recently (within the past five years) and so should reflect current traffic patterns within the study area. Exhibit 2-2 provides a summary of dates on which this information was collected/recorded.

Exhibit 2-2: Traffic Count and Signal Timing Data

INTERSECTION	CONTROL TYPE	DATE OF TMC	DATE OF SIGNAL DATA
Appleby Line & 1 Side Road	Signalized	2016-10-11	NA
Appleby Line & Highway 407 WB Off-Ramp / Carpool Lot	Signalized	2018-12-04	NA
Appleby Line & Highway 407 EB Off-Ramp	Signalized	2018-12-04	NA
Appleby Line & Palladium Way / Harrison Crescent	Signalized	2017-05-25	2006-04-19
Appleby Line & Thomas Alton Boulevard	Signalized	2018-04-10	2011-01-12
Appleby Line & Harrison Crescent	Signalized	2017-11-14	NA
Appleby Line & Dundas Street	Signalized	2017-04-05	NA

2.4.2 Approach

Traffic analysis was conducted using Synchro (version 9) software and follows Highway Capacity Manual (HCM 2000) methodologies of intersection operation analysis. Critical movements were defined as follows:

For signalized intersections,

- V/C ratios for overall intersection operations, through movements or shared through/turning movements equal 0.80 or above;
- V/C ratios for exclusive movements equal 0.85 or above; or,
- Queues for an individual movement are projected to exceed available turning lane storage.

For unsignalized intersections,

- Level-of-service, based on average delay per vehicle or on individual movements is “LOS D” or greater; or
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

Level-of-service (LOS) is a measure of performance based on control delay, defined as follows in Exhibit 2-3.

Exhibit 2-3: Intersection LOS Reference

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The Synchro traffic models were calibrated to better represent measured field conditions. This was accomplished by adjusting the lane utilization factor and via lost time adjustment. The “lane utilization factor” (LUF) was altered when calibrating through movements. This parameter is used to dictate the distribution of traffic across the available lanes, with a value of 1.0 representing a uniform distribution across all lanes. During non-congested periods, there is often more traffic distributed amongst the right-most lanes as compared to the left-most lanes. However, in over-saturated conditions, the distribution of traffic is typically more evenly split, as drivers quickly fill any available gap in traffic.

In existing models, the LUF was adjusted to a value of 1.0 for all through movements initially identified as having a v/c greater than 1.0. These adjustments were then carried forward to their respective movements to the future models (for the same peak period). Additionally, because the above-mentioned driver behaviour is quite predictable, this adjustment was also made to any new critical through movements (having a v/c ratio > 1.0) identified in the future models.

The “lost time adjustment” (LTA) was also altered in order to calibrate left-turn movements. Adjusting this parameter to negative value effectively increases the clearance time available for left-turning traffic to clear the intersection during the amber and/or all-red signal phases.

During oversaturated conditions where left-turn queues are excessively long and/or there are limited gap available in the opposing traffic to make the left-turn (under permissive phasing), drivers are typically more aggressive and willing to turn during the amber/all-red phases.

In existing models, the LTA was changed for all left-turn movements identified as being well over capacity – defined as having a v/c greater than 1.2 – since these turning volumes were explicitly measured in the field. Values were assigned based on the initial v/c ratio for that movement:

- If the v/c ratio was between 1.2 and 1.5, the LTA was set to '-1'; and,
- If the v/c ratio exceeded 1.5, the LTA was set to '-2'.

Subsequently, all adjustments made to the LTA in the existing models were carried forward to the respective movements in the future models (for the same peak periods). However, because this driving behaviour is believed to be less predictable, no additional LTA changes were made to "new critical left-turn movements (having a v/c ratio > 1.2) identified in the future model, which did not exist previously in the existing models.

2.4.3 Model Calibration

No model calibration was required to reflect measured field conditions.

2.4.4 Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the existing conditions. An annual compound growth rate of 1.0% was applied to all count volumes obtained in years prior to 2019 in order to bring all counts to a consistent base year. Existing traffic volumes are shown in Exhibit 2-4.

A summary of the Synchro analysis including delay, v/c, 95th percentile queue lengths and LOS indicators are shown in Exhibit 2-5, with detailed Synchro reports provided in Appendix A. The study intersections are currently operating as follows:

- Appleby Line & 1 Side Road is operating with moderate congestion on the EBLTR lane. Due to high N-S volumes, and heavy EBL and EBR demands, the EBLTR lane is at capacity at v/c = 1.04 in the a.m. peak hour. During the p.m. peak hour, the intersection is operating well with slight congestion experienced by the minor approach.
- Appleby Line & Highway 407 WB Off-Ramp / Carpool Lot access is operating well during both peak periods at LOS B and C. During the p.m. peak hour, moderate delays are experienced by the off-ramp volumes with v/c near critical threshold (v/c = 0.85).
- Appleby Line at Highway 407 EB Off-Ramp is operating well at LOS A during both peak periods. During the p.m. peak hour, moderate delays are experienced by the EB approach due to green time prioritized for N-S volumes.
- Appleby Line & Palladium Way is operating at LOS A during both peak periods. In the morning peak hour, the EBL movement is expected to operate with some delays. During the p.m. peak hour, both minor approaches are expected to operate with some delays.

Exhibit 2-4: Existing Traffic Volumes in the AM (PM) Peak Hour

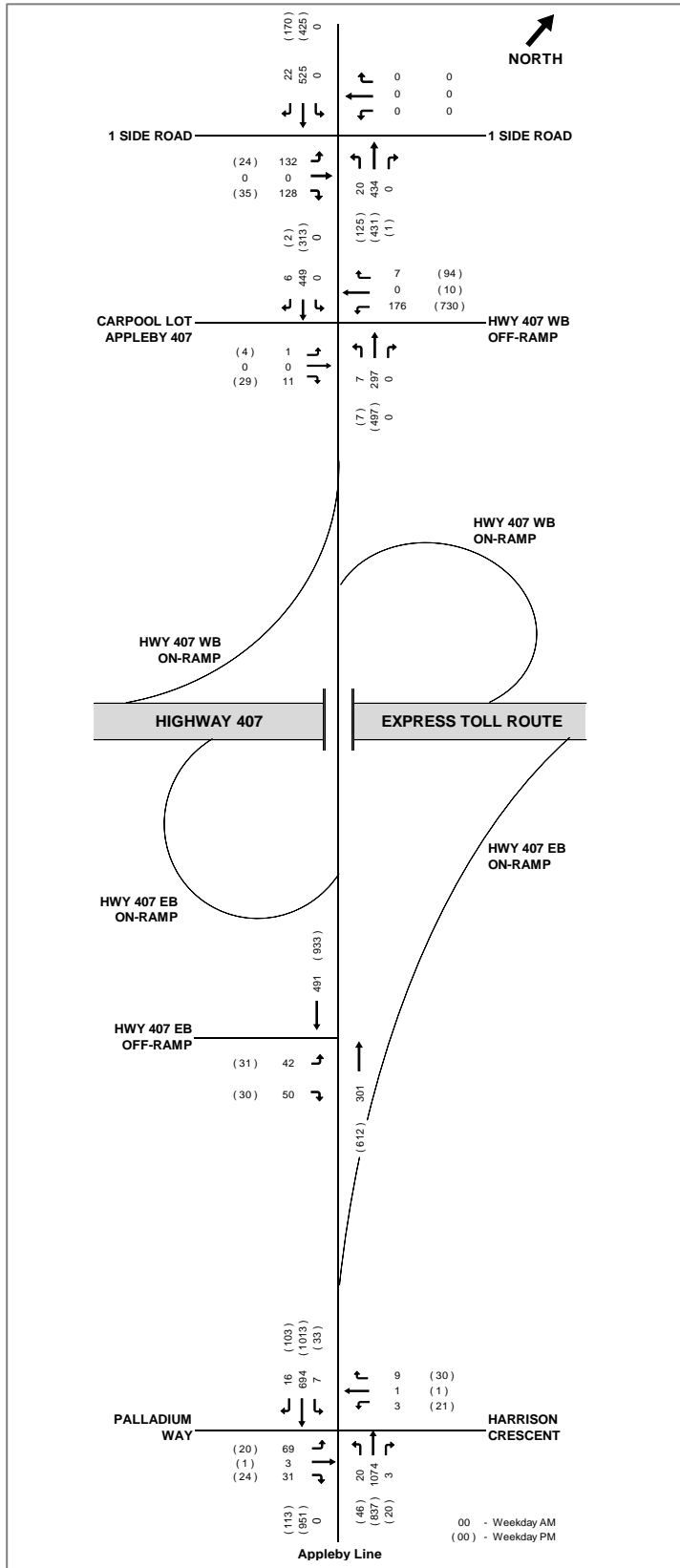


Exhibit 2-5: Synchro Analysis: Existing Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Appleby Line & 1 Side Road <i>(unsignalized)</i>	-	EBLTR	F	1.04	84	-	EBLTR	D	0.32	10
Appleby Line & Highway 407 WB Off-Ramp / Carpool Lot <i>(signalized)</i>	B	No critical movements				C	EBL	D	0.04	4
							EBR	D	0.02	-
							WBL	D	0.84	148
							WBT	D	0.82	141
Appleby Line & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	No critical movements				A	EBL	D	0.37	14
							EBR	D	0.02	8
Appleby Line & Palladium Way / Harrison Crescent <i>(signalized)</i>	A	EBL	D	0.51	20	A	EBL	D	0.27	10
							EBT	D	0.03	8
							WBL	D	0.28	11
							WBT	D	0.03	9

3 Future Conditions

This section documents the future traffic conditions with considerations to background traffic growth and traffic expected to be generated from the Transitway station.

3.1 Future Roadway Network

According to the *Halton Region Budget and Business Plan (2019)*, there are no planned changes to Appleby Line within the study area. Therefore, the road network was left unchanged for the future analysis.

3.2 Transit

Future transit improvements in the area include the planned implementation of a semi exclusive/exclusive right-of-way. Bus priority corridor along Appleby Line was identified in Halton Region Transportation Master Plan (TMP) suggesting possible infrastructure improvements for the corridor.

The 407 Transitway is the most significant future transit service proposed in the immediate area, however, as Appleby Line further develops south of Highway 407, there will likely be an increase in bus service along the corridor and on connecting streets including Palladium Way.

3.3 Active Transportation

The City of Burlington Official Plan identifies future installation of bike lanes along Palladium Way. Currently, there are no planned connections towards the station north of the Highway 407.

3.4 Station Traffic

3.4.1 Station Trip Generation

Ridership forecasts were provided by MTO and sourced from MTO's Greater Golden Horseshoe Travel Demand Model V4. The model is an advanced state-of-practice multi-modal travel demand model that estimates future travel demands within the Greater Golden Horseshoe. The

GGHM was developed to forecast peak period demand in support of the Growth Plan policies and has the capability of predicting mode shifts resulting from new public transit infrastructure. It can also be used to test network response to changes in link characteristics such as transit vehicle frequency, operating speed, station location, and parking availability.

The GGH model accounts for planned and committed road and transit projects sourced from Metrolinx Regional Transportation Plan and local transportation plans. While it is possible that additional projects will be funded over the upcoming years, this model represents a conservative approach.

With input from the MTO, a horizon year of 2031 was selected as the baseline for determining road and intersection requirements as part of this traffic impact study. As MTO's GGH model is to a 2041 horizon, ridership projections for 2031 were not available. Therefore the 2041 demands were carried forward on the basis that entry and exit volumes would be conservative (the resulting turning lanes and queue storage would accommodate 2031 demand) as provided in Exhibit 3-1.

Exhibit 3-1: 2041 AM Peak (2-hour) Boardings

STATION	TOTAL 2-HR BOARDINGS	2-HR PARK-AND-RIDE	2-HR WALK / TRANSIT	% PARK-AND-RIDE	% WALK / TRANSIT
Dundas	923	510	413	55%	45%
Appleby	227	207	20	91%	9%
Bronte	306	90	216	29%	71%
Trafalgar	3,095	436	2,659	14%	86%
Britannia	523	136	387	26%	74%
Derry	911	334	577	37%	63%
Mississauga	982	82	900	8%	92%
Total:	6,967	1,795	5,172	26%	74%

From the above exhibit, two hour park-and-ride boardings were equated to two hour inbound vehicle trips at an assumed factor of 10:11, or 1.1 riders per park-and-ride vehicle. Two hour inbound vehicle trips were then converted to a.m. peak hour inbound trips using a factor of 0.56, developed through review of existing travel patterns using Transportation Tomorrow Survey (TTS 2016) data. The resulting a.m. peak hour inbound vehicle flow is 105 vph and rounded to 106 vph.

Further processing of forecasts was required to estimate a.m. outbound traffic, associated with kiss-n-ride drop off trips, and p.m. peak hour traffic. The ITE Trip Generation Manual (9th edition) provided ratios of inbound to outbound and a.m. to p.m. traffic for typical park-and-ride bus stations. Average trip generation rates for bus stations with park-and-ride lots are indicated in Exhibit 3-2. Using the ratios provided, Exhibit 3-3 lists the estimated station traffic generated give the above assumptions.

Exhibit 3-2: ITE Trip Generation Rates for Park-and-Ride Lots

LAND USE (CODE)	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		Trip Rate	Inbound / Outbound	Trip Rate	Inbound / Outbound
Park-and-ride with bus service (090)	/ parking space	0.71	79% / 21%	0.62	25% / 75%

Exhibit 3-3: Estimated Vehicle Trips Generated by Station

AM PEAK TRIPS		PM PEAK TRIPS	
Inbound	Outbound	Inbound	Outbound
106*	28	29	88

* Calculated based on forecasted 2031 a.m. park-and-ride 2 hrs boardings, at a factor 1.0 inbound vehicles per 1.1 boardings. To convert to a.m. peak hour trips, a factor of 0.56 was multiplied.

3.4.2 Trip Distribution

A map showing the origin of park-and-ride trips destined to Dundas station was extracted from the 2031 GGHM and can be found attached in Appendix E. Using this map, inbound trips were tabulated in terms of general direction of origin (i.e. north, south, east, and west) and assigned to the study area intersections as a percentage of total inbound trips. Distribution of outbound trips was assumed to be the same as inbound trips. Resulting trip assignments are illustrated in Exhibit 3-4. Site generated traffic was assigned to study area intersections and is indicated in Exhibit 3-5.

Exhibit 3-4: Trip Distribution in AM and PM Peak Hours

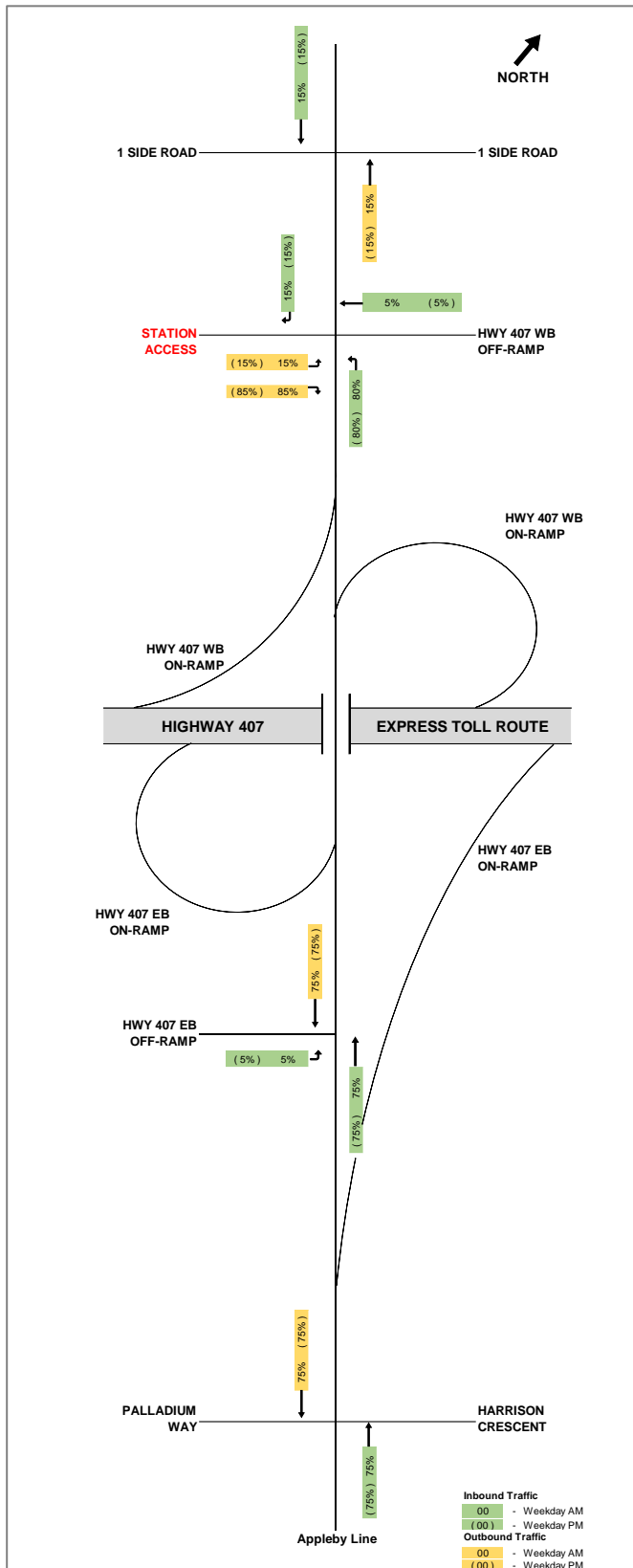
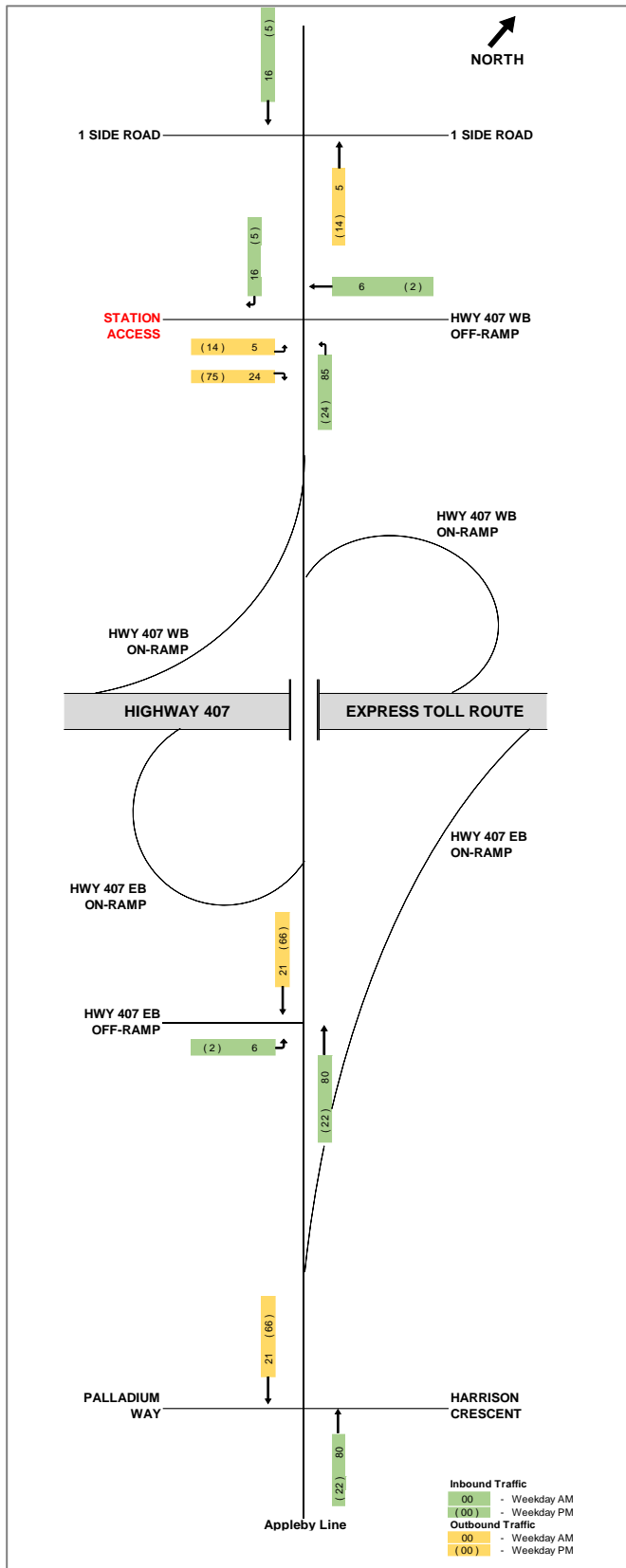


Exhibit 3-5: Site Generated Traffic in the AM Peak Hour and PM Peak Hour



3.4.3 Parking Demands

Part of the scope of the traffic study was to provide a recommended parking lot size for each station. This was developed using the ratio of ridership to parking lot sizes taken from GO transit stations. The intent of this approach is to account for typical daily utilization of the lot for a robust and nearly full transit service with low but non-zero spare capacity across the system. The following provides the approach:

- The average number of inbound vehicle trips (auto drivers) made to each of these GO stations during the a.m. peak period (defined as 6:30-9:30 am) were determined using 2016 Transportation Tomorrow Survey (TTS) data.
- Parking data for the GO transit stations was obtained from the GO Rail Station Access Plan (2016) prepared by Metrolinx. The report notes the total capacity and average utilization of each GO station parking lot, which were used to calculate average parking demands.
- A “parking rate” or ratio between demand and auto driver trips was determined. These values are indicated in the below Exhibit 3-6.

Exhibit 3-6: Parking Demand Factors for nearby GO Transit Stations

2016 TTS AM PEAK PERIOD		2016 GO STATION PARKING *			PARKING RATE (Spaces / Driver)
GO Station	Auto Drivers *	Lot Capacity **	Lot Utilization **	Demand	
Brampton	861	863	96%	828	0.962
Bramalea	1,360	2,371	86%	2,039	1.499
Malton	580	698	96%	670	1.155
Erindale	1,370	2,183	76%	1,659	1.211
Burlington	1,270	2,076	86%	1,785	1.406
Appleby	2,080	2,818	86%	2,423	1.165
Bronte	2,460	2,971	86%	2,555	1.039
Oakville	2,820	4,401	86%	3,785	1.342
Lisgar	350	715	66%	472	1.348
Milton	1,330	1,472	100%	1,472	1.107
Meadowvale	1,080	1,652	96%	1,586	1.468
Streetsville	1,650	1,541	96%	1,479	0.897
Clarkson	2,520	3,800	86%	3,268	1.159
Aldershot	870	1,640	96%	1,574	1.810
<i>Total</i>	<i>20,601</i>	<i>29,201</i>	<i>88%</i>	<i>25,597</i>	1.243

* AM peak period inbound vehicles estimated using 2016 TTS data, and rounded to the nearest 10.

** GO parking data obtained from "GO Rail Station Access Plan" (2016) and dated December 2016

This “parking factor” was then applied to the a.m. peak period inbound trips estimated at each Transitway station. Note that park-and-ride (2-hrs) forecasts (and congruently, estimated inbound vehicle trips) for the a.m. peak two hours can be converted to a.m. peak period forecasts by applying a factor of 1.370, as analysis of the TTS indicate that 73% of 3-hour a.m. peak period trips occur within the two a.m. peak hour.

The resulting estimated parking demands at each Transitway station are provided in Exhibit 3-7. Parking demands are provided for the 2041 horizon, representing the “ultimate” conditions. The recommended parking lot size for Derry Station is 320 spaces. It is noted that protection for future expansion beyond 2041, carpool spaces, and park-and-ride for other transit services are not included in the parking lot size.

Exhibit 3-7: Estimated Parking Demands for each Transitway Station

STATION	GGHM INBOUND TRIPS		PARKING LOT SIZE ***
	AM Peak 2-Hour *	AM Peak Period **	
	2041	2041	2041
Dundas	460	640	800
Appleby	190	260	320
Bronte	80	110	140
Trafalgar	400	540	680
Britannia	120	170	210
Derry	300	420	520
Mississauga	70	100	128

* Calculated based on forecasted a.m. park-and-ride boardings, at a factor 1.0 inbound vehicles per 1.1 boardings.

** Peak 2-hour trips can be converted to peak period trips at a factor of 1.370, based on GGHM outputs.

*** Parking lot size calculated by multiplying estimated a.m. peak period inbound trips by a factor of 1.243.

3.5 Background Traffic Growth

Future background traffic volumes were estimated for the study area using MTO’s GGHM (discussed in 3.4.1) demand model output, provided by MTO, and supplemented with manual refinements considering local conditions. Macro models can be limited with respect to specific hourly forecasts, and the 2011 base-year model (used in the comparative analysis) is also aging, therefore refinements included review of municipal transportation master plans (TMPs), land-use, background population and employment growth, and adjustments for local developments or changes to the road network.

On Appleby Line, the GGHM demand model growth from 2011 base to 2031 has peak direction link flow of 285vph to 408vph or 1.8% annual compound growth rate. Model output figures are provided in Appendix E.

The City of Burlington and Region of Halton population and employment forecasts were considered in the development of traffic growth rates. Relevant documents are listed as follows:

- Greater Toronto and Hamilton Area – “Growth Plan for the Greater Golden Horseshoe” (2017); and
- Halton Region – “Halton Region Transportation Master Plan” (2011).

Examination of the above documents showed that population growth is estimated to be between 0.3% to 0.4% per year between 2011-2031, while employment are forecasted to increase between 0.4% to 0.5% per year during that same period.

In the vicinity of the station, there are a few developments under various stages of construction located south of Highway 407 along Palladium Way. A background review of their respective traffic impact studies suggest using a generalized growth rate of 1% plus traffic forecasts from the known developments (further discussed below in Section 3.5.1).

In summary, based on the information presented, it was concluded that an annual compound growth of 1% will be applied to existing traffic volumes on Appleby Line corridor. This rate was applied to all 'major' movements, which is defined as all through movements along arterial roads or turning movements between two arterial roads. This selected rate is with the assumption that additional nearby development traffic will need to be included.

3.5.1 Nearby Developments

There are several major developments that expected within the study area in the horizon of this traffic study. They will contribute significant traffic volumes to the Appleby Line corridor. Three traffic studies were referenced from the City's website (Ward 6) to assist with development of future traffic growth. A short description of each is provided below:

- **4853 Thomas Alton Boulevard¹** – The subject site is located west of Appleby Line between Palladium Way and Thomas Alton Boulevard. The subject property will include 612 residential units (various unit types) with vehicular access to Thomas Alton Boulevard and a second driveway connection to Palladium Way. The generated site traffic taken from this study is 220 two-way vehicular trips in the a.m. peak hour and 253 two-way vehicular trips in the p.m. peak hour.
- **4721 Palladium Way TIS & TDM Options Report²** – The subject site is located west of Appleby Line on the north side of Palladium Way. The subject property is a religious centre with a small office component. Vehicular access will be provided by two driveway connections to Palladium Way. The generated site traffic taken from this study is 66 two-way vehicular trips in the a.m. peak hour and 117 two-way vehicular trips in the p.m. peak hour.
- **Block 23 20M-1034 4853 Palladium Way TIS³** – The subject is located immediately on the northwest quadrant of Appleby Line & Palladium Way intersection. The development plans for 5.22 hectare of employment area with approximately 24,498 m² of GFA. Vehicular access will be provided by a new roadway connection off Palladium Way, approximately 125m west of Appleby Line. The generated traffic taken from this study is 172 two-way vehicular trips in the a.m. peak hour and 200 two-way vehicular trips in the p.m. peak hour.

Results taken from the three traffic studies are likely conservative as there would be some internal uses (pass-by trips) along the corridor between the developments which would reduce overall trips generated. A summary of the total trips generated as shown in Exhibit 3-8. It is noted that only a portion of the below trips are distributed to the study area, following trip assignments from each traffic studies.

Exhibit 3-8: Future Developments Trip Generation

Development	AM Trips			PM Trips		
	In	Out	Total	In	Out	Total
4853 Thomas Alton Boulevard	47	173	220	152	101	253
4721 Palladium Way	56	10	66	27	90	117
4853 Palladium Way	141	31	172	42	158	200

¹ 4853 Thomas Alton Boulevard Transportation Impact Study, Parking Study & TDM Options Report, accessed via <https://www.burlington.ca/en/services-for-you/ward-six.asp>

² 4721 Palladium Way Transportation Impact Study & TDM Options Report, accessed via <https://www.burlington.ca/en/services-for-you/ward-six.asp>

³ Block 23 20M-1034 4853 Palladium Way Transportation Impact Study, accessed via <https://www.burlington.ca/en/services-for-you/ward-six.asp>

3.6 Future Model Calibration

No model calibration was required to reflect expected future conditions.

3.7 Future Background Operations

To analyze future background conditions, the existing traffic volumes were grown using the growth rates discussed in Section 3.5. Future background conditions include planned improvements discussed in Section 3.1. Exhibit 3-9 illustrates future background traffic volumes during the a.m. and p.m. peak hours.

A summary of critical movements identified during the future background condition analysis is provided in Exhibit 3-10, with detailed output of the Synchro analysis provided in Appendix B.

With background growth added, the study intersections are expected to operate as follows:

- Appleby Line & 1 Side Road is expected to continue operating poorly for the EB approach. With limited gaps available in N-S traffic and lack of dedicated turning lanes, the EB approach will not sufficiently accommodate demands, with v/c being 1.34 during the morning peak hour. This indicate severe congestion and long queues for the minor approach.
- Appleby Line & Highway 407 WB Off-Ramp / Carpool Lot access is expected to continue operating well at LOS B and C in the a.m. peak and p.m. peak hour, respectively. In the p.m. peak hour, the off-ramp movements (i.e. EBL and EBR) deteriorate slightly and now operate above critical thresholds (v/c > 0.85).
- Appleby Line at Highway 407 EB Off-Ramp is expected to continue operating well at LOS A during both peak hours. In the a.m. peak hour, no movements are considered critical, indicating generally free flow conditions. In the p.m. peak hour, individual movements from the EB approach are expected to deteriorate slightly, but remain at LOS D.
- Appleby Line & Palladium Way is expected to deteriorate and operate at LOS B. With all the nearby development traffic introduced, the v/c for the EBL increased to 0.67 and 0.65 for a.m. and p.m. peak hour, respectively. However, there are sufficient reserve capacity indicating acceptable operation.

Exhibit 3-9: Future Background Traffic Volumes for the AM (PM) Peak Hour

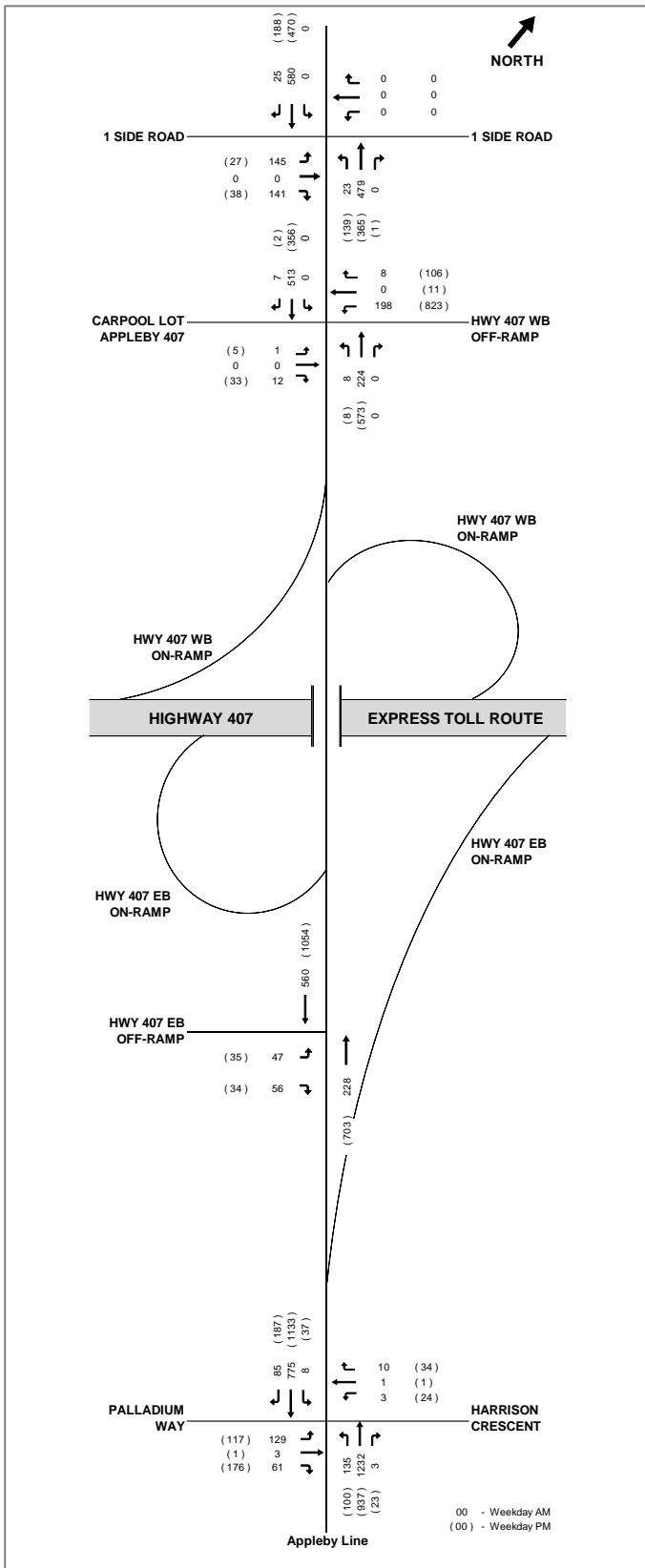


Exhibit 3-10: Synchro Analysis: Future Background Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Appleby Line & 1 Side Road <i>(unsignalized)</i>	-	EBLTR	F	1.34	128	-	EBLTR	E	0.38	12
Appleby Line & Highway 407 WB Off-Ramp / Carpool Lot <i>(signalized)</i>	B	EBL	D	0.07	2	C	EBL	D	0.06	4
		EBR	D				EBR	D	0.02	-
		WBL	D				WBL	D	0.88	161
		WBT	D				WBT	D	0.85	153
Appleby Line & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	No critical movements				A	EBL	D	0.32	16
		EBR	D				EBR	D	0.02	9
Appleby Line & Palladium Way / Harrison Crescent <i>(signalized)</i>	B	EBL	D	0.67	33	B	EBL	D	0.65	41
		EBT	D				EBT	D	0.13	18
		WBL	D				WBL	D	0.20	12
		WBT	D				WBT	D	0.03	9

3.8 Future Total Operations

Future total volumes were calculated adding the station-generated traffic to the future volumes with background growth applied. The future scenarios accounts for all vehicular traffic that is estimated to year 2031 following implementation of the Transitway.

Future total volumes which includes background growth and station-generated traffic are illustrated in Exhibit 3-11.

A summary of critical movements identified during the future total condition analysis is provided in Exhibit 3-12, with detailed output of the Synchro analysis provided in Appendix C.

With the new Transitway demands added to future background conditions, the study intersections are expected to operate as follows:

- Limited station traffic is added to the NBT and SBT movements at Appleby Line and 1 Side Road. Overall, the minor EB approach is expected to operate with long delays and queues. Because the EB approach is marginally affected by station demands with the noted operational issues anticipated to occur with or without the station, improvements for this intersection does not fall within the scope / responsibility of the Transitway-4 project. It is likely that the Halton Region would explore improvements at the intersection.
- With all the station demands added to single Transitway access (Appleby Line & WB Off-Ramp), the intersection will remain at LOS B in the a.m. peak hour and deteriorate to LOS D in the p.m. peak hour. Added volumes will cause the both movements of the WB approach to further deteriorate but with sufficient reserve capacity.
- The intersections of Appleby Line at Highway 407 EB Off-Ramp and at Palladium Way are expected to operate with little to no change with the addition of station demands.

Exhibit 3-11: Future Total Traffic Volumes for the AM (PM) Peak Hour

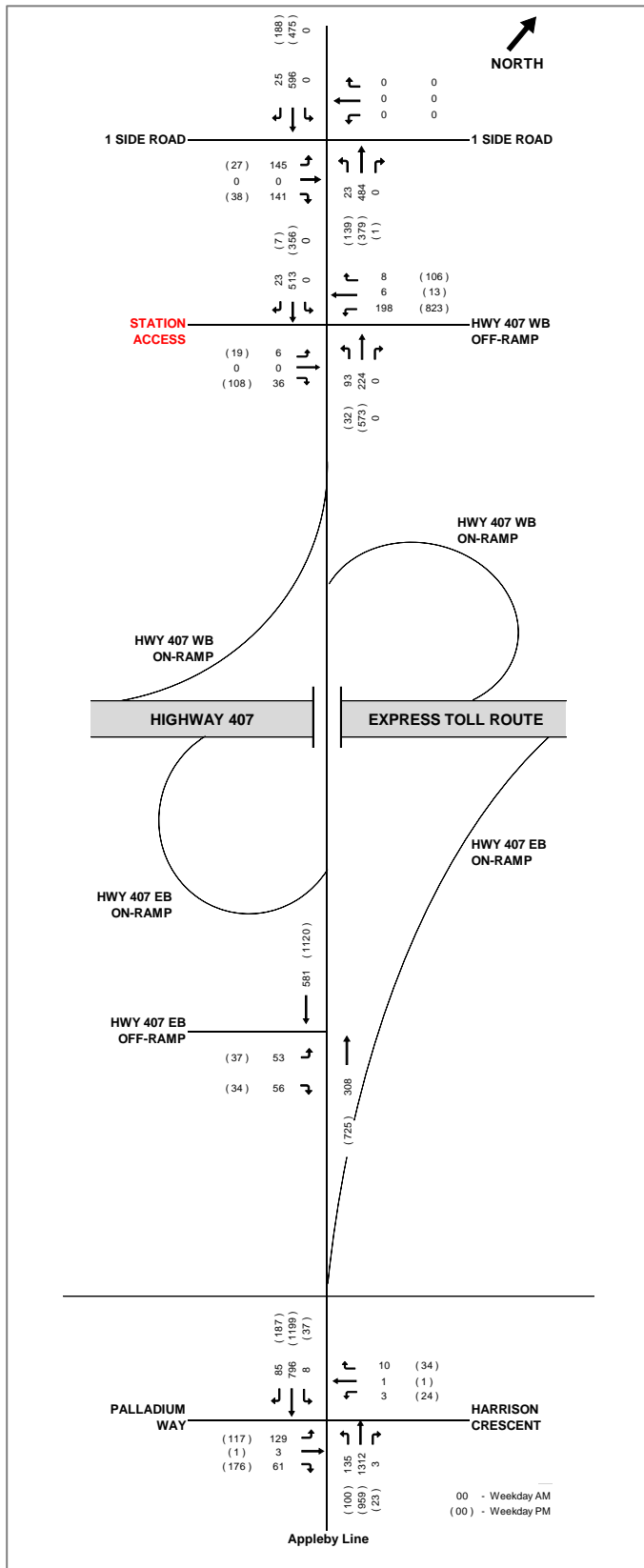


Exhibit 3-12: Synchro Analysis: Future Total Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Appleby Line & 1 Side Road <i>(unsignalized)</i>	-	EBLTR	F	1.39	134	-	EBLTR	E	0.39	13
Appleby Line & Highway 407 WB Off-Ramp / Carpool Lot & Station Access <i>(signalized)</i>	B	EBL	D	0.13	5	D	EBL	D	0.13	11
							EBR	D	0.08	9
							WBL	D	0.91	161
							WBT	D	0.89	154
Appleby Line & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	No critical movements				A	EBL	D	0.33	17
							EBR	D	0.02	9
Appleby Line & Palladium Way / Harrison Crescent <i>(signalized)</i>	B	EBL	D	0.67	33	B	EBL	D	0.65	41
							EBT	D	0.13	18
							WBL	D	0.20	12
							WBT	D	0.03	9

4 Potential Improvement Measures

4.1 Transit

Based on the operational analysis, no special transit priority measures appear warranted for entrance into and out of the station site. The entrance operate well and buses entering and exiting the station are not expected to incur significant delay. The station layout appears to provide a reasonable and direct routing between the bus turnaround / drop-off facility and Appleby Line with limited potential for background queues to interfere.

4.2 Active Transportation

No specific active transportation measures such as pedestrian crossovers appear necessary as there are no existing or planned active transportation facilities connecting to the station given the lack of walkable destinations.

4.3 Traffic

No traffic improvements are required.

5 Summary and Recommendations

This report provides an analysis of traffic operations for the proposed Highway 407 Transitway station located near the interchange of Highway 407 & Appleby Line in the City of Burlington. The report also includes commentary on transit and active transportation access to the proposed station.

The traffic analysis found that traffic operates well under existing conditions with free-flow operation within the study area. At 1 Side Road on the north limits of the study area, side-street traffic experiences some delay due to higher N-S volumes and limited available gaps.

Future conditions during the a.m. and p.m. peak hours were modelled and analyzed based on a horizon year of 2031. Forecasts were developed using background growth rates informed by MTO's travel demand model. Forecasts for traffic to and from the proposed station was estimated based on ridership (park-and-ride) demand. Additional traffic forecasts from nearby developments were also included in the future background condition.

The study indicates that future 2031 background traffic conditions is expected to operate well overall. A few turning and through movements remain critical, however operate under capacity. The only exception is at 1 Side Road where the side-street is expected to operate past capacity. However, traffic is marginally affected by station demands with the noted operational issues anticipated to occur with or without the station. Therefore improvements for this intersection does not fall within the scope / responsibility of the Transitway-4 project.

A single access for the station is proposed, a signalized access located opposite of the Highway 407 WB Off-Ramp. This access is to be shared with existing Appleby Line carpool lot. The traffic model indicates that vehicles accessing and egressing is well served with no major queueing and delays anticipated. Therefore, no geometric improvements are required based on a traffic operations' perspective.

It was found that there are limited opportunities for transit and active transportation connection, given the lack of walkable destinations and majority of developments located south of the Highway 407. As Appleby Line south of Highway 407 develops further, there will likely be an increase in bus service along the corridor. This is aligned with the Region of Halton's Transportation Master Plan which has identified this corridor as a semi-exclusive / exclusive right-of-way for bus priority.

Appendix A-: Existing Conditions Synchro Output

Lanes, Volumes, Timings
1: Appleby Line & 1 Side Rd

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	132	0	128	0	0	0	20	434	0	0	525	22
Future Volume (vph)	132	0	128	0	0	0	20	434	0	0	525	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.933									0.995	
Fl _t Protected		0.975						0.998				
Satd. Flow (prot)	0	1714	0	0	1921	0	0	1797	0	0	1798	0
Fl _t Permitted		0.975						0.998				
Satd. Flow (perm)	0	1714	0	0	1921	0	0	1797	0	0	1798	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		144.9			142.8			190.5			128.0	
Travel Time (s)		10.9			10.7			14.3			9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	0%	7%	0%	0%	6%	14%
Adj. Flow (vph)	143	0	139	0	0	0	22	472	0	0	571	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	282	0	0	0	0	0	494	0	0	595	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 60.9% ICU Level of Service B

Analysis Period (min) 15

Lanes, Volumes, Timings
 3: Hwy 407 Carpool Lot/Hwy 407 WB Off-Ramp & Appleby Line

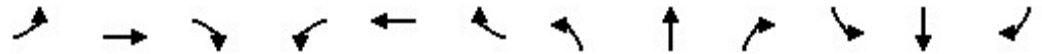
AM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖		↖	↖	↔		↖	↑↑			↑↑↑	
Traffic Volume (vph)	1	0	11	176	0	7	7	297	0	0	449	6
Future Volume (vph)	1	0	11	176	0	7	7	297	0	0	449	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	160.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	7.6			7.6			30.0			7.6		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850		0.988						0.998	
Flt Protected	0.950			0.950	0.956		0.950					
Satd. Flow (prot)	913	0	1498	1667	1645	0	1601	3476	0	0	5024	0
Flt Permitted	0.950			0.950	0.956		0.461					
Satd. Flow (perm)	913	0	1498	1667	1645	0	777	3476	0	0	5024	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191		191							3
Link Speed (k/h)		60			60			70				70
Link Distance (m)		82.1			211.4			66.5				202.8
Travel Time (s)		4.9			12.7			3.4				10.4
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	9%	4%	0%	14%	14%	5%	0%	0%	4%	17%
Adj. Flow (vph)	1	0	12	191	0	8	8	323	0	0	488	7
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	1	0	12	99	100	0	8	323	0	0	495	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1	2		1	2				2
Detector Template	Left		Right	Left	Thru		Left	Thru				Thru
Leading Detector (m)	6.1		6.1	6.1	30.5		6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1		6.1	6.1	1.8		6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0

Lanes, Volumes, Timings
 3: Hwy 407 Carpool Lot/Hwy 407 WB Off-Ramp & Appleby Line

AM Peak Period
 09-20-2019



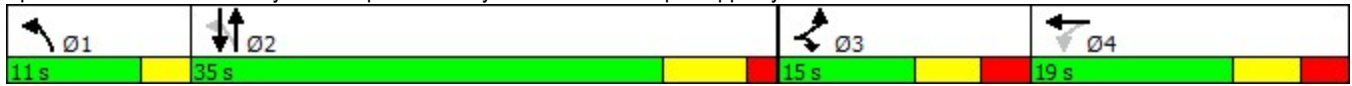
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot		Prot	Perm	NA		pm+pt	NA				NA
Protected Phases	3		3		4		1	2				2
Permitted Phases				4			2					
Detector Phase	3		3	4	4		1	2				2
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0				8.0
Minimum Split (s)	15.0		15.0	15.0	15.0		11.0	33.0				33.0
Total Split (s)	15.0		15.0	19.0	19.0		11.0	35.0				35.0
Total Split (%)	18.8%		18.8%	23.8%	23.8%		13.8%	43.8%				43.8%
Maximum Green (s)	8.0		8.0	12.0	12.0		8.0	28.0				28.0
Yellow Time (s)	4.0		4.0	4.0	4.0		3.0	5.0				5.0
All-Red Time (s)	3.0		3.0	3.0	3.0		0.0	2.0				2.0
Lost Time Adjust (s)	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		3.0	7.0				7.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag				Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes				Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		None	Max				Max
Walk Time (s)				0.0	0.0			7.0				7.0
Flash Dont Walk (s)				0.0	0.0			19.0				19.0
Pedestrian Calls (#/hr)				0	0			0				0
Act Effct Green (s)	8.3		8.3	9.2	9.2		38.5	34.8				34.8
Actuated g/C Ratio	0.15		0.15	0.16	0.16		0.67	0.61				0.61
v/c Ratio	0.01		0.03	0.37	0.24		0.01	0.15				0.16
Control Delay	27.0		0.2	28.1	1.3		6.4	9.5				9.0
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	27.0		0.2	28.1	1.3		6.4	9.5				9.0
LOS	C		A	C	A		A	A				A
Approach Delay		2.2			14.6			9.4				9.0
Approach LOS		A			B			A				A
Queue Length 50th (m)	0.1		0.0	8.4	0.0		0.3	6.4				6.9
Queue Length 95th (m)	1.6		0.0	29.1	0.0		2.3	27.7				27.2
Internal Link Dist (m)		58.1			187.4			42.5				178.8
Turn Bay Length (m)							160.0					
Base Capacity (vph)	132		379	361	506		642	2117				3061
Starvation Cap Reductn	0		0	0	0		0	0				0
Spillback Cap Reductn	0		0	0	0		0	0				0
Storage Cap Reductn	0		0	0	0		0	0				0
Reduced v/c Ratio	0.01		0.03	0.27	0.20		0.01	0.15				0.16

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	57.1
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.37
Intersection Signal Delay:	10.1
Intersection Capacity Utilization:	45.1%
Intersection LOS:	B
ICU Level of Service:	A

Analysis Period (min) 15

Splits and Phases: 3: Hwy 407 Carpool Lot/Hwy 407 WB Off-Ramp & Appleby Line



Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	50	0	301	491	0
Future Volume (vph)	42	50	0	301	491	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Fr _t	0.850					
Fl _t Protected	0.950					
Satd. Flow (prot)	1738	1541	0	3411	3510	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	1738	1541	0	3411	3510	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		54				
Link Speed (k/h)	60			70	70	
Link Distance (m)	280.8			52.2	101.7	
Travel Time (s)	16.8			2.7	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	6%	0%	7%	4%	0%
Adj. Flow (vph)	46	54	0	327	534	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	54	0	327	534	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						

Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	
Total Split (s)	27.0	27.0		53.0	53.0	
Total Split (%)	33.8%	33.8%		66.3%	66.3%	
Maximum Green (s)	20.0	20.0		46.0	46.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	3.0	3.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		0.0	0.0	
Flash Dont Walk (s)	0.0	0.0		0.0	0.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effect Green (s)	8.5	8.5		59.4	59.4	
Actuated g/C Ratio	0.11	0.11		0.77	0.77	
v/c Ratio	0.24	0.25		0.12	0.20	
Control Delay	34.6	12.3		3.5	3.7	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.6	12.3		3.5	3.7	
LOS	C	B		A	A	
Approach Delay	22.6			3.5	3.7	
Approach LOS	C			A	A	
Queue Length 50th (m)	6.9	0.0		6.4	11.2	
Queue Length 95th (m)	14.6	9.1		11.0	17.8	
Internal Link Dist (m)	256.8			28.2	77.7	
Turn Bay Length (m)						
Base Capacity (vph)	453	442		2631	2708	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.10	0.12		0.12	0.20	

Intersection Summary

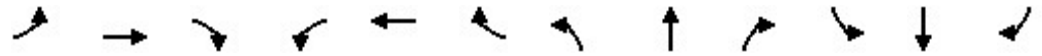
Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 77
 Natural Cycle: 40
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.25
 Intersection Signal Delay: 5.6
 Intersection Capacity Utilization 31.9%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 7: Appleby Line & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
 9: Palladium Way/Harrison Cres & Appleby Line

AM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	3	31	3	1	9	20	1074	3	7	694	16
Future Volume (vph)	69	3	31	3	1	9	20	1074	3	7	694	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	65.0		0.0	100.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	0.95
Frt		0.862			0.864							0.997
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1656	0	1825	1660	0	1825	5043	0	1825	3535	0
Flt Permitted	0.750			0.733			0.322			0.230		
Satd. Flow (perm)	1441	1656	0	1408	1660	0	619	5043	0	442	3535	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		34			10			1				3
Link Speed (k/h)		50			50			60				70
Link Distance (m)		104.0			64.4			215.5				248.7
Travel Time (s)		7.5			4.6			12.9				12.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	3%	0%
Adj. Flow (vph)	75	3	34	3	1	10	22	1167	3	8	754	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	37	0	3	11	0	22	1170	0	8	771	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	

Lanes, Volumes, Timings
 9: Palladium Way/Harrison Cres & Appleby Line

AM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		1.0	1.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	28.0	28.0		8.0	8.0		12.0	33.0		33.0	33.0	
Total Split (s)	28.0	28.0		28.0	28.0		12.0	52.0		40.0	40.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		15.0%	65.0%		50.0%	50.0%	
Maximum Green (s)	21.0	21.0		21.0	21.0		8.0	46.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		4.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		Max	Max	
Walk Time (s)								7.0		7.0	7.0	
Flash Dont Walk (s)								19.0		19.0	19.0	
Pedestrian Calls (#/hr)								0		0	0	
Act Effct Green (s)	9.6	9.6		9.1	9.1		54.7	53.9		51.5	51.5	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.76	0.75		0.71	0.71	
v/c Ratio	0.39	0.15		0.02	0.05		0.04	0.31		0.03	0.31	
Control Delay	34.2	12.0		25.3	15.6		3.6	4.5		7.9	6.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.2	12.0		25.3	15.6		3.6	4.5		7.9	6.6	
LOS	C	B		C	B		A	A		A	A	
Approach Delay		26.8			17.7			4.5			6.6	
Approach LOS		C			B			A			A	
Queue Length 50th (m)	9.3	0.4		0.4	0.1		0.7	18.8		0.3	17.4	
Queue Length 95th (m)	19.9	7.3		2.4	4.0		2.7	29.6		2.7	47.6	
Internal Link Dist (m)		80.0			40.4			191.5			224.7	
Turn Bay Length (m)	45.0			65.0			100.0			70.0		
Base Capacity (vph)	421	508		411	492		603	3772		315	2526	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.07		0.01	0.02		0.04	0.31		0.03	0.31	

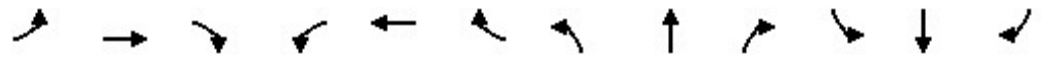
Intersection Summary	
Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	72.1
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.39
Intersection Signal Delay:	6.6
Intersection Capacity Utilization:	42.1%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 9: Palladium Way/Harrison Cres & Appleby Line



Lanes, Volumes, Timings
10: Appleby Line & Thomas Alton Blvd

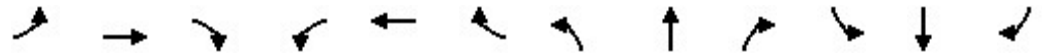
AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗	↖	↖		↖	↑↑↑		↖	↑↑↑	↗
Traffic Volume (vph)	147	7	374	18	2	1	105	865	32	0	681	25
Future Volume (vph)	147	7	374	18	2	1	105	865	32	0	681	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		40.0	15.0		0.0	135.0		0.0	40.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor							1.00					0.98
Frt			0.850		0.950			0.995				0.850
Flt Protected		0.955		0.950			0.950					
Satd. Flow (prot)	0	1817	1601	1722	1825	0	1722	5014	0	1921	5043	1633
Flt Permitted		0.735		0.651			0.317					
Satd. Flow (perm)	0	1399	1601	1180	1825	0	574	5014	0	1921	5043	1598
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			274		1			11				109
Link Speed (k/h)		50			50			60				60
Link Distance (m)		136.0			71.6			303.7				215.5
Travel Time (s)		9.8			5.2			18.2				12.9
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	2%	6%	0%	0%	6%	4%	6%	0%	4%	0%
Adj. Flow (vph)	160	8	407	20	2	1	114	940	35	0	740	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	168	407	20	3	0	114	975	0	0	740	27
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)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Appleby Line & Thomas Alton Blvd

AM Peak Period
09-20-2019



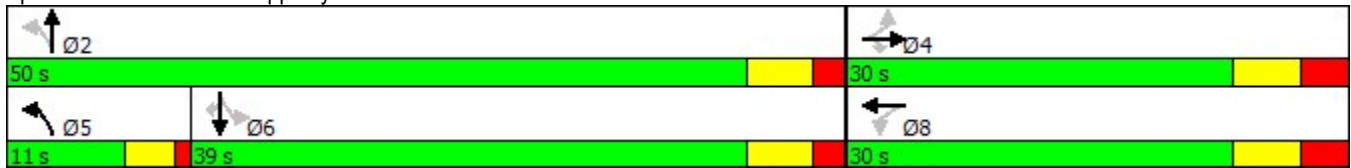
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		7.0	8.0		8.0	8.0	8.0
Minimum Split (s)	30.0	30.0	30.0	15.0	15.0		11.0	44.0		33.0	33.0	33.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0		11.0	50.0		39.0	39.0	39.0
Total Split (%)	37.5%	37.5%	37.5%	37.5%	37.5%		13.8%	62.5%		48.8%	48.8%	48.8%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0		7.0	44.0		33.0	33.0	33.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.0	7.0	7.0	7.0		4.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
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	None		None	Max		Max	Max	Max
Walk Time (s)								7.0		7.0	7.0	7.0
Flash Dont Walk (s)								19.0		19.0	19.0	19.0
Pedestrian Calls (#/hr)								0		0	0	0
Act Effct Green (s)		14.7	14.7	14.7	14.7		46.2	44.2			35.6	35.6
Actuated g/C Ratio		0.20	0.20	0.20	0.20		0.64	0.61			0.49	0.49
v/c Ratio		0.59	0.75	0.08	0.01		0.24	0.32			0.30	0.03
Control Delay		34.2	18.0	22.7	19.0		7.4	7.6			12.8	0.1
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		34.2	18.0	22.7	19.0		7.4	7.6			12.8	0.1
LOS		C	B	C	B		A	A			B	A
Approach Delay		22.8			22.2			7.6			12.4	
Approach LOS		C			C			A			B	
Queue Length 50th (m)		20.6	15.6	2.2	0.2		5.1	19.9			21.9	0.0
Queue Length 95th (m)		37.7	43.6	7.1	2.1		14.1	35.7			36.5	0.0
Internal Link Dist (m)		112.0			47.6			279.7			191.5	
Turn Bay Length (m)			40.0	15.0			135.0					70.0
Base Capacity (vph)		449	700	379	586		480	3084			2494	845
Starvation Cap Reductn		0	0	0	0		0	0			0	0
Spillback Cap Reductn		0	0	0	0		0	0			0	0
Storage Cap Reductn		0	0	0	0		0	0			0	0
Reduced v/c Ratio		0.37	0.58	0.05	0.01		0.24	0.32			0.30	0.03

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	72
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	12.8
Intersection Capacity Utilization	68.2%
Intersection LOS:	B
ICU Level of Service	C

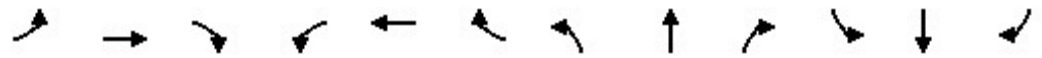
Analysis Period (min) 15

Splits and Phases: 10: Appleby Line & Thomas Alton Blvd



Lanes, Volumes, Timings
11: Harrison Ct & Appleby Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	15	0	0	20	0	890	98	0	1072	1
Future Volume (vph)	0	0	15	0	0	20	0	890	98	0	1072	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	65.0		0.0	45.0		100.0	55.0		60.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt		0.850			0.850				0.850			0.850
Flt Protected												
Satd. Flow (prot)	1921	1361	0	1921	1555	0	1921	4948	1601	1921	5092	1633
Flt Permitted												
Satd. Flow (perm)	1921	1361	0	1921	1555	0	1921	4948	1601	1921	5092	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		341			230				164			164
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		63.1			89.9			268.8			303.7	
Travel Time (s)		4.5			6.5			16.1			18.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	20%	0%	0%	5%	0%	6%	2%	0%	3%	0%
Adj. Flow (vph)	0	0	16	0	0	22	0	967	107	0	1165	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	16	0	0	22	0	0	967	107	0	1165	1
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	

Lanes, Volumes, Timings
11: Harrison Ct & Appleby Line

AM Peak Period
09-20-2019

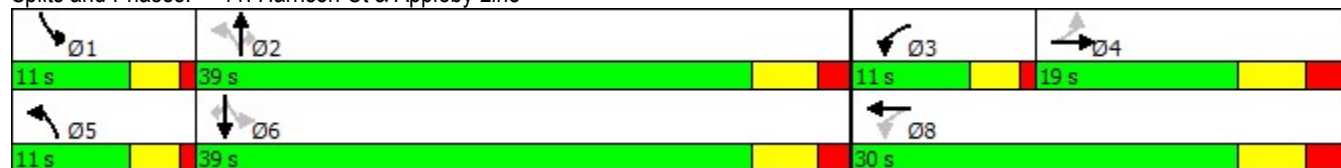


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		7.0	8.0		7.0	8.0	8.0	7.0	8.0	8.0
Minimum Split (s)	19.0	19.0		11.0	30.0		11.0	33.0	33.0	11.0	33.0	33.0
Total Split (s)	19.0	19.0		11.0	30.0		11.0	39.0	39.0	11.0	39.0	39.0
Total Split (%)	23.8%	23.8%		13.8%	37.5%		13.8%	48.8%	48.8%	13.8%	48.8%	48.8%
Maximum Green (s)	12.0	12.0		7.0	23.0		7.0	33.0	33.0	7.0	33.0	33.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0		1.0	3.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		4.0	7.0		4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)								7.0	7.0		7.0	7.0
Flash Dont Walk (s)								19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)		8.0			8.0			51.3	51.3		51.3	51.3
Actuated g/C Ratio		0.14			0.14			0.93	0.93		0.93	0.93
v/c Ratio		0.03			0.05			0.21	0.07		0.25	0.00
Control Delay		0.1			0.2			1.4	0.4		1.5	0.0
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		0.1			0.2			1.4	0.4		1.5	0.0
LOS		A			A			A	A		A	A
Approach Delay		0.1			0.3			1.3			1.5	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		0.0			0.0			0.0	0.0		0.0	0.0
Queue Length 95th (m)		0.0			0.0			19.0	1.7		23.3	0.0
Internal Link Dist (m)		39.1			65.9			244.8			279.7	
Turn Bay Length (m)									100.0			60.0
Base Capacity (vph)		563			783			4601	1500		4735	1530
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.03			0.03			0.21	0.07		0.25	0.00

Intersection Summary







































Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	55.2
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.25
Intersection Signal Delay:	1.4
Intersection LOS:	A
Intersection Capacity Utilization:	38.2%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 11: Harrison Ct & Appleby Line



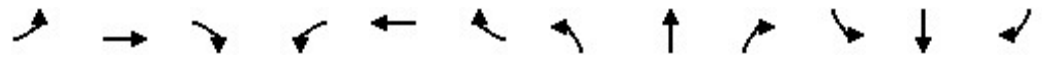
Lanes, Volumes, Timings
12: Appleby Line & Dundas St

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  		 	  		  	  	
Traffic Volume (vph)	254	1561	340	289	606	120	179	597	313	336	703	96
Future Volume (vph)	254	1561	340	289	606	120	179	597	313	336	703	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		150.0	160.0		180.0	115.0		105.0	130.0		150.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor	1.00		0.99	1.00		0.99	0.99		0.98	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	5092	1601	3309	4902	1526	3340	4995	1541	3404	5043	1617
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3468	5092	1580	3309	4902	1505	3323	4995	1512	3385	5043	1587
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			242			130			185			109
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		260.0			225.4			220.9			268.8	
Travel Time (s)		15.6			13.5			13.3			16.1	
Confl. Peds. (#/hr)	2		1	1		2	4		4	4		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	3%	2%	7%	7%	7%	6%	5%	6%	4%	4%	1%
Adj. Flow (vph)	276	1697	370	314	659	130	195	649	340	365	764	104
Shared Lane Traffic (%)												
Lane Group Flow (vph)	276	1697	370	314	659	130	195	649	340	365	764	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)		7.4			7.4			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
12: Appleby Line & Dundas St

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	8.0	15.0	15.0	8.0	15.0	15.0	8.0	15.0	15.0	8.0	15.0	15.0
Minimum Split (s)	14.0	47.0	47.0	14.0	47.0	47.0	14.0	32.0	32.0	14.0	32.0	32.0
Total Split (s)	20.0	72.0	72.0	20.0	72.0	72.0	16.0	32.0	32.0	16.0	32.0	32.0
Total Split (%)	14.3%	51.4%	51.4%	14.3%	51.4%	51.4%	11.4%	22.9%	22.9%	11.4%	22.9%	22.9%
Maximum Green (s)	15.0	65.0	65.0	15.0	65.0	65.0	11.0	25.0	25.0	11.0	25.0	25.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0	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	-1.0	0.0	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0						
Flash Dont Walk (s)		32.0	32.0		32.0	32.0						
Pedestrian Calls (#/hr)		0	0		0	0						
Act Effct Green (s)	14.3	65.0	65.0	14.9	65.6	65.6	10.8	24.1	24.1	12.0	24.4	24.4
Actuated g/C Ratio	0.10	0.47	0.47	0.11	0.47	0.47	0.08	0.17	0.17	0.09	0.18	0.18
v/c Ratio	0.77	0.71	0.43	0.89	0.29	0.17	0.76	0.75	0.82	1.25	0.86	0.28
Control Delay	76.0	31.8	9.6	87.4	23.1	3.8	81.7	60.7	41.6	186.2	66.9	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.0	31.8	9.6	87.4	23.1	3.8	81.7	60.7	41.6	186.2	66.9	9.7
LOS	E	C	A	F	C	A	F	E	D	F	E	A
Approach Delay		33.5			39.1			58.6			97.4	
Approach LOS		C			D			E			F	
Queue Length 50th (m)	38.8	135.7	20.4	44.9	40.6	0.0	27.7	62.8	43.1	~64.8	75.8	0.0
Queue Length 95th (m)	#54.6	153.4	44.6	#70.6	50.0	11.2	#44.0	77.4	#89.7	#96.5	91.8	14.6
Internal Link Dist (m)		236.0			201.4			196.9			244.8	
Turn Bay Length (m)	90.0		150.0	160.0		180.0	115.0		105.0	130.0		150.0
Base Capacity (vph)	374	2380	867	356	2312	778	264	897	423	293	906	374
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.71	0.43	0.88	0.29	0.17	0.74	0.72	0.80	1.25	0.84	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	139.1
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.25
Intersection Signal Delay:	53.1
Intersection LOS:	D
Intersection Capacity Utilization:	82.0%
ICU Level of Service:	D

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

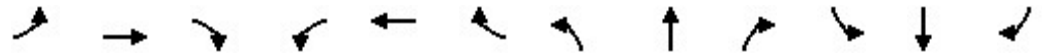
Queue shown is maximum after two cycles.

Splits and Phases: 12: Appleby Line & Dundas St



Lanes, Volumes, Timings
1: Appleby Line & 1 Side Rd

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	24	0	35	0	0	0	125	431	1	0	425	170
Future Volume (vph)	24	0	35	0	0	0	125	431	1	0	425	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.920									0.961	
Flt Protected		0.980						0.989				
Satd. Flow (prot)	0	1622	0	0	1921	0	0	1808	0	0	1785	0
Flt Permitted		0.980						0.989				
Satd. Flow (perm)	0	1622	0	0	1921	0	0	1808	0	0	1785	0
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		112.8			105.6			175.2			84.1	
Travel Time (s)		6.8			6.3			9.0			4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	0%	6%	0%	0%	0%	2%	6%	0%	0%	4%	2%
Adj. Flow (vph)	26	0	38	0	0	0	136	468	1	0	462	185
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	64	0	0	0	0	0	605	0	0	647	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	75.9%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Hwy 407 Carpool Lot/Hwy 407 WB Off-Ramp & Appleby Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	0	29	730	10	94	7	497	0	0	313	2
Future Volume (vph)	4	0	29	730	10	94	7	497	0	0	313	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	90.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.966						0.999	
Flt Protected	0.950			0.950	0.964		0.950					
Satd. Flow (prot)	1825	0	1526	1717	1675	0	1825	3579	0	0	5039	0
Flt Permitted	0.950			0.950	0.964		0.538					
Satd. Flow (perm)	1825	0	1526	1717	1675	0	1034	3579	0	0	5039	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153		15						1	
Link Speed (k/h)		48			60			70			70	
Link Distance (m)		75.0			209.7			64.0			204.3	
Travel Time (s)		5.6			12.6			3.3			10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	7%	1%	20%	1%	0%	2%	0%	0%	4%	0%
Adj. Flow (vph)	4	0	32	793	11	102	8	540	0	0	340	2
Shared Lane Traffic (%)				42%								
Lane Group Flow (vph)	4	0	32	460	446	0	8	540	0	0	342	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1	2		1	2				2
Detector Template	Left		Right	Left	Thru		Left	Thru				Thru
Leading Detector (m)	6.1		6.1	6.1	30.5		6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1		6.1	6.1	1.8		6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA		pm+pt	NA				NA
Protected Phases	3				4		1	2				2

Lanes, Volumes, Timings
 3: Hwy 407 Carpool Lot/Hwy 407 WB Off-Ramp & Appleby Line

PM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			3	4			2					
Detector Phase	3		3	4	4		1	2				2
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0				8.0
Minimum Split (s)	15.0		15.0	15.0	15.0		11.0	33.0				33.0
Total Split (s)	20.0		20.0	34.0	34.0		11.0	35.0				35.0
Total Split (%)	20.0%		20.0%	34.0%	34.0%		11.0%	35.0%				35.0%
Maximum Green (s)	13.0		13.0	27.0	27.0		8.0	28.0				28.0
Yellow Time (s)	4.0		4.0	4.0	4.0		3.0	5.0				5.0
All-Red Time (s)	3.0		3.0	3.0	3.0		0.0	2.0				2.0
Lost Time Adjust (s)	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		3.0	7.0				7.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag				Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes				Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		None	Max				Max
Walk Time (s)								7.0				7.0
Flash Dont Walk (s)								19.0				19.0
Pedestrian Calls (#/hr)								0				0
Act Effct Green (s)	8.1		8.1	27.3	27.3		33.9	28.5				28.5
Actuated g/C Ratio	0.10		0.10	0.34	0.34		0.42	0.36				0.36
v/c Ratio	0.02		0.11	0.79	0.77		0.02	0.42				0.19
Control Delay	38.0		0.8	37.8	35.9		15.3	22.8				20.1
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	38.0		0.8	37.8	35.9		15.3	22.8				20.1
LOS	D		A	D	D		B	C				C
Approach Delay		4.9			36.9			22.7				20.1
Approach LOS		A			D			C				C
Queue Length 50th (m)	0.6		0.0	71.2	66.3		0.8	35.3				14.1
Queue Length 95th (m)	3.8		0.0	#147.6	#140.5		3.3	58.7				24.7
Internal Link Dist (m)		51.0			185.7			40.0				180.3
Turn Bay Length (m)							90.0					
Base Capacity (vph)	300		379	587	583		517	1271				1791
Starvation Cap Reductn	0		0	0	0		0	0				0
Spillback Cap Reductn	0		0	0	0		0	0				0
Storage Cap Reductn	0		0	0	0		0	0				0
Reduced v/c Ratio	0.01		0.08	0.78	0.77		0.02	0.42				0.19

Intersection Summary

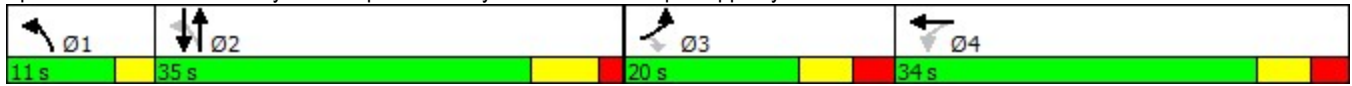
Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 80.1
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 28.9
 Intersection Capacity Utilization 55.4%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service B

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Hwy 407 Carpool Lot/Hwy 407 WB Off-Ramp & Appleby Line



Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	31	30	0	612	933	0
Future Volume (vph)	31	30	0	612	933	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Fr't		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1615	1526	0	3579	3614	0
Flt Permitted	0.950					
Satd. Flow (perm)	1615	1526	0	3579	3614	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		33				
Link Speed (k/h)	60			70	70	
Link Distance (m)	280.9			95.0	119.5	
Travel Time (s)	16.9			4.9	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	7%	0%	2%	1%	0%
Adj. Flow (vph)	34	33	0	665	1014	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	34	33	0	665	1014	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						

Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	
Total Split (s)	30.0	30.0		70.0	70.0	
Total Split (%)	30.0%	30.0%		70.0%	70.0%	
Maximum Green (s)	23.0	23.0		63.0	63.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	3.0	3.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effect Green (s)	8.3	8.3		71.8	71.8	
Actuated g/C Ratio	0.10	0.10		0.84	0.84	
v/c Ratio	0.22	0.19		0.22	0.33	
Control Delay	39.0	15.6		2.8	3.2	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	39.0	15.6		2.8	3.2	
LOS	D	B		A	A	
Approach Delay	27.5			2.8	3.2	
Approach LOS	C			A	A	
Queue Length 50th (m)	5.2	0.0		14.5	25.0	
Queue Length 95th (m)	13.6	8.1		21.5	35.7	
Internal Link Dist (m)	256.9			71.0	95.5	
Turn Bay Length (m)						
Base Capacity (vph)	435	435		3013	3043	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.08	0.08		0.22	0.33	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	85.3
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.33
Intersection Signal Delay:	4.0
Intersection LOS:	A
Intersection Capacity Utilization:	44.1%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 7: Appleby Line & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
9: Palladium Way/Harrison Cres & Appleby Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	1	24	21	1	30	46	837	20	33	1013	103
Future Volume (vph)	20	1	24	21	1	30	46	837	20	33	1013	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	65.0		0.0	100.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	0.95
Frt		0.856			0.854			0.996			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1583	0	1825	1641	0	1789	5173	0	1825	3567	0
Flt Permitted	0.800			0.800			0.191			0.294		
Satd. Flow (perm)	1537	1583	0	1537	1641	0	360	5173	0	565	3567	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			33			8			17	
Link Speed (k/h)		48			48			60			70	
Link Distance (m)		103.9			64.4			215.5			202.6	
Travel Time (s)		7.8			4.8			12.9			10.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	2%	1%	0%	0%	1%	0%
Adj. Flow (vph)	22	1	26	23	1	33	50	910	22	36	1101	112
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	27	0	23	34	0	50	932	0	36	1213	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	

Lanes, Volumes, Timings
 9: Palladium Way/Harrison Cres & Appleby Line

PM Peak Period
 09-20-2019

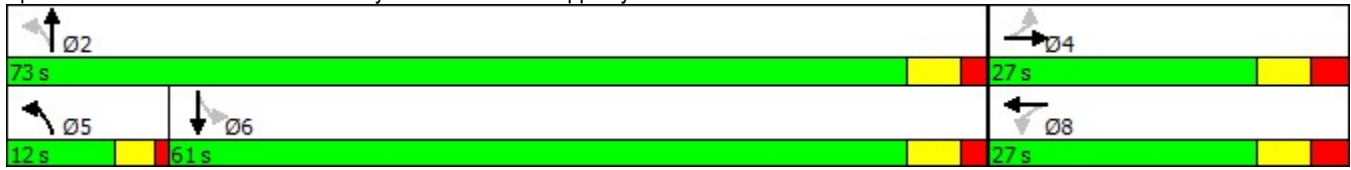


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		7.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	32.0		32.0	32.0	
Total Split (s)	27.0	27.0		27.0	27.0		12.0	73.0		61.0	61.0	
Total Split (%)	27.0%	27.0%		27.0%	27.0%		12.0%	73.0%		61.0%	61.0%	
Maximum Green (s)	20.0	20.0		20.0	20.0		8.0	67.0		55.0	55.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		4.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		Max	Max	
Walk Time (s)								7.0		7.0	7.0	
Flash Dont Walk (s)								19.0		19.0	19.0	
Pedestrian Calls (#/hr)								0		0	0	
Act Effct Green (s)	8.2	8.2		8.2	8.2		75.0	75.4		68.8	68.8	
Actuated g/C Ratio	0.09	0.09		0.09	0.09		0.85	0.85		0.78	0.78	
v/c Ratio	0.15	0.16		0.16	0.19		0.12	0.21		0.08	0.44	
Control Delay	39.5	17.2		39.7	16.5		2.6	2.3		6.6	6.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.5	17.2		39.7	16.5		2.6	2.3		6.6	6.8	
LOS	D	B		D	B		A	A		A	A	
Approach Delay		27.2			25.9			2.3			6.8	
Approach LOS		C			C			A			A	
Queue Length 50th (m)	3.5	0.2		3.7	0.2		1.4	13.0		2.1	52.3	
Queue Length 95th (m)	10.4	7.6		10.8	8.6		3.6	17.7		6.1	70.1	
Internal Link Dist (m)		79.9			40.4			191.5			178.6	
Turn Bay Length (m)	45.0			65.0			100.0			70.0		
Base Capacity (vph)	348	378		348	397		435	4423		441	2787	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.07		0.07	0.09		0.11	0.21		0.08	0.44	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	88.2
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.44
Intersection Signal Delay:	5.8
Intersection Capacity Utilization	56.9%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	B

Splits and Phases: 9: Palladium Way/Harrison Cres & Appleby Line



Lanes, Volumes, Timings
10: Appleby Line & Thomas Alton Blvd

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖	↗		↖	↑↑↑		↖	↑↑↑	↗
Traffic Volume (vph)	39	7	210	54	17	4	414	821	72	0	951	113
Future Volume (vph)	39	7	210	54	17	4	414	821	72	0	951	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		40.0	15.0		0.0	135.0		0.0	40.0		70.0
Storage Lanes	0		0	0		0	1		0	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor		1.00	0.99	1.00	1.00		1.00					0.97
Frt			0.850		0.973			0.988				0.850
Flt Protected		0.960		0.950			0.950					
Satd. Flow (prot)	0	1844	1601	1825	1865	0	1825	5043	0	1921	5193	1617
Flt Permitted		0.745		0.724			0.229					
Satd. Flow (perm)	0	1430	1578	1387	1865	0	439	5043	0	1921	5193	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			225		4			28				123
Link Speed (k/h)		48			50			60				60
Link Distance (m)		136.0			71.5			303.7				215.5
Travel Time (s)		10.2			5.1			18.2				12.9
Confl. Peds. (#/hr)	1		2	2		1	3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	0%	0%	3%	0%	0%	1%	1%
Adj. Flow (vph)	42	8	228	59	18	4	450	892	78	0	1034	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	50	228	59	22	0	450	970	0	0	1034	123
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)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Appleby Line & Thomas Alton Blvd

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0		7.0	8.0		8.0	8.0	8.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0		12.0	33.0		33.0	33.0	33.0
Total Split (s)	30.0	30.0	30.0	30.0	30.0		13.0	70.0		57.0	57.0	57.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	30.0%		13.0%	70.0%		57.0%	57.0%	57.0%
Maximum Green (s)	23.0	23.0	23.0	23.0	23.0		9.0	64.0		51.0	51.0	51.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0		4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0		1.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)		7.0	7.0	7.0	7.0		4.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
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	None		None	Max		Max	Max	Max
Walk Time (s)								7.0		7.0	7.0	7.0
Flash Dont Walk (s)								19.0		19.0	19.0	19.0
Pedestrian Calls (#/hr)								0		0	0	0
Act Effct Green (s)		9.7	9.7	9.7	9.7		66.0	64.0			51.0	51.0
Actuated g/C Ratio		0.11	0.11	0.11	0.11		0.76	0.74			0.59	0.59
v/c Ratio		0.31	0.61	0.38	0.10		0.94	0.26			0.34	0.13
Control Delay		40.7	12.9	43.0	30.9		38.8	3.9			9.7	2.1
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay		40.7	12.9	43.0	30.9		38.8	3.9			9.7	2.1
LOS		D	B	D	C		D	A			A	A
Approach Delay		17.9			39.7			14.9			8.9	
Approach LOS		B			D			B			A	
Queue Length 50th (m)		7.8	0.5	9.3	2.7		19.5	14.3			28.9	0.0
Queue Length 95th (m)		18.2	19.8	20.6	9.3		#65.5	22.8			41.3	6.8
Internal Link Dist (m)		112.0			47.5			279.7			191.5	
Turn Bay Length (m)			40.0	15.0			135.0					70.0
Base Capacity (vph)		379	584	368	497		478	3731			3055	977
Starvation Cap Reductn		0	0	0	0		0	0			0	0
Spillback Cap Reductn		0	0	0	0		0	0			0	0
Storage Cap Reductn		0	0	0	0		0	0			0	0
Reduced v/c Ratio		0.13	0.39	0.16	0.04		0.94	0.26			0.34	0.13

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	86.7
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.94
Intersection Signal Delay:	13.5
Intersection Capacity Utilization	68.4%
Intersection LOS:	B
ICU Level of Service	C

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Appleby Line & Thomas Alton Blvd



Lanes, Volumes, Timings
11: Harrison Ct & Appleby Line

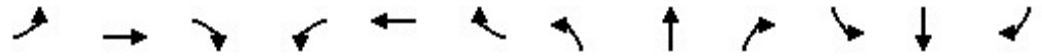
PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	55	0	0	63	0	1249	124	0	1410	4
Future Volume (vph)	0	0	55	0	0	63	0	1249	124	0	1410	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	35.0		0.0	65.0		0.0	45.0		100.0	55.0		60.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor									0.98			0.98
Frt		0.850			0.850				0.850			0.850
Flt Protected												
Satd. Flow (prot)	1921	1570	0	1921	1633	0	1921	5092	1633	1921	5142	1633
Flt Permitted												
Satd. Flow (perm)	1921	1570	0	1921	1633	0	1921	5092	1597	1921	5142	1594
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		280			162				135			131
Link Speed (k/h)		60			50			60			60	
Link Distance (m)		63.0			89.9			268.8			303.7	
Travel Time (s)		3.8			6.5			16.1			18.2	
Confl. Peds. (#/hr)							2		1	1		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	0	0	60	0	0	68	0	1358	135	0	1533	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	60	0	0	68	0	0	1358	135	0	1533	4
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)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			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	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
11: Harrison Ct & Appleby Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		7.0	8.0		7.0	1.0	1.0	7.0	8.0	8.0
Minimum Split (s)	26.0	26.0		12.0	38.0		11.0	33.0	33.0	11.0	33.0	33.0
Total Split (s)	26.0	26.0		12.0	38.0		11.0	51.0	51.0	11.0	51.0	51.0
Total Split (%)	26.0%	26.0%		12.0%	38.0%		11.0%	51.0%	51.0%	11.0%	51.0%	51.0%
Maximum Green (s)	19.0	19.0		8.0	31.0		7.0	45.0	45.0	7.0	45.0	45.0
Yellow Time (s)	4.0	4.0		3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	3.0	3.0		1.0	3.0		1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0		4.0	7.0		4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead			Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Max	Max	None	Max	Max
Walk Time (s)								7.0	7.0		7.0	7.0
Flash Dont Walk (s)								19.0	19.0		19.0	19.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)		7.5			8.1			53.0	53.0		53.0	53.0
Actuated g/C Ratio		0.11			0.12			0.76	0.76		0.76	0.76
v/c Ratio		0.14			0.20			0.35	0.11		0.39	0.00
Control Delay		0.7			1.4			4.1	1.0		4.3	0.0
Queue Delay		0.0			0.0			0.0	0.0		0.0	0.0
Total Delay		0.7			1.4			4.1	1.0		4.3	0.0
LOS		A			A			A	A		A	A
Approach Delay		0.7			1.4			3.8			4.3	
Approach LOS		A			A			A			A	
Queue Length 50th (m)		0.0			0.0			21.4	0.0		25.4	0.0
Queue Length 95th (m)		0.0			0.0			27.7	3.9		32.3	0.0
Internal Link Dist (m)		39.0			65.9			244.8			279.7	
Turn Bay Length (m)									100.0			60.0
Base Capacity (vph)		634			820			3871	1246		3909	1243
Starvation Cap Reductn		0			0			0	0		0	0
Spillback Cap Reductn		0			0			0	0		0	0
Storage Cap Reductn		0			0			0	0		0	0
Reduced v/c Ratio		0.09			0.08			0.35	0.11		0.39	0.00

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	69.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.39
Intersection Signal Delay:	3.9
Intersection Capacity Utilization:	44.7%
Intersection LOS:	A
ICU Level of Service:	A

Analysis Period (min) 15

Splits and Phases: 11: Harrison Ct & Appleby Line

↙ Ø1	↕ Ø2	↘ Ø3	↗ Ø4
11 s	51 s	12 s	26 s
↙ Ø5	↕ Ø6	↙ Ø8	
11 s	51 s	38 s	

Lanes, Volumes, Timings
12: Appleby Line & Dundas St

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	621	144	389	1592	275	386	874	333	348	835	280
Future Volume (vph)	186	621	144	389	1592	275	386	874	333	348	835	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		150.0	160.0		180.0	115.0		105.0	130.0		150.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.97	0.99		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3506	5092	1617	3372	5142	1570	3506	5142	1555	3471	5142	1633
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3504	5092	1587	3365	5142	1541	3488	5142	1515	3429	5142	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			157			254			362			304
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		260.1			228.5			220.9			268.8	
Travel Time (s)		15.6			13.7			13.3			16.1	
Confl. Peds. (#/hr)	6		5	5		6	7		13	13		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	3%	1%	5%	2%	4%	1%	2%	5%	2%	2%	0%
Adj. Flow (vph)	202	675	157	423	1730	299	420	950	362	378	908	304
Shared Lane Traffic (%)												
Lane Group Flow (vph)	202	675	157	423	1730	299	420	950	362	378	908	304
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)		7.4			7.4			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
12: Appleby Line & Dundas St

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	custom	Prot	NA	Perm	Prot	NA	custom	Prot	NA	custom
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			4			6			2			6
Detector Phase	5	2	4	1	6	6	7	4	2	3	8	6
Switch Phase												
Minimum Initial (s)	8.0	46.0	15.0	8.0	15.0	15.0	8.0	15.0	46.0	8.0	15.0	15.0
Minimum Split (s)	14.0	53.0	39.0	14.0	47.0	47.0	14.0	39.0	53.0	14.0	33.0	47.0
Total Split (s)	16.0	61.0	39.0	24.0	69.0	69.0	22.0	39.0	61.0	16.0	33.0	69.0
Total Split (%)	11.4%	43.6%	27.9%	17.1%	49.3%	49.3%	15.7%	27.9%	43.6%	11.4%	23.6%	49.3%
Maximum Green (s)	11.0	54.0	32.0	19.0	62.0	62.0	17.0	32.0	54.0	11.0	26.0	62.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	2.0	3.0	3.0	2.0	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	-1.0	0.0	0.0
Total Lost Time (s)	5.0	7.0	7.0	5.0	7.0	7.0	5.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	Max	None	None	Max	Max	None	None	Max	None	None	Max
Walk Time (s)		7.0			7.0	7.0			7.0			7.0
Flash Dont Walk (s)		32.0			32.0	32.0			32.0			32.0
Pedestrian Calls (#/hr)		0			0	0			0			0
Act Effct Green (s)	10.8	54.0	32.0	19.0	62.2	62.2	17.0	32.0	54.0	12.0	26.0	62.2
Actuated g/C Ratio	0.08	0.39	0.23	0.14	0.44	0.44	0.12	0.23	0.39	0.09	0.19	0.44
v/c Ratio	0.75	0.34	0.33	0.93	0.76	0.36	0.99	0.81	0.45	1.27	0.95	0.35
Control Delay	80.7	31.1	8.1	86.6	35.3	5.9	101.6	57.4	4.6	195.9	75.7	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	0.0
Total Delay	80.7	31.1	8.1	86.6	35.3	5.9	101.6	57.4	4.6	195.9	75.7	3.5
LOS	F	C	A	F	D	A	F	E	A	F	E	A
Approach Delay		37.3			40.6			57.1			90.5	
Approach LOS		D			D			E			F	
Queue Length 50th (m)	28.6	48.1	0.0	60.5	145.2	7.0	60.7	91.9	0.0	~67.8	92.0	0.0
Queue Length 95th (m)	#44.7	59.0	17.9	#90.9	163.5	25.4	#94.4	108.6	19.5	#99.8	#119.0	16.2
Internal Link Dist (m)		236.1			204.5			196.9			244.8	
Turn Bay Length (m)	90.0		150.0	160.0		180.0	115.0		105.0	130.0		150.0
Base Capacity (vph)	275	1964	483	457	2285	825	425	1175	806	297	954	880
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.34	0.33	0.93	0.76	0.36	0.99	0.81	0.45	1.27	0.95	0.35

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Natural Cycle:	130
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.27
Intersection Signal Delay:	55.9
Intersection Capacity Utilization:	101.6%
Intersection LOS:	E
ICU Level of Service:	G

Analysis Period (min) 15

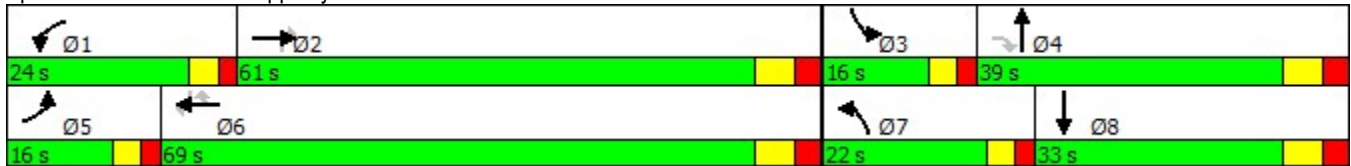
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

















Splits and Phases: 12: Appleby Line & Dundas St



Appendix -B: Future Background Conditions Synchro Output

Lanes, Volumes, Timings
1: Appleby Line & 1 Side Rd

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	0	141	0	0	0	23	479	0	0	580	25
Future Volume (vph)	145	0	141	0	0	0	23	479	0	0	580	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.934									0.994	
Flt Protected		0.975						0.998				
Satd. Flow (prot)	0	1715	0	0	1921	0	0	1797	0	0	1796	0
Flt Permitted		0.975						0.998				
Satd. Flow (perm)	0	1715	0	0	1921	0	0	1797	0	0	1796	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		144.9			142.8			190.5			128.0	
Travel Time (s)		10.9			10.7			14.3			9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	0%	7%	0%	0%	6%	14%
Adj. Flow (vph)	158	0	153	0	0	0	25	521	0	0	630	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	311	0	0	0	0	0	546	0	0	657	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	67.3%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

AM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	12	198	0	8	8	224	0	0	513	7
Future Volume (vph)	1	0	12	198	0	8	8	224	0	0	513	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	160.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	7.6			7.6			30.0			7.6		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850		0.988							0.998
Flt Protected	0.950			0.950	0.956		0.950					
Satd. Flow (prot)	913	0	1498	1667	1645	0	1601	3476	0	0	5024	0
Flt Permitted	0.950			0.950	0.956		0.429					
Satd. Flow (perm)	913	0	1498	1667	1645	0	723	3476	0	0	5024	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191		191							3
Link Speed (k/h)		60			60			70				70
Link Distance (m)		82.1			211.4			66.5				202.8
Travel Time (s)		4.9			12.7			3.4				10.4
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	9%	4%	0%	14%	14%	5%	0%	0%	4%	17%
Adj. Flow (vph)	1	0	13	215	0	9	9	243	0	0	558	8
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	1	0	13	112	112	0	9	243	0	0	566	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1	2		1	2				2
Detector Template	Left		Right	Left	Thru		Left	Thru				Thru
Leading Detector (m)	6.1		6.1	6.1	30.5		6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1		6.1	6.1	1.8		6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0

Lanes, Volumes, Timings
 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

AM Peak Period
 09-20-2019



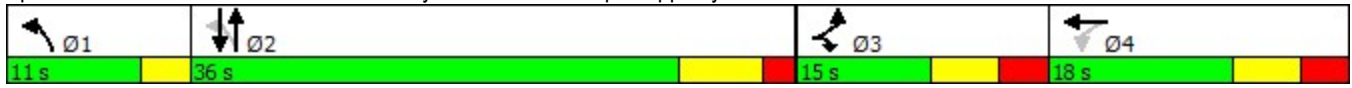
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot		Prot	Perm	NA		pm+pt	NA				NA
Protected Phases	3		3		4		1	2				2
Permitted Phases				4			2					
Detector Phase	3		3	4	4		1	2				2
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0				8.0
Minimum Split (s)	15.0		15.0	15.0	15.0		11.0	33.0				33.0
Total Split (s)	15.0		15.0	18.0	18.0		11.0	36.0				36.0
Total Split (%)	18.8%		18.8%	22.5%	22.5%		13.8%	45.0%				45.0%
Maximum Green (s)	8.0		8.0	11.0	11.0		8.0	29.0				29.0
Yellow Time (s)	4.0		4.0	4.0	4.0		3.0	5.0				5.0
All-Red Time (s)	3.0		3.0	3.0	3.0		0.0	2.0				2.0
Lost Time Adjust (s)	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		3.0	7.0				7.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag				Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes				Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		None	Max				Max
Walk Time (s)				0.0	0.0			7.0				7.0
Flash Dont Walk (s)				0.0	0.0			19.0				19.0
Pedestrian Calls (#/hr)				0	0			0				0
Act Effct Green (s)	8.2		8.2	9.3	9.3		38.3	32.9				32.9
Actuated g/C Ratio	0.14		0.14	0.15	0.15		0.63	0.54				0.54
v/c Ratio	0.01		0.04	0.44	0.27		0.02	0.13				0.21
Control Delay	28.0		0.2	30.2	2.3		6.2	9.5				9.3
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	28.0		0.2	30.2	2.3		6.2	9.5				9.3
LOS	C		A	C	A		A	A				A
Approach Delay		2.2				16.2		9.4				9.3
Approach LOS		A				B		A				A
Queue Length 50th (m)	0.1		0.0	9.8	0.0		0.2	4.8				8.2
Queue Length 95th (m)	1.6		0.0	32.9	2.1		2.5	20.9				30.3
Internal Link Dist (m)		58.1				187.4		42.5				178.8
Turn Bay Length (m)							160.0					
Base Capacity (vph)	124		368	311	462		576	1889				2732
Starvation Cap Reductn	0		0	0	0		0	0				0
Spillback Cap Reductn	0		0	0	0		0	0				0
Storage Cap Reductn	0		0	0	0		0	0				0
Reduced v/c Ratio	0.01		0.04	0.36	0.24		0.02	0.13				0.21

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	60.6
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.44
Intersection Signal Delay:	10.7
Intersection Capacity Utilization:	45.7%
Intersection LOS:	B
ICU Level of Service:	A

Analysis Period (min) 15

Splits and Phases: 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line



Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	47	56	0	228	560	0
Future Volume (vph)	47	56	0	228	560	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Fr't		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1738	1541	0	3411	3510	0
Flt Permitted	0.950					
Satd. Flow (perm)	1738	1541	0	3411	3510	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		61				
Link Speed (k/h)	60			70	70	
Link Distance (m)	280.8			52.2	101.7	
Travel Time (s)	16.8			2.7	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	6%	0%	7%	4%	0%
Adj. Flow (vph)	51	61	0	248	609	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	51	61	0	248	609	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						

Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	
Total Split (s)	27.0	27.0		53.0	53.0	
Total Split (%)	33.8%	33.8%		66.3%	66.3%	
Maximum Green (s)	20.0	20.0		46.0	46.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	3.0	3.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		0.0	0.0	
Flash Dont Walk (s)	0.0	0.0		0.0	0.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	8.6	8.6		58.9	58.9	
Actuated g/C Ratio	0.11	0.11		0.77	0.77	
v/c Ratio	0.26	0.27		0.09	0.23	
Control Delay	34.5	11.9		3.5	3.9	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.5	11.9		3.5	3.9	
LOS	C	B		A	A	
Approach Delay	22.2			3.5	3.9	
Approach LOS	C			A	A	
Queue Length 50th (m)	7.6	0.0		4.7	13.1	
Queue Length 95th (m)	15.7	9.5		8.7	20.8	
Internal Link Dist (m)	256.8			28.2	77.7	
Turn Bay Length (m)						
Base Capacity (vph)	456	449		2621	2697	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.11	0.14		0.09	0.23	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 76.6
 Natural Cycle: 40
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.27
 Intersection Signal Delay: 5.9
 Intersection Capacity Utilization 31.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 7: Appleby Line & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
 9: Palladium Way/Harrison Cres & Appleby Line

AM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	3	61	3	1	10	135	1232	3	8	775	85
Future Volume (vph)	129	3	61	3	1	10	135	1232	3	8	775	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	65.0		0.0	100.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	0.95
Frt		0.857			0.862							0.985
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1646	0	1825	1656	0	1825	5043	0	1825	3501	0
Flt Permitted	0.750			0.712			0.220			0.192		
Satd. Flow (perm)	1441	1646	0	1368	1656	0	423	5043	0	369	3501	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66			11			1				18
Link Speed (k/h)		50			50			60				70
Link Distance (m)		104.0			105.0			215.5				248.7
Travel Time (s)		7.5			7.6			12.9				12.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	3%	0%
Adj. Flow (vph)	140	3	66	3	1	11	147	1339	3	9	842	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	69	0	3	12	0	147	1342	0	9	934	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	

Lanes, Volumes, Timings
9: Palladium Way/Harrison Cres & Appleby Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		1.0	1.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	28.0	28.0		8.0	8.0		12.0	33.0		33.0	33.0	
Total Split (s)	28.0	28.0		28.0	28.0		13.0	52.0		39.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		16.3%	65.0%		48.8%	48.8%	
Maximum Green (s)	21.0	21.0		21.0	21.0		9.0	46.0		33.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		4.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		Max	Max	
Walk Time (s)								7.0		7.0	7.0	
Flash Dont Walk (s)								19.0		19.0	19.0	
Pedestrian Calls (#/hr)								0		0	0	
Act Effct Green (s)	12.3	12.3		11.8	11.8		51.3	50.6		37.0	37.0	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.72	0.71		0.52	0.52	
v/c Ratio	0.56	0.20		0.01	0.04		0.32	0.38		0.05	0.51	
Control Delay	36.1	9.1		23.3	13.9		6.5	6.3		13.0	14.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.1	9.1		23.3	13.9		6.5	6.3		13.0	14.2	
LOS	D	A		C	B		A	A		B	B	
Approach Delay		27.2			15.8			6.3			14.2	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	17.4	0.3		0.4	0.1		5.8	27.0		0.6	43.0	
Queue Length 95th (m)	33.2	9.4		2.3	4.0		14.4	44.2		3.5	70.8	
Internal Link Dist (m)		80.0			81.0			191.5			224.7	
Turn Bay Length (m)	45.0			65.0			100.0			70.0		
Base Capacity (vph)	424	531		402	495		481	3571		191	1822	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.13		0.01	0.02		0.31	0.38		0.05	0.51	

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	71.4
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	10.8
Intersection Capacity Utilization	60.2%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	B

Splits and Phases: 9: Palladium Way/Harrison Cres & Appleby Line



Lanes, Volumes, Timings
1: Appleby Line & 1 Side Rd

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	27	0	38	0	0	0	139	365	1	0	470	188
Future Volume (vph)	27	0	38	0	0	0	139	365	1	0	470	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.921									0.961	
Fl _t Protected		0.980						0.986				
Satd. Flow (prot)	0	1623	0	0	1921	0	0	1806	0	0	1785	0
Fl _t Permitted		0.980						0.986				
Satd. Flow (perm)	0	1623	0	0	1921	0	0	1806	0	0	1785	0
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		112.8			105.6			175.2			84.1	
Travel Time (s)		6.8			6.3			9.0			4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	0%	6%	0%	0%	0%	2%	6%	0%	0%	4%	2%
Adj. Flow (vph)	29	0	41	0	0	0	151	397	1	0	511	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	0	0	0	0	0	549	0	0	715	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

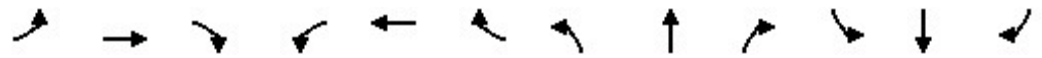
Control Type: Unsignalized

Intersection Capacity Utilization 77.0% ICU Level of Service D

Analysis Period (min) 15

Lanes, Volumes, Timings
 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

PM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	0	33	823	11	106	8	573	0	0	356	2
Future Volume (vph)	5	0	33	823	11	106	8	573	0	0	356	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	90.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.966						0.999	
Flt Protected	0.950			0.950	0.964		0.950					
Satd. Flow (prot)	1825	0	1526	1717	1675	0	1825	3579	0	0	5039	0
Flt Permitted	0.950			0.950	0.964		0.513					
Satd. Flow (perm)	1825	0	1526	1717	1675	0	986	3579	0	0	5039	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153		16							1
Link Speed (k/h)		48			60			70				70
Link Distance (m)		75.0			209.7			64.0				204.3
Travel Time (s)		5.6			12.6			3.3				10.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	7%	1%	20%	1%	0%	2%	0%	0%	4%	0%
Adj. Flow (vph)	5	0	36	895	12	115	9	623	0	0	387	2
Shared Lane Traffic (%)				42%								
Lane Group Flow (vph)	5	0	36	519	503	0	9	623	0	0	389	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1	2		1	2				2
Detector Template	Left		Right	Left	Thru		Left	Thru				Thru
Leading Detector (m)	6.1		6.1	6.1	30.5		6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1		6.1	6.1	1.8		6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA		pm+pt	NA				NA
Protected Phases	3				4		1	2				2

Lanes, Volumes, Timings
3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			3	4			2					
Detector Phase	3		3	4	4		1	2				2
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0				8.0
Minimum Split (s)	15.0		15.0	15.0	15.0		11.0	33.0				33.0
Total Split (s)	15.0		15.0	41.0	41.0		11.0	33.0				33.0
Total Split (%)	15.0%		15.0%	41.0%	41.0%		11.0%	33.0%				33.0%
Maximum Green (s)	8.0		8.0	34.0	34.0		8.0	26.0				26.0
Yellow Time (s)	4.0		4.0	4.0	4.0		3.0	5.0				5.0
All-Red Time (s)	3.0		3.0	3.0	3.0		0.0	2.0				2.0
Lost Time Adjust (s)	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		3.0	7.0				7.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag				Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes				Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		None	Max				Max
Walk Time (s)								7.0				7.0
Flash Dont Walk (s)								19.0				19.0
Pedestrian Calls (#/hr)								0				0
Act Effct Green (s)	8.3		8.3	29.7	29.7		32.4	27.0				27.0
Actuated g/C Ratio	0.10		0.10	0.37	0.37		0.40	0.33				0.33
v/c Ratio	0.03		0.12	0.82	0.80		0.02	0.52				0.23
Control Delay	40.6		0.8	37.6	35.5		18.8	26.9				23.1
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	40.6		0.8	37.6	35.5		18.8	26.9				23.1
LOS	D		A	D	D		B	C				C
Approach Delay		5.7			36.5			26.8				23.1
Approach LOS		A			D			C				C
Queue Length 50th (m)	0.8		0.0	81.0	75.4		1.0	47.7				18.5
Queue Length 95th (m)	4.4		0.0	#161.4	#152.8		4.0	75.5				30.8
Internal Link Dist (m)		51.0			185.7			40.0				180.3
Turn Bay Length (m)							90.0					
Base Capacity (vph)	187		294	748	740		481	1194				1682
Starvation Cap Reductn	0		0	0	0		0	0				0
Spillback Cap Reductn	0		0	0	0		0	0				0
Storage Cap Reductn	0		0	0	0		0	0				0
Reduced v/c Ratio	0.03		0.12	0.69	0.68		0.02	0.52				0.23

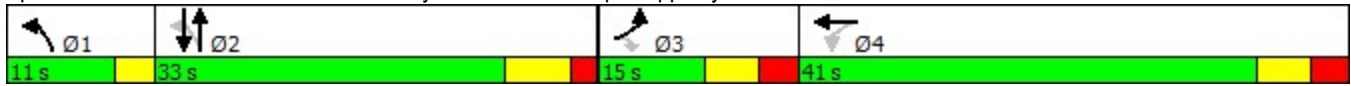
Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	80.9
Natural Cycle:	90
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.82
Intersection Signal Delay:	30.5
Intersection LOS:	C
Intersection Capacity Utilization:	60.5%
ICU Level of Service:	B
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line



Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	35	34	0	703	1054	0
Future Volume (vph)	35	34	0	703	1054	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Fr _t	0.850					
Fl _t Protected	0.950					
Satd. Flow (prot)	1615	1526	0	3579	3614	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	1615	1526	0	3579	3614	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		37				
Link Speed (k/h)	60			70	70	
Link Distance (m)	280.9			95.0	119.5	
Travel Time (s)	16.9			4.9	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	7%	0%	2%	1%	0%
Adj. Flow (vph)	38	37	0	764	1146	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	38	37	0	764	1146	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						

Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	
Total Split (s)	22.0	22.0		78.0	78.0	
Total Split (%)	22.0%	22.0%		78.0%	78.0%	
Maximum Green (s)	15.0	15.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	3.0	3.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effect Green (s)	8.6	8.6		75.4	75.4	
Actuated g/C Ratio	0.09	0.09		0.81	0.81	
v/c Ratio	0.26	0.21		0.26	0.39	
Control Delay	44.1	16.4		3.4	4.0	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	44.1	16.4		3.4	4.0	
LOS	D	B		A	A	
Approach Delay	30.4			3.4	4.0	
Approach LOS	C			A	A	
Queue Length 50th (m)	6.5	0.0		17.2	29.8	
Queue Length 95th (m)	15.9	8.8		25.9	43.3	
Internal Link Dist (m)	256.9			71.0	95.5	
Turn Bay Length (m)						
Base Capacity (vph)	258	275		2884	2912	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.15	0.13		0.26	0.39	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	93.6
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.39
Intersection Signal Delay:	4.7
Intersection LOS:	A
Intersection Capacity Utilization:	44.4%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 7: Appleby Line & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
9: Palladium Way/Harrison Cres & Appleby Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1	176	24	1	34	100	937	23	37	1133	187
Future Volume (vph)	117	1	176	24	1	34	100	937	23	37	1133	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	65.0		0.0	100.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	0.95
Frt		0.851			0.854			0.996			0.979	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1572	0	1825	1641	0	1789	5173	0	1825	3543	0
Flt Permitted	0.732			0.497			0.115			0.262		
Satd. Flow (perm)	1406	1572	0	955	1641	0	217	5173	0	503	3543	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191			37			8			30	
Link Speed (k/h)		48			48			60			70	
Link Distance (m)		103.9			64.4			215.5			202.6	
Travel Time (s)		7.8			4.8			12.9			10.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	2%	1%	0%	0%	1%	0%
Adj. Flow (vph)	127	1	191	26	1	37	109	1018	25	40	1232	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	192	0	26	38	0	109	1043	0	40	1435	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	

Lanes, Volumes, Timings
9: Palladium Way/Harrison Cres & Appleby Line

PM Peak Period
09-20-2019

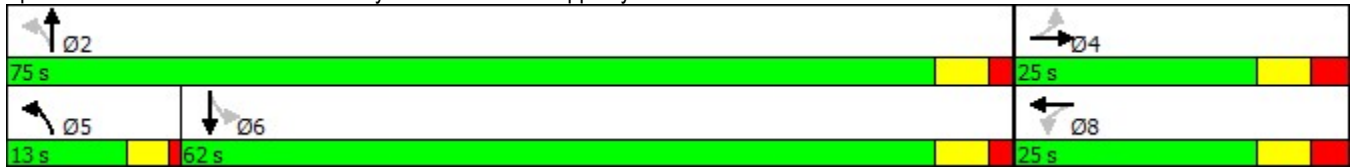


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		7.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	32.0		32.0	32.0	
Total Split (s)	25.0	25.0		25.0	25.0		13.0	75.0		62.0	62.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		13.0%	75.0%		62.0%	62.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		9.0	69.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		4.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		Max	Max	
Walk Time (s)								7.0		7.0	7.0	
Flash Dont Walk (s)								19.0		19.0	19.0	
Pedestrian Calls (#/hr)								0		0	0	
Act Effct Green (s)	13.4	13.4		13.4	13.4		71.5	69.5		60.2	60.2	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.75	0.72		0.63	0.63	
v/c Ratio	0.64	0.50		0.20	0.15		0.38	0.28		0.13	0.64	
Control Delay	54.2	10.4		39.2	13.3		7.8	5.0		10.9	14.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.2	10.4		39.2	13.3		7.8	5.0		10.9	14.0	
LOS	D	B		D	B		A	A		B	B	
Approach Delay		27.8			23.9			5.3			13.9	
Approach LOS		C			C			A			B	
Queue Length 50th (m)	22.4	0.2		4.3	0.2		4.6	20.8		2.9	83.3	
Queue Length 95th (m)	40.5	18.1		11.8	8.6		10.4	30.8		9.1	124.6	
Internal Link Dist (m)		79.9			40.4			191.5			178.6	
Turn Bay Length (m)	45.0			65.0			100.0			70.0		
Base Capacity (vph)	264	450		179	338		309	3748		315	2234	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.43		0.15	0.11		0.35	0.28		0.13	0.64	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	95.9
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	12.3
Intersection LOS:	B
Intersection Capacity Utilization:	77.2%
ICU Level of Service:	D
Analysis Period (min):	15

















Splits and Phases: 9: Palladium Way/Harrison Cres & Appleby Line



Appendix -C: Future Total Conditions Synchro Output

Lanes, Volumes, Timings
1: Appleby Line & 1 Side Rd

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	0	141	0	0	0	23	484	0	0	596	25
Future Volume (vph)	145	0	141	0	0	0	23	484	0	0	596	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.934									0.995	
Flt Protected		0.975						0.998				
Satd. Flow (prot)	0	1715	0	0	1921	0	0	1797	0	0	1798	0
Flt Permitted		0.975						0.998				
Satd. Flow (perm)	0	1715	0	0	1921	0	0	1797	0	0	1798	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		144.9			142.8			190.5			128.0	
Travel Time (s)		10.9			10.7			14.3			9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	0%	7%	0%	0%	6%	14%
Adj. Flow (vph)	158	0	153	0	0	0	25	526	0	0	648	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	311	0	0	0	0	0	551	0	0	675	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	67.5%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶		↷	↶	↔		↶	↕			↕	↷
Traffic Volume (vph)	6	0	36	198	6	8	93	224	0	0	513	23
Future Volume (vph)	6	0	36	198	6	8	93	224	0	0	513	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	160.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	7.6			7.6			30.0			7.6		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor												
Frt			0.850		0.988							0.994
Flt Protected	0.950			0.950	0.959		0.950					
Satd. Flow (prot)	913	0	1498	1667	1654	0	1601	3476	0	0	4986	0
Flt Permitted	0.950			0.950	0.959		0.422					
Satd. Flow (perm)	913	0	1498	1667	1654	0	711	3476	0	0	4986	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191		4							9
Link Speed (k/h)		60			60			70				70
Link Distance (m)		82.1			211.4			66.5				202.8
Travel Time (s)		4.9			12.7			3.4				10.4
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	0%	9%	4%	0%	14%	14%	5%	0%	0%	4%	17%
Adj. Flow (vph)	7	0	39	215	7	9	101	243	0	0	558	25
Shared Lane Traffic (%)				46%								
Lane Group Flow (vph)	7	0	39	116	115	0	101	243	0	0	583	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1	2		1	2				2
Detector Template	Left		Right	Left	Thru		Left	Thru				Thru
Leading Detector (m)	6.1		6.1	6.1	30.5		6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1		6.1	6.1	1.8		6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0

Lanes, Volumes, Timings
3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

AM Peak Period
09-20-2019



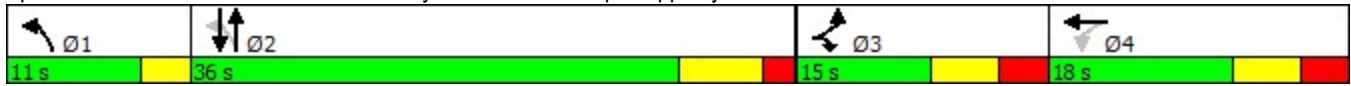
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot		Prot	Perm	NA		pm+pt	NA				NA
Protected Phases	3		3		4		1	2				2
Permitted Phases				4			2					
Detector Phase	3		3	4	4		1	2				2
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0				8.0
Minimum Split (s)	15.0		15.0	15.0	15.0		11.0	33.0				33.0
Total Split (s)	15.0		15.0	18.0	18.0		11.0	36.0				36.0
Total Split (%)	18.8%		18.8%	22.5%	22.5%		13.8%	45.0%				45.0%
Maximum Green (s)	8.0		8.0	11.0	11.0		8.0	29.0				29.0
Yellow Time (s)	4.0		4.0	4.0	4.0		3.0	5.0				5.0
All-Red Time (s)	3.0		3.0	3.0	3.0		0.0	2.0				2.0
Lost Time Adjust (s)	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		3.0	7.0				7.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag				Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes				Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		None	Max				Max
Walk Time (s)				0.0	0.0			7.0				7.0
Flash Dont Walk (s)				0.0	0.0			19.0				19.0
Pedestrian Calls (#/hr)				0	0			0				0
Act Effct Green (s)	8.1		8.1	9.8	9.8		43.1	32.7				32.7
Actuated g/C Ratio	0.11		0.11	0.13	0.13		0.59	0.44				0.44
v/c Ratio	0.07		0.12	0.52	0.52		0.20	0.16				0.26
Control Delay	34.5		0.7	40.5	39.0		9.0	15.7				15.5
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	34.5		0.7	40.5	39.0		9.0	15.7				15.5
LOS	C		A	D	D		A	B				B
Approach Delay		5.9			39.8			13.7				15.5
Approach LOS		A			D			B				B
Queue Length 50th (m)	1.0		0.0	17.4	16.6		6.8	13.0				22.4
Queue Length 95th (m)	4.6		0.0	34.0	32.9		13.7	20.9				30.9
Internal Link Dist (m)		58.1			187.4			42.5				178.8
Turn Bay Length (m)							160.0					
Base Capacity (vph)	100		334	252	253		513	1544				2220
Starvation Cap Reductn	0		0	0	0		0	0				0
Spillback Cap Reductn	0		0	0	0		0	0				0
Storage Cap Reductn	0		0	0	0		0	0				0
Reduced v/c Ratio	0.07		0.12	0.46	0.45		0.20	0.16				0.26

Intersection Summary

Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	73.6
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	19.3
Intersection Capacity Utilization:	45.9%
Intersection LOS:	B
ICU Level of Service:	A

Analysis Period (min) 15

Splits and Phases: 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line



Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	53	56	0	308	581	0
Future Volume (vph)	53	56	0	308	581	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Fr't		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1738	1541	0	3411	3510	0
Flt Permitted	0.950					
Satd. Flow (perm)	1738	1541	0	3411	3510	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		61				
Link Speed (k/h)	60			70	70	
Link Distance (m)	280.8			52.2	101.7	
Travel Time (s)	16.8			2.7	5.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	6%	0%	7%	4%	0%
Adj. Flow (vph)	58	61	0	335	632	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	61	0	335	632	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						

Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	
Total Split (s)	27.0	27.0		53.0	53.0	
Total Split (%)	33.8%	33.8%		66.3%	66.3%	
Maximum Green (s)	20.0	20.0		46.0	46.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	3.0	3.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Walk Time (s)	0.0	0.0		0.0	0.0	
Flash Dont Walk (s)	0.0	0.0		0.0	0.0	
Pedestrian Calls (#/hr)	0	0		0	0	
Act Effct Green (s)	8.8	8.8		58.3	58.3	
Actuated g/C Ratio	0.12	0.12		0.77	0.77	
v/c Ratio	0.29	0.26		0.13	0.24	
Control Delay	34.7	11.7		3.7	4.0	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	34.7	11.7		3.7	4.0	
LOS	C	B		A	A	
Approach Delay	22.9			3.7	4.0	
Approach LOS	C			A	A	
Queue Length 50th (m)	8.6	0.0		6.6	13.7	
Queue Length 95th (m)	16.9	9.4		11.7	22.3	
Internal Link Dist (m)	256.8			28.2	77.7	
Turn Bay Length (m)						
Base Capacity (vph)	458	451		2609	2685	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.13	0.14		0.13	0.24	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 76.2
 Natural Cycle: 40
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.29
 Intersection Signal Delay: 6.0
 Intersection Capacity Utilization 33.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 7: Appleby Line & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
 9: Palladium Way/Harrison Cres & Appleby Line

AM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	3	61	3	1	10	135	1312	3	8	796	85
Future Volume (vph)	129	3	61	3	1	10	135	1312	3	8	796	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	65.0		0.0	100.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	0.95
Frt		0.857			0.862							0.986
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1646	0	1825	1656	0	1825	5043	0	1825	3504	0
Flt Permitted	0.750			0.712			0.212			0.175		
Satd. Flow (perm)	1441	1646	0	1368	1656	0	407	5043	0	336	3504	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66			11			1				17
Link Speed (k/h)		50			50			60				70
Link Distance (m)		104.0			105.0			215.5				248.7
Travel Time (s)		7.5			7.6			12.9				12.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	0%	3%	0%
Adj. Flow (vph)	140	3	66	3	1	11	147	1426	3	9	865	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	69	0	3	12	0	147	1429	0	9	957	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	

Lanes, Volumes, Timings
 9: Palladium Way/Harrison Cres & Appleby Line

AM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		1.0	1.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	28.0	28.0		8.0	8.0		12.0	33.0		33.0	33.0	
Total Split (s)	28.0	28.0		28.0	28.0		13.0	52.0		39.0	39.0	
Total Split (%)	35.0%	35.0%		35.0%	35.0%		16.3%	65.0%		48.8%	48.8%	
Maximum Green (s)	21.0	21.0		21.0	21.0		9.0	46.0		33.0	33.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		4.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		Max	Max	
Walk Time (s)								7.0		7.0	7.0	
Flash Dont Walk (s)								19.0		19.0	19.0	
Pedestrian Calls (#/hr)								0		0	0	
Act Effct Green (s)	12.3	12.3		11.8	11.8		51.3	50.6		37.0	37.0	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.72	0.71		0.52	0.52	
v/c Ratio	0.56	0.20		0.01	0.04		0.32	0.40		0.05	0.52	
Control Delay	36.1	9.1		23.3	13.9		6.6	6.5		13.2	14.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.1	9.1		23.3	13.9		6.6	6.5		13.2	14.4	
LOS	D	A		C	B		A	A		B	B	
Approach Delay		27.2			15.8			6.5			14.4	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	17.4	0.3		0.4	0.1		5.8	29.5		0.6	44.5	
Queue Length 95th (m)	33.2	9.4		2.3	4.0		14.4	48.0		3.5	73.2	
Internal Link Dist (m)		80.0			81.0			191.5			224.7	
Turn Bay Length (m)	45.0			65.0			100.0			70.0		
Base Capacity (vph)	424	531		402	495		471	3571		174	1823	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.13		0.01	0.02		0.31	0.40		0.05	0.52	

Intersection Summary	
Area Type:	Other
Cycle Length:	80
Actuated Cycle Length:	71.4
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	10.9
Intersection Capacity Utilization	61.7%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	B

Splits and Phases: 9: Palladium Way/Harrison Cres & Appleby Line



Lanes, Volumes, Timings
1: Appleby Line & 1 Side Rd

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	27	0	38	0	0	0	139	379	1	0	475	188
Future Volume (vph)	27	0	38	0	0	0	139	379	1	0	475	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.921									0.962	
Flt Protected		0.980						0.987				
Satd. Flow (prot)	0	1623	0	0	1921	0	0	1807	0	0	1787	0
Flt Permitted		0.980						0.987				
Satd. Flow (perm)	0	1623	0	0	1921	0	0	1807	0	0	1787	0
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		112.8			105.6			175.2			84.1	
Travel Time (s)		6.8			6.3			9.0			4.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	0%	6%	0%	0%	0%	2%	6%	0%	0%	4%	2%
Adj. Flow (vph)	29	0	41	0	0	0	151	412	1	0	516	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	0	0	0	0	0	564	0	0	720	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	78.0%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

PM Peak Period
 09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	0	108	823	13	106	32	573	0	0	356	7
Future Volume (vph)	19	0	108	823	13	106	32	573	0	0	356	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	90.0		0.0	0.0		0.0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt			0.850		0.966						0.997	
Flt Protected	0.950			0.950	0.964		0.950					
Satd. Flow (prot)	1825	0	1526	1717	1674	0	1825	3579	0	0	5032	0
Flt Permitted	0.950			0.950	0.964		0.510					
Satd. Flow (perm)	1825	0	1526	1717	1674	0	980	3579	0	0	5032	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153		16							3
Link Speed (k/h)		48			60			70				70
Link Distance (m)		75.0			209.7			64.0				204.3
Travel Time (s)		5.6			12.6			3.3				10.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	7%	1%	20%	1%	0%	2%	0%	0%	4%	0%
Adj. Flow (vph)	21	0	117	895	14	115	35	623	0	0	387	8
Shared Lane Traffic (%)				42%								
Lane Group Flow (vph)	21	0	117	519	505	0	35	623	0	0	395	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1		1	1	2		1	2				2
Detector Template	Left		Right	Left	Thru		Left	Thru				Thru
Leading Detector (m)	6.1		6.1	6.1	30.5		6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1		6.1	6.1	1.8		6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Prot		Perm	Perm	NA		pm+pt	NA				NA
Protected Phases	3				4		1	2				2

Lanes, Volumes, Timings
 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line

PM Peak Period
 09-20-2019



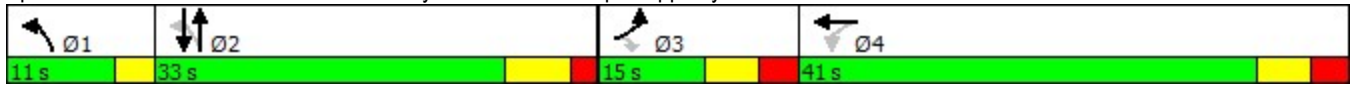
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			3	4			2					
Detector Phase	3		3	4	4		1	2				2
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0				8.0
Minimum Split (s)	15.0		15.0	15.0	15.0		11.0	33.0				33.0
Total Split (s)	15.0		15.0	41.0	41.0		11.0	33.0				33.0
Total Split (%)	15.0%		15.0%	41.0%	41.0%		11.0%	33.0%				33.0%
Maximum Green (s)	8.0		8.0	34.0	34.0		8.0	26.0				26.0
Yellow Time (s)	4.0		4.0	4.0	4.0		3.0	5.0				5.0
All-Red Time (s)	3.0		3.0	3.0	3.0		0.0	2.0				2.0
Lost Time Adjust (s)	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		3.0	7.0				7.0
Lead/Lag	Lead		Lead	Lag	Lag		Lead	Lag				Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes				Yes
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0				3.0
Recall Mode	None		None	None	None		None	Max				Max
Walk Time (s)								7.0				7.0
Flash Dont Walk (s)								19.0				19.0
Pedestrian Calls (#/hr)								0				0
Act Effct Green (s)	8.1		8.1	31.4	31.4		34.8	26.3				26.3
Actuated g/C Ratio	0.09		0.09	0.34	0.34		0.37	0.28				0.28
v/c Ratio	0.13		0.43	0.90	0.88		0.08	0.62				0.28
Control Delay	44.7		8.5	50.1	47.0		18.5	33.6				27.9
Queue Delay	0.0		0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	44.7		8.5	50.1	47.0		18.5	33.6				27.9
LOS	D		A	D	D		B	C				C
Approach Delay		14.0				48.6		32.8				27.9
Approach LOS		B				D		C				C
Queue Length 50th (m)	3.9		0.0	99.1	93.1		4.0	56.9				22.3
Queue Length 95th (m)	11.1		9.2	#161.4	#153.7		9.9	75.5				31.0
Internal Link Dist (m)		51.0				185.7		40.0				180.3
Turn Bay Length (m)							90.0					
Base Capacity (vph)	158		271	632	627		439	1009				1421
Starvation Cap Reductn	0		0	0	0		0	0				0
Spillback Cap Reductn	0		0	0	0		0	0				0
Storage Cap Reductn	0		0	0	0		0	0				0
Reduced v/c Ratio	0.13		0.43	0.82	0.81		0.08	0.62				0.28

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 93.1
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 38.1
 Intersection Capacity Utilization 61.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Station Access/Hwy 407 WB Off-Ramp & Appleby Line



Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	37	34	0	725	1120	0
Future Volume (vph)	37	34	0	725	1120	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Fr _t	0.850					
Fl _t Protected	0.950					
Satd. Flow (prot)	1615	1526	0	3579	3614	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	1615	1526	0	3579	3614	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		37				
Link Speed (k/h)	60			70	70	
Link Distance (m)	280.9			95.0	119.5	
Travel Time (s)	16.9			4.9	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	13%	7%	0%	2%	1%	0%
Adj. Flow (vph)	40	37	0	788	1217	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	37	0	788	1217	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						

Lanes, Volumes, Timings
7: Appleby Line & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0	
Total Split (s)	22.0	22.0		78.0	78.0	
Total Split (%)	22.0%	22.0%		78.0%	78.0%	
Maximum Green (s)	15.0	15.0		71.0	71.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	3.0	3.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effct Green (s)	8.7	8.7		75.5	75.5	
Actuated g/C Ratio	0.09	0.09		0.81	0.81	
v/c Ratio	0.27	0.21		0.27	0.42	
Control Delay	44.3	16.3		3.4	4.2	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	44.3	16.3		3.4	4.2	
LOS	D	B		A	A	
Approach Delay	30.8			3.4	4.2	
Approach LOS	C			A	A	
Queue Length 50th (m)	6.8	0.0		18.0	32.6	
Queue Length 95th (m)	16.7	8.8		27.2	47.9	
Internal Link Dist (m)	256.9			71.0	95.5	
Turn Bay Length (m)						
Base Capacity (vph)	258	275		2882	2910	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.16	0.13		0.27	0.42	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	93.7
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.42
Intersection Signal Delay:	4.9
Intersection LOS:	A
Intersection Capacity Utilization:	45.0%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 7: Appleby Line & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
9: Palladium Way/Harrison Cres & Appleby Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	1	176	24	1	34	100	959	23	37	1199	187
Future Volume (vph)	117	1	176	24	1	34	100	959	23	37	1199	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.0		0.0	65.0		0.0	100.0		0.0	70.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	0.95
Frt		0.851			0.854			0.996			0.980	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1572	0	1825	1641	0	1789	5173	0	1825	3546	0
Flt Permitted	0.732			0.497			0.101			0.256		
Satd. Flow (perm)	1406	1572	0	955	1641	0	190	5173	0	492	3546	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		191			37			8			28	
Link Speed (k/h)		48			48			60			70	
Link Distance (m)		103.9			64.4			215.5			202.6	
Travel Time (s)		7.8			4.8			12.9			10.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	4%	0%	0%	0%	2%	1%	0%	0%	1%	0%
Adj. Flow (vph)	127	1	191	26	1	37	109	1042	25	40	1303	203
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	192	0	26	38	0	109	1067	0	40	1506	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	

Lanes, Volumes, Timings
9: Palladium Way/Harrison Cres & Appleby Line

PM Peak Period
09-20-2019

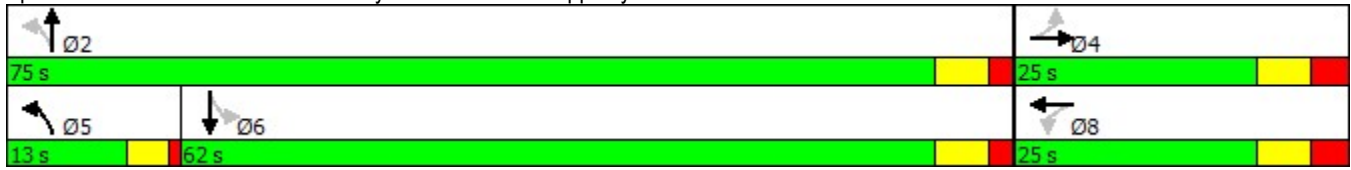


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		6	6	
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		7.0	8.0		8.0	8.0	
Minimum Split (s)	15.0	15.0		15.0	15.0		11.0	32.0		32.0	32.0	
Total Split (s)	25.0	25.0		25.0	25.0		13.0	75.0		62.0	62.0	
Total Split (%)	25.0%	25.0%		25.0%	25.0%		13.0%	75.0%		62.0%	62.0%	
Maximum Green (s)	18.0	18.0		18.0	18.0		9.0	69.0		56.0	56.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		1.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		4.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Max		Max	Max	
Walk Time (s)								7.0		7.0	7.0	
Flash Dont Walk (s)								19.0		19.0	19.0	
Pedestrian Calls (#/hr)								0		0	0	
Act Effct Green (s)	13.4	13.4		13.4	13.4		71.5	69.5		60.2	60.2	
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.75	0.72		0.63	0.63	
v/c Ratio	0.64	0.50		0.20	0.15		0.41	0.28		0.13	0.67	
Control Delay	54.2	10.4		39.2	13.3		8.5	5.1		11.0	14.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.2	10.4		39.2	13.3		8.5	5.1		11.0	14.7	
LOS	D	B		D	B		A	A		B	B	
Approach Delay		27.8			23.9			5.4			14.6	
Approach LOS		C			C			A			B	
Queue Length 50th (m)	22.4	0.2		4.3	0.2		4.6	21.5		3.0	90.7	
Queue Length 95th (m)	40.5	18.1		11.8	8.6		10.6	31.6		9.1	135.3	
Internal Link Dist (m)		79.9			40.4			191.5			178.6	
Turn Bay Length (m)	45.0			65.0			100.0			70.0		
Base Capacity (vph)	264	450		179	338		291	3748		308	2235	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.43		0.15	0.11		0.37	0.28		0.13	0.67	

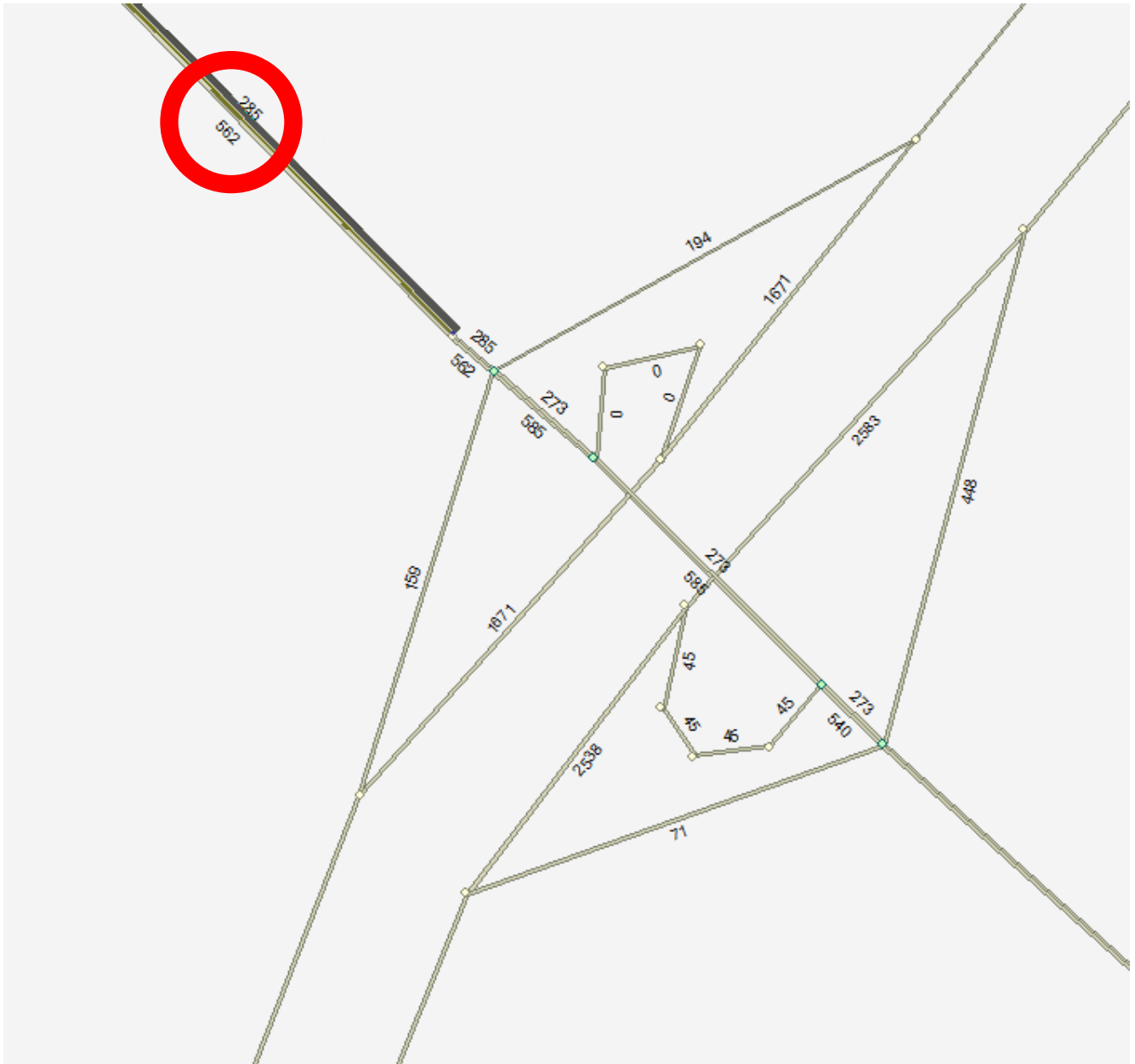
Intersection Summary

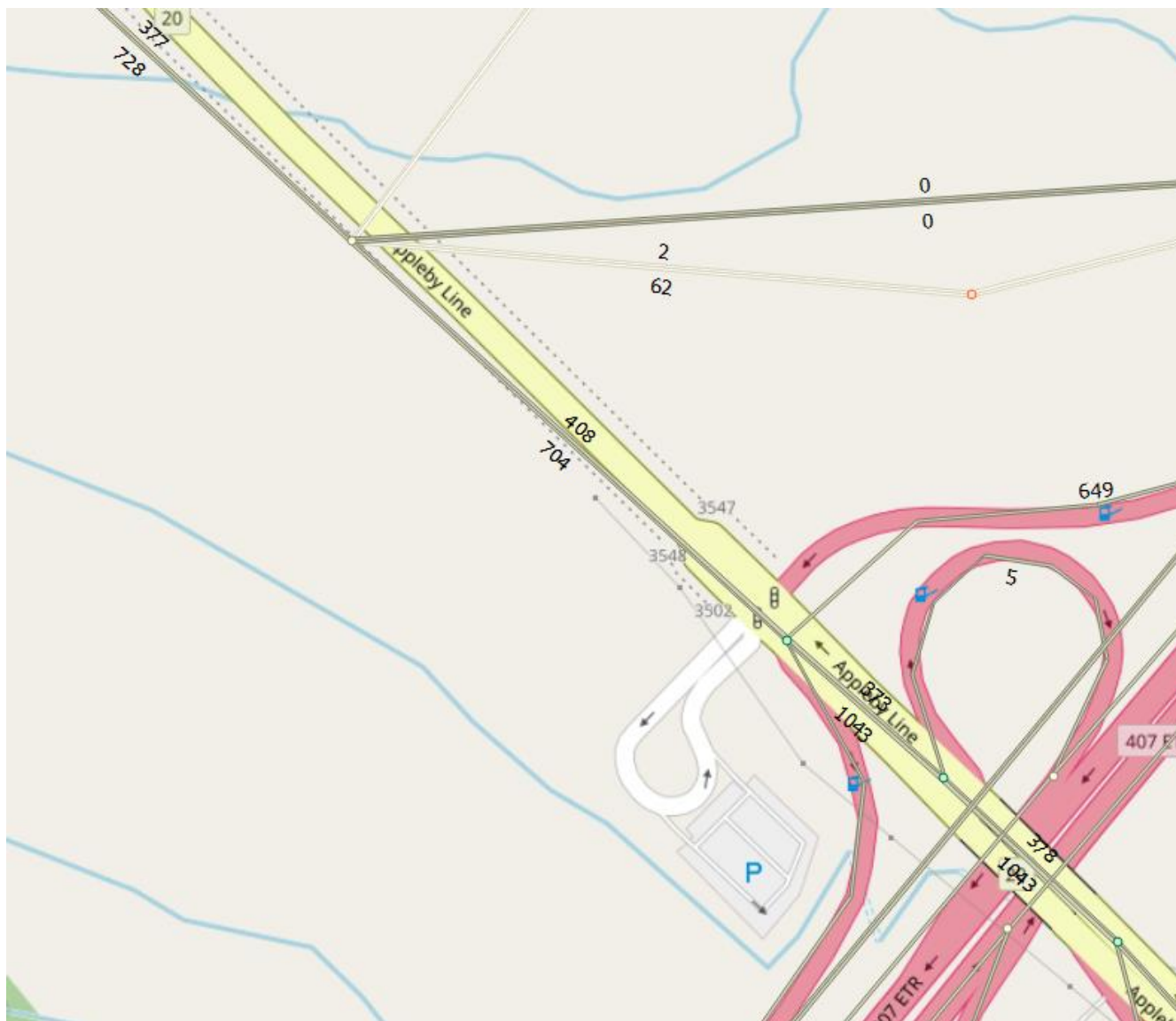
Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	95.9
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	12.7
Intersection Capacity Utilization	79.0%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	D

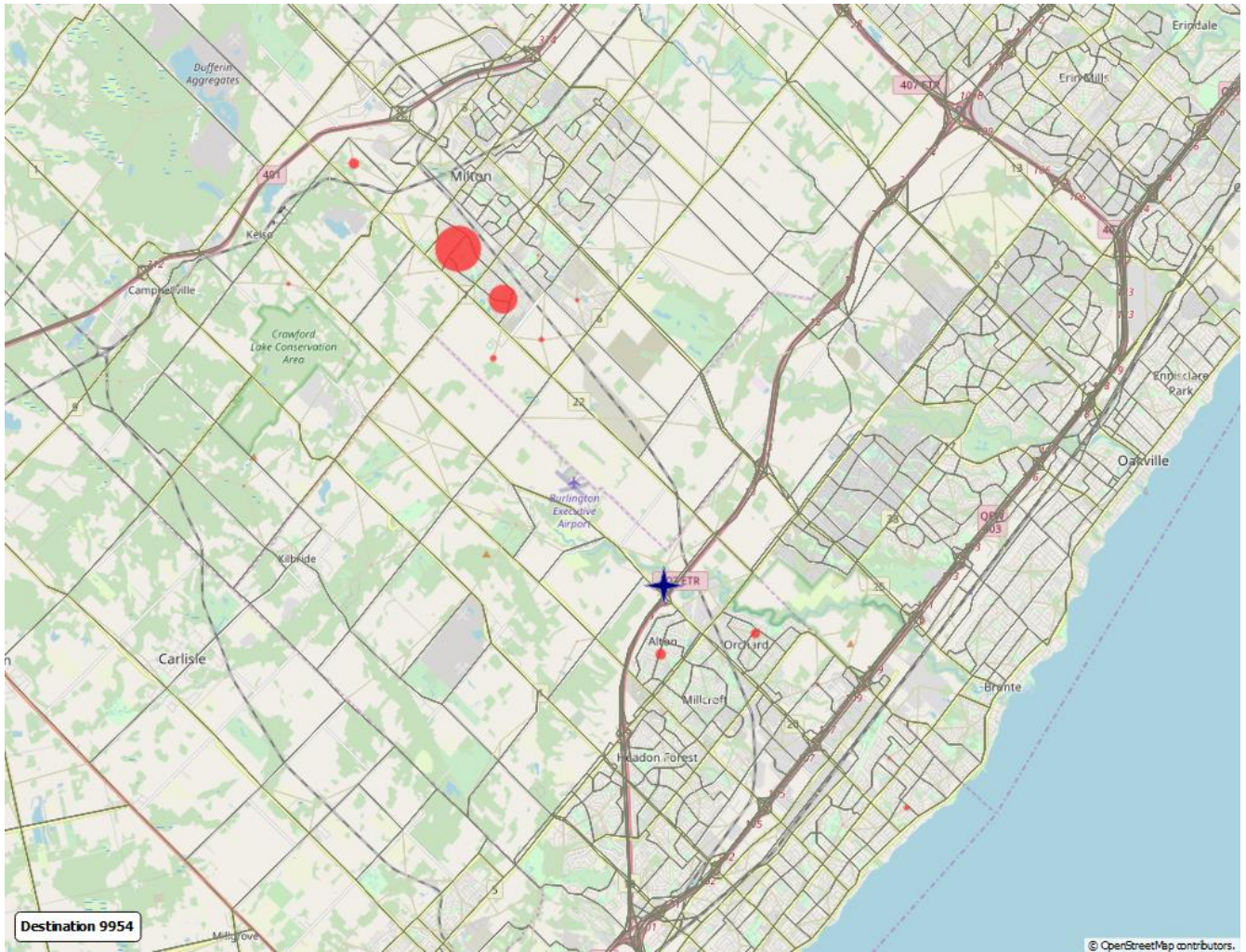
Splits and Phases: 9: Palladium Way/Harrison Cres & Appleby Line



Appendix D-: EMME Output









Final Report

Bronte Station Traffic Impact Study

Highway 407 Transitway-4



Prepared for Ministry of Transportation, Ontario
by IBI Group
November 15, 2019

Document Control Page

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1 Introduction

This report is a traffic impact study for the proposed 407 Transitway Station located near the interchange of Highway 407 and Bronte Road (Highway 25) in Oakville, Ontario. This report was prepared as part of the Environmental Assessment of the 407 Transitway, Brant Street to West of Hurontario Street.

The purpose of this report is to provide an assessment of traffic, transit, walking and cycling access to the proposed station. The assessment includes operations analysis and review of local road network configuration to identify needs and opportunities for transportation-related changes and coordination to accommodate the station.

1.1 Transitway Overview

The Highway 407 Transitway is a rapid transit facility planned within the Greater Toronto and Hamilton Area (GTHA). The Transitway will be fully grade-separated with an exclusive right-of-way and will run parallel along the Highway 407 corridor. This Transitway project supports the Province's Growth Plan by meeting increased travel demands through alternative transportation modes, providing increased mobility for a wide variety of users, and supporting transit-oriented development and associated land uses. The Transitway is initially designed to support busway service (BRT) with provisions for future conversion to light-rail transit (LRT) technology.

The section under the current EA spans approximately 43 kilometres from Brant Street in Burlington to west of Hurontario Street (west of proposed Hurontario Station) in Mississauga. This section of the Transitway provides opportunities to connect numerous Urban Growth Centres (e.g. Hamilton, Oakville, Milton and Mississauga City Centres) as well as to a number of higher order transit systems, supporting development within both the Region of Halton and Peel. The transitway is being planned to the 2041 horizon. Traffic analysis is to the 2031 horizon due to uncertainties in development levels and traffic trends beyond 2031.

1.2 Study Area

The proposed station is located east of Bronte Road just south of Highway 407 and Bronte Road interchange as shown in Exhibit 1-1. This location was developed in consultation with the Town of Oakville and accommodates the Transitway alignment south of Highway 407. There currently exists a carpool lot located opposite of the Highway 407 WB Off-ramp. In coordination with the Ministry of Transportation, the carpool lot is planned to be moved south of the highway with its access connecting to the east leg of the Highway 407 EB Off-ramp. The study area includes:

- Bronte Road & Burnhamthorpe Road West (*unsignalized*);
- Bronte Road & Highway 407 WB Off-Ramp / *Existing* Carpool Lot (*signalized*);
- Bronte Road & Highway 407 EB Off-Ramp / *Future* Carpool Lot (*signalized*);
- Bronte Road & William Halton Parkway (*signalized*); and
- Bronte Road & Dundas Street West (*signalized*).

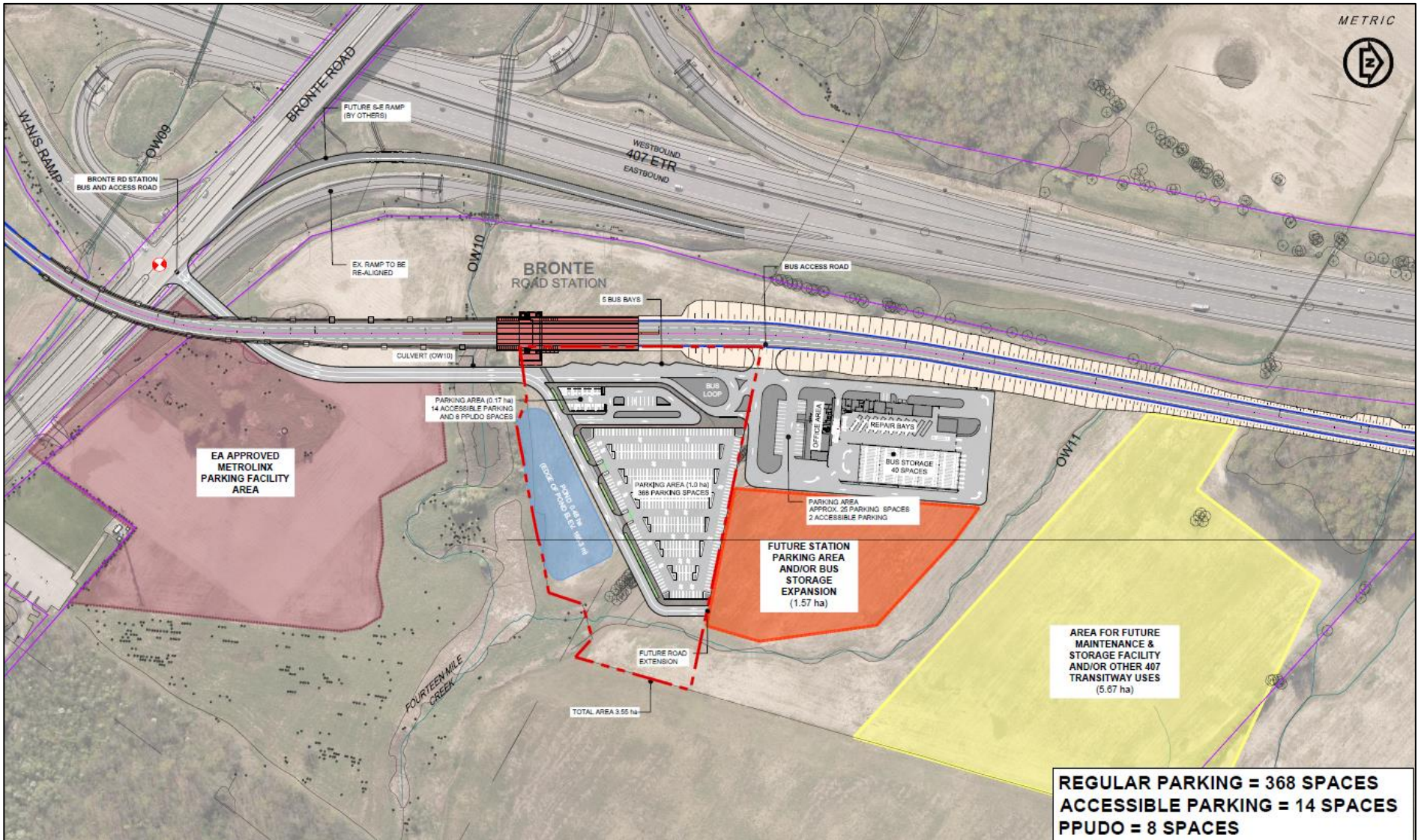
1.3 Station Plan

The proposed station layout is provided in Exhibit 1-2. The site plan illustrates that the station connects to the access road for the relocated carpool lot opposite of the Highway 407 EB Off-ramp. Further commentary on station layout and internal circulation is provided in Section 4.

Exhibit 1-1: Study Area



Exhibit 1-2: Proposed Station Layout



2 Existing Conditions

This section documents the existing road network, facilities, and weekday peak hour operations at the studied intersections.

2.1 Road Network

Bronte Road is a north-south regional road within Halton Region. It begins at Lakeshore Road West and ends at Derry Road, where it continues northwards as Ontario Street South. Within the study area, Bronte Road has four lanes, a posted speed limit 80 km/h between Highway 407 and Burnhamthorpe Road West and a speed limit of 70 km/h south of Highway 407. The land use surrounding Bronte Road is currently open space with some residential units along Bronte Road.

Highway 407 is a tolled 400-series highway with a six lane cross section. It connects the City of Burlington to the City of Pickering. 400-series highways have a speed limit of 100 km/h. A full interchange is located at Highway 407 and Bronte Road.

Burnhamthorpe Road West is an east-west regional road within Halton Region that is classified as a collector road by the Town of Oakville. It is a two lane road with a posted speed limit of 60 km/h. The road is discontinuous east of Bronte Road as it crosses Highway 407 and Sixteen Mile Creek, and ends at Tremaine Road to the west. The land use surrounding Burnhamthorpe is currently open with some residential units.

William Halton Parkway is a two lane east-west road classified as a minor arterial by the Town of Oakville. It has a posted speed limit of 60 km/h and provides access to a hospital.

Dundas Street West is an east-west regional road that spans from the City of Hamilton to the City of Toronto. Within the study area, it is classified as minor arterial by the Town of Oakville, has six lanes, a posted speed limit of 60 km/h.

2.2 Transit

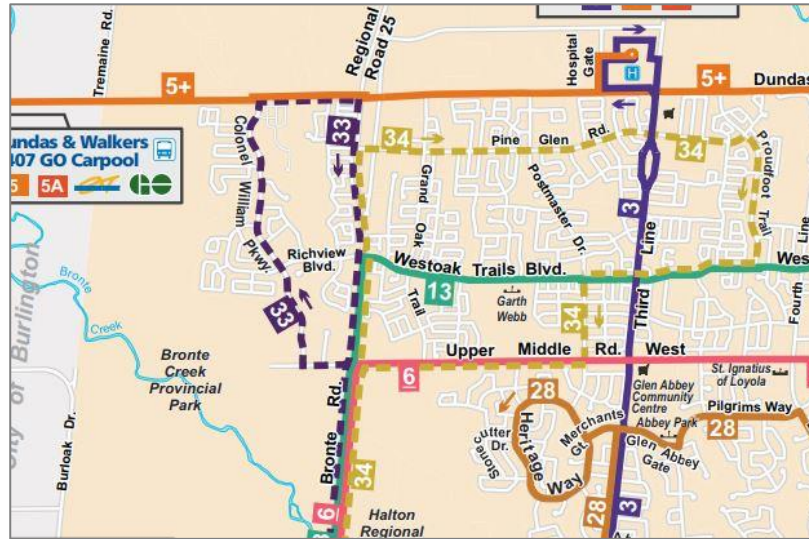
The Highway 407 Park & Ride at Bronte Road serves as a stop GO Transit buses.

- **GO Route 20 (Milton/Oakville)** connects Milton GO Station with Oakville GO Station with stops at Bronte Road Park & Ride, Trafalgar Road Park & Ride, and Sheridan College. This bus route operates on weekdays only with approximately one hour headways.
- **GO Route 47 (407 West)** serves between York University (Toronto) and Hamilton GO Centre with stops at Highway 407 Bus Terminal (Vaughan), Bramalea GO (Brampton), Square One (Mississauga), Bronte Road Park & Ride, McMaster University (Hamilton). Route 47 operates with 10 minute headways at peak hours.

Several Oakville Transit (OT) routes already operate in the surrounding area of the proposed station location. It is assumed that after the Transitway becomes operational, local transit agencies will connect their surrounding transit routes to the station.

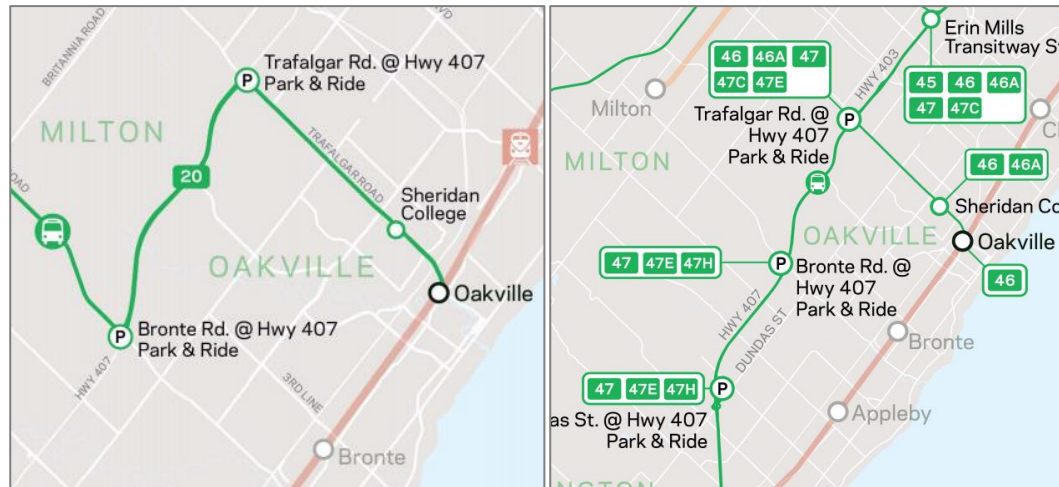
Exhibit 2-1 and Exhibit 2-2 illustrate the OT and GO bus route maps within the study area.

Exhibit 2-1: Oakville Transit Routes within Study Area



Source: Oakville Transit System Map (2019)

Exhibit 2-2: GO Bus Routes 20 (left) and 47 (right) within Study Area



Source: GO Transit Route Maps (2019)

2.3 Active Transportation

Currently, there are no active transportation facilities in and around the station area. The surrounding lands and the area to the north of the station are predominantly rural with no walkable destinations or points of interest nearby.

2.4 Traffic Conditions

2.4.1 Traffic Counts & Signal Timing Data

Traffic count data and signal timing information was collected from Halton Region and 407 ETR. All turning movement counts modelled for the purposes of this study were conducted recently (within the past five years) and so should reflect current traffic patterns within the study area. Exhibit 2-3 provides a summary of dates on which this information was collected/recorded.

Exhibit 2-3: Traffic Count and Signal Timing Data

INTERSECTION	CONTROL TYPE	DATE OF TMC	DATE OF SIGNAL DATA
Bronte Road & Burnhamthorpe Road West	Unsignalized	2017-05-23	NA
Bronte Road & Highway 407 WB Off-Ramp / Carpool Lot	Signalized	2018-12-06	NA
Bronte Road & Highway 407 EB Off-Ramp	Signalized	2018-12-06	NA
Bronte Road & William Halton Parkway	Signalized	Currently unavailable	2015-09-14
Bronte Road & Dundas Street West	Signalized	2017-06-26	2015-05-12

2.4.2 Analysis Approach

Traffic analysis was conducted using Synchro (version 9) software and follows Highway Capacity Manual (HCM 2000) methodologies of intersection operation analysis.

All critical movements identified through Synchro analysis are outlined and discussed, as per the following conditions:

For signalized intersections,

- V/C ratios for overall intersection operations, through movements or shared through/turning movements equal 0.80 or above;
- V/C ratios for exclusive movements equal 0.85 or above; or,
- Queues for an individual movement are projected to exceed available turning lane storage.

For unsignalized intersections,

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

Level-of-service (LOS) is a measure of performance based on control delay, defined as follows in Exhibit 2-4.

Exhibit 2-4: Intersection LOS Reference

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The Synchro traffic models were calibrated to better represent measured field conditions. This was accomplished by adjusting the lane utilization factor and via lost time adjustment. The “lane utilization factor” (LUF) was altered when calibrating through movements. This parameter is used to dictate the distribution of traffic across the available lanes, with a value of 1.0 representing a uniform distribution across all lanes. During non-congested periods, there is often more traffic distributed amongst the right-most lanes as compared to the left-most lanes. However, in over-saturated conditions, the distribution of traffic is typically more evenly split, as drivers quickly fill any available gap in traffic.

In existing models, the LUF was adjusted to a value of 1.0 for all through movements initially identified as having a v/c greater than 1.0. These adjustments were then carried forward to their respective movements to the future models (for the same peak period). Additionally, because the above-mentioned driver behaviour is quite predictable, this adjustment was also made to any new critical through movements (having a v/c ratio > 1.0) identified in the future models.

The “lost time adjustment” (LTA) was also altered in order to calibrate left-turn movements. Adjusting this parameter to negative value effectively increases the clearance time available for left-turning traffic to clear the intersection during the amber and/or all-red signal phases.

During oversaturated conditions where left-turn queues are excessively long and/or there are limited gap available in the opposing traffic to make the left-turn (under permissive phasing), drivers are typically more aggressive and willing to turn during the amber/all-red phases.

In existing models, the LTA was changed for all left-turn movements identified as being well over capacity – defined as having a v/c greater than 1.2 – since these turning volumes were explicitly measured in the field. Values were assigned based on the initial v/c ratio for that movement:

- If the v/c ratio was between 1.2 and 1.5, the LTA was set to ‘-1’; and,
- If the v/c ratio exceeded 1.5, the LTA was set to ‘-2’.

Subsequently, all adjustments made to the LTA in the existing models were carried forward to the respective movements in the future models (for the same peak periods). However, because this driving behaviour is believed to be less predictable, no additional LTA changes were made to “new critical left-turn movements (having a v/c ratio > 1.2) identified in the future model, which did not exist previously in the existing models.

2.4.3 Model Calibration

The existing traffic models were calibrated to better reflect measured field conditions accomplished by adjusting the lane utilization factor (LUF) and/or lost time adjustment (LTA) for certain movements.

The adjustments made to the existing models are outlined in Exhibit 2-5.

Exhibit 2-5: Existing Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Bronte Road & Dundas Street	NBT	LUF	1.0
PM Peak	Bronte Road & Dundas Street	NBT	LUF	1.0
		EBL	LTA	-2 seconds
		NBL	LTA	-1 seconds
		SBL	LTA	-1 seconds

2.4.4 Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the existing conditions. An annual compound growth rate of 1.0% was applied to all count volumes obtained in years prior to 2018 in order to bring all counts to a consistent base year. Existing conditions traffic volumes are shown in Exhibit 2-6.

A summary of the Synchro analysis including delay, v/c, 95th percentile queue lengths and LOS indicators are shown in Exhibit 2-7, with detailed Synchro reports provided in Appendix A. The study intersections are currently operating as follows:

- Bronte Road & Burnhamthorpe Road is operating poorly on its minor approaches due to high N-S volumes with limited available gaps. The two shared EB and WB movements are operating at capacity / overcapacity during the two peak periods, indicating long delays and queues.
- The two Highway 407 off-ramps are operating well during both peak periods with a LOS of C or better. Due to the split phasing for the WB Off-ramp intersection, vehicles exiting both the off-ramp and the existing carpool lot are expected to incur long delays, however their movements have sufficient reserve capacity to accommodate demands.
- Bronte Road & Dundas Street is operating with moderate congestion at LOS D and E in the a.m. and p.m. peak hours, respectively. Due to green time being prioritized to the high through volumes, all left-turning movements in both peak periods are operating either at capacity or overcapacity. During the p.m. peak hour, the EBL, NBL, and SBL movements are operating past capacity with long delays and queues.

Exhibit 2-6: Existing Traffic Volumes in the AM (PM) Peak Hour

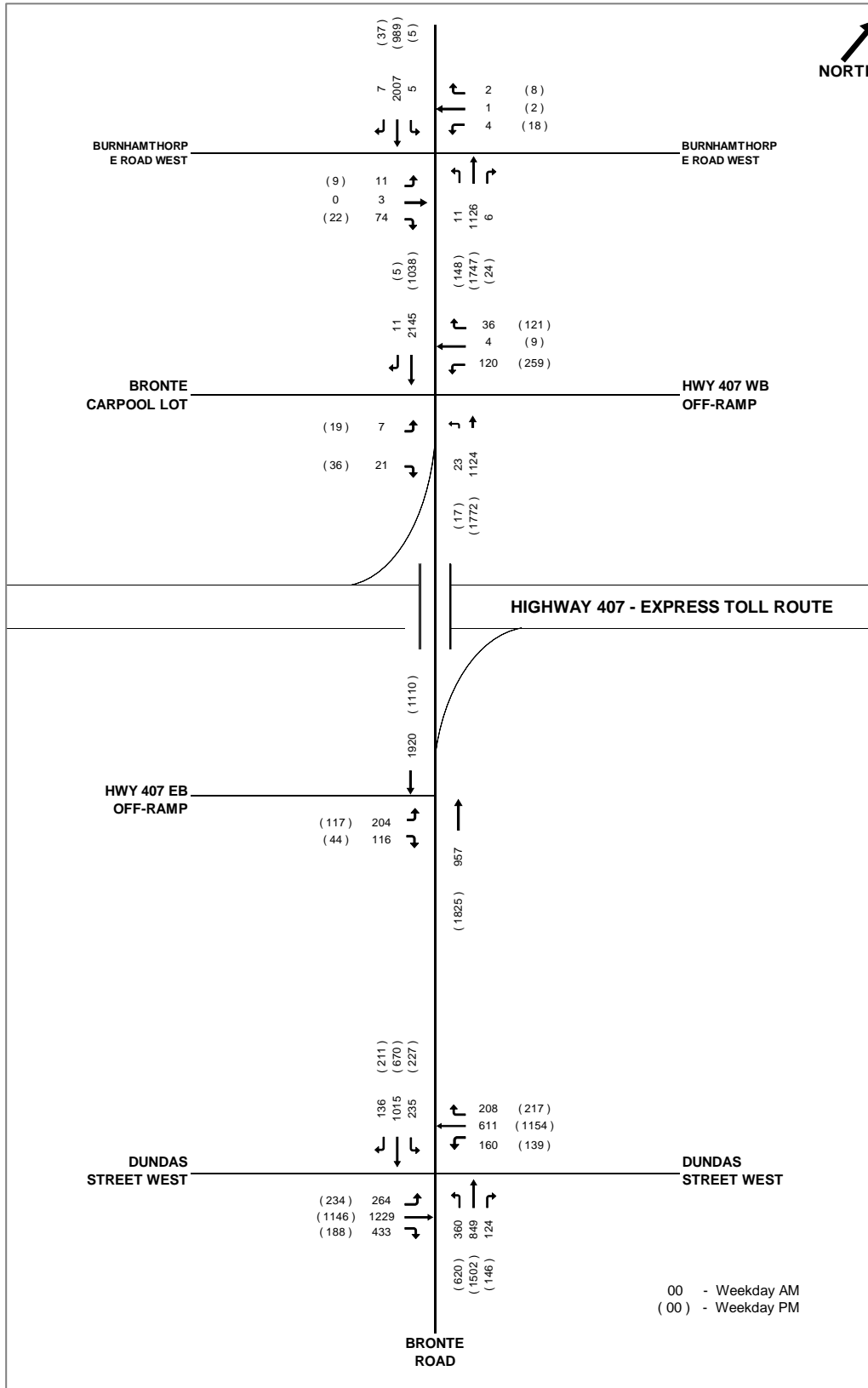


Exhibit 2-7: Synchro Analysis: Existing Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Bronte Road & Burnhamthorpe Road West <i>(unsignalized)</i>	-	EBLTR WBLTR	F F	2.59 1.44	81 13	-	EBLTR WBLTR	F F	1.03 Err*	28 Err*
Bronte Road & Highway 407 WB Off-Ramp / Carpool Lot Access <i>(signalized)</i>	B	EBLR WBL WBT WBR	E E E E	0.02 0.50 0.53 0.03	- 34 35 -	C	EBLR WBL WBT WBR	E E E E	0.04 0.66 0.65 0.21	3 66 65 28
Bronte Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	B	EBL EBR	D D	0.60 0.60	29 37	A	EBL	D	0.38	18
Bronte Road & William Halton Parkway <i>(signalized)</i>										
Bronte Road & Dundas Street West <i>(signalized)</i>	D	EBL EBT EBR WBL WBT NBL NBT SBL SBT	F D D F D F D E E	1.07 0.85 0.57 0.96 0.59 0.97 0.85 0.94 0.98	90 125 77 69 73 78 132 90 170	E	EBL EBT WBL WBT NBL NBT SBL SBT	F D E D F E F D	1.20 0.74 0.87 0.90 1.05 1.01 1.12 0.64	98 105 51 130 116 224 92 91

*Err – indicates severe congestion may occur outside of model parameters

**TMCs and traffic forecasts were not made available

3 Future Conditions

This section documents the future conditions with considerations to background traffic growth and traffic expected to be generated from the Transitway station.

3.1 Future Road Network

The future horizon year of 2031 has two confirmed changes in the road network within the study area according to the *Halton Region Budget and Business Plan (2019)*. Bronte Road / Regional Road 25 is planned to be widened from four lanes to six lanes from Speers Road to Highway 407 and from Highway 407 to Britannia Road by year 2025 and 2026, respectively. During the development of this report, there are no available studies published. Therefore, it was assumed that future conditions will match the six lane cross section with additional through lanes only and no additional turning lanes.

The study area may also be impacted by the four-lane extension of William Halton Parkway scheduled for 2019, which will cross over Sixteen Mile Creek and connect traffic from Bronte Road to Burnhamthorpe Road. William Halton Parkway, from Old Bronte Road to Hospital Gate, is expected to be widened from two to four lanes of travel with construction also starting in 2019. Turning movement counts and traffic forecasts for this new extension was not made available and are subject to development levels.

3.2 Transit

The Region of Halton has indicated a planned semi exclusive/exclusive right of way bus corridor on Bronte Road in their Transportation Master Plan (TMP), suggesting that future transit infrastructure improvements will be implemented along Bronte Road.

3.3 Active Transportation

The Region of Halton's Active Transportation Master Plan (ATMP) proposes bike lanes and multi-use trails on both sides Bronte Road from Highway 407 to the south limits of the study area. It also identifies paved shoulders and a multi-use trail on the west side of Bronte Road north of Highway 407. Additionally, there is a planned off road trail west of the station connecting Bronte Road and Dundas Street in a looped trail.

3.4 Station Traffic

3.4.1 Station Trip Generation

Ridership forecasts were provided by MTO and sourced from MTO's Greater Golden Horseshoe Travel Demand Model V4. The model is an advanced state-of-practice multi-modal travel demand model that estimates future travel demands within the Greater Golden Horseshoe. The GGHM was developed to forecast peak period demand in support of the Growth Plan policies and has the capability of predicting mode shifts resulting from new public transit infrastructure. It can also be used to test network response to changes in link characteristics such as transit vehicle frequency, operating speed, station location, and parking availability.

The GGH model accounts for planned and committed road and transit projects sourced from Metrolinx Regional Transportation Plan and local transportation plans. While it is possible that additional projects will be funded over the upcoming years, this model represents a conservative approach.

With input from the MTO, a horizon year of 2031 was selected as the baseline for determining road and intersection requirements as part of this traffic impact study. As MTO's GGH model is to a 2041 horizon, ridership projections for 2031 were not available. Therefore the 2041 demands were carried forward on the basis that entry and exit volumes would be conservative (the resulting turning lanes and queue storage would accommodate 2031 demand) as provided in Exhibit 3-1.

Exhibit 3-1: 2041 AM Peak (2-hour) Boardings

STATION	TOTAL 2-HR BOARDINGS	2-HR PARK-AND-RIDE	2-HR WALK / TRANSIT	% PARK-AND-RIDE	% WALK / TRANSIT
Dundas	923	510	413	55%	45%
Appleby	227	207	20	91%	9%
Bronte	306	90	216	29%	71%
Trafalgar	3,095	436	2,659	14%	86%
Britannia	523	136	387	26%	74%
Derry	911	334	577	37%	63%
Mississauga	982	82	900	8%	92%
Total:	6,967	1,795	5,172	26%	74%

From the above exhibit, two hour park-and-ride boardings were equated to two hour inbound vehicle trips at an assumed factor of 10:11, or 1.1 riders per park-and-ride vehicle. Two hour inbound vehicle trips were then converted to a.m. peak hour inbound trips using a factor of 0.56, developed through review of existing travel patterns using Transportation Tomorrow Survey (TTS 2016) data. The resulting a.m. peak hour inbound vehicle flow is 45 vph and rounded to 46 vph.

Exhibit 3-2: ITE Trip Generation Rates for Park-and-Ride Lots

LAND USE (CODE)	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		Trip Rate	Inbound / Outbound	Trip Rate	Inbound / Outbound
Park-and-ride with bus service (090)	/ parking space	0.71	79% / 21%	0.62	25% / 75%

Exhibit 3-3: Estimated Vehicular Trips Generated by Station

AM PEAK TRIPS		PM PEAK TRIPS	
Inbound	Outbound	Inbound	Outbound
46*	12	13	38

* Calculated based on forecasted 2031 a.m. park-and-ride 2 hrs boardings, at a factor 1.0 inbound vehicles per 1.1 boardings. To convert to a.m. peak hour trips, a factor of 0.56 was multiplied.

3.4.2 Trip Distribution

A map showing the origin of park-and-ride trips destined to Dundas station was extracted from the 2031 GGHM and can found attached in Appendix E. Using this map, inbound trips were tabulated in terms of general direction of origin (i.e. north, south, east, and west) and assigned to the study area intersections as a percentage of total inbound trips. Distribution of outbound trips was assumed to be the same as inbound trips. Resulting trip assignments are illustrated in Exhibit 3-4. Site generated traffic was assigned to study area intersections and is indicated in Exhibit 3-5.

Exhibit 3-4: Trip Distribution in AM and PM Peak Hours

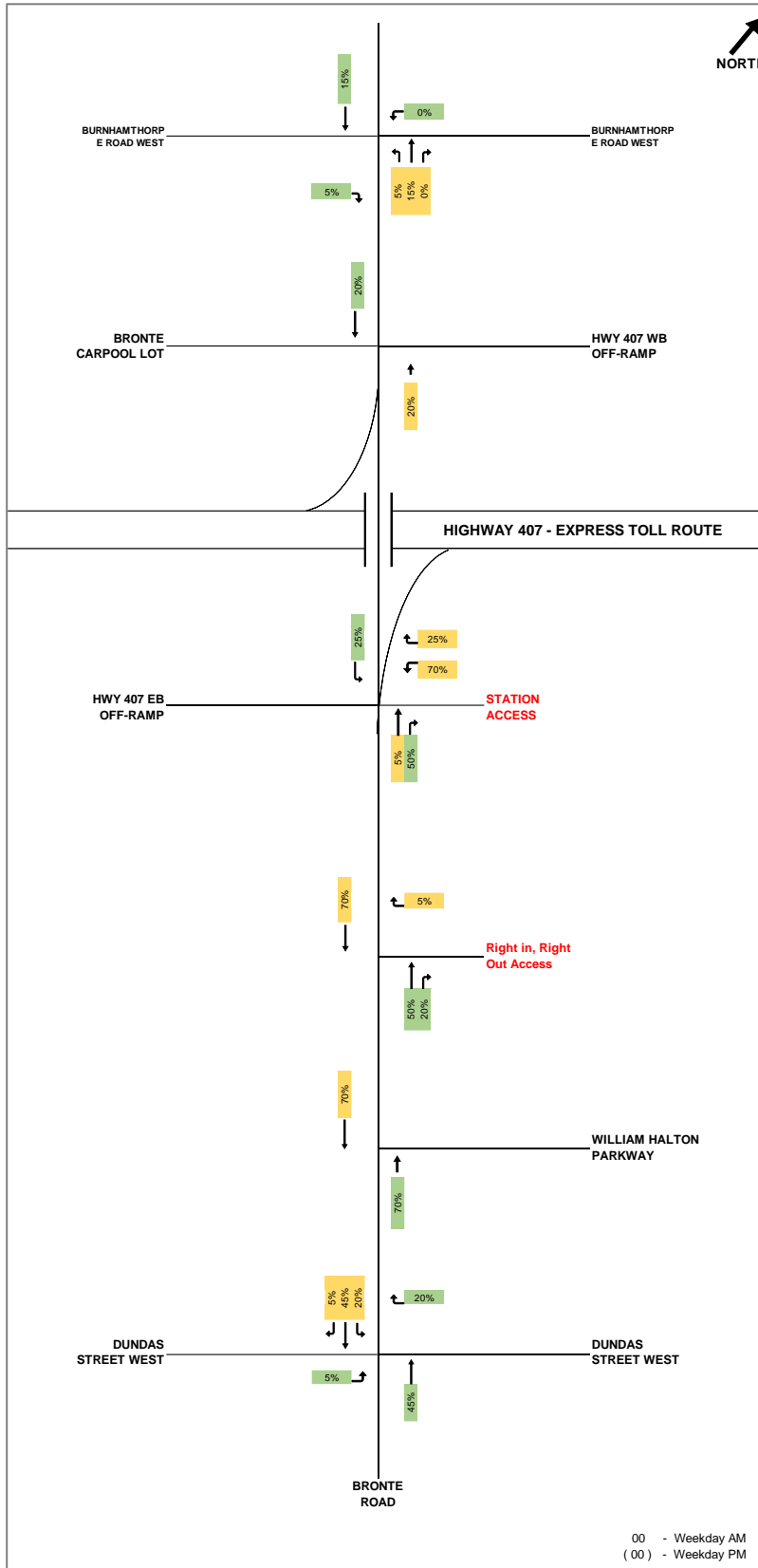
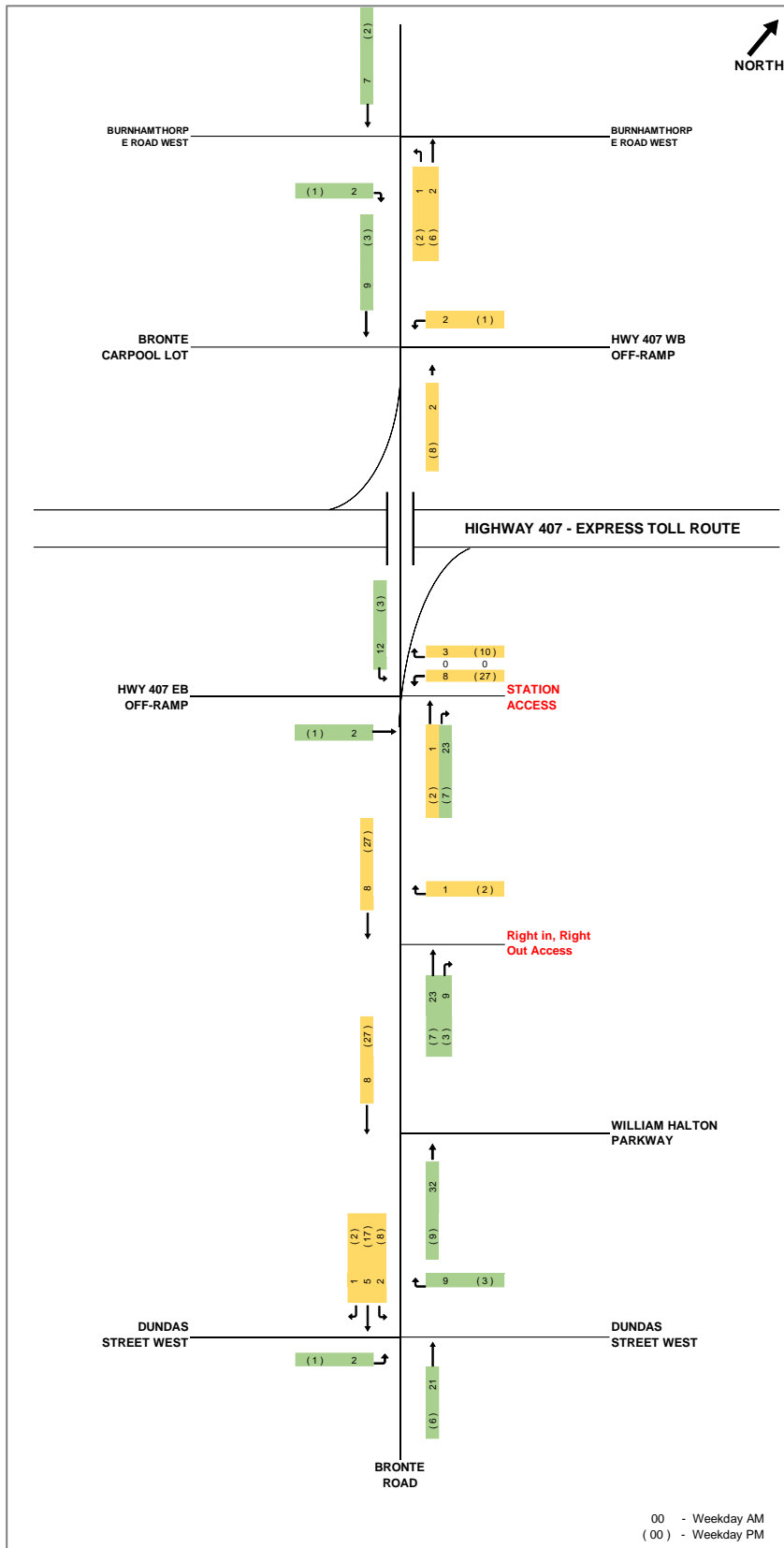


Exhibit 3-5: Site Generated Traffic in AM Peak Hour and PM Peak Hours



Parking Demands

Part of the scope of the traffic study was to provide a recommended parking lot size for each station. This was developed using the ratio of ridership to parking lot sizes taken from GO transit stations. The intent of this approach is to account for typical daily utilization of the lot for a robust and nearly full transit service with low but non-zero spare parking capacity across the system. The following provides the approach:

- The average number of inbound vehicle trips (auto drivers) made to each of these GO stations during the a.m. peak period (defined as 6:30-9:30 am) were determined using 2016 Transportation Tomorrow Survey (TTS) data.
- Parking data for the GO transit stations was obtained from the GO Rail Station Access Plan (2016) prepared by Metrolinx. The report notes the total capacity and average utilization of each GO station parking lot, which were used to calculate average parking demands.
- A “parking factor” or ratio between demand and auto driver trips was determined. These values are indicated in the below Exhibit 3-6.

Exhibit 3-6: Parking Demand Factors for nearby GO Transit Stations

2016 TTS AM PEAK PERIOD		2016 GO STATION PARKING *			PARKING RATE (spaces / driver)
GO Station	Auto Drivers *	Lot Capacity **	Lot Utilization **	Demand	
Brampton	861	863	96%	828	0.962
Bramalea	1,360	2,371	86%	2,039	1.499
Malton	580	698	96%	670	1.155
Erindale	1,370	2,183	76%	1,659	1.211
Burlington	1,270	2,076	86%	1,785	1.406
Appleby	2,080	2,818	86%	2,423	1.165
Bronte	2,460	2,971	86%	2,555	1.039
Oakville	2,820	4,401	86%	3,785	1.342
Lisgar	350	715	66%	472	1.348
Milton	1,330	1,472	100%	1,472	1.107
Meadowvale	1,080	1,652	96%	1,586	1.468
Streetsville	1,650	1,541	96%	1,479	0.897
Clarkson	2,520	3,800	86%	3,268	1.159
Aldershot	870	1,640	96%	1,574	1.810
<i>Total</i>	<i>20,601</i>	<i>29,201</i>	<i>88%</i>	<i>25,597</i>	1.243

* AM peak period inbound vehicles estimated using 2016 TTS data, and rounded to the nearest 10.

** GO parking data obtained from "GO Rail Station Access Plan" (2016) and dated December 2016

This “parking factor” was then applied to the a.m. peak period inbound trips estimated at each Transitway station. Note that park-and-ride (2-hrs) forecasts (and congruently, estimated inbound vehicle trips) for the a.m. peak two hours can be converted to a.m. peak period forecasts by applying a factor of 1.370, as analysis of the TTS indicate that 73% of 3-hour a.m. peak period trips occur within the two a.m. peak hour.

The resulting estimated parking demands at each Transitway station are provided in Exhibit 3-7. Parking demands are provided for the 2041 horizon, representing the “ultimate” conditions. The

recommended parking lot size for Bronte Station is 140 spaces. It is noted that protection for future expansion beyond 2041, carpool spaces, and park-and-ride for other transit services are not included in the parking lot size, but may be considered in the development of the station area (property) and station layout.

Exhibit 3-7: Estimated Parking Demands for each Transitway Station

STATION	GGHM INBOUND TRIPS		PARKING LOT SIZE ***
	AM Peak 2-Hour *	AM Peak Period **	
	2041	2041	2041
Dundas	460	640	800
Appleby	190	260	320
Bronte	80	110	140
Trafalgar	400	540	680
Britannia	120	170	210
Derry	300	420	520
Mississauga	70	100	128

* Calculated based on forecasted a.m. park-and-ride boardings, at a factor 1.0 inbound vehicles per 1.1 boardings.

** Peak 2-hour trips can be converted to peak period trips at a factor of 1.370, based on GGHM outputs.

*** Parking lot size calculated by multiplying estimated a.m. peak period inbound trips by a factor of 1.243.

3.5 Background Traffic Growth

Future background traffic volumes were estimated for the study area using MTO’s GGHM (discussed in Section 3.4.1) demand model output, provided by MTO, and supplemented with manual refinements considering local conditions. Macro models can be limited with respect to specific hourly forecasts, and the 2011 base-year model (used in the comparative analysis) is also aging, therefore refinements included review of municipal transportation master plans (TMPs), land-use, background population and employment growth, and adjustments for local developments or changes to the road network.

On Bronte Road, the GGHM demand model growth from 2011 base to 2031 has peak direction link flow of 991vph to 1525vph or 2.2% annual compound growth rate. Model output figures are provided in Appendix E. This high growth rate seems appropriate, given the future widening of Bronte Road.

The Town of Oakville and Region of Halton population and employment forecasts were also considered in the development of traffic growth rates. Relevant documents are listed as follows:

- Greater Toronto and Hamilton Area – “Growth Plan for the Greater Golden Horseshoe” (2017); and
- Halton Region – “Halton Region Transportation Master Plan” (2011).

Examination of the above documents showed that population growth is estimated to be between 0.3% to 0.4% per year between 2011-2031, while employment are forecasted to increase between 0.4% to 0.5% per year during that same period.

In summary, based on the information presented, the annual compound growth from the GGHM of 2.2% was selected as a best-fit with available information, to be applied to existing traffic volumes on Bronte Road corridor. This rate was applied to all ‘major’ movements, which is defined as all through movements along arterial roads or turning movements between two arterial roads.

3.5.1 Nearby Developments

In the vicinity of the station, local developments are limited to small commercial / residential / farmland properties to the north and south of the station. Therefore, the above rates appear suitable and no traffic from major developments need to be added.

3.6 Future Model Calibration

The future Synchro models were calibrated to better reflect expected conditions accomplished by adjusting either the Lane Utilization Factor (LUF) or Lost Time Adjustments (LTA) for certain movements.

Adjustments made to the future traffic models are summarized in Exhibit 3-8.

Exhibit 3-8: Future Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Bronte Road & Dundas Street	EBT	LUF	1.0
		EBL	LTA	-1 seconds
		NBL	LTA	-1 seconds
		SBL	LTA	-1 seconds
PM Peak	Bronte Road & Dundas Street	WBT	LUF	1.0
		NBT	LUF	1.0
		EBL	LTA	-2 seconds
		NBL	LTA	-2 seconds
		SBL	LTA	-1 seconds

3.7 Future Background Operations

To analyze future background conditions, the existing traffic volumes were grown using the growth rates discussed in Section 3.5. Future background conditions include planned improvements discussed in Section 3.1. Exhibit 3-10 illustrates future background traffic volumes during the a.m. and p.m. peak hours.

A summary of critical movements identified during the future background condition analysis is provided in Exhibit 3-9, with detailed output of the Synchro analysis provided in Appendix B.

With background growth added, the study intersections are expected to operate as follows:

- Bronte Road & Burnhamthorpe Road is expected to continue operate poorly on its minor approaches. Given the added N-S growth and with the new widening assumptions, side-street volumes are likely unable to turn onto Bronte Road. With high opposing volumes, the NBL in the a.m. peak hour and the SBL in the p.m. peak hour are now critical.
- Bronte Road & Highway 407 WB Off-ramp is expected to continue operating well at LOS B and C in the a.m. and p.m. peak hours, respectively. As noted previously, the existing carpool lot is being moved south of Highway 407 and will connect to the EB Off-ramp. Therefore, the split phasing was removed at this intersection. Under the new phasing, more green time is allocated to the N-S through movements, causing the WBL to continue operating with moderate delays at LOS D/E.
- Bronte Road & Highway 407 EB Off-Ramp is expected to operate well at LOS B during both peak periods. To accommodate outbound traffic from the carpool lot,

split phasing was assumed. Results show minor deterioration of off-ramp volumes with its movements now operating at LOS E.

- Bronte Road & Dundas Street is expected to remain at LOS E during the a.m. peak hour but deteriorate to LOS F in the p.m. peak hour. With high growth rates used, all critical through movements identified in existing conditions analysis are now nearing capacity, except WBT and NBT which are operating at capacity. During both peak periods, all left-turning movements are expected to operate past capacity, given green time prioritized for the higher through volumes.

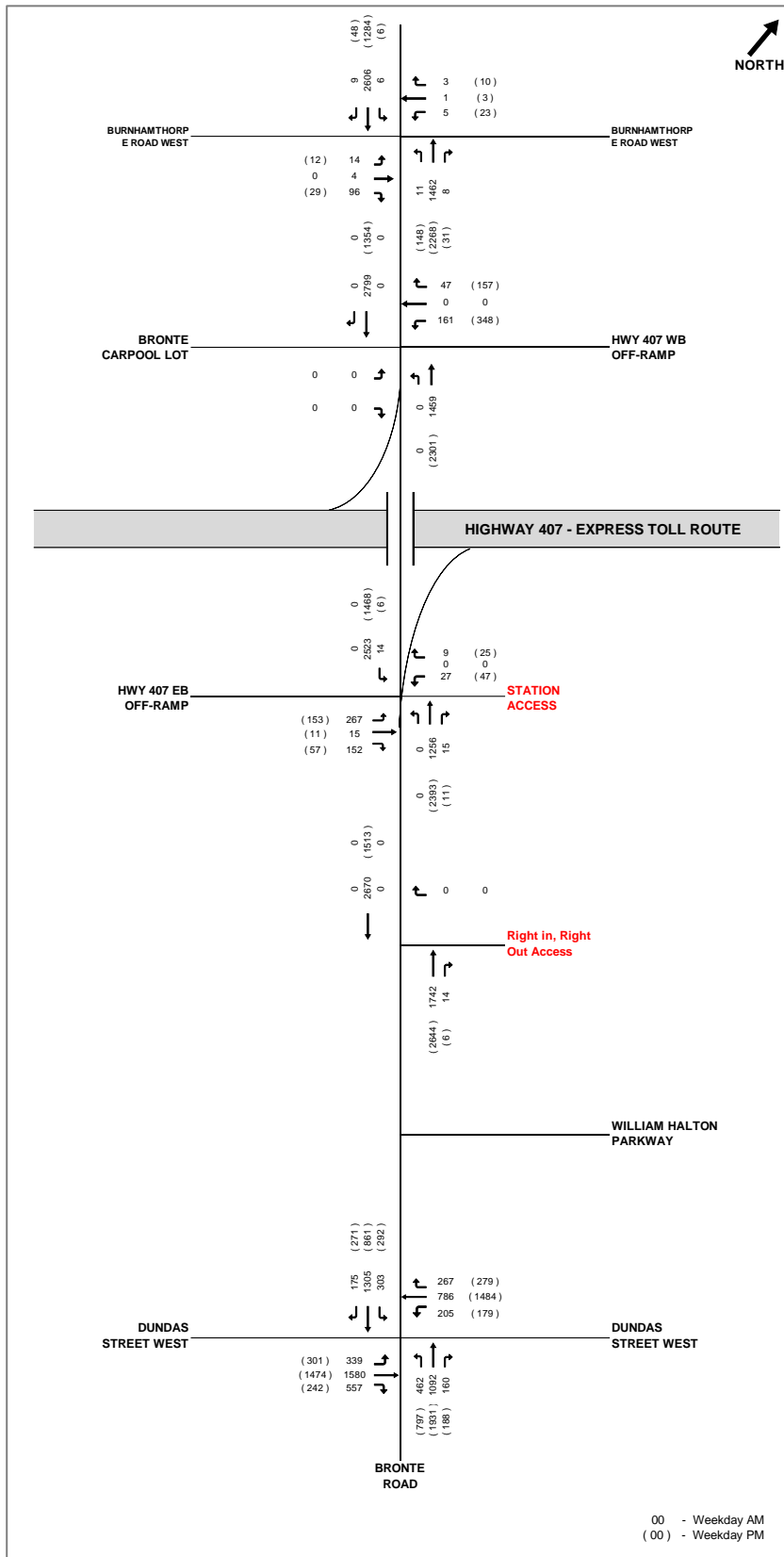
Exhibit 3-9: Synchro Analysis: Future Background Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Bronte Road & Burnhamthorpe Road West <i>(unsignalized)</i>	-	EBLTR WBLTR NBL	F F E	Err* Err* 0.10	Err* Err* 3	-	EBLTR WBLTR SBL	F F D	Err* Err* 0.05	Err* Err* 1
Bronte Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	B	WBL WBR	E D	0.75 0.03	71 12	C	WBL WBR	D D	0.68 0.34	127 56
Bronte Road & Highway 407 EB Off-Ramp / Carpool Lot Access <i>(signalized)</i>	B	EBL EBT EBR WBL WBR	E E E F E	0.74 0.72 0.38 0.64 0.01	67 66 38 19 -	B	EBL EBT EBR WBL WBR	E E D E E	0.63 0.63 0.04 0.49 0.02	43 43 4 26 -
Trafalgar Road & William Halton Parkway** <i>(signalized)</i>	N/a	-	-	-	-	N/a	-	-	-	-
Bronte Road & Dundas Street West <i>(signalized)</i>	E	EBL EBT EBR WBL WBT NBL NBT SBL SBT	F D D F D F D F D	1.16 0.90 0.77 1.04 0.73 1.16 0.74 1.10 0.89	130 136 131 85 93 99 101 114 126	F	EBL EBT WBL WBT NBL NBT SBL SBT	F D F E F E F D	1.43 0.91 1.15 1.03 1.44 1.00 1.12 0.58	134 145 78 173 169 184 115 77

*Err – indicates severe congestion may occur outside of model parameters

**Analysis subject to road extension of William Halton Parkway

Exhibit 3-10: Future Background Traffic Volumes for the AM (PM) Peak Hour



3.8 Future Total Operations

Future total volumes were calculated adding the station-generated traffic to the future volumes with background growth applied. The future scenarios accounts for all vehicular traffic that is estimated to year 2031 following implementation of the Transitway.

Future total volumes which includes background growth and station-generated traffic are illustrated in Exhibit 3-11.

A summary of critical movements identified during the future total condition analysis is provided in Exhibit 3-12, with detailed output of the Synchro analysis provided in Appendix C.

With the new Transitway demands added to future background conditions, the study intersections are expected to operate as follows:

- Limited amounts of station traffic are added to the NBT, NBL, SBT and EBR movements at Bronte Road & Burnhamthorpe Road. Overall, the minor approach continues to operate with long delays and queues. Because the two approaches are marginally affected by station demands (1-7 vph in either peak hours), improvements for this intersection does not fall within the scope and responsibility of Transitway-4 project. It is likely that the Halton Region would explore improvements at the intersection tied to future widening of Bronte Road.
- The two Highway Off-Ramps are expected to operate with little to no change with the addition of the station demands. A few movements show slightly higher v/c and queue lengths, however no movements are nearing capacity thresholds.
- Bronte Road & Dundas Street is expected to continue operating poorly at LOS E and F during both peak periods. With moderate amounts of station traffic introduced to this intersection, operation are not drastically different than background conditions (as provided in the above section). Some station demands are added to already over capacity movements, such as the EBL and the SBL movement causing further deterioration.

Overall, the traffic impacts of the station are minimal but noticeable at the intersection of Bronte Road and Dundas Street intersection where movements are operating overcapacity.

Exhibit 3-11: Future Total Traffic Volumes for the AM (PM) Peak Hour

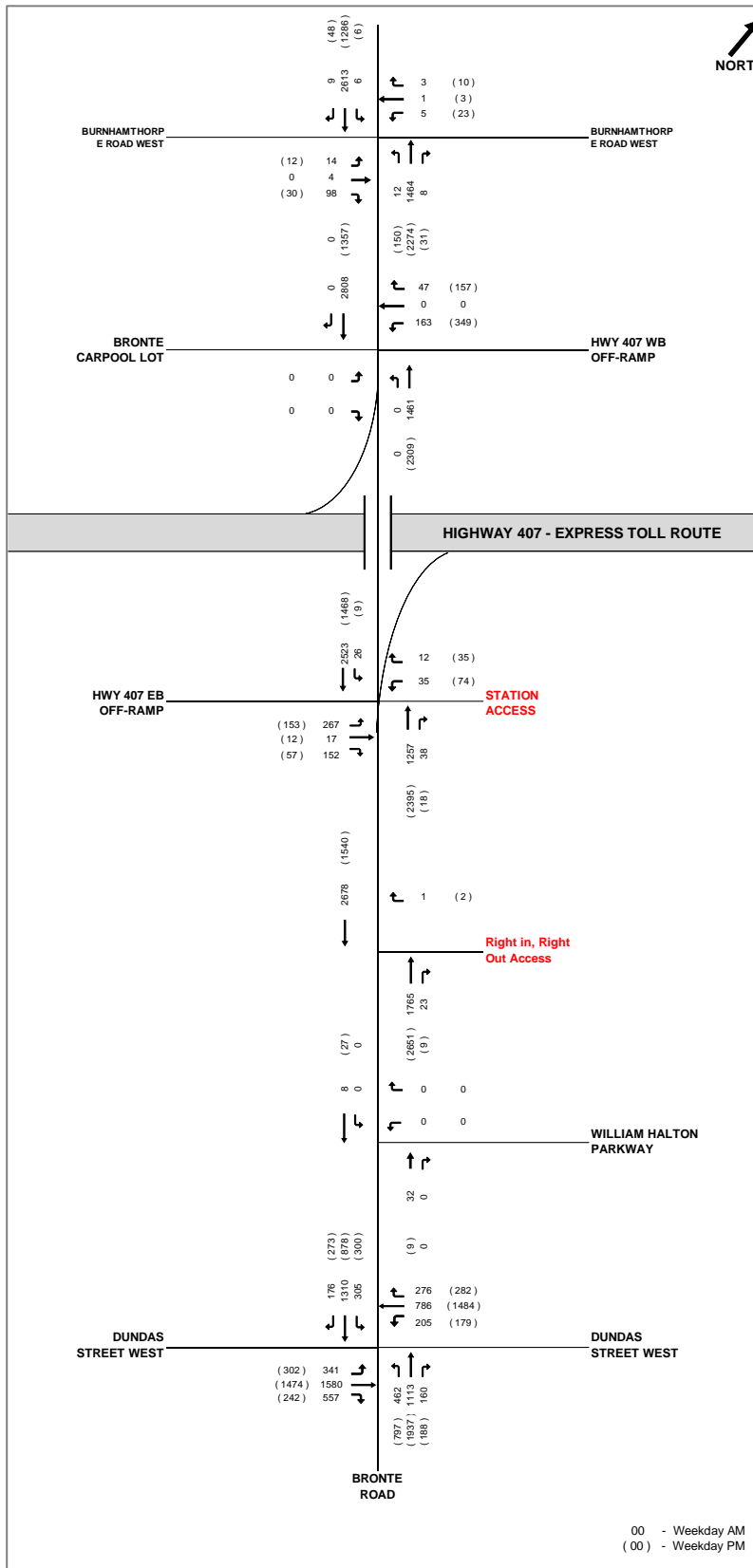


Exhibit 3-12: Synchro Analysis: Future Total Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Bronte Road & Burnhamthorpe Road West <i>(unsignalized)</i>	-	EBLTR WBLTR NBL	F F E	Err* Err* 0.11	Err* Err* 3	-	EBLTR WBLTR SBL	F F D	Err* Err* 0.05	Err* Err* 1
Bronte Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	B	WBL WBR	E D	0.76 0.03	72 12	C	WBL WBR	D D	0.68 0.34	128 56
Bronte Road & Highway 407 EB Off-Ramp / Carpool Lot Access <i>(signalized)</i>	B	EBL EBT EBR WBL WBR	E E E F E	0.74 0.74 0.38 0.63 0.01	67 67 38 25 -	B	EBL EBT EBR WBL WBR	E E E E E	0.64 0.62 0.04 0.53 0.02	44 44 4 37 -
Trafalgar Road & William Halton Parkway** <i>(signalized)</i>	N/a	-	-	-	-	N/a	-	-	-	-
Bronte Road & Dundas Street West <i>(signalized)</i>	E	EBL EBT EBR WBL WBT NBL NBT SBL SBT	F D D F D F D F D	1.18 0.90 0.77 1.04 0.73 1.16 0.75 1.12 0.89	132 136 131 85 94 99 103 118 127	F	EBL EBT WBL WBT NBL NBT SBL SBT	F D F E F E F D	1.44 0.91 1.15 1.03 1.44 1.00 1.15 0.59	135 145 78 174 169 186 119 79

*Err – indicates severe congestion may occur outside of model parameters

**TMCs and traffic forecasts were not made available

4 Potential Improvement Measures

4.1 Transit

Based on the operational analysis, no special transit priority measures appear warranted for entrance into and out of the station site. The entrances operate well and buses entering and exiting the station are not expected to incur significant delay. The station layout appears to provide a reasonable and direct routing between the bus turnaround / drop-off facility and Bronte Road with limited potential for background queues to interfere.

4.2 Active Transportation

No specific active transportation measures such as pedestrian crossovers appear necessary as the proposed access configuration will providing crossing opportunity for pedestrians and cyclist to the west of Bronte Road (refer to Exhibit 1-2). The station layout should be reviewed under the future widening of Bronte Road to ensure active transportation connections are provided to the multi-use trails to both the north and the south of Highway 407 and the planned off-road trail west of the station as per Region of Halton’s ATMP and City of Oakville’s ATMP.

4.3 Traffic

The below improvement measures were analyzed in Synchro (given Future total volumes) with results presented below in Exhibit 4-1.

- Dedicated WBR lane;
- Dual SBL lanes (protected phasing);
- Optimized signal timings.

Exhibit 4-1: Analysis of Improvements to Bronte Road & Dundas Street

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Bronte Road & Dundas Street (<i>planned configuration*</i>)	1.21	EBL	F	1.18	132	1.26	EBL	F	1.44	135
		EBT	D	0.90	136		EBT	D	0.91	145
		EBR	D	0.77	131		WBL	F	1.15	78
		WBL	F	1.04	85		WBT	E	1.03	174
		WBT	D	0.73	94		NBL	F	1.44	169
		NBL	F	1.16	99		NBT	E	1.00	186
		NBT	D	0.75	103		SBL	F	1.15	119
		SBL	F	1.12	118		SBT	D	0.59	79
		SBT	D	0.89	127					
Bronte Road & Dundas Street (<i>with improvements</i>)	1.01	EBL	F	1.05	102	1.21	EBL	F	1.44	135
		EBT	D	0.95	149		EBT	D	0.91	145
		EBR	D	0.77	126		WBL	F	1.15	78
		WBL	F	1.04	85		WBT	D	0.86	127
		WBT	D	0.56	70		NBL	F	1.44	169
		NBL	F	1.02	92		NBT	D	0.96	178
		NBT	D	0.73	103		SBL	F	0.93	63
		SBL	E	0.72	51		SBT	D	0.59	79
		SBT	D	0.89	127					

*refer to Future Road Network (Section 3.1)

The following was observed:

- Implementing dual SBL turning lanes (with protected phasing) will significantly improve operation and free up some green time for conflicting movements.
- Providing a dedicated WBR lane will better facilitate high WBT demands and allow better operation for EBL (permissive) movements.
- Average intersection v/c significantly reduced in the a.m. and p.m. peak hours.

These improvement measures will drastically improve operations at this intersection, particularly the left turning movements affected by the station demands (i.e. SBL and EBL). Implementing dual SBL may be viable given the future widening of Bronte Road, as the existing intersection right-of-way appears to result in overlapping lefts (conflicts with already implemented dual NBL lanes). Therefore, further feasibility review should be conducted under Bronte Road widening project to ensure safe and efficient operation.

5 Summary and Recommendations

This report provides an analysis of traffic operations for the proposed Highway 407 Transitway station located near the interchange of Highway 407 & Bronte Road in the Town of Oakville. The report also includes commentary on transit and active transportation access to the proposed station.

The traffic analysis found that the intersection of Bronte Road and Burnhamthorpe Road operates poorly, experiencing heavy delay on the minor approaches due to the high N-S through movement volumes, resulting in limited available gaps. The Highway 407 Off-Ramps operates well under existing condition. Bronte Road and Dundas Street is operating with moderate congestion during both peak periods. All left turn movements are operating as critical and experience long delays and queuing.

Future conditions during the a.m. and p.m. peak hours were modelled and analyzed based on a horizon year of 2031. Forecasts were developed using background growth rates informed by MTO's travel demand model. Forecasts for traffic to and from the proposed station was estimated based on ridership (park-and-ride) demand. The study accounts for the planned widening of Bronte Road along with plans to relocate the existing carpool lot to the proposed Transitway station area.

The future 2031 background is expected to see significant growth in the study area. Bronte Road and Burnhamthorpe Road is expected to continue operating poorly on the minor approaches. Bronte Road and Dundas Street is expected to operate poorly with all movements operating at or overcapacity. However, traffic is marginally affected by the station demands, the operational issues arise regardless of the presence of the station.



















A signalized access and a right in/right out access is proposed, these accesses will be shared with the relocated carpool lot. Traffic models indicate that vehicles ingress and egress with no significant queuing. Therefore, no major geometric improvements are required.

With the future widening of Bronte Road, the station layout should be reviewed to ensure that active transportation connections are provided to the planned multi-use trails to the north and south and the off road trail to the west of the station. As Bronte Road south of Highway 407 develops further, there will likely be an increase in bus service along the corridor. This is aligned with the Region of Halton's Transportation Master Plan which has identified this corridor as a semi-exclusive / exclusive right-of-way for bus priority. No transit oriented improvements are required, the station layout accommodates bus activity sufficiently.

Appendix A-: Existing Conditions Synchro Output

Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	3	74	4	1	2	11	1126	6	5	2007	7
Future Volume (vph)	11	3	74	4	1	2	11	1126	6	5	2007	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.886			0.961			0.999			0.999	
Flt Protected		0.994			0.972		0.950			0.950		
Satd. Flow (prot)	0	1650	0	0	1396	0	1674	3435	0	1825	3439	0
Flt Permitted		0.994			0.972		0.950			0.950		
Satd. Flow (perm)	0	1650	0	0	1396	0	1674	3435	0	1825	3439	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	50%	0%	0%	9%	6%	33%	0%	6%	14%
Adj. Flow (vph)	12	3	80	4	1	2	12	1224	7	5	2182	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	95	0	0	7	0	12	1231	0	5	2190	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	67.7%						ICU Level of Service C					
Analysis Period (min)	15											

Lanes, Volumes, Timings
2: Carpool lot/Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↖	↖	↖	↑↑			↑↑↑	
Traffic Volume (vph)	7	0	21	120	4	36	23	1124	0	0	2145	11
Future Volume (vph)	7	0	21	120	4	36	23	1124	0	0	2145	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		100.0	90.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.900				0.850					0.999	
Flt Protected		0.987		0.950	0.955		0.950					
Satd. Flow (prot)	0	1405	0	1591	1544	1512	1615	3444	0	0	4989	0
Flt Permitted		0.987		0.950	0.955		0.054					
Satd. Flow (perm)	0	1405	0	1591	1544	1512	92	3444	0	0	4989	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101				101						1
Link Speed (k/h)		60			60			80				80
Link Distance (m)		81.6			298.7			59.2				415.7
Travel Time (s)		4.9			17.9			2.7				18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	14%	0%	24%	9%	75%	8%	13%	6%	0%	0%	5%	9%
Adj. Flow (vph)	8	0	23	130	4	39	25	1222	0	0	2332	12
Shared Lane Traffic (%)				49%								
Lane Group Flow (vph)	0	31	0	66	68	39	25	1222	0	0	2344	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2				2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA				NA
Protected Phases	4	4		8	8		1!	2				6!

Lanes, Volumes, Timings
2: Carpool lot/Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019

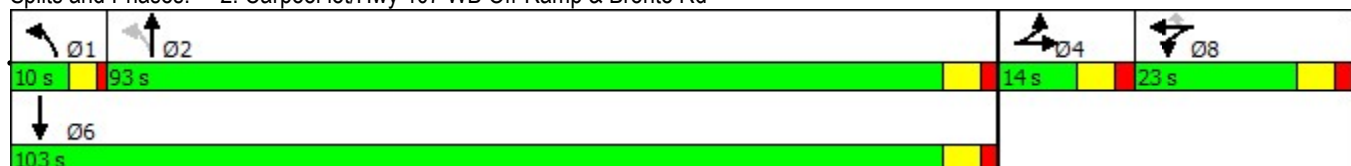


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8	2					
Detector Phase	4	4		8	8	8	1	2			6	
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	4.0	20.0			20.0	
Minimum Split (s)	12.0	12.0		12.0	12.0	12.0	8.0	26.0			26.0	
Total Split (s)	14.0	14.0		23.0	23.0	23.0	10.0	93.0			103.0	
Total Split (%)	10.0%	10.0%		16.4%	16.4%	16.4%	7.1%	66.4%			73.6%	
Maximum Green (s)	8.0	8.0		17.0	17.0	17.0	6.0	87.0			97.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0			4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0			2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0			0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	6.0			6.0	
Lead/Lag							Lead	Lag				
Lead-Lag Optimize?							Yes	Yes				
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	None	None	Max			Max	
Act Effct Green (s)		6.0		11.0	11.0	11.0	97.2	91.8			97.5	
Actuated g/C Ratio		0.05		0.09	0.09	0.09	0.76	0.72			0.77	
v/c Ratio		0.19		0.49	0.52	0.18	0.18	0.49			0.61	
Control Delay		2.6		68.6	70.6	1.7	7.6	10.6			8.6	
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0			0.0	
Total Delay		2.6		68.6	70.6	1.7	7.6	10.6			8.6	
LOS		A		E	E	A	A	B			A	
Approach Delay		2.6			54.3			10.5			8.6	
Approach LOS		A			D			B			A	
Queue Length 50th (m)		0.0		17.5	18.2	0.0	1.5	82.3			99.5	
Queue Length 95th (m)		0.0		33.7	34.5	0.0	4.2	110.6			129.3	
Internal Link Dist (m)		57.6			274.7			35.2			391.7	
Turn Bay Length (m)						100.0	90.0					
Base Capacity (vph)		183		213	207	290	142	2483			3820	
Starvation Cap Reductn		0		0	0	0	0	0			0	
Spillback Cap Reductn		0		0	0	0	0	0			0	
Storage Cap Reductn		0		0	0	0	0	0			0	
Reduced v/c Ratio		0.17		0.31	0.33	0.13	0.18	0.49			0.61	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 127.3
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 11.2
 Intersection Capacity Utilization 61.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service B
 ! Phase conflict between lane groups.

Splits and Phases: 2: Carpool lot/Hwy 407 WB Off-Ramp & Bronte Rd



Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↶↶	↷		↶↶↶	↶↶	
Traffic Volume (vph)	206	117	0	967	1939	0
Future Volume (vph)	206	117	0	967	1939	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	80.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	7.6		7.6			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.95	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3309	1585	0	5043	3476	0
Flt Permitted	0.950					
Satd. Flow (perm)	3309	1585	0	5043	3476	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		23				
Link Speed (k/h)	60			70	70	
Link Distance (m)	268.2			122.3	131.9	
Travel Time (s)	16.1			6.3	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	3%	0%	4%	5%	0%
Adj. Flow (vph)	224	127	0	1051	2108	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	224	127	0	1051	2108	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		26.0	26.0	
Total Split (s)	16.0	16.0		69.0	69.0	
Total Split (%)	18.8%	18.8%		81.2%	81.2%	
Maximum Green (s)	10.0	10.0		63.0	63.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effct Green (s)	9.5	9.5		63.0	63.0	
Actuated g/C Ratio	0.11	0.11		0.75	0.75	
v/c Ratio	0.60	0.64		0.28	0.81	
Control Delay	43.1	45.2		3.7	10.4	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	43.1	45.2		3.7	10.4	
LOS	D	D		A	B	
Approach Delay	43.8			3.7	10.4	
Approach LOS	D			A	B	
Queue Length 50th (m)	18.0	16.2		16.4	95.6	
Queue Length 95th (m)	29.0	#37.4		20.7	127.5	
Internal Link Dist (m)	244.2			98.3	107.9	
Turn Bay Length (m)		80.0				
Base Capacity (vph)	391	207		3760	2591	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.57	0.61		0.28	0.81	

Intersection Summary































Area Type: Other
 Cycle Length: 85
 Actuated Cycle Length: 84.5
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 11.8
 Intersection LOS: B
 Intersection Capacity Utilization 70.8%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp

↑ Ø2	↗ Ø4
69 s	16 s
↓ Ø6	
69 s	

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 			 	
Traffic Volume (vph)	261	1217	429	158	605	206	356	841	123	233	1005	135
Future Volume (vph)	261	1217	429	158	605	206	356	841	123	233	1005	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		0.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.97	0.95	1.00	1.00	*1.00	1.00
Ped Bike Factor									0.99	1.00		
Frt			0.850		0.962				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	5043	1541	1521	4588	0	3404	3476	1408	1738	3625	1408
Flt Permitted	0.217			0.108			0.950			0.116		
Satd. Flow (perm)	397	5043	1541	173	4588	0	3404	3476	1388	212	3625	1408
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			283		74				109			112
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		240.8			245.2			173.6			441.7	
Travel Time (s)		14.4			14.7			8.9			22.7	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	4%	6%	20%	12%	4%	4%	5%	16%	5%	6%	16%
Adj. Flow (vph)	284	1323	466	172	658	224	387	914	134	253	1092	147
Shared Lane Traffic (%)												
Lane Group Flow (vph)	284	1323	466	172	882	0	387	914	134	253	1092	147
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6					4	8		8
Detector Phase	5	2	2	1	6		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0		14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	14.0	44.0	44.0	14.0	44.0		18.0	44.0	44.0	18.0	44.0	44.0
Total Split (%)	11.7%	36.7%	36.7%	11.7%	36.7%		15.0%	36.7%	36.7%	15.0%	36.7%	36.7%
Maximum Green (s)	10.0	37.0	37.0	10.0	37.0		14.0	37.0	37.0	14.0	37.0	37.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.0	7.0	4.0	7.0		4.0	7.0	7.0	4.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0			29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	50.0	37.0	37.0	50.0	37.0		14.0	37.0	37.0	54.0	37.0	37.0
Actuated g/C Ratio	0.42	0.31	0.31	0.42	0.31		0.12	0.31	0.31	0.45	0.31	0.31
v/c Ratio	1.03	0.85	0.70	0.93	0.60		0.97	0.85	0.27	0.93	0.98	0.29
Control Delay	88.4	45.3	19.9	79.6	34.1		92.3	48.0	9.9	68.0	63.4	10.9
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	88.4	45.3	19.9	79.6	34.1		92.3	48.0	9.9	68.0	63.4	10.9
LOS	F	D	B	E	C		F	D	A	E	E	B
Approach Delay		45.5			41.5			56.4			59.0	
Approach LOS		D			D			E			E	
Queue Length 50th (m)	~44.9	106.8	37.5	26.0	59.1		47.4	106.2	4.2	41.6	127.1	5.9
Queue Length 95th (m)	#90.0	125.4	76.5	#68.7	73.4		#78.1	131.7	18.6	#90.2	#169.6	21.2
Internal Link Dist (m)		216.8			221.2			149.6			417.7	
Turn Bay Length (m)	80.0		75.0	115.0			110.0		50.0	180.0		65.0
Base Capacity (vph)	277	1554	670	184	1465		397	1071	503	273	1117	511
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.85	0.70	0.93	0.60		0.97	0.85	0.27	0.93	0.98	0.29

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 14.4 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 50.7
 Intersection LOS: D

Intersection Capacity Utilization 88.5% ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

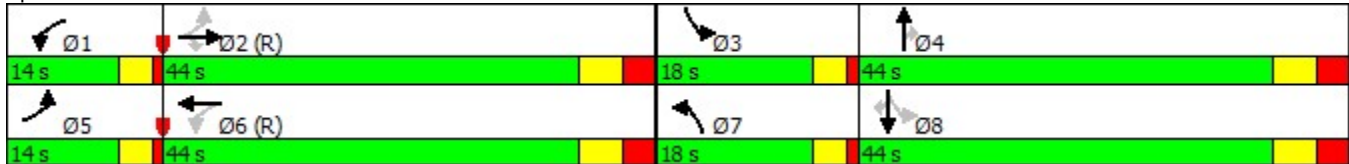
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Bronte Rd & Dundas St W



Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

PM Peak Period
09-20-2019



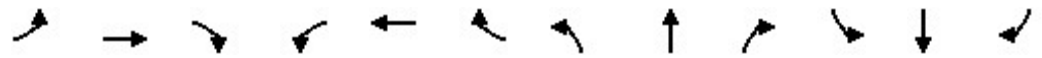
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (vph)	9	0	22	18	2	8	148	1747	24	5	989	37
Future Volume (vph)	9	0	22	18	2	8	148	1747	24	5	989	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	0.0			0.0			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.905			0.961			0.998			0.995	
Flt Protected		0.986			0.969		0.950			0.950		
Satd. Flow (prot)	0	1612	0	0	1789	0	1706	3503	0	1521	3461	0
Flt Permitted		0.986			0.969		0.950			0.950		
Satd. Flow (perm)	0	1612	0	0	1789	0	1706	3503	0	1521	3461	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	9%	0%	0%	0%	7%	4%	4%	20%	5%	3%
Adj. Flow (vph)	10	0	24	20	2	9	161	1899	26	5	1075	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	34	0	0	31	0	161	1925	0	5	1115	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.7%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
2: Carpool Lot/Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↖	↖	↖	↖	↑↑			↑↑↑	
Traffic Volume (vph)	19	0	36	259	9	121	17	1772	0	0	1038	5
Future Volume (vph)	19	0	36	259	9	121	17	1772	0	0	1038	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		100.0	90.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	0.0			0.0			7.6			0.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.912				0.850					0.999	
Flt Protected		0.983		0.950	0.956		0.950					
Satd. Flow (prot)	0	1509	0	1683	1673	1585	1547	3544	0	0	4987	0
Flt Permitted		0.983		0.950	0.956		0.236					
Satd. Flow (perm)	0	1509	0	1683	1673	1585	384	3544	0	0	4987	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		101				101						1
Link Speed (k/h)		60			60			80				80
Link Distance (m)		81.7			298.6			50.4				415.7
Travel Time (s)		4.9			17.9			2.3				18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	19%	3%	22%	3%	18%	3%	0%	0%	5%	20%
Adj. Flow (vph)	21	0	39	282	10	132	18	1926	0	0	1128	5
Shared Lane Traffic (%)				48%								
Lane Group Flow (vph)	0	60	0	147	145	132	18	1926	0	0	1133	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	2	1	1	2				2
Detector Template	Left			Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	0.0		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	0.0		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Split	NA		Split	NA	Perm	pm+pt	NA				NA
Protected Phases	4	4		8	8		1!	2				6!

Lanes, Volumes, Timings
2: Carpool Lot/Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases						8	2					
Detector Phase	4	4		8	8	8	1	2				6
Switch Phase												
Minimum Initial (s)	6.0	6.0		6.0	6.0	6.0	4.0	20.0				20.0
Minimum Split (s)	12.0	12.0		12.0	12.0	12.0	8.0	26.0				26.0
Total Split (s)	12.0	12.0		25.0	25.0	25.0	8.0	95.0				103.0
Total Split (%)	8.6%	8.6%		17.9%	17.9%	17.9%	5.7%	67.9%				73.6%
Maximum Green (s)	6.0	6.0		19.0	19.0	19.0	4.0	89.0				97.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	4.0				4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0				2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	6.0				6.0
Lead/Lag							Lead	Lag				
Lead-Lag Optimize?							Yes	Yes				
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0				3.0
Recall Mode	Max	Max		Max	Max	Max	None	Max				Max
Act Effct Green (s)		6.0		19.0	19.0	19.0	97.4	93.8				97.0
Actuated g/C Ratio		0.04		0.14	0.14	0.14	0.70	0.67				0.69
v/c Ratio		0.37		0.64	0.64	0.44	0.06	0.81				0.33
Control Delay		8.4		71.3	71.0	21.2	6.5	21.0				8.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Delay		8.4		71.3	71.0	21.2	6.5	21.0				8.8
LOS		A		E	E	C	A	C				A
Approach Delay		8.4			55.6			20.8				8.8
Approach LOS		A			E			C				A
Queue Length 50th (m)		0.0		41.1	40.5	7.7	1.4	173.6				41.9
Queue Length 95th (m)		3.3		65.6	65.0	27.5	3.7	247.2				48.9
Internal Link Dist (m)		57.7			274.6			26.4				391.7
Turn Bay Length (m)						100.0	90.0					
Base Capacity (vph)		161		228	227	302	300	2374				3455
Starvation Cap Reductn		0		0	0	0	0	0				0
Spillback Cap Reductn		0		0	0	0	0	0				0
Storage Cap Reductn		0		0	0	0	0	0				0
Reduced v/c Ratio		0.37		0.64	0.64	0.44	0.06	0.81				0.33

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 21.0
 Intersection LOS: C
 Intersection Capacity Utilization 76.5%
 ICU Level of Service D
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Splits and Phases: 2: Carpool Lot/Hwy 407 WB Off-Ramp & Bronte Rd



Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↑↑↑	↑↑	
Traffic Volume (vph)	118	44	0	1843	1121	0
Future Volume (vph)	118	44	0	1843	1121	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	80.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	0.0		0.0			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.95	1.00
Ped Bike Factor						
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3278	1633	0	5092	3510	0
Flt Permitted	0.950					
Satd. Flow (perm)	3278	1633	0	5092	3510	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		48				
Link Speed (k/h)	60			70	70	
Link Distance (m)	268.0			94.2	125.6	
Travel Time (s)	16.1			4.8	6.5	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	0%	0%	3%	4%	0%
Adj. Flow (vph)	128	48	0	2003	1218	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	128	48	0	2003	1218	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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	

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm		NA	NA	
Protected Phases	4			2	2	
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		26.0	26.0	
Total Split (s)	17.0	17.0		68.0	68.0	
Total Split (%)	20.0%	20.0%		80.0%	80.0%	
Maximum Green (s)	11.0	11.0		62.0	62.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effct Green (s)	8.6	8.6		62.9	62.9	
Actuated g/C Ratio	0.10	0.10		0.75	0.75	
v/c Ratio	0.38	0.23		0.52	0.46	
Control Delay	37.8	13.4		4.9	4.7	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	37.8	13.4		4.9	4.7	
LOS	D	B		A	A	
Approach Delay	31.2			4.9	4.7	
Approach LOS	C			A	A	
Queue Length 50th (m)	9.8	0.0		37.3	30.3	
Queue Length 95th (m)	17.7	9.3		52.4	45.7	
Internal Link Dist (m)	244.0			70.2	101.6	
Turn Bay Length (m)		80.0				
Base Capacity (vph)	431	256		3835	2643	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.30	0.19		0.52	0.46	

Intersection Summary































Area Type:	Other
Cycle Length:	85
Actuated Cycle Length:	83.5
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.52
Intersection Signal Delay:	6.2
Intersection LOS:	A
Intersection Capacity Utilization:	50.6%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp



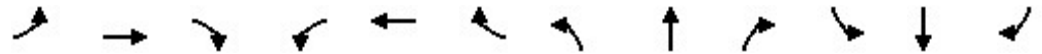
Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	 			 	
Traffic Volume (vph)	232	1135	186	138	1143	215	614	1487	145	225	663	209
Future Volume (vph)	232	1135	186	138	1143	215	614	1487	145	225	663	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		0.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	0.97	*1.00	1.00	1.00	0.95	1.00
Ped Bike Factor			0.98	1.00			1.00		0.99	1.00		0.99
Frt			0.850		0.976				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	5092	1585	1674	4970	0	3506	3767	1484	1825	3444	1585
Flt Permitted	0.105			0.118			0.950			0.108		
Satd. Flow (perm)	196	5092	1552	208	4970	0	3503	3767	1462	207	3444	1563
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			186		33				109			145
Link Speed (k/h)		60			60			70				70
Link Distance (m)		376.2			269.7			173.6				441.6
Travel Time (s)		22.6			16.2			8.9				22.7
Confl. Peds. (#/hr)			9	9			2		3	3		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	9%	3%	3%	1%	2%	10%	0%	6%	3%
Adj. Flow (vph)	232	1135	186	138	1143	215	614	1487	145	225	663	209
Shared Lane Traffic (%)												
Lane Group Flow (vph)	232	1135	186	138	1358	0	614	1487	145	225	663	209
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)		3.7			3.7			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6					4	8		8
Detector Phase	5	2	2	1	6		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0		14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	11.0	43.0	43.0	11.0	43.0		23.0	54.0	54.0	12.0	43.0	43.0
Total Split (%)	9.2%	35.8%	35.8%	9.2%	35.8%		19.2%	45.0%	45.0%	10.0%	35.8%	35.8%
Maximum Green (s)	7.0	36.0	36.0	7.0	36.0		19.0	47.0	47.0	8.0	36.0	36.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-2.0	0.0	0.0	0.0	0.0		-1.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	2.0	7.0	7.0	4.0	7.0		3.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0			29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	50.0	36.0	36.0	46.0	36.0		20.0	47.0	47.0	49.0	36.0	36.0
Actuated g/C Ratio	0.42	0.30	0.30	0.38	0.30		0.17	0.39	0.39	0.41	0.30	0.30
v/c Ratio	1.17	0.74	0.31	0.84	0.90		1.05	1.01	0.23	1.10	0.64	0.37
Control Delay	142.4	41.4	5.9	63.7	48.2		99.6	62.0	8.4	120.6	39.8	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	142.4	41.4	5.9	63.7	48.2		99.6	62.0	8.4	120.6	39.8	12.8
LOS	F	D	A	E	D		F	E	A	F	D	B
Approach Delay		52.2			49.7			68.8			51.3	
Approach LOS		D			D			E			D	
Queue Length 50th (m)	~48.0	88.0	0.0	20.3	109.7		~81.2	~176.1	5.2	~42.5	71.2	11.0
Queue Length 95th (m)	#97.8	104.7	16.1	#50.7	#130.1		#116.3	#223.7	18.3	#91.8	91.2	30.5
Internal Link Dist (m)		352.2			245.7			149.6			417.6	
Turn Bay Length (m)	80.0		75.0	115.0			110.0		50.0	180.0		65.0
Base Capacity (vph)	199	1527	595	165	1514		584	1475	638	205	1033	570
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.17	0.74	0.31	0.84	0.90		1.05	1.01	0.23	1.10	0.64	0.37

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	115
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.17
Intersection Signal Delay:	57.3
Intersection LOS:	E

Intersection Capacity Utilization 111.6% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

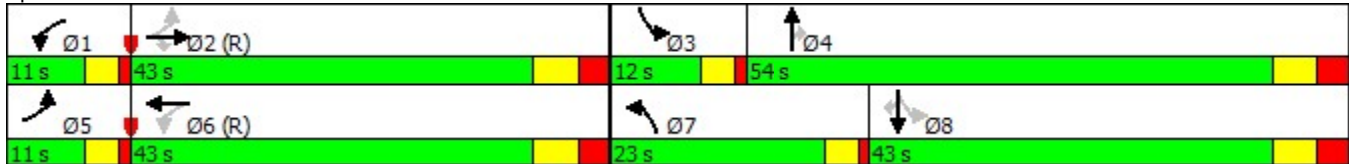
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Bronte Rd & Dundas St W



Appendix B-: Future Background Conditions Synchro Output

Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

AM Peak Period
09-20-2019

















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑	
Traffic Volume (vph)	14	4	96	5	1	3	11	1462	8	6	2606	9
Future Volume (vph)	14	4	96	5	1	3	11	1462	8	6	2606	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.886			0.955			0.999			0.999	
Flt Protected		0.994			0.973		0.950			0.950		
Satd. Flow (prot)	0	1650	0	0	1397	0	1674	4936	0	1825	4942	0
Flt Permitted		0.994			0.973		0.950			0.950		
Satd. Flow (perm)	0	1650	0	0	1397	0	1674	4936	0	1825	4942	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	50%	0%	0%	9%	6%	33%	0%	6%	14%
Adj. Flow (vph)	15	4	104	5	1	3	12	1589	9	7	2833	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	0	0	9	0	12	1598	0	7	2843	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	64.1%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	161	47	1459	0	0	2799
Future Volume (vph)	161	47	1459	0	0	2799
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1674	1512	4948	0	0	4995
Flt Permitted	0.950					
Satd. Flow (perm)	1674	1512	4948	0	0	4995
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		51				
Link Speed (k/h)	60		80			80
Link Distance (m)	298.7		59.2			415.7
Travel Time (s)	17.9		2.7			18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	8%	6%	0%	0%	5%
Adj. Flow (vph)	175	51	1586	0	0	3042
Shared Lane Traffic (%)						
Lane Group Flow (vph)	175	51	1586	0	0	3042
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	6.0	6.0	20.0			20.0
Minimum Split (s)	12.0	12.0	26.0			26.0
Total Split (s)	30.0	30.0	110.0			110.0
Total Split (%)	21.4%	21.4%	78.6%			78.6%
Maximum Green (s)	24.0	24.0	104.0			104.0
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0	6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	Max			Max
Act Effct Green (s)	18.7	18.7	104.1			104.1
Actuated g/C Ratio	0.14	0.14	0.77			0.77
v/c Ratio	0.75	0.20	0.42			0.79
Control Delay	76.2	14.6	5.8			11.5
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	76.2	14.6	5.8			11.5
LOS	E	B	A			B
Approach Delay	62.3		5.8			11.5
Approach LOS	E		A			B
Queue Length 50th (m)	45.4	0.0	45.6			152.5
Queue Length 95th (m)	70.5	11.8	61.4			198.5
Internal Link Dist (m)	274.7		35.2			391.7
Turn Bay Length (m)		100.0				
Base Capacity (vph)	298	311	3820			3857
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.59	0.16	0.42			0.79

Intersection Summary























Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 134.8
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 12.0
 Intersection Capacity Utilization 73.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: Hwy 407 WB Off-Ramp & Bronte Rd



Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	267	15	152	27	0	9	0	1256	15	14	2523	0
Future Volume (vph)	267	15	152	27	0	9	0	1256	15	14	2523	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		80.0	0.0		0.0	0.0		25.0	50.0		0.0
Storage Lanes	1		1	1		1	0		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850			0.850			0.850			
Flt Protected	0.950	0.957		0.950							0.950	
Satd. Flow (prot)	1620	1640	1585	1789	0	1601	0	5043	1601	1789	4995	0
Flt Permitted	0.950	0.957		0.950						0.157		
Satd. Flow (perm)	1620	1640	1585	1789	0	1601	0	5043	1601	296	4995	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			101			101			
Link Speed (k/h)		60			48			70			70	
Link Distance (m)		268.2			146.8			150.8			131.9	
Travel Time (s)		16.1			11.0			7.8			6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	2%	3%	2%	2%	2%	0%	4%	2%	2%	5%	0%
Adj. Flow (vph)	290	16	165	29	0	10	0	1365	16	15	2742	0
Shared Lane Traffic (%)	47%											
Lane Group Flow (vph)	154	152	165	29	0	10	0	1365	16	15	2742	0
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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			1.6			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1		1		2	1	1	2	
Detector Template	Left	Thru	Right	Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1		6.1		30.5	6.1	6.1	30.5	
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	6.1		6.1		1.8	6.1	6.1	1.8	
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	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Split	NA	Perm	Prot		Perm		NA	Perm	pm+pt	NA	
Protected Phases	4	4		8				2		1	6	

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
09-20-2019

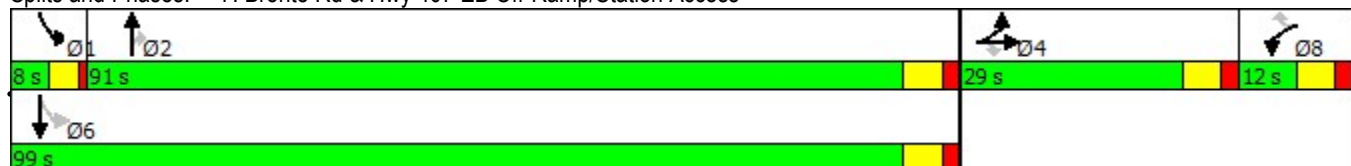


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8			2	6		
Detector Phase	4	4	4	8		8		2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0		20.0	20.0	4.0	20.0	
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0		26.0	26.0	8.0	26.0	
Total Split (s)	29.0	29.0	29.0	12.0		12.0		91.0	91.0	8.0	99.0	
Total Split (%)	20.7%	20.7%	20.7%	8.6%		8.6%		65.0%	65.0%	5.7%	70.7%	
Maximum Green (s)	23.0	23.0	23.0	6.0		6.0		85.0	85.0	4.0	93.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0		2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0		6.0	6.0	4.0	6.0	
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		None		Max	Max	None	Max	
Act Effct Green (s)	17.3	17.3	17.3	6.0		6.0		90.6	90.6	95.6	93.6	
Actuated g/C Ratio	0.13	0.13	0.13	0.05		0.05		0.70	0.70	0.74	0.72	
v/c Ratio	0.72	0.70	0.55	0.35		0.06		0.39	0.01	0.06	0.76	
Control Delay	73.2	71.6	29.2	75.6		0.7		10.2	0.0	7.2	14.8	
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	73.2	71.6	29.2	75.6		0.7		10.2	0.0	7.2	14.8	
LOS	E	E	C	E		A		B	A	A	B	
Approach Delay		57.3			56.4			10.1			14.7	
Approach LOS		E			E			B			B	
Queue Length 50th (m)	42.0	41.3	15.6	7.7		0.0		52.0	0.0	1.1	169.5	
Queue Length 95th (m)	66.8	66.0	38.4	18.8		0.0		81.4	0.0	3.6	212.4	
Internal Link Dist (m)		244.2			122.8			126.8			107.9	
Turn Bay Length (m)			80.0						25.0	50.0		
Base Capacity (vph)	289	292	365	83		170		3523	1149	264	3604	
Starvation Cap Reductn	0	0	0	0		0		0	0	0	0	
Spillback Cap Reductn	0	0	0	0		0		0	0	0	0	
Storage Cap Reductn	0	0	0	0		0		0	0	0	0	
Reduced v/c Ratio	0.53	0.52	0.45	0.35		0.06		0.39	0.01	0.06	0.76	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 129.7
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 18.0
 Intersection Capacity Utilization 74.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access



Lanes, Volumes, Timings
8: Bronte Rd & Station RIRO Access

AM Peak Period
09-20-2019



































Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑↑↑	↘		↑↑↑
Traffic Volume (vph)	0	0	1742	14	0	2670
Future Volume (vph)	0	0	1742	14	0	2670
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt				0.850		
Flt Protected						
Satd. Flow (prot)	0	1883	5142	1601	0	5142
Flt Permitted						
Satd. Flow (perm)	0	1883	5142	1601	0	5142
Link Speed (k/h)	48		70			70
Link Distance (m)	151.8		780.4			150.8
Travel Time (s)	11.4		40.1			7.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1893	15	0	2902
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	1893	15	0	2902
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.9%
ICU Level of Service	A
Analysis Period (min)	15

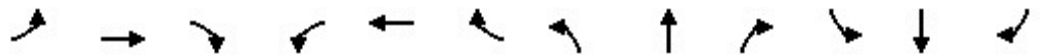
Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  			  	
Traffic Volume (vph)	339	1580	557	205	786	267	462	1092	160	303	1305	175
Future Volume (vph)	339	1580	557	205	786	267	462	1092	160	303	1305	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		0.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor									0.99	1.00		
Frt			0.850		0.962				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	5542	1541	1521	4588	0	3404	4995	1408	1738	4948	1408
Flt Permitted	0.140			0.111			0.950			0.133		
Satd. Flow (perm)	256	5542	1541	178	4588	0	3404	4995	1388	243	4948	1408
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			263		73				130			150
Link Speed (k/h)		60			60			70				70
Link Distance (m)		240.8			245.2			173.6				441.7
Travel Time (s)		14.4			14.7			8.9				22.7
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	4%	6%	20%	12%	4%	4%	5%	16%	5%	6%	16%
Adj. Flow (vph)	339	1580	557	205	786	267	462	1092	160	303	1305	175
Shared Lane Traffic (%)												
Lane Group Flow (vph)	339	1580	557	205	1053	0	462	1092	160	303	1305	175
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)		3.7			3.7			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6					4	8		8
Detector Phase	5	2	2	1	6		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0		14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	17.0	45.0	45.0	15.0	43.0		17.0	43.0	43.0	17.0	43.0	43.0
Total Split (%)	14.2%	37.5%	37.5%	12.5%	35.8%		14.2%	35.8%	35.8%	14.2%	35.8%	35.8%
Maximum Green (s)	13.0	38.0	38.0	11.0	36.0		13.0	36.0	36.0	13.0	36.0	36.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	0.0	0.0	0.0	0.0		-1.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	4.0	7.0		3.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0			29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	56.4	38.0	38.0	50.4	36.0		14.0	35.6	35.6	53.6	35.6	35.6
Actuated g/C Ratio	0.47	0.32	0.32	0.42	0.30		0.12	0.30	0.30	0.45	0.30	0.30
v/c Ratio	1.14	0.90	0.84	1.01	0.74		1.16	0.74	0.32	1.07	0.89	0.33
Control Delay	122.4	47.4	32.1	98.4	38.7		144.3	41.5	10.2	103.1	48.9	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	122.4	47.4	32.1	98.4	38.7		144.3	41.5	10.2	103.1	48.9	9.2
LOS	F	D	C	F	D		F	D	B	F	D	A
Approach Delay		54.2			48.4			66.3			54.2	
Approach LOS		D			D			E			D	
Queue Length 50th (m)	~72.2	118.2	68.7	~37.5	76.2		~66.5	84.3	5.1	~58.6	106.9	4.2
Queue Length 95th (m)	#130.0	136.1	#130.7	#85.4	92.8		#98.8	100.6	21.5	#113.9	125.8	21.0
Internal Link Dist (m)		216.8			221.2			149.6			417.7	
Turn Bay Length (m)	80.0		75.0	115.0			110.0		50.0	180.0		65.0
Base Capacity (vph)	297	1754	667	202	1427		397	1498	507	282	1484	527
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.14	0.90	0.84	1.01	0.74		1.16	0.73	0.32	1.07	0.88	0.33

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 14.4 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 125
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.16
 Intersection Signal Delay: 56.1
 Intersection LOS: E

Intersection Capacity Utilization 98.7% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

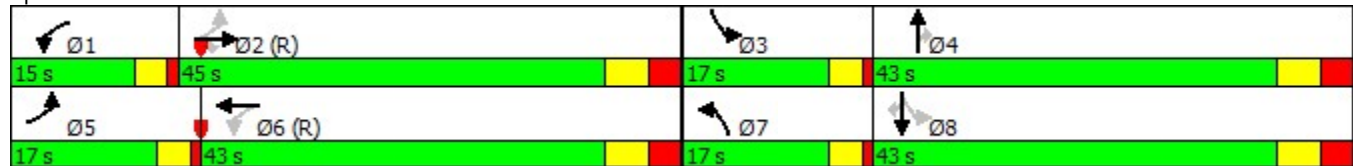
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Bronte Rd & Dundas St W



Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

PM Peak Period
09-20-2019

















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↕↕		↕	↕↕↕	
Traffic Volume (vph)	12	0	29	23	3	10	148	2268	31	6	1284	48
Future Volume (vph)	12	0	29	23	3	10	148	2268	31	6	1284	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.904			0.962			0.998			0.995	
Flt Protected		0.986			0.969		0.950			0.950		
Satd. Flow (prot)	0	1609	0	0	1791	0	1706	5033	0	1521	4973	0
Flt Permitted		0.986			0.969		0.950			0.950		
Satd. Flow (perm)	0	1609	0	0	1791	0	1706	5033	0	1521	4973	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	9%	0%	0%	0%	7%	4%	4%	20%	5%	3%
Adj. Flow (vph)	13	0	32	25	3	11	161	2465	34	7	1396	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	45	0	0	39	0	161	2499	0	7	1448	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.9%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	348	157	2301	0	0	1354
Future Volume (vph)	348	157	2301	0	0	1354
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1772	1585	5092	0	0	4995
Flt Permitted	0.950					
Satd. Flow (perm)	1772	1585	5092	0	0	4995
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		3				
Link Speed (k/h)	60		80			80
Link Distance (m)	298.6		50.4			415.7
Travel Time (s)	17.9		2.3			18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	0%	0%	5%
Adj. Flow (vph)	378	171	2501	0	0	1472
Shared Lane Traffic (%)						
Lane Group Flow (vph)	378	171	2501	0	0	1472
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019

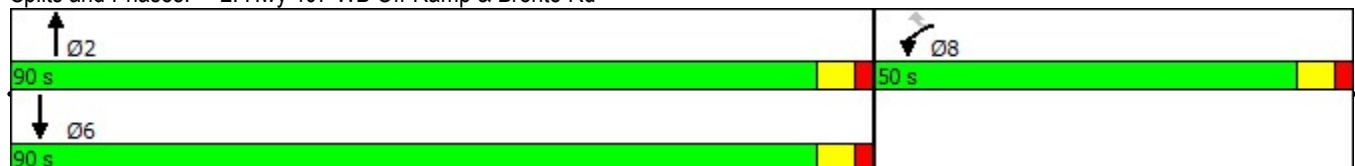


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	6.0	6.0	20.0			20.0
Minimum Split (s)	12.0	12.0	26.0			26.0
Total Split (s)	50.0	50.0	90.0			90.0
Total Split (%)	35.7%	35.7%	64.3%			64.3%
Maximum Green (s)	44.0	44.0	84.0			84.0
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0	6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	Max	Max	Max			Max
Act Effct Green (s)	44.0	44.0	84.0			84.0
Actuated g/C Ratio	0.31	0.31	0.60			0.60
v/c Ratio	0.68	0.34	0.82			0.49
Control Delay	49.2	38.6	24.9			16.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	49.2	38.6	24.9			16.6
LOS	D	D	C			B
Approach Delay	45.9		24.9			16.6
Approach LOS	D		C			B
Queue Length 50th (m)	91.3	35.8	190.2			80.6
Queue Length 95th (m)	127.2	56.2	209.8			92.2
Internal Link Dist (m)	274.6		26.4			391.7
Turn Bay Length (m)		100.0				
Base Capacity (vph)	556	500	3055			2997
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.68	0.34	0.82			0.49

Intersection Summary

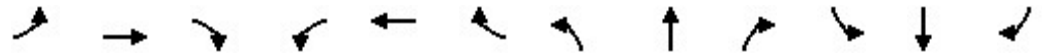
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 24.7
 Intersection Capacity Utilization 73.7%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 2: Hwy 407 WB Off-Ramp & Bronte Rd



Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	11	57	47	0	25	0	2393	11	6	1468	0
Future Volume (vph)	153	11	57	47	0	25	0	2393	11	6	1468	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		80.0	0.0		0.0	0.0		25.0	50.0		0.0
Storage Lanes	1		1	1		1	0		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			
Flt Protected	0.950	0.958		0.950						0.950		
Satd. Flow (prot)	1605	1631	1633	1789	0	1601	0	5092	1601	1789	5043	0
Flt Permitted	0.950	0.958		0.950						0.043		
Satd. Flow (perm)	1605	1631	1633	1789	0	1601	0	5092	1601	81	5043	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			101			101			
Link Speed (k/h)		60			48			70			70	
Link Distance (m)		268.0			138.9			156.7			125.6	
Travel Time (s)		16.1			10.4			8.1			6.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	2%	0%	2%	2%	2%	0%	3%	2%	2%	4%	0%
Adj. Flow (vph)	166	12	62	51	0	27	0	2601	12	7	1596	0
Shared Lane Traffic (%)	47%											
Lane Group Flow (vph)	88	90	62	51	0	27	0	2601	12	7	1596	0
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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			1.6			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1		1		2	1	1		2
Detector Template	Left	Thru	Right	Left		Right		Thru	Right	Left		Thru
Leading Detector (m)	6.1	30.5	6.1	6.1		6.1		30.5	6.1	6.1		30.5
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	6.1		6.1		1.8	6.1	6.1		1.8
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
Detector 2 Size(m)		1.8						1.8				1.8
Detector 2 Type		Cl+Ex						Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0				0.0

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

PM Peak Period
09-20-2019



















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA	Perm	Prot		Perm		NA	Perm	pm+pt	NA	
Protected Phases	4	4		8				2		1	6	
Permitted Phases			4			8			2	6		
Detector Phase	4	4	4	8		8		2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	5.0		5.0		20.0	20.0	4.0	20.0	
Minimum Split (s)	12.0	12.0	12.0	24.0		24.0		26.0	26.0	8.0	26.0	
Total Split (s)	20.0	20.0	20.0	24.0		24.0		88.0	88.0	8.0	96.0	
Total Split (%)	14.3%	14.3%	14.3%	17.1%		17.1%		62.9%	62.9%	5.7%	68.6%	
Maximum Green (s)	14.0	14.0	14.0	18.0		18.0		82.0	82.0	4.0	90.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0		2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0		6.0	6.0	4.0	6.0	
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		None		Max	Max	None	Max	
Walk Time (s)				7.0		7.0						
Flash Dont Walk (s)				11.0		11.0						
Pedestrian Calls (#/hr)				0		0						
Act Effct Green (s)	11.5	11.5	11.5	9.0		9.0		89.0	89.0	92.5	90.5	
Actuated g/C Ratio	0.09	0.09	0.09	0.07		0.07		0.70	0.70	0.73	0.72	
v/c Ratio	0.61	0.61	0.26	0.40		0.13		0.73	0.01	0.06	0.44	
Control Delay	74.3	74.3	4.9	67.2		1.3		14.8	0.0	7.5	8.9	
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	74.3	74.3	4.9	67.2		1.3		14.8	0.0	7.5	8.9	
LOS	E	E	A	E		A		B	A	A	A	
Approach Delay		56.4			44.4			14.8				8.8
Approach LOS		E			D			B				A
Queue Length 50th (m)	23.0	23.5	0.0	12.7		0.0		137.8	0.0	0.5	60.5	
Queue Length 95th (m)	42.5	43.3	3.7	26.2		0.0		212.4	0.0	2.1	79.5	
Internal Link Dist (m)		244.0			114.9			132.7				101.6
Turn Bay Length (m)			80.0						25.0	50.0		
Base Capacity (vph)	178	181	271	256		315		3585	1157	113	3610	
Starvation Cap Reductn	0	0	0	0		0		0	0	0	0	
Spillback Cap Reductn	0	0	0	0		0		0	0	0	0	
Storage Cap Reductn	0	0	0	0		0		0	0	0	0	
Reduced v/c Ratio	0.49	0.50	0.23	0.20		0.09		0.73	0.01	0.06	0.44	

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	126.4
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	15.4
Intersection Capacity Utilization	70.4%
Intersection LOS:	B
ICU Level of Service	C

Analysis Period (min) 15

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

 Ø1  Ø2	 Ø4  Ø8
8 s   88 s   	20 s    24 s   
 Ø6 96 s   	

Lanes, Volumes, Timings
8: Bronte Rd & Station RIRO Access

PM Peak Period
09-20-2019



































Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↑↑↑	↗		↓↓↓
Traffic Volume (vph)	0	0	2644	6	0	1513
Future Volume (vph)	0	0	2644	6	0	1513
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt				0.850		
Flt Protected						
Satd. Flow (prot)	0	1883	5142	1601	0	5142
Flt Permitted						
Satd. Flow (perm)	0	1883	5142	1601	0	5142
Link Speed (k/h)	48		70			70
Link Distance (m)	159.3		767.6			156.7
Travel Time (s)	11.9		39.5			8.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2874	7	0	1645
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	2874	7	0	1645
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.4%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  			  	
Traffic Volume (vph)	301	1474	242	179	1484	279	797	1931	188	292	861	271
Future Volume (vph)	301	1474	242	179	1484	279	797	1931	188	292	861	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		0.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	*1.00	0.91	0.97	*1.00	1.00	1.00	0.91	1.00
Ped Bike Factor			0.98	1.00			1.00		0.99	1.00		0.99
Frt			0.850		0.976				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	5092	1585	1674	5461	0	3506	5650	1484	1825	4948	1585
Flt Permitted	0.100			0.108			0.950			0.108		
Satd. Flow (perm)	187	5092	1552	190	5461	0	3503	5650	1462	207	4948	1563
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		39				109			145
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		376.2			269.7			173.6			441.6	
Travel Time (s)		22.6			16.2			8.9			22.7	
Confl. Peds. (#/hr)			9	9			2		3	3		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	9%	3%	3%	1%	2%	10%	0%	6%	3%
Adj. Flow (vph)	301	1474	242	179	1484	279	797	1931	188	292	861	271
Shared Lane Traffic (%)												
Lane Group Flow (vph)	301	1474	242	179	1763	0	797	1931	188	292	861	271
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6					4	8		8
Detector Phase	5	2	2	1	6		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0		14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	12.0	45.0	45.0	11.0	44.0		21.0	48.0	48.0	16.0	43.0	43.0
Total Split (%)	10.0%	37.5%	37.5%	9.2%	36.7%		17.5%	40.0%	40.0%	13.3%	35.8%	35.8%
Maximum Green (s)	8.0	38.0	38.0	7.0	37.0		17.0	41.0	41.0	12.0	36.0	36.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-2.0	0.0	0.0	0.0	0.0		-2.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	2.0	7.0	7.0	4.0	7.0		2.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0			29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	53.0	38.0	38.0	47.0	37.0		19.0	41.0	41.0	53.0	36.0	36.0
Actuated g/C Ratio	0.44	0.32	0.32	0.39	0.31		0.16	0.34	0.34	0.44	0.30	0.30
v/c Ratio	1.41	0.91	0.38	1.12	1.03		1.44	1.00	0.33	1.10	0.58	0.48
Control Delay	234.0	49.3	7.7	133.4	70.1		243.5	60.2	14.1	114.9	37.5	18.5
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	234.0	49.3	7.7	133.4	70.1		243.5	60.2	14.1	114.9	37.5	18.5
LOS	F	D	A	F	E		F	E	B	F	D	B
Approach Delay		71.9			76.0			107.4			49.7	
Approach LOS		E			E			F			D	
Queue Length 50th (m)	~78.7	122.0	4.6	~32.1	~146.1		~131.1	~150.8	12.9	~60.5	62.8	22.9
Queue Length 95th (m)	#133.5	#145.3	23.3	#77.7	#173.3		#168.8	#184.3	31.2	#114.8	76.8	48.0
Internal Link Dist (m)		352.2			245.7			149.6			417.6	
Turn Bay Length (m)	80.0		75.0	115.0			110.0		50.0	180.0		65.0
Base Capacity (vph)	214	1612	637	160	1710		555	1930	571	266	1484	570
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.91	0.38	1.12	1.03		1.44	1.00	0.33	1.10	0.58	0.48

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	145
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.44
Intersection Signal Delay:	81.5
Intersection LOS:	F

Lanes, Volumes, Timings
 10: Bronte Rd & Dundas St W

PM Peak Period
 09-20-2019

Intersection Capacity Utilization 123.4% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

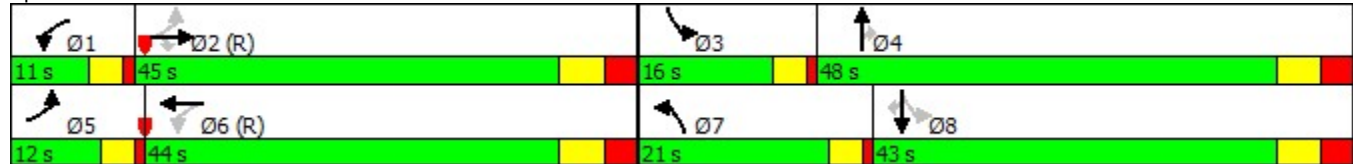
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Bronte Rd & Dundas St W



Appendix C-: Future Total Conditions Synchro Output

Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

AM Peak Period
09-20-2019













Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑↑↑		↕	↑↑↑	
Traffic Volume (vph)	14	4	99	5	1	3	12	1464	8	6	2613	9
Future Volume (vph)	14	4	99	5	1	3	12	1464	8	6	2613	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.885			0.955			0.999			0.999	
Flt Protected		0.994			0.973		0.950			0.950		
Satd. Flow (prot)	0	1648	0	0	1397	0	1674	4936	0	1825	4942	0
Flt Permitted		0.994			0.973		0.950			0.950		
Satd. Flow (perm)	0	1648	0	0	1397	0	1674	4936	0	1825	4942	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	50%	0%	0%	9%	6%	33%	0%	6%	14%
Adj. Flow (vph)	15	4	108	5	1	3	13	1591	9	7	2840	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	0	0	9	0	13	1600	0	7	2850	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	64.4%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	164	47	1462	0	0	2809
Future Volume (vph)	164	47	1462	0	0	2809
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1674	1512	4948	0	0	4995
Flt Permitted	0.950					
Satd. Flow (perm)	1674	1512	4948	0	0	4995
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		51				
Link Speed (k/h)	60		80			80
Link Distance (m)	298.7		59.2			415.7
Travel Time (s)	17.9		2.7			18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	8%	6%	0%	0%	5%
Adj. Flow (vph)	178	51	1589	0	0	3053
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	51	1589	0	0	3053
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	6.0	6.0	20.0			20.0
Minimum Split (s)	12.0	12.0	26.0			26.0
Total Split (s)	30.0	30.0	110.0			110.0
Total Split (%)	21.4%	21.4%	78.6%			78.6%
Maximum Green (s)	24.0	24.0	104.0			104.0
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0	6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	Max			Max
Act Effct Green (s)	18.9	18.9	104.1			104.1
Actuated g/C Ratio	0.14	0.14	0.77			0.77
v/c Ratio	0.76	0.20	0.42			0.79
Control Delay	76.7	14.5	5.9			11.7
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	76.7	14.5	5.9			11.7
LOS	E	B	A			B
Approach Delay	62.9		5.9			11.7
Approach LOS	E		A			B
Queue Length 50th (m)	46.3	0.0	46.2			155.2
Queue Length 95th (m)	71.5	11.8	61.7			200.4
Internal Link Dist (m)	274.7		35.2			391.7
Turn Bay Length (m)		100.0				
Base Capacity (vph)	297	310	3815			3851
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.60	0.16	0.42			0.79

Intersection Summary























Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 135
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 12.2
 Intersection Capacity Utilization 73.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: Hwy 407 WB Off-Ramp & Bronte Rd



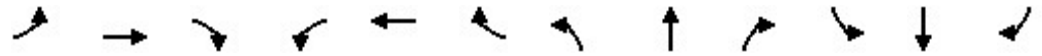
Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	267	18	152	36	0	12	0	1257	38	26	2523	0
Future Volume (vph)	267	18	152	36	0	12	0	1257	38	26	2523	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		80.0	0.0		0.0	0.0		25.0	50.0		0.0
Storage Lanes	1		1	1		1	0		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850			0.850			0.850			
Flt Protected	0.950	0.958		0.950						0.950		
Satd. Flow (prot)	1620	1644	1585	1789	0	1601	0	5043	1601	1789	4995	0
Flt Permitted	0.950	0.958		0.950						0.155		
Satd. Flow (perm)	1620	1644	1585	1789	0	1601	0	5043	1601	292	4995	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			101			101			
Link Speed (k/h)		60			48			70			70	
Link Distance (m)		268.2			146.8			150.8			131.9	
Travel Time (s)		16.1			11.0			7.8			6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	2%	3%	2%	2%	2%	0%	4%	2%	2%	5%	0%
Adj. Flow (vph)	290	20	165	39	0	13	0	1366	41	28	2742	0
Shared Lane Traffic (%)	47%											
Lane Group Flow (vph)	154	156	165	39	0	13	0	1366	41	28	2742	0
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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			1.6			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1		1		2	1	1	2	
Detector Template	Left	Thru	Right	Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1		6.1		30.5	6.1	6.1	30.5	
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	6.1		6.1		1.8	6.1	6.1	1.8	
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	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Split	NA	Perm	Prot		Perm		NA	Perm	pm+pt	NA	
Protected Phases	4	4		8				2		1	6	

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8			2	6		
Detector Phase	4	4	4	8		8		2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0		20.0	20.0	4.0	20.0	
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0		26.0	26.0	8.0	26.0	
Total Split (s)	29.0	29.0	29.0	12.0		12.0		91.0	91.0	8.0	99.0	
Total Split (%)	20.7%	20.7%	20.7%	8.6%		8.6%		65.0%	65.0%	5.7%	70.7%	
Maximum Green (s)	23.0	23.0	23.0	6.0		6.0		85.0	85.0	4.0	93.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0		2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0		6.0	6.0	4.0	6.0	
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		None		Max	Max	None	Max	
Act Effct Green (s)	17.5	17.5	17.5	6.0		6.0		88.8	88.8	95.4	93.4	
Actuated g/C Ratio	0.13	0.13	0.13	0.05		0.05		0.67	0.67	0.72	0.71	
v/c Ratio	0.72	0.72	0.56	0.48		0.08		0.40	0.04	0.11	0.78	
Control Delay	74.4	74.1	29.5	84.1		0.9		11.7	0.1	7.8	16.1	
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	74.4	74.1	29.5	84.1		0.9		11.7	0.1	7.8	16.1	
LOS	E	E	C	F		A		B	A	A	B	
Approach Delay		58.7			63.3			11.4			16.0	
Approach LOS		E			E			B			B	
Queue Length 50th (m)	42.0	42.5	15.6	10.4		0.0		63.7	0.0	2.1	169.5	
Queue Length 95th (m)	66.8	67.3	38.4	#25.1		0.0		81.5	0.0	5.6	212.4	
Internal Link Dist (m)		244.2			122.8			126.8			107.9	
Turn Bay Length (m)			80.0						25.0	50.0		
Base Capacity (vph)	283	287	360	81		169		3385	1108	255	3527	
Starvation Cap Reductn	0	0	0	0		0		0	0	0	0	
Spillback Cap Reductn	0	0	0	0		0		0	0	0	0	
Storage Cap Reductn	0	0	0	0		0		0	0	0	0	
Reduced v/c Ratio	0.54	0.54	0.46	0.48		0.08		0.40	0.04	0.11	0.78	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 132.3
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 19.5
 Intersection Capacity Utilization 74.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
 09-20-2019

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

 Ø1  Ø2	 Ø4  Ø8
8 s  91 s	29 s  12 s
 Ø6 99 s 	

Lanes, Volumes, Timings
8: Bronte Rd & Station RIRO Access

AM Peak Period
09-20-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↑↑↑	↘		↑↑↑
Traffic Volume (vph)	0	1	1765	24	0	2679
Future Volume (vph)	0	1	1765	24	0	2679
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1629	5142	1601	0	5142
Flt Permitted						
Satd. Flow (perm)	0	1629	5142	1601	0	5142
Link Speed (k/h)	48		70			70
Link Distance (m)	151.8		780.4			150.8
Travel Time (s)	11.4		40.1			7.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1	1918	26	0	2912
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1	1918	26	0	2912
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.1%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	342	1580	557	205	786	277	462	1113	160	306	1311	176
Future Volume (vph)	342	1580	557	205	786	277	462	1113	160	306	1311	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		0.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.91	0.91	0.97	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor									0.99	1.00		
Frt			0.850		0.961				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	5542	1541	1521	4585	0	3404	4995	1408	1738	4948	1408
Flt Permitted	0.137			0.111			0.950			0.126		
Satd. Flow (perm)	251	5542	1541	178	4585	0	3404	4995	1388	230	4948	1408
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			263		76				127			150
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		240.8			245.2			173.6			441.7	
Travel Time (s)		14.4			14.7			8.9			22.7	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	4%	6%	20%	12%	4%	4%	5%	16%	5%	6%	16%
Adj. Flow (vph)	342	1580	557	205	786	277	462	1113	160	306	1311	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	342	1580	557	205	1063	0	462	1113	160	306	1311	176
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6					4	8		8
Detector Phase	5	2	2	1	6		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0		14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	17.0	45.0	45.0	15.0	43.0		17.0	43.0	43.0	17.0	43.0	43.0
Total Split (%)	14.2%	37.5%	37.5%	12.5%	35.8%		14.2%	35.8%	35.8%	14.2%	35.8%	35.8%
Maximum Green (s)	13.0	38.0	38.0	11.0	36.0		13.0	36.0	36.0	13.0	36.0	36.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	0.0	0.0	0.0	0.0		-1.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	4.0	7.0		3.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0			29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	56.4	38.0	38.0	50.4	36.0		14.0	35.6	35.6	53.6	35.6	35.6
Actuated g/C Ratio	0.47	0.32	0.32	0.42	0.30		0.12	0.30	0.30	0.45	0.30	0.30
v/c Ratio	1.16	0.90	0.84	1.01	0.74		1.16	0.75	0.32	1.10	0.89	0.34
Control Delay	129.4	47.4	32.1	98.7	38.8		144.3	41.9	10.6	112.5	49.2	9.3
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	129.4	47.4	32.1	98.7	38.8		144.3	41.9	10.6	112.5	49.2	9.3
LOS	F	D	C	F	D		F	D	B	F	D	A
Approach Delay		55.3			48.5			66.3			56.1	
Approach LOS		E			D			E			E	
Queue Length 50th (m)	~74.6	118.2	68.7	~37.5	77.0		~66.5	86.3	5.6	~62.3	107.6	4.4
Queue Length 95th (m)	#132.4	136.1	#130.7	#85.4	93.6		#98.8	103.1	22.1	#118.1	126.6	21.2
Internal Link Dist (m)		216.8			221.2			149.6			417.7	
Turn Bay Length (m)	80.0		75.0	115.0			110.0		50.0	180.0		65.0
Base Capacity (vph)	295	1754	667	202	1428		397	1498	505	278	1484	527
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.16	0.90	0.84	1.01	0.74		1.16	0.74	0.32	1.10	0.88	0.33

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 14.4 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 125
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.16
 Intersection Signal Delay: 56.9
 Intersection LOS: E

Intersection Capacity Utilization 99.2% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

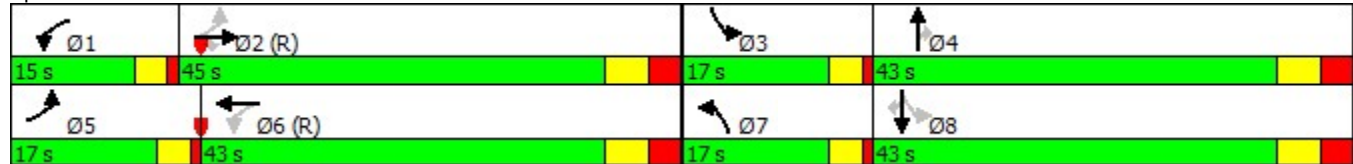
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.





















Queue shown is maximum after two cycles.

Splits and Phases: 10: Bronte Rd & Dundas St W



Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

PM Peak Period
09-20-2019











												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	0	30	23	3	10	150	2274	31	6	1286	48
Future Volume (vph)	12	0	30	23	3	10	150	2274	31	6	1286	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.903			0.962			0.998			0.995	
Flt Protected		0.986			0.969		0.950			0.950		
Satd. Flow (prot)	0	1607	0	0	1791	0	1706	5033	0	1521	4973	0
Flt Permitted		0.986			0.969		0.950			0.950		
Satd. Flow (perm)	0	1607	0	0	1791	0	1706	5033	0	1521	4973	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	9%	0%	0%	0%	7%	4%	4%	20%	5%	3%
Adj. Flow (vph)	13	0	33	25	3	11	163	2472	34	7	1398	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	46	0	0	39	0	163	2506	0	7	1450	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.1%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	349	157	2309	0	0	1357
Future Volume (vph)	349	157	2309	0	0	1357
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1772	1585	5092	0	0	4995
Flt Permitted	0.950					
Satd. Flow (perm)	1772	1585	5092	0	0	4995
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		3				
Link Speed (k/h)	60		80			80
Link Distance (m)	298.6		50.4			415.7
Travel Time (s)	17.9		2.3			18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	0%	0%	5%
Adj. Flow (vph)	379	171	2510	0	0	1475
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	171	2510	0	0	1475
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	6.0	6.0	20.0			20.0
Minimum Split (s)	12.0	12.0	26.0			26.0
Total Split (s)	50.0	50.0	90.0			90.0
Total Split (%)	35.7%	35.7%	64.3%			64.3%
Maximum Green (s)	44.0	44.0	84.0			84.0
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0	6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	Max	Max	Max			Max
Act Effct Green (s)	44.0	44.0	84.0			84.0
Actuated g/C Ratio	0.31	0.31	0.60			0.60
v/c Ratio	0.68	0.34	0.82			0.49
Control Delay	49.2	38.6	25.0			16.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	49.2	38.6	25.0			16.6
LOS	D	D	C			B
Approach Delay	45.9		25.0			16.6
Approach LOS	D		C			B
Queue Length 50th (m)	91.7	35.8	191.4			80.9
Queue Length 95th (m)	127.6	56.2	211.2			92.4
Internal Link Dist (m)	274.6		26.4			391.7
Turn Bay Length (m)		100.0				
Base Capacity (vph)	556	500	3055			2997
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.68	0.34	0.82			0.49

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 24.8
 Intersection Capacity Utilization 73.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 2: Hwy 407 WB Off-Ramp & Bronte Rd



Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	12	57	74	0	35	0	2395	18	10	1468	0
Future Volume (vph)	153	12	57	74	0	35	0	2395	18	10	1468	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		80.0	0.0		0.0	0.0		25.0	50.0		0.0
Storage Lanes	1		1	1		1	0		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			
Flt Protected	0.950	0.959		0.950						0.950		
Satd. Flow (prot)	1605	1634	1633	1789	0	1601	0	5092	1601	1789	5043	0
Flt Permitted	0.950	0.959		0.950						0.044		
Satd. Flow (perm)	1605	1634	1633	1789	0	1601	0	5092	1601	83	5043	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			101			101			
Link Speed (k/h)		60			48			70			70	
Link Distance (m)		268.0			138.9			156.7			125.6	
Travel Time (s)		16.1			10.4			8.1			6.5	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	2%	0%	2%	2%	2%	0%	3%	2%	2%	4%	0%
Adj. Flow (vph)	166	13	62	80	0	38	0	2603	20	11	1596	0
Shared Lane Traffic (%)	46%											
Lane Group Flow (vph)	90	89	62	80	0	38	0	2603	20	11	1596	0
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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			1.6			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1		1		2	1	1		2
Detector Template	Left	Thru	Right	Left		Right		Thru	Right	Left		Thru
Leading Detector (m)	6.1	30.5	6.1	6.1		6.1		30.5	6.1	6.1		30.5
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	6.1		6.1		1.8	6.1	6.1		1.8
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
Detector 2 Size(m)		1.8						1.8				1.8
Detector 2 Type		Cl+Ex						Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0				0.0

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

PM Peak Period
09-20-2019








Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA	Perm	Prot		Perm		NA	Perm	pm+pt	NA	
Protected Phases	4	4		8				2		1	6	
Permitted Phases			4			8			2	6		
Detector Phase	4	4	4	8		8		2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	5.0		5.0		20.0	20.0	4.0	20.0	
Minimum Split (s)	12.0	12.0	12.0	24.0		24.0		26.0	26.0	8.0	26.0	
Total Split (s)	20.0	20.0	20.0	24.0		24.0		88.0	88.0	8.0	96.0	
Total Split (%)	14.3%	14.3%	14.3%	17.1%		17.1%		62.9%	62.9%	5.7%	68.6%	
Maximum Green (s)	14.0	14.0	14.0	18.0		18.0		82.0	82.0	4.0	90.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0		2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0		6.0	6.0	4.0	6.0	
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		None		Max	Max	None	Max	
Walk Time (s)				7.0		7.0						
Flash Dont Walk (s)				11.0		11.0						
Pedestrian Calls (#/hr)				0		0						
Act Effct Green (s)	11.7	11.7	11.7	11.2		11.2		87.1	87.1	92.1	90.1	
Actuated g/C Ratio	0.09	0.09	0.09	0.09		0.09		0.66	0.66	0.70	0.69	
v/c Ratio	0.63	0.61	0.26	0.53		0.17		0.77	0.02	0.10	0.46	
Control Delay	78.2	76.5	5.1	70.3		1.6		18.7	0.1	9.0	10.3	
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	78.2	76.5	5.1	70.3		1.6		18.7	0.1	9.0	10.3	
LOS	E	E	A	E		A		B	A	A	B	
Approach Delay		58.7			48.2			18.5				10.3
Approach LOS		E			D			B				B
Queue Length 50th (m)	24.0	23.6	0.0	20.3		0.0		148.0	0.0	0.8	64.9	
Queue Length 95th (m)	44.3	43.5	3.5	37.2		0.0		227.1	0.0	3.0	86.1	
Internal Link Dist (m)		244.0			114.9			132.7				101.6
Turn Bay Length (m)			80.0						25.0	50.0		
Base Capacity (vph)	171	174	264	246		307		3384	1097	110	3469	
Starvation Cap Reductn	0	0	0	0		0		0	0	0	0	
Spillback Cap Reductn	0	0	0	0		0		0	0	0	0	
Storage Cap Reductn	0	0	0	0		0		0	0	0	0	
Reduced v/c Ratio	0.53	0.51	0.23	0.33		0.12		0.77	0.02	0.10	0.46	

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	131
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	18.5
Intersection Capacity Utilization	70.4%
Intersection LOS:	B
ICU Level of Service	C

Analysis Period (min) 15

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

 Ø1	 Ø2	 Ø4	 Ø8
8 s	88 s	20 s	24 s
 Ø6			
96 s			

Lanes, Volumes, Timings
8: Bronte Rd & Station RIRO Access

PM Peak Period
09-20-2019



































Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↑↑↑	↗		↓↓↓
Traffic Volume (vph)	0	2	2651	9	0	1540
Future Volume (vph)	0	2	2651	9	0	1540
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1629	5142	1601	0	5142
Flt Permitted						
Satd. Flow (perm)	0	1629	5142	1601	0	5142
Link Speed (k/h)	48		70			70
Link Distance (m)	159.3		767.6			156.7
Travel Time (s)	11.9		39.5			8.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2	2882	10	0	1674
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	2882	10	0	1674
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	61.2%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  			  	
Traffic Volume (vph)	302	1474	242	179	1484	282	797	1937	188	300	879	273
Future Volume (vph)	302	1474	242	179	1484	282	797	1937	188	300	879	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		0.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		0	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	*1.00	0.91	0.97	*1.00	1.00	1.00	0.91	1.00
Ped Bike Factor			0.98	1.00			1.00		0.99	1.00		0.99
Frt			0.850		0.976				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	5092	1585	1674	5461	0	3506	5650	1484	1825	4948	1585
Flt Permitted	0.100			0.108			0.950			0.108		
Satd. Flow (perm)	187	5092	1552	190	5461	0	3503	5650	1462	207	4948	1563
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214		40				109			145
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		376.2			269.7			173.6			441.6	
Travel Time (s)		22.6			16.2			8.9			22.7	
Confl. Peds. (#/hr)			9	9			2		3	3		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	9%	3%	3%	1%	2%	10%	0%	6%	3%
Adj. Flow (vph)	302	1474	242	179	1484	282	797	1937	188	300	879	273
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	1474	242	179	1766	0	797	1937	188	300	879	273
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6					4	8		8
Detector Phase	5	2	2	1	6		7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0		10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0		14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	12.0	45.0	45.0	11.0	44.0		21.0	48.0	48.0	16.0	43.0	43.0
Total Split (%)	10.0%	37.5%	37.5%	9.2%	36.7%		17.5%	40.0%	40.0%	13.3%	35.8%	35.8%
Maximum Green (s)	8.0	38.0	38.0	7.0	37.0		17.0	41.0	41.0	12.0	36.0	36.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-2.0	0.0	0.0	0.0	0.0		-2.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	2.0	7.0	7.0	4.0	7.0		2.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0			29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	53.0	38.0	38.0	47.0	37.0		19.0	41.0	41.0	53.0	36.0	36.0
Actuated g/C Ratio	0.44	0.32	0.32	0.39	0.31		0.16	0.34	0.34	0.44	0.30	0.30
v/c Ratio	1.41	0.91	0.38	1.12	1.03		1.44	1.00	0.33	1.13	0.59	0.48
Control Delay	235.9	49.3	7.7	133.4	70.4		243.5	60.9	14.1	124.8	37.7	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	235.9	49.3	7.7	133.4	70.4		243.5	60.9	14.1	124.8	37.7	18.7
LOS	F	D	A	F	E		F	E	B	F	D	B
Approach Delay		72.2			76.2			107.7			52.1	
Approach LOS		E			E			F			D	
Queue Length 50th (m)	~79.1	122.0	4.6	~32.1	~146.5		~131.1	~152.3	12.9	~64.5	64.4	23.4
Queue Length 95th (m)	#134.5	#145.3	23.3	#77.7	#173.9		#168.8	#185.5	31.2	#119.3	78.5	48.7
Internal Link Dist (m)		352.2			245.7			149.6			417.6	
Turn Bay Length (m)	80.0		75.0	115.0			110.0		50.0	180.0		65.0
Base Capacity (vph)	214	1612	637	160	1711		555	1930	571	266	1484	570
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.91	0.38	1.12	1.03		1.44	1.00	0.33	1.13	0.59	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.44
 Intersection Signal Delay: 82.1
 Intersection LOS: F

Intersection Capacity Utilization 124.1% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

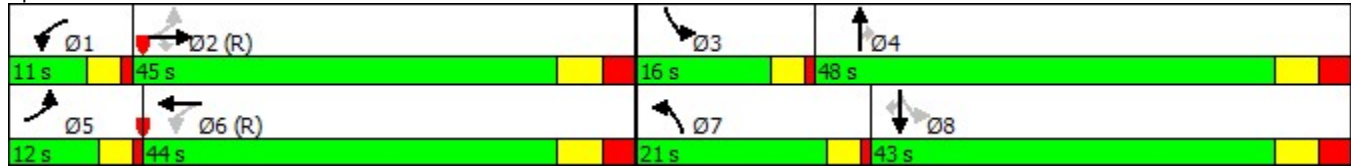
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 10: Bronte Rd & Dundas St W



Appendix D-: Future Improvement Conditions Synchro Output

Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

AM Peak Period
09-20-2019

















Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↕↕		↗	↕↕↕	
Traffic Volume (vph)	14	4	99	5	1	3	12	1464	8	6	2613	9
Future Volume (vph)	14	4	99	5	1	3	12	1464	8	6	2613	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.885			0.955			0.999			0.999	
Flt Protected		0.994			0.973		0.950			0.950		
Satd. Flow (prot)	0	1648	0	0	1397	0	1674	4936	0	1825	4942	0
Flt Permitted		0.994			0.973		0.950			0.950		
Satd. Flow (perm)	0	1648	0	0	1397	0	1674	4936	0	1825	4942	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	3%	50%	0%	0%	9%	6%	33%	0%	6%	14%
Adj. Flow (vph)	15	4	108	5	1	3	13	1591	9	7	2840	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	127	0	0	9	0	13	1600	0	7	2850	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	64.4%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	164	47	1462	0	0	2809
Future Volume (vph)	164	47	1462	0	0	2809
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1674	1512	4948	0	0	4995
Flt Permitted	0.950					
Satd. Flow (perm)	1674	1512	4948	0	0	4995
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		51				
Link Speed (k/h)	60		80			80
Link Distance (m)	298.7		59.2			415.7
Travel Time (s)	17.9		2.7			18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	9%	8%	6%	0%	0%	5%
Adj. Flow (vph)	178	51	1589	0	0	3053
Shared Lane Traffic (%)						
Lane Group Flow (vph)	178	51	1589	0	0	3053
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

AM Peak Period
09-20-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	6.0	6.0	20.0			20.0
Minimum Split (s)	12.0	12.0	26.0			26.0
Total Split (s)	30.0	30.0	110.0			110.0
Total Split (%)	21.4%	21.4%	78.6%			78.6%
Maximum Green (s)	24.0	24.0	104.0			104.0
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0	6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	Max			Max
Act Effct Green (s)	18.9	18.9	104.1			104.1
Actuated g/C Ratio	0.14	0.14	0.77			0.77
v/c Ratio	0.76	0.20	0.42			0.79
Control Delay	76.7	14.5	5.9			11.7
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	76.7	14.5	5.9			11.7
LOS	E	B	A			B
Approach Delay	62.9		5.9			11.7
Approach LOS	E		A			B
Queue Length 50th (m)	46.3	0.0	46.2			155.2
Queue Length 95th (m)	71.5	11.8	61.7			200.4
Internal Link Dist (m)	274.7		35.2			391.7
Turn Bay Length (m)		100.0				
Base Capacity (vph)	297	310	3815			3851
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.60	0.16	0.42			0.79

Intersection Summary























Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 135
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 12.2
 Intersection Capacity Utilization 73.4%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 2: Hwy 407 WB Off-Ramp & Bronte Rd



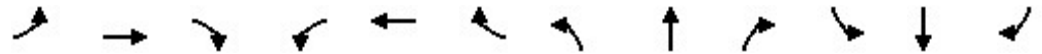
Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	267	18	152	36	0	12	0	1257	38	26	2523	0
Future Volume (vph)	267	18	152	36	0	12	0	1257	38	26	2523	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		80.0	0.0		0.0	0.0		25.0	50.0		0.0
Storage Lanes	1		1	1		1	0		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt			0.850			0.850			0.850			
Flt Protected	0.950	0.958		0.950						0.950		
Satd. Flow (prot)	1620	1644	1585	1789	0	1601	0	5043	1601	1789	4995	0
Flt Permitted	0.950	0.958		0.950						0.155		
Satd. Flow (perm)	1620	1644	1585	1789	0	1601	0	5043	1601	292	4995	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			101			101			
Link Speed (k/h)		60			48			70			70	
Link Distance (m)		268.2			146.8			150.8			131.9	
Travel Time (s)		16.1			11.0			7.8			6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	2%	3%	2%	2%	2%	0%	4%	2%	2%	5%	0%
Adj. Flow (vph)	290	20	165	39	0	13	0	1366	41	28	2742	0
Shared Lane Traffic (%)	47%											
Lane Group Flow (vph)	154	156	165	39	0	13	0	1366	41	28	2742	0
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)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			1.6			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1		1		2	1	1	2	
Detector Template	Left	Thru	Right	Left		Right		Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1		6.1		30.5	6.1	6.1	30.5	
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	6.1		6.1		1.8	6.1	6.1	1.8	
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	
Detector 2 Size(m)		1.8						1.8			1.8	
Detector 2 Type		Cl+Ex						Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0			0.0	
Turn Type	Split	NA	Perm	Prot		Perm		NA	Perm	pm+pt	NA	
Protected Phases	4	4		8				2		1	6	

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8			2	6		
Detector Phase	4	4	4	8		8		2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	6.0		6.0		20.0	20.0	4.0	20.0	
Minimum Split (s)	12.0	12.0	12.0	12.0		12.0		26.0	26.0	8.0	26.0	
Total Split (s)	29.0	29.0	29.0	12.0		12.0		91.0	91.0	8.0	99.0	
Total Split (%)	20.7%	20.7%	20.7%	8.6%		8.6%		65.0%	65.0%	5.7%	70.7%	
Maximum Green (s)	23.0	23.0	23.0	6.0		6.0		85.0	85.0	4.0	93.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0		2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0		6.0	6.0	4.0	6.0	
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		None		Max	Max	None	Max	
Act Effct Green (s)	17.5	17.5	17.5	6.0		6.0		88.8	88.8	95.4	93.4	
Actuated g/C Ratio	0.13	0.13	0.13	0.05		0.05		0.67	0.67	0.72	0.71	
v/c Ratio	0.72	0.72	0.56	0.48		0.08		0.40	0.04	0.11	0.78	
Control Delay	74.4	74.1	29.5	84.1		0.9		11.7	0.1	7.8	16.1	
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	74.4	74.1	29.5	84.1		0.9		11.7	0.1	7.8	16.1	
LOS	E	E	C	F		A		B	A	A	B	
Approach Delay		58.7			63.3			11.4			16.0	
Approach LOS		E			E			B			B	
Queue Length 50th (m)	42.0	42.5	15.6	10.4		0.0		63.7	0.0	2.1	169.5	
Queue Length 95th (m)	66.8	67.3	38.4	#25.1		0.0		81.5	0.0	5.6	212.4	
Internal Link Dist (m)		244.2			122.8			126.8			107.9	
Turn Bay Length (m)			80.0						25.0	50.0		
Base Capacity (vph)	283	287	360	81		169		3385	1108	255	3527	
Starvation Cap Reductn	0	0	0	0		0		0	0	0	0	
Spillback Cap Reductn	0	0	0	0		0		0	0	0	0	
Storage Cap Reductn	0	0	0	0		0		0	0	0	0	
Reduced v/c Ratio	0.54	0.54	0.46	0.48		0.08		0.40	0.04	0.11	0.78	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 132.3
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 19.5
 Intersection LOS: B
 Intersection Capacity Utilization 74.8%
 ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

AM Peak Period
 09-20-2019

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

 Ø1	 Ø2	 Ø4	 Ø8
8 s	91 s	29 s	12 s
 Ø6			
99 s			

Lanes, Volumes, Timings
8: Bronte Rd & Station RIRO Access

AM Peak Period
09-20-2019


































Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↑↑↑	↗		↑↑↑
Traffic Volume (vph)	0	1	1765	24	0	2679
Future Volume (vph)	0	1	1765	24	0	2679
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1629	5142	1601	0	5142
Flt Permitted						
Satd. Flow (perm)	0	1629	5142	1601	0	5142
Link Speed (k/h)	48		70			70
Link Distance (m)	151.8		780.4			150.8
Travel Time (s)	11.4		40.1			7.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1	1918	26	0	2912
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1	1918	26	0	2912
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.1%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  		  	 	
Traffic Volume (vph)	342	1580	557	205	786	277	462	1113	160	306	1311	176
Future Volume (vph)	342	1580	557	205	786	277	462	1113	160	306	1311	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		75.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor									0.99	1.00		
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	5542	1541	1521	4683	1570	3404	4995	1408	3372	4948	1408
Fl _t Permitted	0.259			0.111			0.950			0.950		
Satd. Flow (perm)	474	5542	1541	178	4683	1570	3404	4995	1388	3371	4948	1408
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			289			277			127			150
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		240.8			245.2			173.6			441.7	
Travel Time (s)		14.4			14.7			8.9			22.7	
Confl. Peds. (#/hr)									2	2		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	4%	6%	20%	12%	4%	4%	5%	16%	5%	6%	16%
Adj. Flow (vph)	342	1580	557	205	786	277	462	1113	160	306	1311	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	342	1580	557	205	786	277	462	1113	160	306	1311	176
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0	43.0	14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	15.0	43.0	43.0	15.0	43.0	43.0	19.0	43.0	43.0	19.0	43.0	43.0
Total Split (%)	12.5%	35.8%	35.8%	12.5%	35.8%	35.8%	15.8%	35.8%	35.8%	15.8%	35.8%	35.8%
Maximum Green (s)	11.0	36.0	36.0	11.0	36.0	36.0	15.0	36.0	36.0	15.0	36.0	36.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-1.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	3.0	7.0	7.0	4.0	7.0	7.0	3.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0	29.0		29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	52.4	36.0	36.0	50.4	36.0	36.0	16.0	36.4	36.4	15.2	35.6	35.6
Actuated g/C Ratio	0.44	0.30	0.30	0.42	0.30	0.30	0.13	0.30	0.30	0.13	0.30	0.30
v/c Ratio	1.02	0.95	0.84	1.01	0.56	0.42	1.02	0.73	0.31	0.72	0.89	0.34
Control Delay	81.0	54.5	31.1	98.4	37.2	5.7	98.7	41.0	10.5	60.3	49.2	9.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.0	54.5	31.1	98.4	37.2	5.7	98.7	41.0	10.5	60.3	49.2	9.3
LOS	F	D	C	F	D	A	F	D	B	E	D	A
Approach Delay		52.9			40.2			53.6			47.2	
Approach LOS		D			D			D			D	
Queue Length 50th (m)	~56.0	121.3	63.4	~37.5	56.9	0.0	~58.1	86.3	5.6	35.8	107.6	4.4
Queue Length 95th (m)	#102.4	#149.0	#125.7	#85.4	70.4	18.9	#91.7	103.1	22.1	50.9	126.6	21.2
Internal Link Dist (m)		216.8			221.2			149.6			417.7	
Turn Bay Length (m)	80.0		75.0	115.0		75.0	110.0		50.0	180.0		65.0
Base Capacity (vph)	336	1662	664	202	1404	664	453	1515	509	449	1484	527
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.95	0.84	1.01	0.56	0.42	1.02	0.73	0.31	0.68	0.88	0.33

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 14.4 (12%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 49.4
 Intersection LOS: D

Intersection Capacity Utilization 98.7% ICU Level of Service F

Analysis Period (min) 15

* User Entered Value

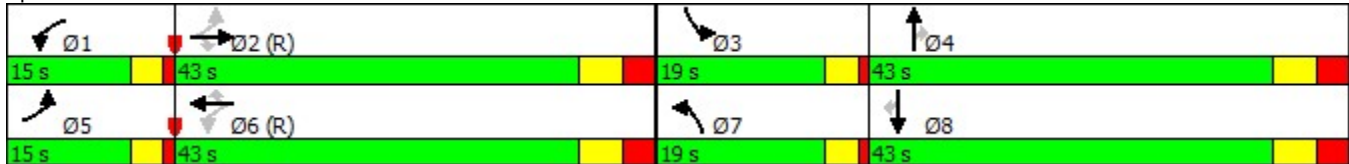
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.





















Queue shown is maximum after two cycles.

Splits and Phases: 10: Bronte Rd & Dundas St W



Lanes, Volumes, Timings
1: Bronte Rd & Burnhamthorpe Rd

PM Peak Period
09-20-2019











												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	0	30	23	3	10	150	2274	31	6	1286	48
Future Volume (vph)	12	0	30	23	3	10	150	2274	31	6	1286	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.903			0.962			0.998			0.995	
Flt Protected		0.986			0.969		0.950			0.950		
Satd. Flow (prot)	0	1607	0	0	1791	0	1706	5033	0	1521	4973	0
Flt Permitted		0.986			0.969		0.950			0.950		
Satd. Flow (perm)	0	1607	0	0	1791	0	1706	5033	0	1521	4973	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		106.3			132.2			415.7			137.7	
Travel Time (s)		8.0			9.9			31.2			10.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	9%	0%	0%	0%	7%	4%	4%	20%	5%	3%
Adj. Flow (vph)	13	0	33	25	3	11	163	2472	34	7	1398	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	46	0	0	39	0	163	2506	0	7	1450	0
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)		0.0			0.0			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.1%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	349	157	2309	0	0	1357
Future Volume (vph)	349	157	2309	0	0	1357
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1772	1585	5092	0	0	4995
Flt Permitted	0.950					
Satd. Flow (perm)	1772	1585	5092	0	0	4995
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		3				
Link Speed (k/h)	60		80			80
Link Distance (m)	298.6		50.4			415.7
Travel Time (s)	17.9		2.3			18.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	0%	0%	5%
Adj. Flow (vph)	379	171	2510	0	0	1475
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	171	2510	0	0	1475
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	8		2			6

Lanes, Volumes, Timings
2: Hwy 407 WB Off-Ramp & Bronte Rd

PM Peak Period
09-20-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		8				
Detector Phase	8	8	2			6
Switch Phase						
Minimum Initial (s)	6.0	6.0	20.0			20.0
Minimum Split (s)	12.0	12.0	26.0			26.0
Total Split (s)	50.0	50.0	90.0			90.0
Total Split (%)	35.7%	35.7%	64.3%			64.3%
Maximum Green (s)	44.0	44.0	84.0			84.0
Yellow Time (s)	4.0	4.0	4.0			4.0
All-Red Time (s)	2.0	2.0	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	6.0	6.0	6.0			6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	Max	Max	Max			Max
Act Effct Green (s)	44.0	44.0	84.0			84.0
Actuated g/C Ratio	0.31	0.31	0.60			0.60
v/c Ratio	0.68	0.34	0.82			0.49
Control Delay	49.2	38.6	25.0			16.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	49.2	38.6	25.0			16.6
LOS	D	D	C			B
Approach Delay	45.9		25.0			16.6
Approach LOS	D		C			B
Queue Length 50th (m)	91.7	35.8	191.4			80.9
Queue Length 95th (m)	127.6	56.2	211.2			92.4
Internal Link Dist (m)	274.6		26.4			391.7
Turn Bay Length (m)		100.0				
Base Capacity (vph)	556	500	3055			2997
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.68	0.34	0.82			0.49

Intersection Summary

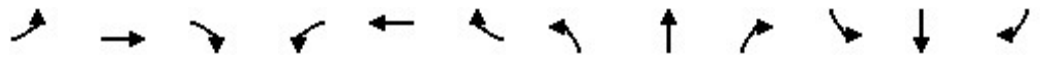
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 24.8
 Intersection Capacity Utilization 73.9%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 2: Hwy 407 WB Off-Ramp & Bronte Rd



Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	153	12	57	74	0	35	0	2395	18	10	1468	0
Future Volume (vph)	153	12	57	74	0	35	0	2395	18	10	1468	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		80.0	0.0		0.0	0.0		25.0	50.0		0.0
Storage Lanes	1		1	1		1	0		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor												
Frt			0.850			0.850			0.850			
Flt Protected	0.950	0.959		0.950						0.950		
Satd. Flow (prot)	1605	1634	1633	1789	0	1601	0	5092	1601	1789	5043	0
Flt Permitted	0.950	0.959		0.950						0.044		
Satd. Flow (perm)	1605	1634	1633	1789	0	1601	0	5092	1601	83	5043	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			101			101			101			
Link Speed (k/h)		60			48			70				70
Link Distance (m)		268.0			138.9			156.7				125.6
Travel Time (s)		16.1			10.4			8.1				6.5
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	2%	0%	2%	2%	2%	0%	3%	2%	2%	4%	0%
Adj. Flow (vph)	166	13	62	80	0	38	0	2603	20	11	1596	0
Shared Lane Traffic (%)	46%											
Lane Group Flow (vph)	90	89	62	80	0	38	0	2603	20	11	1596	0
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)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.9			1.6			4.9				4.9
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1		1		2	1	1		2
Detector Template	Left	Thru	Right	Left		Right		Thru	Right	Left		Thru
Leading Detector (m)	6.1	30.5	6.1	6.1		6.1		30.5	6.1	6.1		30.5
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	6.1		6.1		1.8	6.1	6.1		1.8
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
Detector 2 Size(m)		1.8						1.8				1.8
Detector 2 Type		Cl+Ex						Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0						0.0				0.0

Lanes, Volumes, Timings
7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

PM Peak Period
09-20-2019







Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Split	NA	Perm	Prot		Perm		NA	Perm	pm+pt	NA	
Protected Phases	4	4		8				2		1	6	
Permitted Phases			4			8			2	6		
Detector Phase	4	4	4	8		8		2	2	1	6	
Switch Phase												
Minimum Initial (s)	6.0	6.0	6.0	5.0		5.0		20.0	20.0	4.0	20.0	
Minimum Split (s)	12.0	12.0	12.0	24.0		24.0		26.0	26.0	8.0	26.0	
Total Split (s)	20.0	20.0	20.0	24.0		24.0		88.0	88.0	8.0	96.0	
Total Split (%)	14.3%	14.3%	14.3%	17.1%		17.1%		62.9%	62.9%	5.7%	68.6%	
Maximum Green (s)	14.0	14.0	14.0	18.0		18.0		82.0	82.0	4.0	90.0	
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0		2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0		6.0		6.0	6.0	4.0	6.0	
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		None		Max	Max	None	Max	
Walk Time (s)				7.0		7.0						
Flash Dont Walk (s)				11.0		11.0						
Pedestrian Calls (#/hr)				0		0						
Act Effct Green (s)	11.7	11.7	11.7	11.2		11.2		87.1	87.1	92.1	90.1	
Actuated g/C Ratio	0.09	0.09	0.09	0.09		0.09		0.66	0.66	0.70	0.69	
v/c Ratio	0.63	0.61	0.26	0.53		0.17		0.77	0.02	0.10	0.46	
Control Delay	78.2	76.5	5.1	70.3		1.6		18.7	0.1	9.0	10.3	
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0	0.0	0.0	0.0	
Total Delay	78.2	76.5	5.1	70.3		1.6		18.7	0.1	9.0	10.3	
LOS	E	E	A	E		A		B	A	A	B	
Approach Delay		58.7				48.2		18.5				10.3
Approach LOS		E				D		B				B
Queue Length 50th (m)	24.0	23.6	0.0	20.3		0.0		148.0	0.0	0.8	64.9	
Queue Length 95th (m)	44.3	43.5	3.5	37.2		0.0		227.1	0.0	3.0	86.1	
Internal Link Dist (m)		244.0				114.9		132.7				101.6
Turn Bay Length (m)			80.0						25.0	50.0		
Base Capacity (vph)	171	174	264	246		307		3384	1097	110	3469	
Starvation Cap Reductn	0	0	0	0		0		0	0	0	0	
Spillback Cap Reductn	0	0	0	0		0		0	0	0	0	
Storage Cap Reductn	0	0	0	0		0		0	0	0	0	
Reduced v/c Ratio	0.53	0.51	0.23	0.33		0.12		0.77	0.02	0.10	0.46	

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	131
Natural Cycle:	100
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	18.5
Intersection Capacity Utilization	70.4%
Intersection LOS:	B
ICU Level of Service	C

Analysis Period (min) 15

Splits and Phases: 7: Bronte Rd & Hwy 407 EB Off-Ramp/Station Access

 Ø1	 Ø2	 Ø4	 Ø8
8 s	88 s	20 s	24 s
 Ø6			
96 s			

Lanes, Volumes, Timings
8: Bronte Rd & Station RIRO Access

PM Peak Period
09-20-2019






































Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↖	↑↑↑	↗		↓↓↓
Traffic Volume (vph)	0	2	2651	9	0	1540
Future Volume (vph)	0	2	2651	9	0	1540
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	0.0	
Storage Lanes	0	1		1	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
Frt		0.865		0.850		
Flt Protected						
Satd. Flow (prot)	0	1629	5142	1601	0	5142
Flt Permitted						
Satd. Flow (perm)	0	1629	5142	1601	0	5142
Link Speed (k/h)	48		70			70
Link Distance (m)	159.3		767.6			156.7
Travel Time (s)	11.9		39.5			8.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2	2882	10	0	1674
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2	2882	10	0	1674
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 61.2% ICU Level of Service B
 Analysis Period (min) 15

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  		 	  		  	  	
Traffic Volume (vph)	302	1474	242	179	1484	282	797	1937	188	300	879	273
Future Volume (vph)	302	1474	242	179	1484	282	797	1937	188	300	879	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		75.0	115.0		75.0	110.0		50.0	180.0		65.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	*1.00	1.00	0.97	*1.00	1.00	0.97	0.91	1.00
Ped Bike Factor			0.98	1.00			1.00		0.99	1.00		0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1772	5092	1585	1674	5595	1585	3506	5650	1484	3541	4948	1585
Fl _t Permitted	0.100			0.108			0.950			0.950		
Satd. Flow (perm)	187	5092	1552	190	5595	1585	3503	5650	1462	3540	4948	1563
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214			200			109			145
Link Speed (k/h)		60			60			70				70
Link Distance (m)		376.2			269.7			173.6				441.6
Travel Time (s)		22.6			16.2			8.9				22.7
Confl. Peds. (#/hr)			9	9			2		3	3		2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	3%	3%	9%	3%	3%	1%	2%	10%	0%	6%	3%
Adj. Flow (vph)	302	1474	242	179	1484	282	797	1937	188	300	879	273
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	1474	242	179	1484	282	797	1937	188	300	879	273
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)		3.7			3.7			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	0	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	0.0	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	0.0	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Bronte Rd & Dundas St W

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	10.0	10.0	10.0	7.0	10.0	10.0
Minimum Split (s)	11.0	43.0	43.0	11.0	43.0	43.0	14.0	43.0	43.0	11.0	43.0	43.0
Total Split (s)	12.0	45.0	45.0	11.0	44.0	44.0	21.0	50.0	50.0	14.0	43.0	43.0
Total Split (%)	10.0%	37.5%	37.5%	9.2%	36.7%	36.7%	17.5%	41.7%	41.7%	11.7%	35.8%	35.8%
Maximum Green (s)	8.0	38.0	38.0	7.0	37.0	37.0	17.0	43.0	43.0	10.0	36.0	36.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	-2.0	0.0	0.0	0.0	0.0	0.0	-2.0	0.0	0.0	-1.0	0.0	0.0
Total Lost Time (s)	2.0	7.0	7.0	4.0	7.0	7.0	2.0	7.0	7.0	3.0	7.0	7.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		29.0	29.0		29.0	29.0		29.0	29.0		29.0	29.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	53.0	38.0	38.0	47.0	37.0	37.0	19.0	43.0	43.0	11.0	36.0	36.0
Actuated g/C Ratio	0.44	0.32	0.32	0.39	0.31	0.31	0.16	0.36	0.36	0.09	0.30	0.30
v/c Ratio	1.41	0.91	0.38	1.12	0.86	0.45	1.44	0.96	0.32	0.93	0.59	0.48
Control Delay	235.9	49.3	7.7	133.4	45.2	12.5	243.5	50.0	13.4	88.6	37.7	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	235.9	49.3	7.7	133.4	45.2	12.5	243.5	50.0	13.4	88.6	37.7	18.7
LOS	F	D	A	F	D	B	F	D	B	F	D	B
Approach Delay		72.2			48.6			100.4			44.7	
Approach LOS		E			D			F			D	
Queue Length 50th (m)	~79.1	122.0	4.6	~32.1	109.5	14.1	~131.1	147.3	12.5	36.7	64.4	23.4
Queue Length 95th (m)	#134.5	#145.3	23.3	#77.7	126.6	37.6	#168.8	#177.8	30.3	#62.5	78.5	48.7
Internal Link Dist (m)		352.2			245.7			149.6			417.6	
Turn Bay Length (m)	80.0		75.0	115.0		75.0	110.0		50.0	180.0		65.0
Base Capacity (vph)	214	1612	637	160	1725	627	555	2024	593	324	1484	570
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.41	0.91	0.38	1.12	0.86	0.45	1.44	0.96	0.32	0.93	0.59	0.48

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	135
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.44
Intersection Signal Delay:	71.8
Intersection LOS:	E

Intersection Capacity Utilization 109.7% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

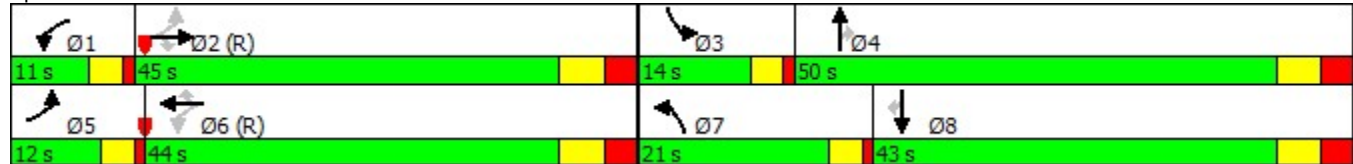
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

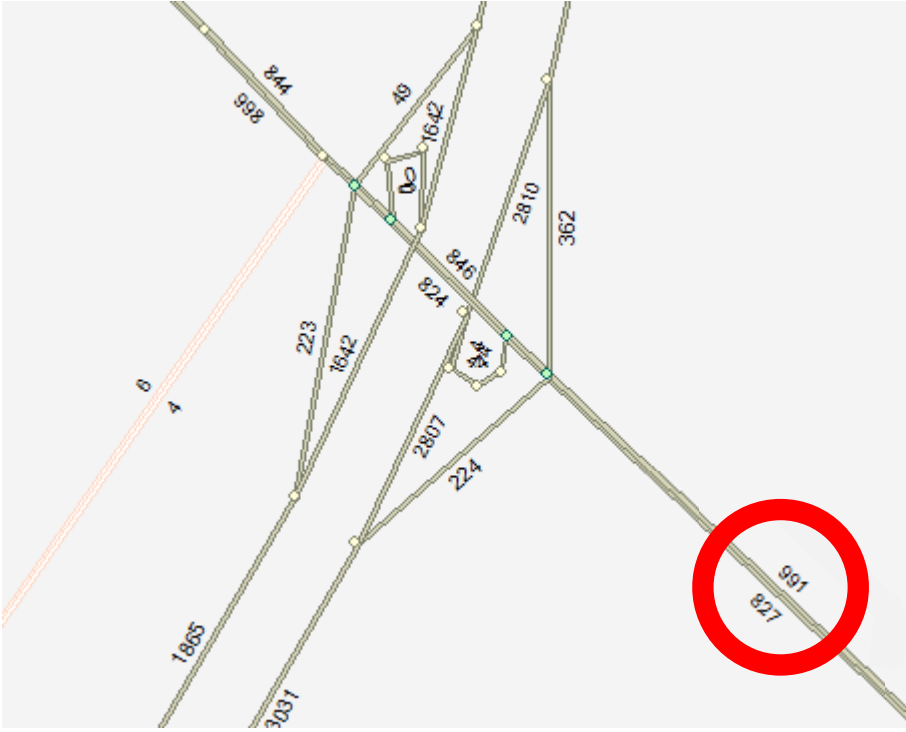
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

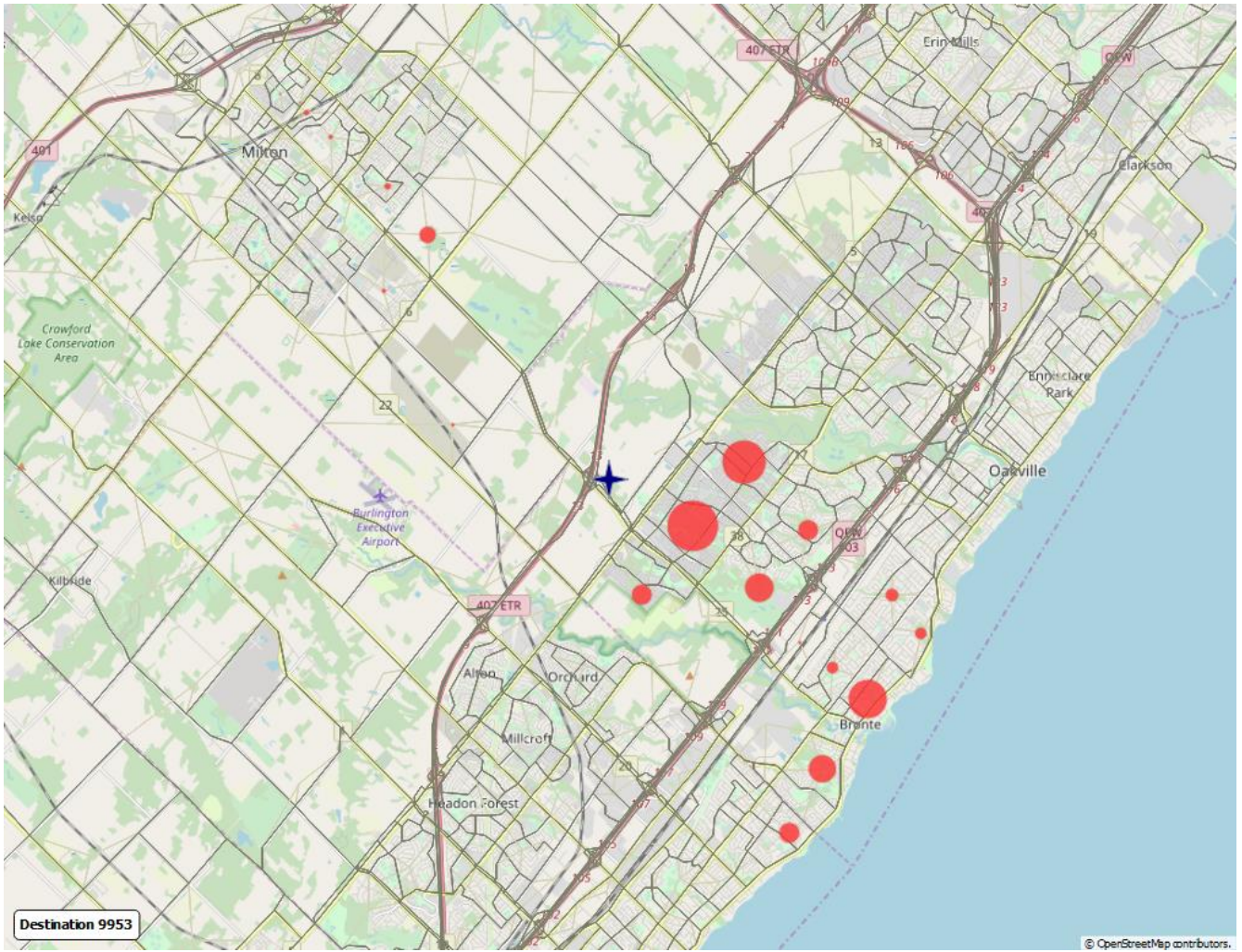
Splits and Phases: 10: Bronte Rd & Dundas St W



Appendix E-: EMME Output









Final Report

Trafalgar Station Traffic Impact Study

Highway 407 Transitway-4



Prepared for Ministry of Transportation, Ontario
by IBI Group
November 15, 2019

Document Control Page

CLIENT:	Ministry of Transportation, Ontario
PROJECT NAME:	Highway 407 Transitway-4
REPORT TITLE:	Trafalgar Station TIS – Draft 2019-09-17
IBI REFERENCE:	109989
VERSION:	2.0
DIGITAL MASTER:	J:\109989_407_TW4\10.0 Reports\Traffic Engineering
ORIGINATOR:	Gary Yeung, Joshua Lee
REVIEWER:	Josh Wilson, Scott Johnston
AUTHORIZATION:	Scott Johnston
CIRCULATION LIST:	
HISTORY:	1.0 Draft 2019-09-17 2.0 Final 2019-11-15

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1 Introduction

This report is a traffic impact study for the proposed 407 Transitway Station located near the interchange of Highway 407 and Trafalgar Road in Oakville, Ontario. This report was prepared as part of the Environmental Assessment of the 407 Transitway, Brant Street to West of Hurontario Street.

The purpose of this report is to provide an assessment of traffic, transit, walking and cycling access to the proposed station. The assessment includes operations analysis and review of local road network configuration to identify needs and opportunities for transportation-related changes and coordination to accommodate the station.

1.1 Transitway Overview

The Highway 407 Transitway is a rapid transit facility planned within the Greater Toronto and Hamilton Area (GTHA). The Transitway will be fully grade-separated with an exclusive right-of-way and will run parallel along the Highway 407 corridor. This Transitway project supports the Province's Growth Plan by meeting increased travel demands through alternative transportation modes, providing increased mobility for a wide variety of users, and supporting transit-oriented development and associated land uses. The Transitway is initially designed to support busway service (BRT) with provisions for future conversion to light-rail transit (LRT) technology.

The section under the current EA spans approximately 43 kilometres from Brant Street in Burlington to west of Hurontario Street (west of proposed Hurontario Station) in Mississauga. This section of the Transitway provides opportunities to connect numerous Urban Growth Centres (e.g. Hamilton, Oakville, Milton and Mississauga City Centres) as well as to a number of higher order transit systems, supporting development within both the Region of Halton and Peel. The transitway is being planned to the 2041 horizon. Traffic analysis is to the 2031 horizon due to uncertainties in development levels and traffic trends beyond 2031.

1.2 Study Area

The proposed station is located west of Trafalgar Road just south of Highway 407 and Trafalgar Road interchange in Oakville as shown in Exhibit 1-1. This location was developed in consultation with the Town of Oakville and accommodates the Transitway alignment south of Highway 407. There currently exists a GO carpool lot located at the proposed station area. The study area includes the following intersections:

- Trafalgar Road & E Lower Base Line (*signalized*);
- Trafalgar Road & Highway 407 WB Off-Ramp / Carpool Lot (*signalized*);
- Trafalgar Road & Highway 407 EB Off-Ramp (*signalized*);
- Trafalgar Road & 407 GO Oakville Carpool Lot Access (*signalized*); and
- Trafalgar Road & Burnhamthorpe Road East (*signalized*).

1.3 Station Plan

The proposed station layout is provided in Exhibit 1-2. The site plan illustrates that the new Transitway station will maintain the existing accesses of the GO carpool lot. Further commentary on station layout and internal circulation is provided in Section 4 of this report.

Exhibit 1-1: Study Area

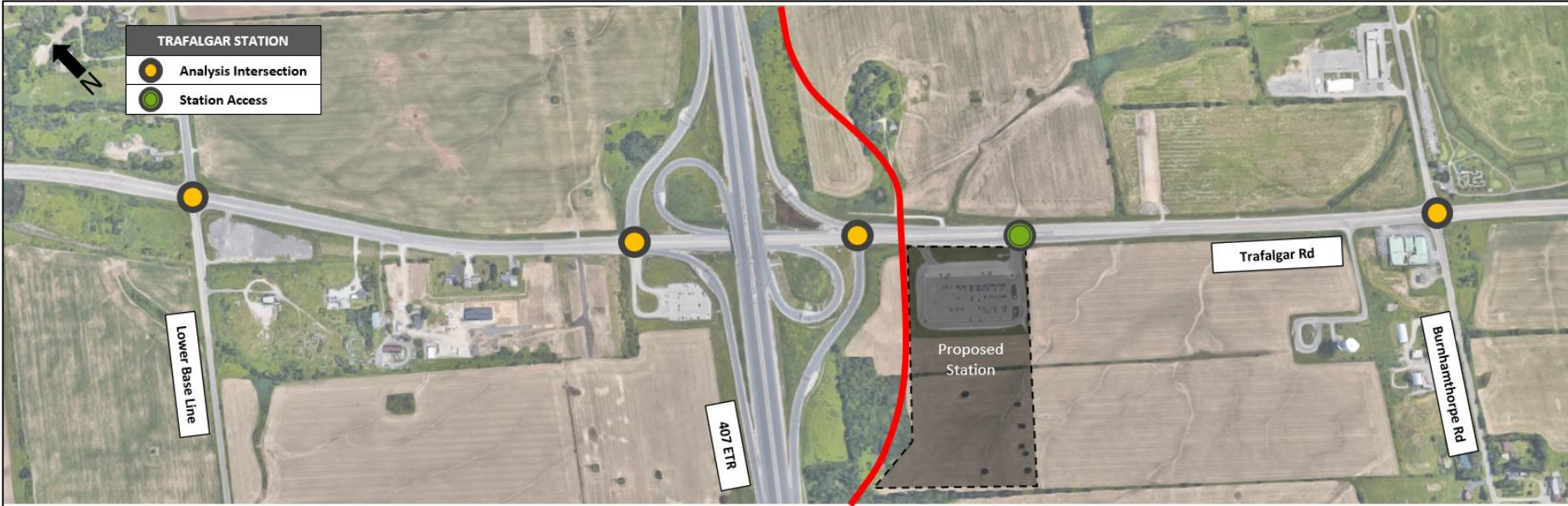
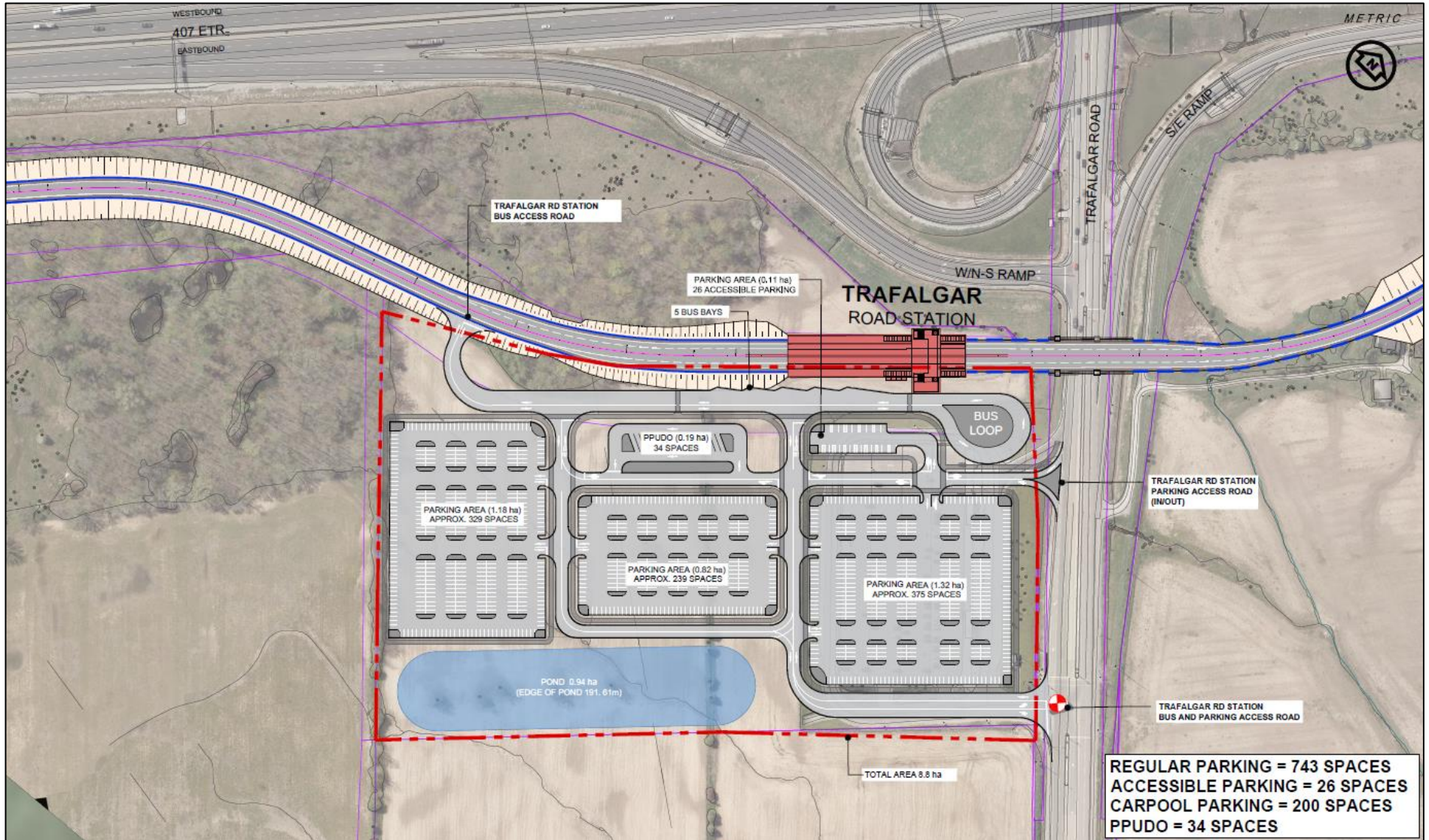


Exhibit 1-2: Proposed Station Layout



2 Existing Conditions

This section documents the existing road network, facilities, and weekday peak hour operations at the studied intersections.

2.1 Road Network

Trafalgar Road is a minor north-south arterial road in Halton Region that starts at Lakeshore Road East and continues north beyond the Halton Region border. Within the study area, Trafalgar Road has four lanes and a posted speed limit of 80 km/h.

Highway 407 is a tolled 400-series highway with a six lane cross section. It connects the City of Burlington to the City of Pickering. 400-series highways have a speed limit of 100 km/h. A full interchange is located at Highway 407 and Trafalgar Road.

East Lower Base Line is a two lane east-west collector road in the Town of Milton. It starts at Sixth Line and ends at Ninth Line to the east. West of Sixth Line, East Lower Base Line continues as Lower Base Line West. East of Ninth Line, East Lower Base Line continues as Eglinton Avenue West. The surrounding land use is currently agricultural with some residential units. East Lower Base Line has a posted speed limit of 70 km/h west of Trafalgar Road and 60 km/h to the east.

Burnhamthorpe Road East spans from the City of Mississauga to the Town of Oakville. Within Halton Region, it is a two lane collector regional road with a posted speed limit of 60 km/h. The surrounding land use is agricultural with some residential units.

2.2 Transit

The Highway 407 Park & Ride lot at Trafalgar Road serves as a transit stop for the following GO Transit routes:

- **GO Route 20 (Milton/Oakville)** connects Milton GO Station with Oakville GO Station with stops at Bronte Road Park & Ride, Trafalgar Road Park & Ride, and Sheridan College. This bus route operates on weekdays only with approximately one hour headways.
- **GO Route 40 (Hamilton/Richmond Hill)** connects Richmond Hill Centre to Hamilton GO Centre with stops at Highway 407 Bus Terminal (Vaughan), Person Airport, Square One Bus Terminal (Mississauga) and Trafalgar Road Park & Ride. Route 40 operates with approximately 30 minute headways during peak hours.
- **GO Route 46 (407 West)** serves between York University (Toronto) to Oakville GO Station with stops at Highway 407 Bus Terminal (Vaughan), Bramalea GO (Brampton), Square One (Mississauga), Trafalgar Road Park & Ride (Oakville), and Sheridan College (Oakville). Route 46 operates with 15 minute headways during peak hours.
- **GO Route 47 (407 West)** serves between York University (Toronto) and Hamilton GO Centre with stops at Highway 407 Bus Terminal (Vaughan), Bramalea GO (Brampton), Square One (Mississauga), Trafalgar Road Park & Ride, McMaster University (Hamilton). Route 47 operates with approximately 15 minute headways at peak hours.

Exhibit 2-1 provides maps for GO Transit routes within the study area.

Exhibit 2-1: GO Transit Routes 20 (top left), 40 (top right), and 46 and 47 (bottom left)



Source: GO Transit Route Maps (2019)

2.3 Active Transportation

There are currently in Active Transportation facilities near the station area; the surrounding area is largely undeveloped rural lands to the north and south with a lack of walkable destinations.

2.4 Traffic Conditions

2.4.1 Traffic Counts & Signal Timing Data

Traffic count data and signal timing information was collected from Halton Region and 407 ETR. All turning movement counts modelled for the purposes of this study were conducted recently (within the past five years) and so should reflect current traffic patterns within the study area. Exhibit 2-2 provides a summary of dates on which this information was collected/recorded.

Exhibit 2-2: Traffic Count and Signal Timing Data

INTERSECTION	CONTROL TYPE	DATE OF TMC	DATE OF SIGNAL DATA
Trafalgar Road & E Lower Base Line	Signalized	2017-06-05	2017-06-03
Trafalgar Road & Highway 407 WB Off-Ramp / Carpool Lot	Signalized	2018-12-06	NA
Trafalgar Road & Highway 407 EB Off-Ramp	Signalized	2018-12-04	NA
Trafalgar Road & 407 GO Oakville Carpool Lot Access	Signalized	2017-06-01	NA
Trafalgar Road & Burnhamthorpe Road East	Signalized	2017-06-26	2018-05-15

2.4.2 Analysis Approach

This study documents existing traffic conditions, and assesses anticipated future conditions by considering background traffic growth and the estimated traffic generated from the proposed Transitway. Traffic analysis was conducted using Synchro (version 9) software and follows Highway Capacity Manual (HCM 2000) methodologies of intersection operation analysis.

All critical movements identified through Synchro analysis are outlined and discussed, as per the following conditions:

For signalized intersections,

- V/C ratios for overall intersection operations, through movements or shared through/turning movements equal 0.80 or above;
- V/C ratios for exclusive movements equal 0.85 or above; or,
- Queues for an individual movement are projected to exceed available turning lane storage.

For unsignalized intersections,

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

Level-of-service (LOS) is a measure of performance based on control delay, defined as follows in Exhibit 2-3.

Exhibit 2-3: Intersection LOS Reference

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The Synchro traffic models were calibrated to better represent measured field conditions. This was accomplished by adjusting the lane utilization factor and via lost time adjustment. The “lane utilization factor” (LUF) was altered when calibrating through movements. This parameter is used to dictate the distribution of traffic across the available lanes, with a value of 1.0 representing a uniform distribution across all lanes. During non-congested periods, there is often more traffic distributed amongst the right-most lanes as compared to the left-most lanes. However, in over-saturated conditions, the distribution of traffic is typically more evenly split, as drivers quickly fill any available gap in traffic.

In existing models, the LUF was adjusted to a value of 1.0 for all through movements initially identified as having a v/c greater than 1.0. These adjustments were then carried forward to their respective movements to the future models (for the same peak period). Additionally, because the above-mentioned driver behaviour is quite predictable, this adjustment was also made to any new critical through movements (having a v/c ratio > 1.0) identified in the future models.

The “lost time adjustment” (LTA) was also altered in order to calibrate left-turn movements. Adjusting this parameter to negative value effectively increases the clearance time available for left-turning traffic to clear the intersection during the amber and/or all-red signal phases.

During oversaturated conditions where left-turn queues are excessively long and/or there are limited gap available in the opposing traffic to make the left-turn (under permissive phasing), drivers are typically more aggressive and willing to turn during the amber/all-red phases.

In existing models, the LTA was changed for all left-turn movements identified as being well over capacity – defined as having a v/c greater than 1.2 – since these turning volumes were explicitly measured in the field. Values were assigned based on the initial v/c ratio for that movement:

- If the v/c ratio was between 1.2 and 1.5, the LTA was set to ‘-1’; and,
- If the v/c ratio exceeded 1.5, the LTA was set to ‘-2’.

Subsequently, all adjustments made to the LTA in the existing models were carried forward to the respective movements in the future models (for the same peak periods). However, because this driving behaviour is believed to be less predictable, no additional LTA changes were made to “new critical left-turn movements (having a v/c ratio > 1.2) identified in the future model, which did not exist previously in the existing models.

2.4.3 Model Calibration

The existing traffic models were calibrated to better reflect measured field conditions accomplished by adjusting the lane utilization factor (LUF) and/or lost time adjustment (LTA) for certain movements.

The adjustments made to the existing models are outlined in Exhibit 2-4.

Exhibit 2-4: Existing Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	(no adjustments)	-	-	-
PM Peak	Trafalgar Road & E Lower Base Line	SBL	LTA	-1 seconds
	Trafalgar Road & Burnhamthorpe Road East	NBL	LTA	-1 seconds

2.4.4 Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the existing conditions. An annual compound growth rate of 1.0% was applied to all count volumes obtained in years prior to 2019 in order to bring all counts to a consistent base year. Existing conditions traffic volumes are shown in Exhibit 2-5.

A summary of the Synchro analysis including delay, v/c, 95th percentile queue lengths and LOS indicators are shown in Exhibit 2-6, with detailed Synchro reports provided in Appendix A. The study intersections are currently operating as follows:

- Trafalgar Road & E Lower Base Line is operating at LOS D during both peak periods. In the morning peak, there are high EBT demands with majority of green time prioritized for N-S movements. The SBL movement is also nearing capacity ($v/c = 0.90$) due to high opposing NBT demands. During the p.m. peak hour, the reverse is shown where there are heavy WBT demands, causing the movement to operate past capacity. The SBL will also experience long delays as there is a lack of protected phasing (i.e. advance left-turn) and minimal gaps from northbound traffic.
- Trafalgar Road at Highway 407 WB Off-Ramp / Carpool Lot access, Highway 407 EB Off-Ramp and 407 GO Oakville Carpool Lot access are all currently operating well at LOS B or better during both peak periods. All N-S movements are operating well with moderate delays experienced by the minor approaches.
- Trafalgar Road & Burnhamthorpe Road East is operating at LOS D and LOS E during the a.m. and p.m. peak hours, respectively. During the a.m. peak, the EBT and its conflicting movement (i.e. WBL) are operating overcapacity ($v/c = 1.05$ & 1.03). Meanwhile, the NBT and SBL movements are approaching capacity, with little room for additional traffic. During the p.m. peak hour, the WBT and NBL movements are overcapacity due to insufficient green time. The SBL movement is operating close to capacity with $v/c = 0.94$.

Exhibit 2-5: Existing Traffic Volumes in the AM (PM) Peak Hour

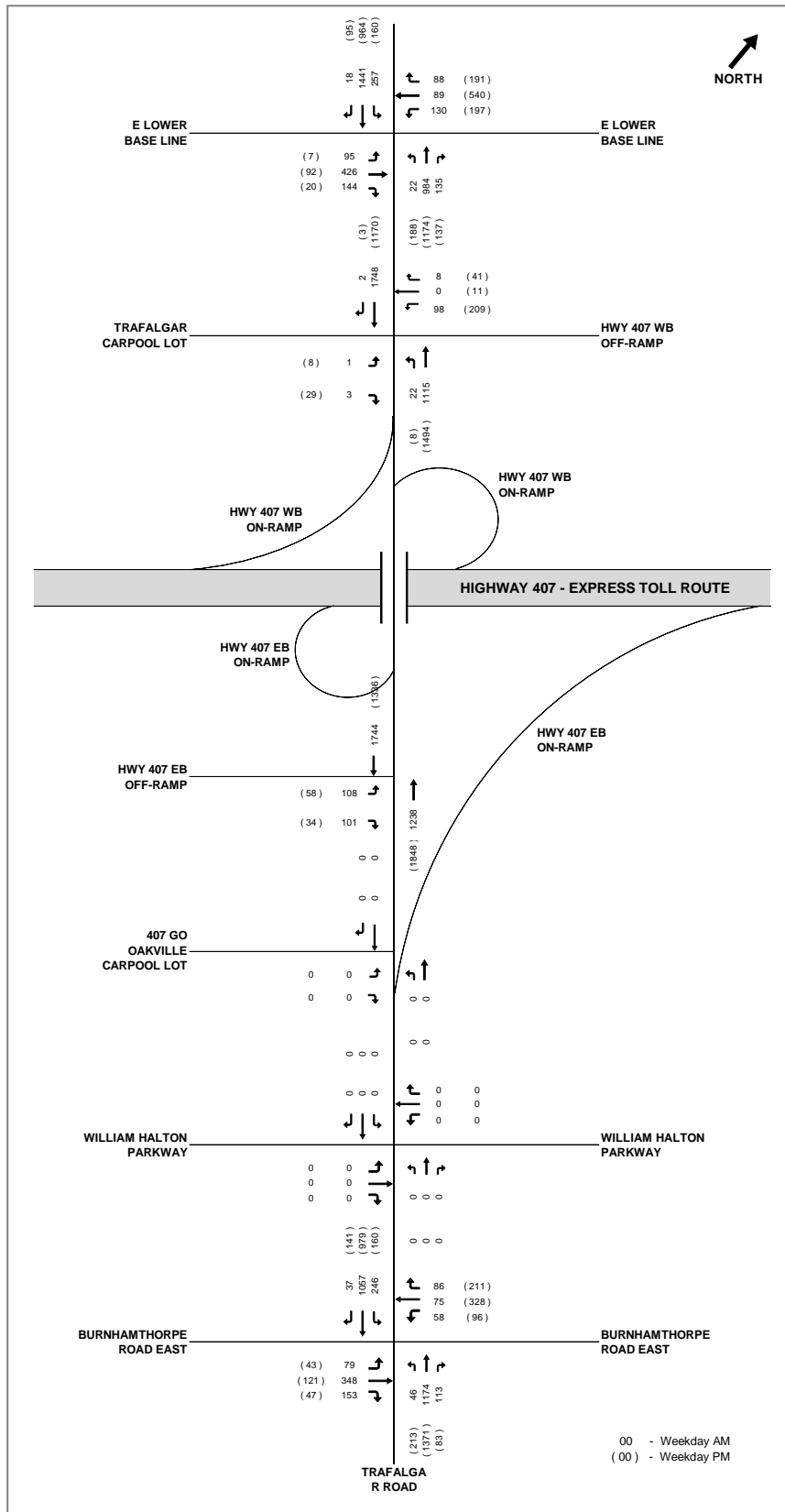


Exhibit 2-6: Synchro Analysis: Existing Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Trafalgar Road & E Lower Base Line <i>(signalized)</i>	D	EBT WBL NBL NBT SBL	E D D D E	0.96 0.77 0.37 0.92 0.90	200 44 13 171 90	D	WBT NBL SBL	F D F	1.12 0.84 1.11	249 77 80
Trafalgar Road & Highway 407 WB Off-Ramp / Carpool Lot Access <i>(signalized)</i>	A	EBLR WBL WBT WBR	D E D D	0.00 0.57 0.05 0.01	- 26 8 -	B	EBLR WBL WBT WBR	D D D D	0.03 0.66 0.68 0.03	2 43 45 2
Trafalgar Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	EBL EBR	D D	0.59 0.49	44 34	A	EBL EBR	D D	0.49 0.03	25 10
Trafalgar Road & 407 GO Oakville Carpool Lot Access <i>(signalized)</i>	A	EBL EBR	E D	0.48 0.02	16 8	A	EBL EBR	D D	0.40 0.03	17 10
Trafalgar Road & William Halton Parkway*	N/a	-	-	-	-	N/a	-	-	-	-
Trafalgar Road & Burnhamthorpe Road East <i>(signalized)</i>	D	EBL EBT WBL NBT SBL	C F F D F	0.28 1.05 1.03 0.93 0.99	30 203 45 221 100	E	EBL EBT WBL WBT NBL SBL	E D D F F E	0.69 0.40 0.41 1.33 1.17 0.94	30 51 36 226 107 62

*William Halton Parkway currently under construction, no TMCs or traffic forecasts available

3 Future Conditions

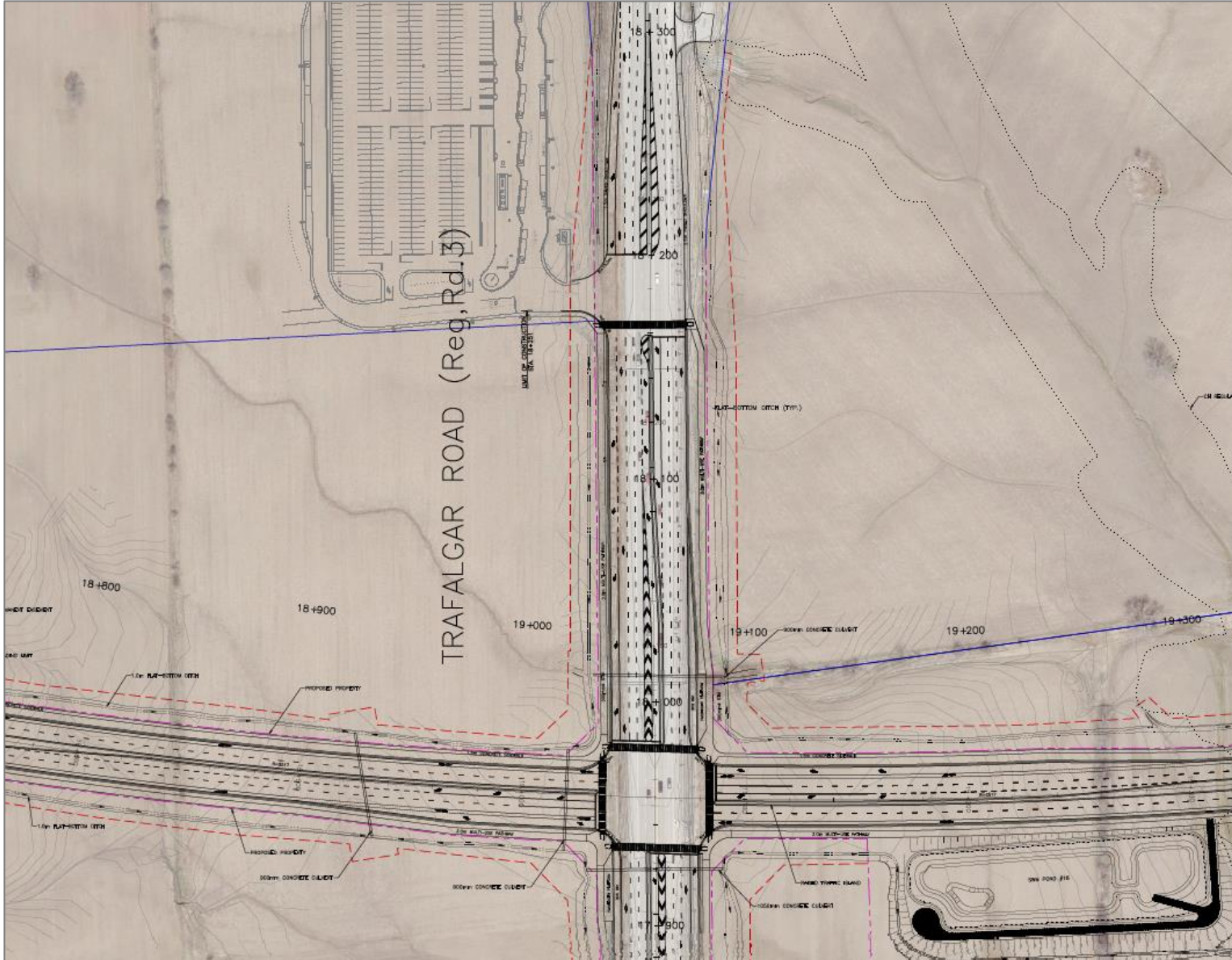
This section documents the future traffic conditions with considerations to background traffic growth and traffic expected to be generated from the Transitway station.

3.1 Future Roadway Network

According to the *Halton Region Budget and Business Plan (2019)*, Trafalgar Road will be widened from four to six lanes of travel in two segments within the study area. From Dundas Street to Highway 407, construction for widening will begin in 2020. From Highway 407 to Britannia Road, construction will begin in 2027. During the development of this report, there are no available studies published. Therefore, it was assumed that future conditions will match the six lane cross section with additional through lanes only and no additional turning lanes.

The future road network will also be affected by the construction of a new 4-lane arterial road intersecting Trafalgar Road within the study area, named William Halton Parkway. Construction between Neyagawa Boulevard and Trafalgar Road is currently underway and is expected to finish in May 2020. This new road will connect to Trafalgar Road midway between the existing signalized 407 GO carpool lot access and Burnhamthorpe Road. The latest available preliminary drawing of this new road is shown below in Exhibit 3-1. Turning movement counts and traffic forecasts were not made available by the Region of Halton and are subject to development levels. Therefore, the analysis was limited to reviewing storage lengths for the NBL turn lane for the proposed station access / existing 407 GO carpool access.

Exhibit 3-1: William Halton Parkway Concept Drawing – Trafalgar Road to Ninth Line



Source: Halton Region Pre-Construction Public Information Centre for William Halton Parkway (January 2016)

3.2 Transit

Trafalgar road has been identified in Halton Region's Transportation Master Plan as a 'Bus Rapid Transit' (BRT) corridor and it is expected that significant improvements will be conducted to accommodate the BRT.

3.3 Active Transportation

The City of Oakville Active Transportation Master Plan has identified Trafalgar Road as a future in boulevard multi-purpose trail. This would connect to the Transitway station to active transportation network in Oakville. There also is a proposed off road trail that would serve as an alternate connection between the Transitway station and William Halton Parkway west of Trafalgar Road.

3.4 Station Traffic

3.4.1 Station Trip Generation

Ridership forecasts were provided by MTO and sourced from MTO's Greater Golden Horseshoe Travel Demand Model V4. The model is an advanced state-of-practice multi-modal travel demand model that estimates future travel demands within the Greater Golden Horseshoe. The GGHM was developed to forecast peak period demand in support of the Growth Plan policies and has the capability of predicting mode shifts resulting from new public transit infrastructure. It can also be used to test network response to changes in link characteristics such as transit vehicle frequency, operating speed, station location, and parking availability.

The GGH model accounts for planned and committed road and transit projects sourced from Metrolinx Regional Transportation Plan and local transportation plans. While it is possible that additional projects will be funded over the upcoming years, this model represents a conservative approach.

With input from the MTO, a horizon year of 2031 was selected as the baseline for determining road and intersection requirements as part of this traffic impact study. As MTO's GGH model is to a 2041 horizon, ridership projections for 2031 were not available. Therefore the 2041 demands were carried forward on the basis that entry and exit volumes would be conservative (the resulting turning lanes and queue storage would accommodate 2031 demand) as provided in Exhibit 3-2.

Exhibit 3-2: 2041 AM Peak (2-hour) Boardings

STATION	TOTAL 2-HR BOARDINGS	2-HR PARK-AND-RIDE	2-HR WALK / TRANSIT	% PARK-AND-RIDE	% WALK / TRANSIT
Dundas	923	510	413	55%	45%
Appleby	227	207	20	91%	9%
Bronte	306	90	216	29%	71%
Trafalgar	3,095	436	2,659	14%	86%
Britannia	523	136	387	26%	74%
Derry	911	334	577	37%	63%
Mississauga	982	82	900	8%	92%
Total:	6,967	1,795	5,172	26%	74%

From the above exhibit, two hour park-and-ride boardings were equated to two hour inbound vehicle trips at an assumed factor of 10:11, or 1.1 riders per park-and-ride vehicle. Two hour inbound vehicle trips were then converted to a.m. peak hour inbound trips using a factor of 0.56, developed through review of existing travel patterns using Transportation Tomorrow Survey (TTS 2016) data. The resulting a.m. peak hour inbound vehicle flow is 221 vph and rounded to 222 vph.

Further processing of forecasts was required to estimate a.m. outbound traffic, associated with kiss-n-ride drop off trips, and p.m. peak hour traffic. The ITE Trip Generation Manual (9th edition) provided ratios of inbound to outbound and a.m. to p.m. traffic for typical park-and-ride bus stations. Average trip generation rates for bus stations with park-and-ride lots are indicated in Exhibit 3-3. Using the ratios provided, Exhibit 3-4 lists the estimated station traffic generated give the above assumptions.

Exhibit 3-3: ITE Trip Generation Rates for Park-and-Ride Lots

LAND USE (CODE)	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		Trip Rate	Inbound / Outbound	Trip Rate	Inbound / Outbound
Park-and-ride with bus service (090)	/ parking space	0.71	79% / 21%	0.62	25% / 75%

Exhibit 3-4: Estimated Vehicle Trips Generated by Station

AM PEAK TRIPS		PM PEAK TRIPS	
Inbound	Outbound	Inbound	Outbound
222*	59	61	184

* Calculated based on forecasted 2031 a.m. park-and-ride 2 hrs boardings, at a factor 1.0 inbound vehicles per 1.1 boardings. To convert to a.m. peak hour trips, a factor of 0.56 was multiplied.

3.4.2 Trip Distribution

A map showing the origin of park-and-ride trips destined to Dundas station was extracted from the 2031 GGHM and can found attached in Appendix E. Using this map, inbound trips were tabulated in terms of general direction of origin (i.e. north, south, east, and west) and assigned to the study area intersections as a percentage of total inbound trips. Distribution of outbound trips was assumed to be the same as inbound trips. Resulting trip assignments are illustrated in Exhibit 3-5. Site generated traffic was assigned to study area intersections and is indicated in Exhibit 3-6.

Exhibit 3-5: Trip Distribution in AM and PM Peak Hours

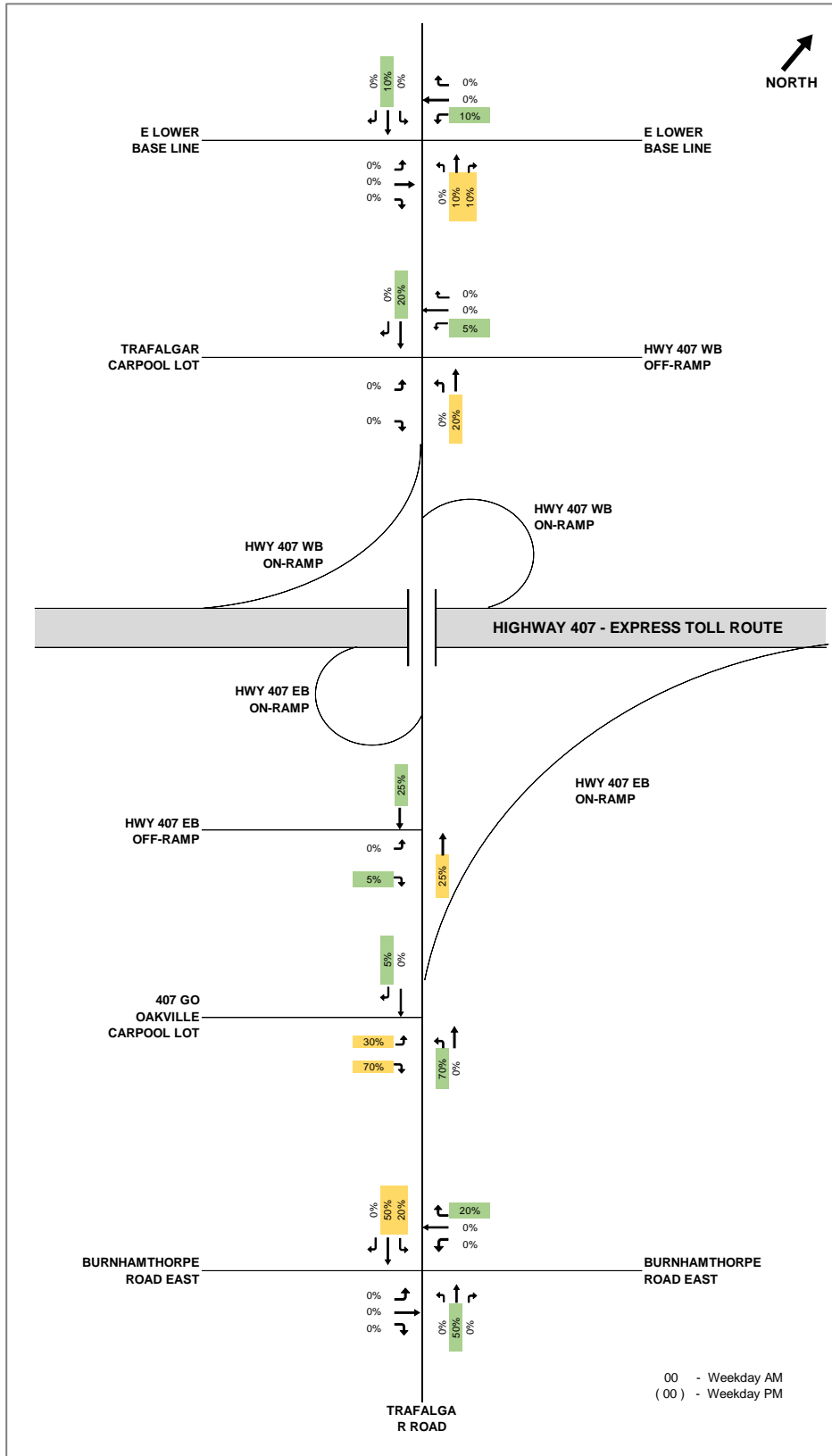
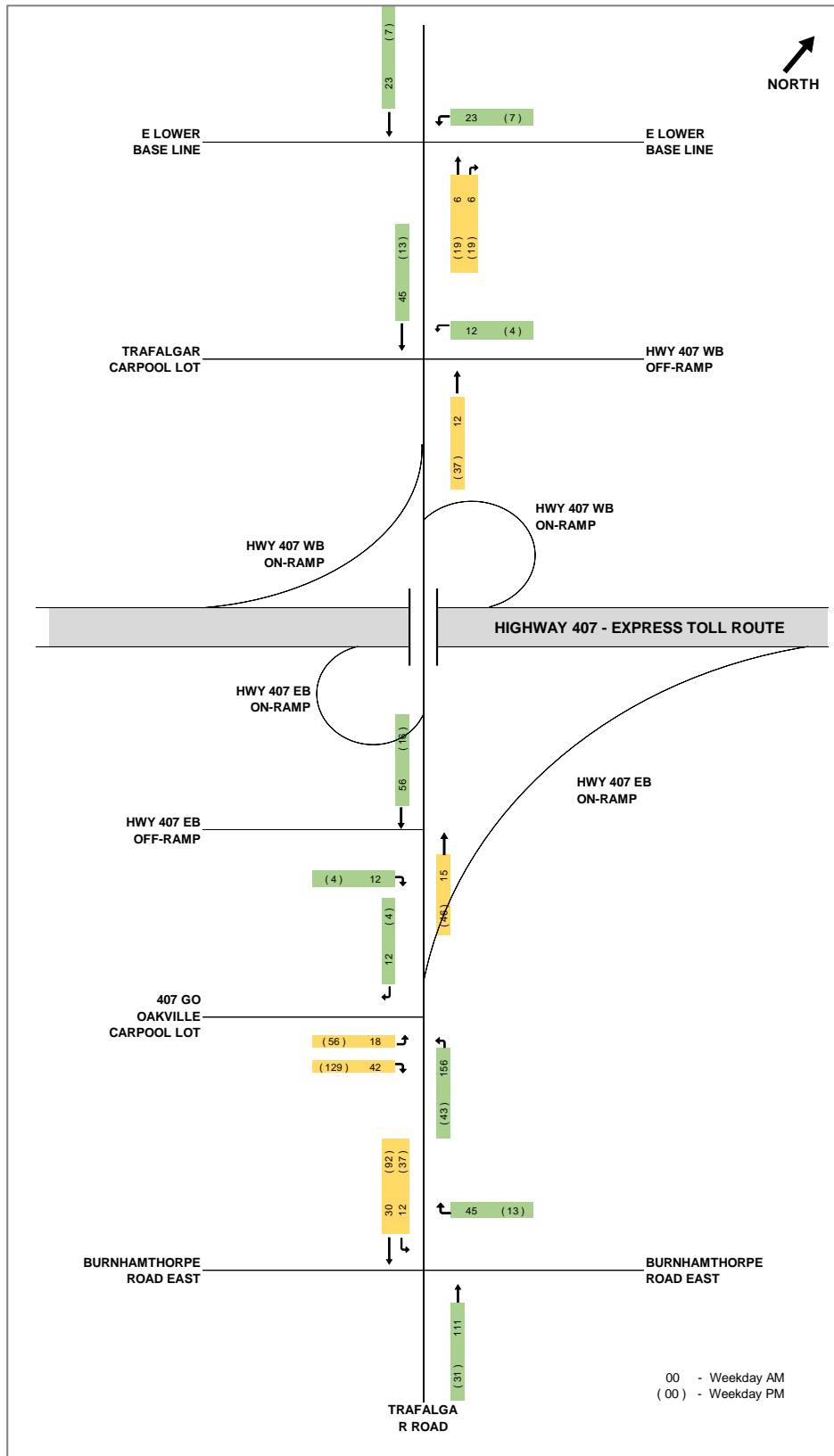


Exhibit 3-6: Site Generated Traffic in AM Peak Hour and PM Peak Hour



3.4.3 Parking Demands

Part of the scope of the traffic study was to provide a recommended parking lot size for each station. This was developed using the ratio of ridership to parking lot sizes taken from GO transit stations. The intent of this approach is to account for typical daily utilization of the lot for a robust and nearly full transit service with low but non-zero spare capacity across the system. The following provides the approach:

- The average number of inbound vehicle trips (auto drivers) made to each of these GO stations during the a.m. peak period (defined as 6:30-9:30 am) were determined using 2016 Transportation Tomorrow Survey (TTS) data.
- Parking data for the GO transit stations was obtained from the GO Rail Station Access Plan (2016) prepared by Metrolinx. The report notes the total capacity and average utilization of each GO station parking lot, which were used to calculate average parking demands.
- A “parking rate” or ratio between demand and auto driver trips was determined. These values are indicated in the below Exhibit 3-7.

Exhibit 3-7: Parking Demand Factors for nearby GO Transit Stations

2016 TTS AM PEAK PERIOD		2016 GO STATION PARKING *			PARKING RATE (Spaces / Driver)
GO Station	Auto Drivers *	Lot Capacity **	Lot Utilization **	Demand	
Brampton	861	863	96%	828	0.962
Bramalea	1,360	2,371	86%	2,039	1.499
Malton	580	698	96%	670	1.155
Erindale	1,370	2,183	76%	1,659	1.211
Burlington	1,270	2,076	86%	1,785	1.406
Appleby	2,080	2,818	86%	2,423	1.165
Bronte	2,460	2,971	86%	2,555	1.039
Oakville	2,820	4,401	86%	3,785	1.342
Lisgar	350	715	66%	472	1.348
Milton	1,330	1,472	100%	1,472	1.107
Meadowvale	1,080	1,652	96%	1,586	1.468
Streetsville	1,650	1,541	96%	1,479	0.897
Clarkson	2,520	3,800	86%	3,268	1.159
Aldershot	870	1,640	96%	1,574	1.810
<i>Total</i>	<i>20,601</i>	<i>29,201</i>	<i>88%</i>	<i>25,597</i>	1.243

* AM peak period inbound vehicles estimated using 2016 TTS data, and rounded to the nearest 10.

** GO parking data obtained from "GO Rail Station Access Plan" (2016) and dated December 2016

This “parking factor” was then applied to the a.m. peak period inbound trips estimated at each Transitway station. Note that park-and-ride (2-hrs) forecasts (and congruently, estimated inbound vehicle trips) for the a.m. peak two hours can be converted to a.m. peak period forecasts by applying a factor of 1.370, as analysis of the TTS indicate that 73% of 3-hour a.m. peak period trips occur within the two a.m. peak hour.

The resulting estimated parking demands at each Transitway station are provided in Exhibit 3-8. Parking demands are provided for the 2041 horizon, representing the “ultimate” conditions. The recommended parking lot size for Trafalgar Station is 680 spaces. It is noted that protection for future expansion beyond 2041, carpool spaces, and park-and-ride for other transit services are not included in the parking lot size, but may be considered in the development of the station area (property) and station layout.

Exhibit 3-8: Estimated Parking Demands for each Transitway Station

STATION	GGHM INBOUND TRIPS		PARKING LOT SIZE ***
	AM Peak 2-Hour *	AM Peak Period **	
	2041	2041	2041
Dundas	460	640	800
Appleby	190	260	320
Bronte	80	110	140
Trafalgar	400	540	680
Britannia	120	170	210
Derry	300	420	520
Mississauga	70	100	128

* Calculated based on forecasted a.m. park-and-ride boardings, at a factor 1.0 inbound vehicles per 1.1 boardings.

** Peak 2-hour trips can be converted to peak period trips at a factor of 1.370, based on GGHM outputs.

*** Parking lot size calculated by multiplying estimated a.m. peak period inbound trips by a factor of 1.243.

3.5 Background Traffic Growth

Future background traffic volumes were estimated for the study area using MTO’s GGHM (discussed in Section 3.4.1) demand model output, provided by MTO. On Trafalgar Road, the GGHM demand model growth from 2011 base to 2031 has peak direction link flow of 1598vph to 2449vph or 2.2% annual compound growth rate. Model output figures are provided in Appendix E. This high growth rate seems appropriate, given the future widening of Trafalgar Road, and was therefore carried forward for analysis. This rate was applied to all ‘major’ movements, which is defined as all through movements along arterial roads or turning movements between two arterial roads.

3.5.1 Nearby Development

In the vicinity of the station, local developments are limited to small commercial / residential / farmland properties to the north and south of the station. Therefore, the above rate appear suitable and no traffic from major developments need to be added.

3.6 Future Model Calibration

The future Synchro models were calibrated to better reflect expected conditions accomplished by adjusting either the Lane Utilization Factor (LUF) or Lost Time Adjustments (LTA) for certain movements.

Adjustments made to the future traffic models are summarized in Exhibit 3-9.

Exhibit 3-9: Future Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	(no adjustments)	-	-	-
PM Peak	Trafalgar Road & E Lower Base Line	SBL	LTA	-1 seconds
	Trafalgar Road & Burnhamthorpe Road East	NBL	LTA	-1 seconds

3.7 Future Background Operations

To analyze future background conditions, the existing traffic volumes were grown using the growth rates discussed in Section 3.5. Future background conditions include planned improvements discussed in Section 3.1. Exhibit 3-10 illustrates future background traffic volumes during the a.m. and p.m. peak hours.

To better capture expected future conditions for the p.m. peak period, protected phasing was applied to both NBL and SBL movements for the Burnhamthorpe and E Lower Baseline intersections, respectively. This is to accommodate for the higher opposing through volumes on Trafalgar Road.

A summary of critical movements identified during the future background condition analysis is provided in Exhibit 3-11, with detailed output of the Synchro analysis provided in Appendix B.

With the background growth added, the study intersections are expected to operate as follows:

- Trafalgar Road & E Lower Baseline is expected to remain at LOS D during both peak periods. Because of the road widening assumptions, all at capacity / critical movements now operate with higher reserve capacity (i.e. lower v/c). During the a.m. peak hour, green time is reallocated to the minor approaches, where the EBT and WBL now operating below capacity. Traffic operation, despite widening of Trafalgar Road remains relatively the same for both the NBT and SBL movements. During the p.m. peak hour, the SBL movement is expected to operate below capacity (given the new protected phasing as described above). With the added green time taken from the N-S phases, the WBT now operate at LOS D with sufficient reserve capacity ($v/c = 0.91$) to accommodate the heavy demands.
- Trafalgar Road at Highway 407 WB Off-Ramp / Carpool Lot access, Highway 407 EB Off-Ramp and 407 GO Oakville Carpool Lot access are expected to continue operating well at LOS B or better during both peak periods. With higher N-S and ramp volumes, the minor approaches experience some added delays, however all movements remain under the capacity threshold.
- Trafalgar Road & Burnhamthorpe Road is expected to improve in operation for the two peak periods. During the a.m. peak hour, additional green time is allocated to the minor approaches where the EBL and WBT now operate below / at capacity. During the p.m. peak hour, with phasing and widening assumptions, the NBL and WBT now operate below capacity, with sufficient green time to accommodate demands.

Exhibit 3-10: Future Background Traffic Volumes for the AM (PM) Peak Hour

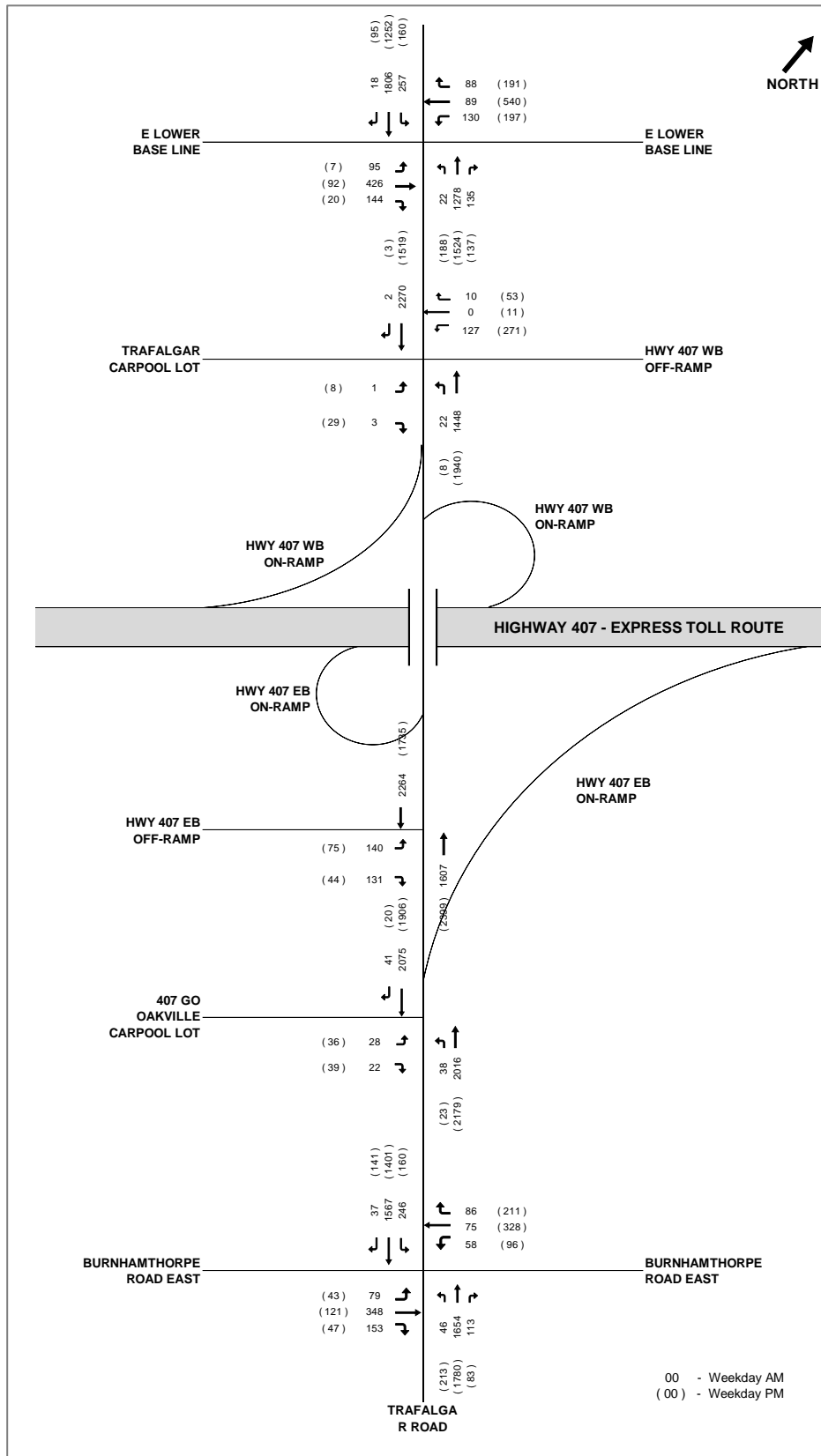


Exhibit 3-11: Synchro Analysis: Future Background Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Trafalgar Road & E Lower Base Line <i>(signalized)</i>	D	EBT WBL NBL NBT SBL	E D D D E	0.93 0.76 0.36 0.84 0.91	191 44 13 132 89	D	WBT NBT SBL	D D D	0.91 0.86 0.74	211 139 47
Trafalgar Road & Highway 407 WB Off-Ramp / Carpool Lot Access <i>(signalized)</i>	A	EBLR WBL WBT WBR	D E D D	0.00 0.68 0.07 0.01	- 32 14 -	B	WBL WBT	D D	0.69 0.74	51 53
Trafalgar Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	EBL EBR	D D	0.62 0.66	52 49	A	EBL EBR	D D	0.59 0.11	32 13
Trafalgar Road & 407 GO Oakville Carpool Lot Access <i>(signalized)</i>	A	EBL EBR	E D	0.38 0.02	16 8	A	EBL EBR	D D	0.41 0.03	17 10
Trafalgar Road & William Halton Parkway* <i>(signalized)</i>	N/a	-	-	-	-	N/a	-	-	-	-
Trafalgar Road & Burnhamthorpe Road East <i>(signalized)</i>	D	EBT WBL NBL NBT SBL	E F E D F	0.93 1.00 0.64 0.90 0.97	181 44 32 176 100	D	EBL WBL WBT NBL NBT SBL	E C E D C D	0.68 0.27 0.96 0.81 0.89 0.85	29 30 184 67 165 58

*TMCs and traffic forecasts were not made available

3.8 Future Total Operations

Future total volumes were calculated adding the station-generated traffic to the future volumes with background growth applied. The future scenarios accounts for all vehicular traffic that is estimated to year 2031 following implementation of the Transitway.

Future total volumes which includes background growth and station-generated traffic are illustrated in Exhibit 3-12.

A summary of critical movements identified during the future total condition analysis is provided in Exhibit 3-13, with detailed output of the Synchro analysis provided in Appendix C.

With the new Transitway demands added to future background growth conditions, the study intersections are expected to operate as follows:

- Trafalgar Road & E Lower Baseline is expected to marginally deteriorate with the addition of the moderate amounts of station demand, with its LOS remaining at D during both peak periods. During both peak periods, some demands are added to the NBT and SBT with sufficient capacity to accommodate given the future widening. In the morning peak hour, some station demands are added to the critical WBL movement. The movement will deteriorate to LOS E with v/c = 0.90, suggesting moderate delays and queues.
- The two Highway 407 off-ramps are expected to continue to operate well at LOS B or better during both peak periods. With station demands added to the two off-ramp

volumes, levels-of-service deteriorate slightly but remain below capacity, indicating acceptable operation.

- Trafalgar Road & Station Access is expected to drop in LOS to B during both peak periods. With majority of station demands added to the NBL, the movement is expected to operate past capacity during the morning peak period. In addition, the 95th percentile queue length is 95m in the morning peak which exceeds the available storage length shown the preliminary drawing for the new William Halton Parkway road (refer to discussions in Section 3.1). Therefore, improvement measures such as optimizing signal splits should be considered for this location.
- Trafalgar Road & Burnhamthorpe Road is expected to remain relatively stable with the added station demands, operating at LOS D during both peak periods. With moderate amounts added to both the NBT and SBT movements, the critical NBT and its conflicting SBL movement is expected to operate near / at capacity during the two peak periods. Outside of these two movements, no major change was observed.

Exhibit 3-12: Future Total Traffic Volumes for the AM (PM) Peak Hour

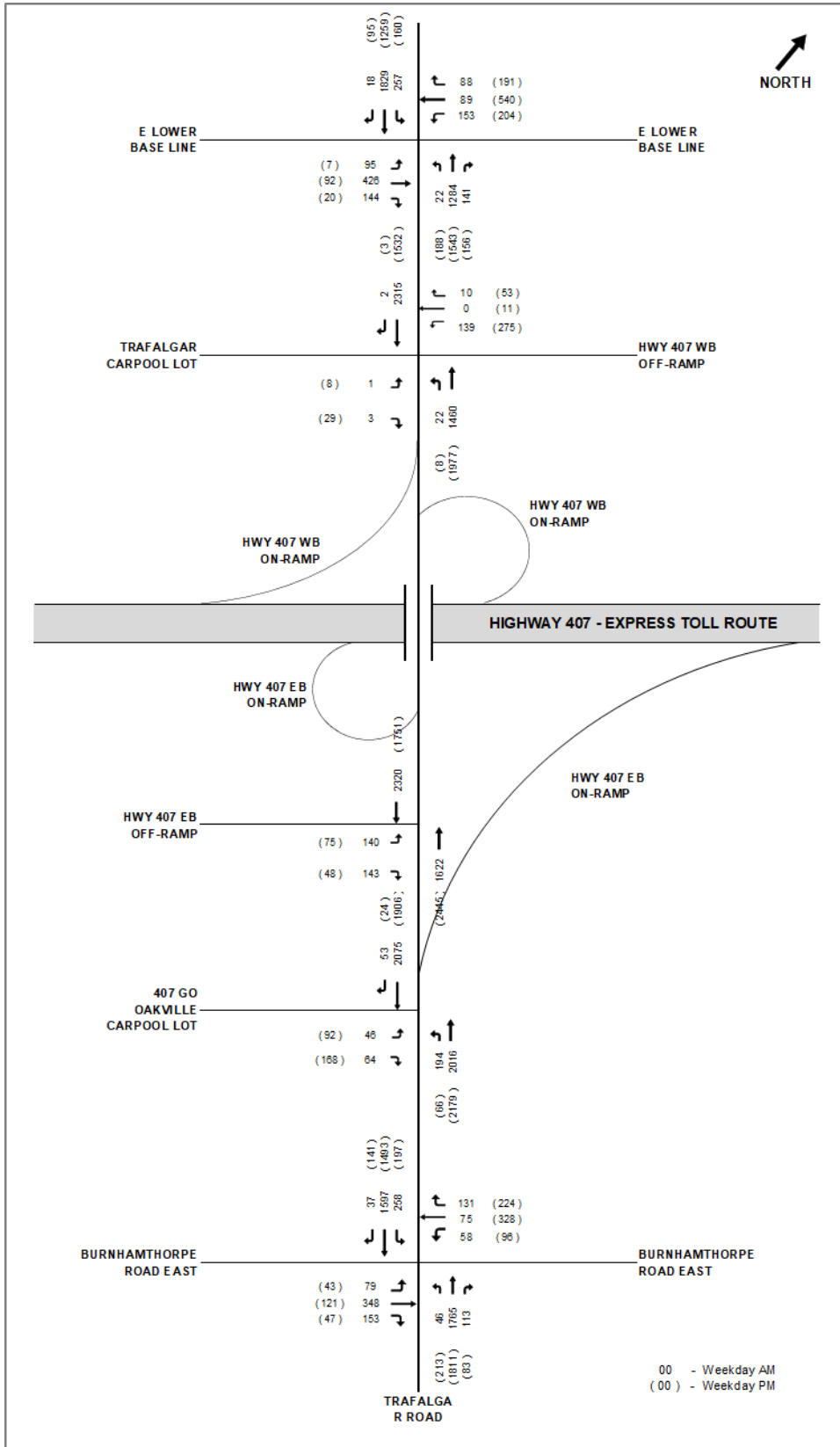


Exhibit 3-13: Synchro Analysis: Future Total Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Trafalgar Road & E Lower Base Line <i>(signalized)</i>	D	EBT WBL NBL NBT SBL	E E D D E	0.93 0.90 0.36 0.85 0.91	191 57 13 134 89	D	WBT NBT SBL	D D D	0.91 0.88 0.74	211 144 47
Trafalgar Road & Highway 407 WB Off-Ramp / Carpool Lot Access <i>(signalized)</i>	A	EBLR WBL WBT WBR	D E D D	0.00 0.62 0.11 0.01	- 34 16 -	B	WBL WBT	D D	0.69 0.74	51 54
Trafalgar Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	B	EBL EBR	D D	0.59 0.69	52 53	A	EBL EBR	D D	0.59 0.16	32 14
Trafalgar Road & Station Access <i>(signalized)</i>	B	EBL EBR NBL	D D F	0.51 0.05 1.33	23 13 95	B	EBL EBR	D D	0.55 0.62	35 44
Trafalgar Road & William Halton Parkway* <i>(signalized)</i>	N/a	-	-	-	-	N/a	-	-	-	-
Trafalgar Road & Burnhamthorpe Road East <i>(signalized)</i>	D	EBT WBL NBL NBT SBL	E F E D F	0.93 1.00 0.68 0.95 1.01	181 44 33 208 108	D	EBL WBL WBT NBL NBT SBL SBT	E C E D C F C	0.68 0.27 0.97 0.81 0.91 1.05 0.85	30 30 191 67 170 81 147

*TMCs and traffic forecasts were not made available

4 Potential Improvement Measures

4.1 Transit

Based on the operational analysis, no special transit priority measures appear warranted for entrance into and out of the station site. The entrances operate well and buses entering and exiting the station are not expected to incur significant delay. The station layout appears to provide a reasonable and direct routing between the bus turnaround / drop-off facility and Trafalgar Road with limited potential for background queues to interfere.

4.2 Active Transportation

No specific active transportation measures such as pedestrian crossovers appear necessary as the proposed access configuration will providing crossing opportunity for pedestrians and cyclist to the west of Bronte Road (refer to Exhibit 1-2). The station layout should be reviewed under the future widening of Trafalgar Road to ensure active transportation connections are provided to the multi-use trails and off-road trail identified in the Region of Halton's ATMP.

4.3 Traffic

Given the future total operations and consideration of planned future road widening, no additional road improvements were identified within the study area. Signal timing changes were explored at Trafalgar Road & Station Access and Trafalgar Road & Burnhamthorpe Road.

4.3.1 Trafalgar Road & Station Access

Improvements at this intersections were limited to optimizing signal splits, with results presented in Exhibit 4-1. Average volume to capacity was significantly reduced in the a.m. peak hour, with the NBL movement now operating below capacity. With this improvement, the 95th percentile queues for the NBL movement will be sufficient stored as per the preliminary design drawings of the new William Halton Parkway intersection.

Exhibit 4-1: Analysis of Improvements to Trafalgar Road & Station Access

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Trafalgar Road & Station Access (<i>planned configuration*</i>)	1.28	EBL	D	0.51	23	0.65	EBL	D	0.55	35
		EBR	D	0.05	13		EBR	D	0.62	44
		NBL	F	1.33	95					
Trafalgar Road & Station Access (<i>with improvements</i>)	0.78	EBL	D	0.51	23	0.64	EBL	D	0.58	35
		EBR	D	0.05	13		EBR	D	0.45	34
		NBL	D	0.79	55					

*refer to Future Roadway Network (Section 3.1)

4.3.2 Trafalgar Road & Burnhamthorpe Road

Improvements at this intersections were limited to optimizing signal splits, with results presented in Exhibit 4-2. During a.m. peak hour, with optimized splits, green time from the minor is reallocated to the NBT and SBL, where the movements now operate below capacity. During the p.m. peak hour, green time was taken from the NBT movement, with the SBL now operating below capacity threshold.

Exhibit 4-2: Analysis of Improvements to Trafalgar Road & Burnhamthorpe Road

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Trafalgar Road & Burnhamthorpe Road (<i>planned configuration*</i>)	1.03	EBT WBL NBL NBT SBL	E F E D F	0.93 1.00 0.68 0.95 1.01	181 44 33 208 108	1.00	EBL WBL WBT NBL NBT SBL SBT	E C E D C F C	0.68 0.27 0.97 0.81 0.91 1.05 0.85	30 30 191 67 170 81 147
Trafalgar Road & Burnhamthorpe Road (<i>with improvements</i>)	1.02	EBT WBL NBL NBT SBL	E F E D F	0.96 1.03 0.64 0.94 0.98	192 45 31 192 104	0.96	EBL WBL WBT NBL NBT SBL SBT	E C E D D E C	0.68 0.27 0.97 0.81 0.94 0.90 0.85	30 30 191 67 189 73 147

5 Summary and Recommendations

This report provides an analysis of traffic operations for the proposed Highway 407 Transitway station located near the interchange of Highway 407 & Trafalgar Road in the Town of Oakville. The report also includes commentary on transit and active transportation access to the proposed station.

The traffic analysis found that study area intersections are currently operating well though approaching capacity. At E Lower Base Line in the p.m. peak, the WBT and SBL movements have volume to capacity greater than 1.0. At Burnhamthorpe Road, the EBT and WBL in the a.m. peak and SBT and NBL also have volume to capacity greater than 1.0.

Future conditions during the a.m. and p.m. peak hours were modelled and analyzed based on a horizon year of 2031. Forecasts were developed using background growth rates informed by MTO's travel demand model. Forecasts for traffic to and from the proposed station was estimated based on ridership (park-and-ride) demand. The study accounts for the planned widening of Trafalgar Road. Although requested, turning movement counts and traffic forecasts were not made available for the new William Halton Parkway road. The analysis for this study also includes a review of storage lengths proposed in preliminary design drawings of this new road.

The study indicates that future 2031 background traffic conditions is expected to operate well overall considering the widening assumptions. A few turning and through movements remain critical, however operate under capacity. The only exception is the WBL movement in the a.m. peak at Trafalgar Road & Burnhamthorpe Road which operates at capacity. Site traffic adds moderate volume to the intersections causing minor further deterioration. Other study area intersections tend to operate satisfactorily in both peak hours.

The two accesses from the existing 407 GO carpool lot will be maintained, a signalized and a right-in access. With optimized traffic signals, the traffic model indicates that vehicles accessing and egressing is well served with no major queueing and delays anticipated, including queues spilling back to the future William Halton Parkway intersection.

With the future widening of Trafalgar Road, the station layout should be reviewed to ensure that active transportation connections are provided to the planned multi-use trail and the proposed off-road trail identified in the City's Active Transportation Master Plan. With future developments occurring along William Halton Parkway (currently under construction), there will likely be an increase in bus service along Trafalgar Road which is align with Halton Region's Transportation Master Plan which has identified Trafalgar Road as a 'Bus Rapid Transit' corridor.

Appendix A-: Existing Conditions Synchro Output

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	426	144	130	89	88	22	984	135	257	1391	18
Future Volume (vph)	95	426	144	130	89	88	22	984	135	257	1391	18
Ideal Flow (vphpl)	1900	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	140.0		0.0	160.0		0.0	160.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.962			0.925			0.982			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1993	0	1807	1623	0	1738	3463	0	1722	3495	0
Flt Permitted	0.646			0.103			0.095			0.094		
Satd. Flow (perm)	1217	1993	0	196	1623	0	174	3463	0	170	3495	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			48			14				2
Link Speed (k/h)		70			60			80				80
Link Distance (m)		223.2			178.2			708.1				196.3
Travel Time (s)		11.5			10.7			31.9				8.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	1%	7%	1%	3%	16%	5%	4%	0%	6%	4%	22%
Adj. Flow (vph)	95	426	144	130	89	88	22	984	135	257	1391	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	570	0	130	177	0	22	1119	0	257	1409	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.86	0.86	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			2		1	6	

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8			4			2			6		
Detector Phase	8	8		7	4		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		25.0	25.0		7.0	25.0	
Minimum Split (s)	24.0	24.0		11.0	24.0		32.0	32.0		11.0	32.0	
Total Split (s)	41.0	41.0		11.0	52.0		49.0	49.0		19.0	68.0	
Total Split (%)	34.2%	34.2%		9.2%	43.3%		40.8%	40.8%		15.8%	56.7%	
Maximum Green (s)	35.0	35.0		7.0	46.0		42.0	42.0		15.0	61.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		5.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0	7.0		4.0	7.0	
Lead/Lag	Lag	Lag		Lead			Lead	Lead		Lag		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Act Effct Green (s)	35.0	35.0		48.0	46.0		42.0	42.0		64.0	61.0	
Actuated g/C Ratio	0.29	0.29		0.40	0.38		0.35	0.35		0.53	0.51	
v/c Ratio	0.27	0.96		0.76	0.27		0.37	0.92		0.90	0.79	
Control Delay	35.2	70.6		51.9	19.6		49.7	49.5		77.5	28.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.2	70.6		51.9	19.6		49.7	49.5		77.5	28.4	
LOS	D	E		D	B		D	D		E	C	
Approach Delay		65.6			33.3			49.5			36.0	
Approach LOS		E			C			D			D	
Queue Length 50th (m)	17.2	129.7		19.5	20.1		3.8	130.5		42.5	138.8	
Queue Length 95th (m)	31.9	#200.0		#44.0	36.9		13.2	#171.1		#90.2	168.0	
Internal Link Dist (m)		199.2			154.2			684.1			172.3	
Turn Bay Length (m)	90.0			140.0			160.0			160.0		
Base Capacity (vph)	354	591		172	651		60	1221		284	1777	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.27	0.96		0.76	0.27		0.37	0.92		0.90	0.79	

Intersection Summary

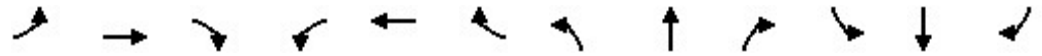
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 45.1
 Intersection LOS: D
 Intersection Capacity Utilization 115.3%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & E Lower Base Line



Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↕	↗	↙	↕			↕	↗
Traffic Volume (vph)	1	0	3	98	0	8	0	1115	0	0	1748	2
Future Volume (vph)	1	0	3	98	0	8	0	1115	0	0	1748	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		75.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor											1.00	
Frt		0.899			0.997	0.850						
Flt Protected		0.988		0.950	0.953							
Satd. Flow (prot)	0	1706	0	1445	1389	1551	1921	3476	0	0	5040	0
Flt Permitted		0.925		0.755	0.728							
Satd. Flow (perm)	0	1598	0	1148	1061	1551	1921	3476	0	0	5040	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			73	73						
Link Speed (k/h)		50			60			80				80
Link Distance (m)		134.2			294.5			40.0				708.1
Travel Time (s)		9.7			17.7			1.8				31.9
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	5%	0%	0%	4%	50%
Adj. Flow (vph)	1	0	3	107	0	9	0	1212	0	0	1900	2
Shared Lane Traffic (%)				49%		10%						
Lane Group Flow (vph)	0	4	0	55	53	8	0	1212	0	0	1902	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2				2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-20-2019

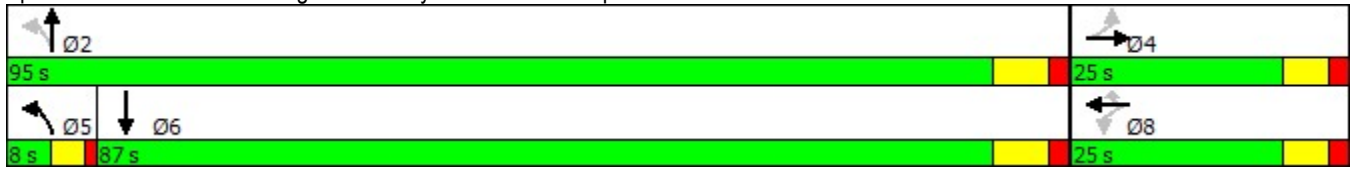


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2					
Detector Phase	4	4		8	8	8	5	2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	4.0	20.0			20.0	
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	8.0	27.0			27.0	
Total Split (s)	25.0	25.0		25.0	25.0	25.0	8.0	95.0			87.0	
Total Split (%)	20.8%	20.8%		20.8%	20.8%	20.8%	6.7%	79.2%			72.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0	19.0	4.0	88.0			80.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	5.0			5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0			2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0			0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
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	None	None	Max			Max	
Act Effct Green (s)		8.7		11.0	11.0	11.0		92.5			92.5	
Actuated g/C Ratio		0.08		0.10	0.10	0.10		0.82			0.82	
v/c Ratio		0.02		0.49	0.31	0.04		0.42			0.46	
Control Delay		0.2		62.7	10.4	0.3		4.3			4.3	
Queue Delay		0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay		0.2		62.7	10.4	0.3		4.3			4.3	
LOS		A		E	B	A		A			A	
Approach Delay		0.3			34.5			4.3			4.3	
Approach LOS		A			C			A			A	
Queue Length 50th (m)		0.0		12.2	0.0	0.0		36.5			41.8	
Queue Length 95th (m)		0.0		26.0	7.6	0.0		58.5			62.6	
Internal Link Dist (m)		110.2			270.5			16.0			684.1	
Turn Bay Length (m)						75.0						
Base Capacity (vph)		330		194	240	322		2861			4148	
Starvation Cap Reductn		0		0	0	0		0			0	
Spillback Cap Reductn		0		0	0	0		0			0	
Storage Cap Reductn		0		0	0	0		0			0	
Reduced v/c Ratio		0.01		0.28	0.22	0.02		0.42			0.46	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	112.4
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	5.4
Intersection LOS:	A
Intersection Capacity Utilization:	58.3%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 2: Trafalgar Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	108	101	0	1238	1744	0
Future Volume (vph)	108	101	0	1238	1744	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Fr't		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	1772	1471	0	3476	3476	0
Flt Permitted	0.950					
Satd. Flow (perm)	1772	1471	0	3476	3476	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		33				
Link Speed (k/h)	60			80	80	
Link Distance (m)	275.7			68.5	133.7	
Travel Time (s)	16.5			3.1	6.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	11%	0%	5%	5%	0%
Adj. Flow (vph)	117	110	0	1346	1896	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	117	110	0	1346	1896	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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	Perm	Perm		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Detector Phase	4	4		2	6	
Switch Phase						

Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		27.0	27.0	
Total Split (s)	25.0	25.0		95.0	95.0	
Total Split (%)	20.8%	20.8%		79.2%	79.2%	
Maximum Green (s)	19.0	19.0		88.0	88.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effct Green (s)	12.8	12.8		88.1	88.1	
Actuated g/C Ratio	0.11	0.11		0.77	0.77	
v/c Ratio	0.59	0.57		0.50	0.71	
Control Delay	60.2	44.7		5.9	8.7	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	60.2	44.7		5.9	8.7	
LOS	E	D		A	A	
Approach Delay	52.7			5.9	8.7	
Approach LOS	D			A	A	
Queue Length 50th (m)	25.1	16.3		48.5	91.9	
Queue Length 95th (m)	43.7	34.4		74.5	141.4	
Internal Link Dist (m)	251.7			44.5	109.7	
Turn Bay Length (m)						
Base Capacity (vph)	295	273		2688	2688	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.40	0.40		0.50	0.71	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	113.9
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	10.5
Intersection LOS:	B
Intersection Capacity Utilization:	65.3%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 6: Trafalgar Rd & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	28	22	38	1553	1598	41
Future Volume (vph)	28	22	38	1553	1598	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1313	1432	1690	3544	3510	1601
Flt Permitted	0.950		0.102			
Satd. Flow (perm)	1313	1432	181	3544	3510	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		24				27
Link Speed (k/h)	50			80	80	
Link Distance (m)	110.2			686.4	184.4	
Travel Time (s)	7.9			30.9	8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	39%	14%	8%	3%	4%	2%
Adj. Flow (vph)	30	24	41	1688	1737	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	24	41	1688	1737	45
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	25.0	25.0	9.0	95.0	86.0	86.0
Total Split (%)	20.8%	20.8%	7.5%	79.2%	71.7%	71.7%
Maximum Green (s)	19.0	19.0	5.0	88.0	79.0	79.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	8.5	8.5	98.8	98.7	93.3	93.3
Actuated g/C Ratio	0.08	0.08	0.88	0.88	0.83	0.83
v/c Ratio	0.30	0.18	0.18	0.54	0.59	0.03
Control Delay	56.5	21.1	3.4	3.8	7.2	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.2	0.0
Total Delay	56.5	21.1	3.4	3.8	7.3	2.6
LOS	E	C	A	A	A	A
Approach Delay	40.8			3.8	7.2	
Approach LOS	D			A	A	
Queue Length 50th (m)	6.7	0.0	1.1	54.3	92.1	0.9
Queue Length 95th (m)	15.5	8.1	3.1	79.2	126.7	4.2
Internal Link Dist (m)	86.2			662.4	160.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	222	263	227	3122	2924	1338
Starvation Cap Reductn	0	0	0	0	337	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.09	0.18	0.54	0.67	0.03

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	112
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	6.0
Intersection Capacity Utilization:	60.8%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	B

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

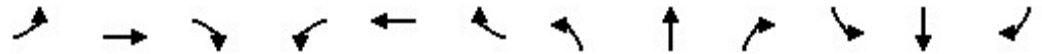
AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	348	153	58	75	86	46	1274	113	246	1207	37
Future Volume (vph)	79	348	153	58	75	86	46	1274	113	246	1207	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.954			0.920			0.988			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1791	0	1755	1698	0	1496	3476	0	1789	3401	0
Flt Permitted	0.585			0.118			0.180			0.067		
Satd. Flow (perm)	1081	1791	0	218	1698	0	283	3476	0	126	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			47			10			5	
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		160.5			183.6			210.4			686.4	
Travel Time (s)		9.6			11.0			9.5			30.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	3%	4%	3%	5%	22%	4%	1%	2%	7%	3%
Adj. Flow (vph)	86	378	166	63	82	93	50	1385	123	267	1312	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	544	0	63	175	0	50	1508	0	267	1352	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		7.0	20.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		26.0	26.0		11.0	26.0	
Total Split (s)	40.0	40.0		40.0	40.0		62.0	62.0		18.0	80.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		51.7%	51.7%		15.0%	66.7%	
Maximum Green (s)	34.0	34.0		34.0	34.0		56.0	56.0		14.0	74.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		3.0	4.6	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.4	1.4		1.0	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		4.0	6.0	
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	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Act Effct Green (s)	34.0	34.0		34.0	34.0		56.0	56.0		76.0	74.0	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.47	0.47		0.63	0.62	
v/c Ratio	0.28	1.05		1.03	0.34		0.38	0.93		0.98	0.64	
Control Delay	36.6	92.8		169.8	26.8		31.4	41.0		82.5	16.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.6	92.8		169.8	26.8		31.4	41.0		82.5	16.4	
LOS	D	F		F	C		C	D		F	B	
Approach Delay		85.1			64.6			40.7			27.3	
Approach LOS		F			E			D			C	
Queue Length 50th (m)	15.8	~136.0		~15.4	23.5		7.4	170.6		46.9	99.4	
Queue Length 95th (m)	30.1	#203.3		#44.7	42.9		19.8	#220.8		#100.0	121.0	
Internal Link Dist (m)		136.5			159.6			186.4			662.4	
Turn Bay Length (m)	30.0			20.0			70.0			65.0		
Base Capacity (vph)	306	520		61	514		132	1627		273	2099	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.28	1.05		1.03	0.34		0.38	0.93		0.98	0.64	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 43.6
 Intersection Capacity Utilization 107.2%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service G

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

Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	92	20	197	540	191	188	1174	137	160	964	95
Future Volume (vph)	7	92	20	197	540	191	188	1174	137	160	964	95
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	140.0		0.0	160.0		0.0	160.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.973			0.961			0.984			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1810	0	1789	2030	0	1825	3529	0	1789	3538	0
Flt Permitted	0.114			0.685			0.207			0.134		
Satd. Flow (perm)	219	1810	0	1290	2030	0	398	3529	0	252	3538	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			17			19			15	
Link Speed (k/h)		70			60			80			80	
Link Distance (m)		223.2			178.2			722.6			196.4	
Travel Time (s)		11.5			10.7			32.5			8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	0%	2%	0%	2%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	7	92	20	197	540	191	188	1174	137	160	964	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	112	0	197	731	0	188	1311	0	160	1059	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.86	0.86	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

PM Peak Period
09-20-2019

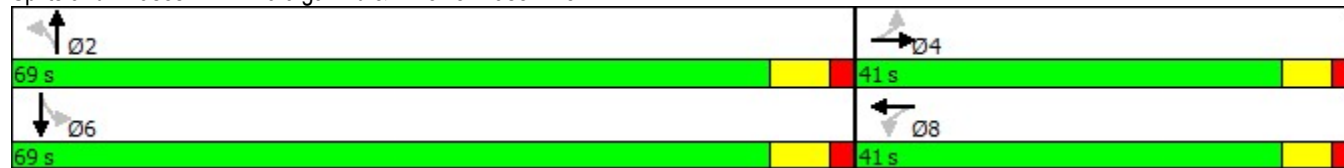


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		25.0	25.0		25.0	25.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		32.0	32.0		32.0	32.0	
Total Split (s)	41.0	41.0		41.0	41.0		69.0	69.0		69.0	69.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%		62.7%	62.7%	
Maximum Green (s)	35.0	35.0		35.0	35.0		62.0	62.0		62.0	62.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		7.0	7.0		6.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Recall Mode	None	None		None	None		Max	Max		Max	Max	
Act Effct Green (s)	35.0	35.0		35.0	35.0		62.0	62.0		63.0	62.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.56	0.56		0.57	0.56	
v/c Ratio	0.10	0.19		0.48	1.11		0.84	0.66		1.11	0.53	
Control Delay	31.0	25.8		35.0	105.5		53.4	18.3		135.1	15.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.0	25.8		35.0	105.5		53.4	18.3		135.1	15.9	
LOS	C	C		C	F		D	B		F	B	
Approach Delay		26.1			90.5			22.7			31.5	
Approach LOS		C			F			C			C	
Queue Length 50th (m)	1.1	15.8		33.9	~178.1		31.6	95.7		~39.3	69.5	
Queue Length 95th (m)	4.9	29.3		56.0	#249.2		#77.4	118.3		#80.1	86.6	
Internal Link Dist (m)		199.2			154.2			698.6			172.4	
Turn Bay Length (m)	90.0			140.0			160.0			160.0		
Base Capacity (vph)	69	582		410	657		224	1997		144	2000	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.19		0.48	1.11		0.84	0.66		1.11	0.53	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Natural Cycle: 110
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.11
 Intersection Signal Delay: 42.4
 Intersection LOS: D
 Intersection Capacity Utilization 109.7%
 ICU Level of Service H
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & E Lower Base Line



Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↕	↗	↖	↕			↕	↗
Traffic Volume (vph)	8	0	29	209	11	41	8	1494	0	0	1170	3
Future Volume (vph)	8	0	29	209	11	41	8	1494	0	0	1170	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		75.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.95	1.00	1.00	0.91	0.91
Frt		0.895			0.994	0.850						
Flt Protected		0.989		0.950	0.959		0.950					
Satd. Flow (prot)	0	1612	0	1667	1584	1551	1825	3544	0	0	5142	0
Flt Permitted		0.920		0.730	0.727		0.182					
Satd. Flow (perm)	0	1500	0	1281	1201	1551	350	3544	0	0	5142	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		79			2	79						1
Link Speed (k/h)		50			60			80				80
Link Distance (m)		69.8			298.3			34.5				722.6
Travel Time (s)		5.0			17.9			1.6				32.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	7%	4%	18%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	9	0	32	227	12	45	9	1624	0	0	1272	3
Shared Lane Traffic (%)				46%		10%						
Lane Group Flow (vph)	0	41	0	123	121	40	9	1624	0	0	1275	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	2	1	1	2				2
Detector Template	Left			Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	0.0		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	0.0		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA				NA
Protected Phases		4			8		5	2				6

Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-20-2019

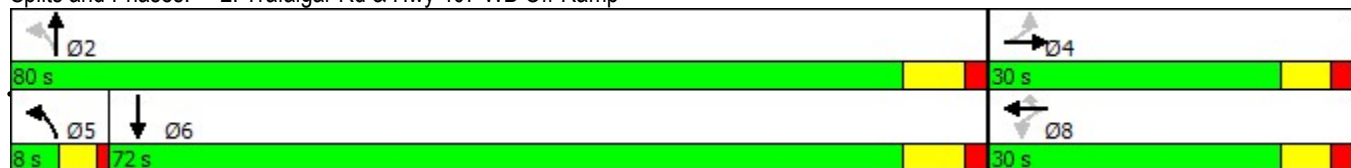


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2					
Detector Phase	4	4		8	8	8	5	2				6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	4.0	20.0				20.0
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	8.0	27.0				27.0
Total Split (s)	30.0	30.0		30.0	30.0	30.0	8.0	80.0				72.0
Total Split (%)	27.3%	27.3%		27.3%	27.3%	27.3%	7.3%	72.7%				65.5%
Maximum Green (s)	24.0	24.0		24.0	24.0	24.0	4.0	73.0				65.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	5.0				5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0				2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	7.0				7.0
Lead/Lag							Lead					Lag
Lead-Lag Optimize?							Yes					Yes
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	None	None	Max				Max
Act Effct Green (s)		13.9		15.3	15.3	15.3	76.2	73.2				71.7
Actuated g/C Ratio		0.14		0.15	0.15	0.15	0.75	0.72				0.71
v/c Ratio		0.15		0.64	0.66	0.13	0.03	0.64				0.35
Control Delay		2.6		55.5	57.4	2.2	4.6	9.4				7.0
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Delay		2.6		55.5	57.4	2.2	4.6	9.4				7.0
LOS		A		E	E	A	A	A				A
Approach Delay		2.6			48.8			9.4				7.0
Approach LOS		A			D			A				A
Queue Length 50th (m)		0.0		24.2	24.5	0.0	0.4	74.0				29.1
Queue Length 95th (m)		2.1		43.3	44.8	2.0	2.0	123.6				59.7
Internal Link Dist (m)		45.8			274.3			10.5				698.6
Turn Bay Length (m)						75.0	75.0					
Base Capacity (vph)		415		303	286	427	320	2555				3632
Starvation Cap Reductn		0		0	0	0	0	0				0
Spillback Cap Reductn		0		0	0	0	0	0				0
Storage Cap Reductn		0		0	0	0	0	0				0
Reduced v/c Ratio		0.10		0.41	0.42	0.09	0.03	0.64				0.35

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 101.5
 Natural Cycle: 60
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 11.9
 Intersection Capacity Utilization 68.8%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: Trafalgar Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (vph)	58	34	0	1848	1336	0	
Future Volume (vph)	58	34	0	1848	1336	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	
Ped Bike Factor							
Frt	0.850						
Flt Protected	0.950						
Satd. Flow (prot)	1738	1317	0	3544	3544	0	
Flt Permitted	0.950						
Satd. Flow (perm)	1738	1317	0	3544	3544	0	
Right Turn on Red	Yes						Yes
Satd. Flow (RTOR)	37						
Link Speed (k/h)	60			80	80		
Link Distance (m)	275.6			82.5	116.1		
Travel Time (s)	16.5			3.7	5.2		
Confl. Peds. (#/hr)			1			1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	5%	24%	0%	3%	3%	0%	
Adj. Flow (vph)	63	37	0	2009	1452	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	63	37	0	2009	1452	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	3.7			0.0	0.0		
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	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24	14	24			14	
Number of Detectors	1	1	2		2		
Detector Template	Left	Right	Thru		Thru		
Leading Detector (m)	6.1	6.1	30.5		30.5		
Trailing Detector (m)	0.0		0.0		0.0		
Detector 1 Position(m)	0.0		0.0		0.0		
Detector 1 Size(m)	6.1	6.1	1.8		1.8		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0		0.0		
Detector 1 Queue (s)	0.0		0.0		0.0		
Detector 1 Delay (s)	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	NA		NA		
Protected Phases	4		2		6		
Permitted Phases	4						

Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		27.0	27.0	
Total Split (s)	20.0	20.0		90.0	90.0	
Total Split (%)	18.2%	18.2%		81.8%	81.8%	
Maximum Green (s)	14.0	14.0		83.0	83.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effect Green (s)	9.2	9.2		87.5	87.5	
Actuated g/C Ratio	0.09	0.09		0.83	0.83	
v/c Ratio	0.42	0.25		0.69	0.50	
Control Delay	53.8	18.5		6.7	4.4	
Queue Delay	0.0	0.0		0.3	0.0	
Total Delay	53.8	18.5		7.0	4.4	
LOS	D	B		A	A	
Approach Delay	40.7			7.0	4.4	
Approach LOS	D			A	A	
Queue Length 50th (m)	12.4	0.0		83.5	44.4	
Queue Length 95th (m)	25.4	9.7		126.4	66.6	
Internal Link Dist (m)	251.6			58.5	92.1	
Turn Bay Length (m)						
Base Capacity (vph)	229	206		2928	2928	
Starvation Cap Reductn	0	0		296	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.28	0.18		0.76	0.50	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	105.9
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	6.9
Intersection LOS:	A
Intersection Capacity Utilization:	66.9%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 6: Trafalgar Rd & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	36	39	23	1678	1468	20
Future Volume (vph)	36	39	23	1678	1468	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1460	1555	1755	3544	3579	1633
Flt Permitted	0.950		0.119			
Satd. Flow (perm)	1460	1555	220	3544	3579	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		42				15
Link Speed (k/h)	50			80	80	
Link Distance (m)	123.2			686.4	170.4	
Travel Time (s)	8.9			30.9	7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	5%	4%	3%	2%	0%
Adj. Flow (vph)	39	42	25	1824	1596	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	42	25	1824	1596	22
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	25.0	25.0	8.0	85.0	77.0	77.0
Total Split (%)	22.7%	22.7%	7.3%	77.3%	70.0%	70.0%
Maximum Green (s)	19.0	19.0	4.0	78.0	70.0	70.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	8.6	8.6	87.9	86.4	81.5	81.5
Actuated g/C Ratio	0.08	0.08	0.85	0.83	0.79	0.79
v/c Ratio	0.33	0.25	0.10	0.62	0.57	0.02
Control Delay	51.2	16.9	2.8	5.4	7.3	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	16.9	2.8	5.4	7.3	2.9
LOS	D	B	A	A	A	A
Approach Delay	33.4			5.4	7.3	
Approach LOS	C			A	A	
Queue Length 50th (m)	7.6	0.0	0.6	63.1	74.2	0.3
Queue Length 95th (m)	17.2	9.9	2.2	94.8	104.1	2.6
Internal Link Dist (m)	99.2			662.4	146.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	267	319	245	2948	2809	1285
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.13	0.10	0.62	0.57	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	103.8
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	6.9
Intersection Capacity Utilization:	63.1%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	B

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	121	47	96	328	211	213	1371	83	160	1079	141
Future Volume (vph)	43	121	47	96	328	211	213	1371	83	160	1079	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.958			0.941			0.991			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1817	0	1825	1797	0	1825	3516	0	1825	3495	0
Flt Permitted	0.154			0.555			0.183			0.062		
Satd. Flow (perm)	290	1817	0	1066	1797	0	352	3516	0	119	3495	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			27			9			27	
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		160.6			183.5			210.4			686.4	
Travel Time (s)		9.6			11.0			9.5			30.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	3%	1%	0%	3%	0%
Adj. Flow (vph)	47	132	51	104	357	229	232	1490	90	174	1173	153
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	183	0	104	586	0	232	1580	0	174	1326	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		7.0	20.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		26.0	26.0		11.0	26.0	
Total Split (s)	32.0	32.0		32.0	32.0		67.0	67.0		11.0	78.0	
Total Split (%)	29.1%	29.1%		29.1%	29.1%		60.9%	60.9%		10.0%	70.9%	
Maximum Green (s)	26.0	26.0		26.0	26.0		61.0	61.0		7.0	72.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		3.0	4.6	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.4	1.4		1.0	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		-1.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.0	6.0		4.0	6.0	
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	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Act Effct Green (s)	26.0	26.0		26.0	26.0		62.0	61.0		74.0	72.0	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.56	0.55		0.67	0.65	
v/c Ratio	0.69	0.41		0.41	1.32		1.17	0.81		0.93	0.58	
Control Delay	87.4	35.5		41.5	191.5		144.3	23.9		72.6	11.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	87.4	35.5		41.5	191.5		144.3	23.9		72.6	11.5	
LOS	F	D		D	F		F	C		E	B	
Approach Delay		46.1			168.9			39.3			18.6	
Approach LOS		D			F			D			B	
Queue Length 50th (m)	9.2	30.2		19.0	~159.1		~59.5	136.3		20.8	74.2	
Queue Length 95th (m)	#29.9	50.7		35.7	#226.1		#106.9	167.3		#61.6	91.7	
Internal Link Dist (m)		136.6			159.5			186.4			662.4	
Turn Bay Length (m)	30.0			20.0			70.0			65.0		
Base Capacity (vph)	68	442		251	445		198	1953		188	2296	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.69	0.41		0.41	1.32		1.17	0.81		0.93	0.58	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.32
 Intersection Signal Delay: 53.5
 Intersection LOS: D
 Intersection Capacity Utilization 108.6%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Appendix B-: Future Background Conditions Synchro Output

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	426	144	130	89	88	22	1278	135	257	1806	18
Future Volume (vph)	95	426	144	130	89	88	22	1278	135	257	1806	18
Ideal Flow (vphpl)	1900	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	140.0		0.0	160.0		0.0	160.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.962			0.925			0.986			0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1993	0	1807	1623	0	1738	4991	0	1722	5029	0
Flt Permitted	0.646			0.100			0.101			0.092		
Satd. Flow (perm)	1217	1993	0	190	1623	0	185	4991	0	167	5029	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			49			16			2	
Link Speed (k/h)		70			60			80			80	
Link Distance (m)		223.2			178.2			708.1			196.3	
Travel Time (s)		11.5			10.7			31.9			8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	1%	7%	1%	3%	16%	5%	4%	0%	6%	4%	22%
Adj. Flow (vph)	95	426	144	130	89	88	22	1278	135	257	1806	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	570	0	130	177	0	22	1413	0	257	1824	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.86	0.86	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			2		1	6	

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8			4			2			6		
Detector Phase	8	8		7	4		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		25.0	25.0		7.0	25.0	
Minimum Split (s)	24.0	24.0		11.0	24.0		32.0	32.0		11.0	32.0	
Total Split (s)	43.0	43.0		11.0	54.0		46.0	46.0		20.0	66.0	
Total Split (%)	35.8%	35.8%		9.2%	45.0%		38.3%	38.3%		16.7%	55.0%	
Maximum Green (s)	37.0	37.0		7.0	48.0		39.0	39.0		16.0	59.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		5.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0	7.0		4.0	7.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Act Effct Green (s)	36.1	36.1		49.1	47.1		39.7	39.7		62.0	59.0	
Actuated g/C Ratio	0.30	0.30		0.41	0.40		0.33	0.33		0.52	0.50	
v/c Ratio	0.26	0.93		0.75	0.26		0.35	0.84		0.90	0.73	
Control Delay	33.6	62.3		50.2	18.4		50.6	42.4		62.7	26.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.6	62.3		50.2	18.4		50.6	42.4		62.7	26.1	
LOS	C	E		D	B		D	D		E	C	
Approach Delay		58.2			31.9			42.5			30.6	
Approach LOS		E			C			D			C	
Queue Length 50th (m)	16.8	126.1		18.9	19.4		4.0	113.0		43.5	121.5	
Queue Length 95th (m)	31.1	#191.4		#43.5	35.6		13.4	132.3		#89.3	139.7	
Internal Link Dist (m)		199.2			154.2			684.1			172.3	
Turn Bay Length (m)	90.0			140.0			160.0			160.0		
Base Capacity (vph)	378	629		173	683		62	1675		295	2492	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.91		0.75	0.26		0.35	0.84		0.87	0.73	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 119.1
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 38.6
 Intersection LOS: D
 Intersection Capacity Utilization 111.5%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Lanes, Volumes, Timings
 1: Trafalgar Rd & E Lower Base Line

AM Peak Period
 09-20-2019

Splits and Phases: 1: Trafalgar Rd & E Lower Base Line



Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↕	↗	↙	↕↕↕			↕↕↕	
Traffic Volume (vph)	1	0	3	127	0	10	0	1448	0	0	2270	2
Future Volume (vph)	1	0	3	127	0	10	0	1448	0	0	2270	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		75.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor											1.00	
Frt		0.899			0.998	0.850						
Flt Protected		0.988		0.950	0.953							
Satd. Flow (prot)	0	1706	0	1445	1389	1551	1921	4995	0	0	5041	0
Flt Permitted		0.927		0.755	0.727							
Satd. Flow (perm)	0	1601	0	1148	1060	1551	1921	4995	0	0	5041	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			73	73						
Link Speed (k/h)		50			60			80				80
Link Distance (m)		134.2			294.5			40.0				708.1
Travel Time (s)		9.7			17.7			1.8				31.9
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	5%	0%	0%	4%	50%
Adj. Flow (vph)	1	0	3	138	0	11	0	1574	0	0	2467	2
Shared Lane Traffic (%)				50%		10%						
Lane Group Flow (vph)	0	4	0	69	70	10	0	1574	0	0	2469	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2				2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-20-2019

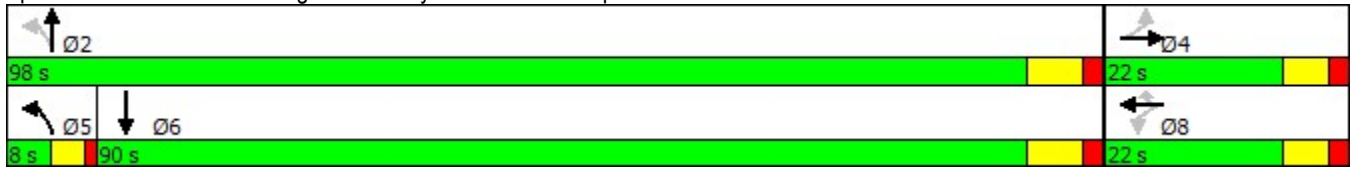


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2					
Detector Phase	4	4		8	8	8	5	2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	4.0	20.0			20.0	
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	8.0	27.0			27.0	
Total Split (s)	22.0	22.0		22.0	22.0	22.0	8.0	98.0			90.0	
Total Split (%)	18.3%	18.3%		18.3%	18.3%	18.3%	6.7%	81.7%			75.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0	16.0	4.0	91.0			83.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	5.0			5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0			2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0			0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
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	None	None	Max			Max	
Act Effct Green (s)		8.8		11.9	11.9	11.9		95.6			95.6	
Actuated g/C Ratio		0.08		0.10	0.10	0.10		0.82			0.82	
v/c Ratio		0.02		0.59	0.40	0.04		0.38			0.60	
Control Delay		0.2		69.8	17.4	0.3		4.0			5.8	
Queue Delay		0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay		0.2		69.8	17.4	0.3		4.0			5.8	
LOS		A		E	B	A		A			A	
Approach Delay		0.3			40.5			4.0			5.8	
Approach LOS		A			D			A			A	
Queue Length 50th (m)		0.0		16.0	0.0	0.0		34.3			72.2	
Queue Length 95th (m)		0.0		31.8	13.9	0.0		47.3			97.5	
Internal Link Dist (m)		110.2			270.5			16.0			684.1	
Turn Bay Length (m)						75.0						
Base Capacity (vph)		283		157	208	276		4102			4140	
Starvation Cap Reductn		0		0	0	0		0			0	
Spillback Cap Reductn		0		0	0	0		0			0	
Storage Cap Reductn		0		0	0	0		0			0	
Reduced v/c Ratio		0.01		0.44	0.34	0.04		0.38			0.60	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	116.4
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	6.3
Intersection LOS:	A
Intersection Capacity Utilization:	65.0%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Trafalgar Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	140	131	0	1607	2264	0
Future Volume (vph)	140	131	0	1607	2264	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Fr _t		0.850				
Fl _t Protected	0.950					
Satd. Flow (prot)	1772	1471	0	4995	4995	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	1772	1471	0	4995	4995	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		8				
Link Speed (k/h)	60			80	80	
Link Distance (m)	275.7			68.5	133.7	
Travel Time (s)	16.5			3.1	6.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	11%	0%	5%	5%	0%
Adj. Flow (vph)	152	142	0	1747	2461	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	152	142	0	1747	2461	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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	Perm	Perm		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Detector Phase	4	4		2	6	
Switch Phase						

Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		27.0	27.0	
Total Split (s)	30.0	30.0		90.0	90.0	
Total Split (%)	25.0%	25.0%		75.0%	75.0%	
Maximum Green (s)	24.0	24.0		83.0	83.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effct Green (s)	15.5	15.5		83.1	83.1	
Actuated g/C Ratio	0.14	0.14		0.74	0.74	
v/c Ratio	0.62	0.68		0.47	0.66	
Control Delay	56.4	59.0		6.5	8.8	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	56.4	59.0		6.5	8.8	
LOS	E	E		A	A	
Approach Delay	57.6			6.5	8.8	
Approach LOS	E			A	A	
Queue Length 50th (m)	31.6	28.1		46.5	84.0	
Queue Length 95th (m)	52.2	48.6		71.2	126.4	
Internal Link Dist (m)	251.7			44.5	109.7	
Turn Bay Length (m)						
Base Capacity (vph)	381	323		3719	3719	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.40	0.44		0.47	0.66	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	111.6
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	11.1
Intersection LOS:	B
Intersection Capacity Utilization:	62.7%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 6: Trafalgar Rd & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	28	22	38	2016	2075	41
Future Volume (vph)	28	22	38	2016	2075	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1313	1432	1690	5092	5043	1601
Flt Permitted	0.950		0.056			
Satd. Flow (perm)	1313	1432	100	5092	5043	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		24				30
Link Speed (k/h)	50			80	80	
Link Distance (m)	110.2			686.4	184.4	
Travel Time (s)	7.9			30.9	8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	39%	14%	8%	3%	4%	2%
Adj. Flow (vph)	30	24	41	2191	2255	45
Shared Lane Traffic (%)						
Lane Group Flow (vph)	30	24	41	2191	2255	45
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	24.0	24.0	10.0	96.0	86.0	86.0
Total Split (%)	20.0%	20.0%	8.3%	80.0%	71.7%	71.7%
Maximum Green (s)	18.0	18.0	6.0	89.0	79.0	79.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	8.5	8.5	98.8	97.3	91.3	91.3
Actuated g/C Ratio	0.07	0.07	0.86	0.85	0.80	0.80
v/c Ratio	0.31	0.19	0.25	0.51	0.56	0.04
Control Delay	57.8	21.1	5.2	3.7	6.9	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	21.1	5.2	3.7	6.9	2.5
LOS	E	C	A	A	A	A
Approach Delay	41.5			3.7	6.8	
Approach LOS	D			A	A	
Queue Length 50th (m)	6.7	0.0	1.1	44.9	79.2	0.8
Queue Length 95th (m)	15.7	7.9	3.1	62.2	102.1	4.1
Internal Link Dist (m)	86.2			662.4	160.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	206	245	169	4319	4012	1280
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.10	0.24	0.51	0.56	0.04

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	114.7
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	5.7
Intersection Capacity Utilization:	56.8%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	B

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	348	153	58	75	86	46	1654	113	246	1567	37
Future Volume (vph)	79	348	153	58	75	86	46	1654	113	246	1567	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.954			0.920			0.990			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1791	0	1755	1698	0	1496	5002	0	1789	4891	0
Flt Permitted	0.601			0.108			0.117			0.074		
Satd. Flow (perm)	1110	1791	0	199	1698	0	184	5002	0	139	4891	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			51			11				5
Link Speed (k/h)		60			60			80				80
Link Distance (m)		160.5			183.6			210.4				686.4
Travel Time (s)		9.6			11.0			9.5				30.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	3%	4%	3%	5%	22%	4%	1%	2%	7%	3%
Adj. Flow (vph)	86	378	166	63	82	93	50	1798	123	267	1703	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	544	0	63	175	0	50	1921	0	267	1743	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1		6

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

AM Peak Period
09-20-2019

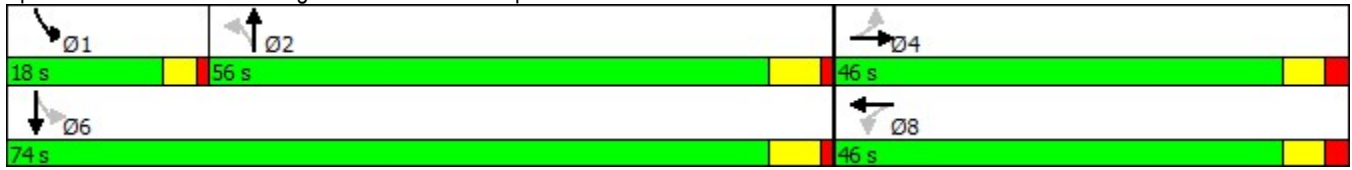


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		7.0	20.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		26.0	26.0		11.0	26.0	
Total Split (s)	46.0	46.0		46.0	46.0		56.0	56.0		18.0	74.0	
Total Split (%)	38.3%	38.3%		38.3%	38.3%		46.7%	46.7%		15.0%	61.7%	
Maximum Green (s)	40.0	40.0		40.0	40.0		50.0	50.0		14.0	68.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		3.0	4.6	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.4	1.4		1.0	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		4.0	6.0	
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	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Act Effct Green (s)	37.5	37.5		37.5	37.5		50.1	50.1		70.1	68.1	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.43	0.43		0.60	0.58	
v/c Ratio	0.24	0.93		1.00	0.30		0.64	0.90		0.96	0.62	
Control Delay	31.4	62.0		156.8	22.4		68.3	38.6		76.0	17.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	31.4	62.0		156.8	22.4		68.3	38.6		76.0	17.7	
LOS	C	E		F	C		E	D		E	B	
Approach Delay		57.8			58.0			39.3			25.4	
Approach LOS		E			E			D			C	
Queue Length 50th (m)	14.6	117.7		14.4	20.9		9.3	153.3		47.0	96.1	
Queue Length 95th (m)	27.7	#181.0		#43.5	38.9		#31.7	175.9		#100.1	110.9	
Internal Link Dist (m)		136.5			159.6			186.4			662.4	
Turn Bay Length (m)	30.0			20.0			70.0			65.0		
Base Capacity (vph)	378	622		67	612		78	2136		279	2834	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.23	0.87		0.94	0.29		0.64	0.90		0.96	0.62	

Intersection Summary























Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 117.6
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 36.9
 Intersection LOS: D
 Intersection Capacity Utilization 103.7%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

PM Peak Period
09-20-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	92	20	197	540	191	188	1524	137	160	1252	95
Future Volume (vph)	7	92	20	197	540	191	188	1524	137	160	1252	95
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	140.0		0.0	160.0		0.0	160.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.973			0.961			0.988			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1810	0	1789	2030	0	1825	5088	0	1789	5092	0
Flt Permitted	0.094			0.685			0.097			0.101		
Satd. Flow (perm)	181	1810	0	1290	2030	0	186	5088	0	190	5092	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			19			15			12	
Link Speed (k/h)		70			60			80			80	
Link Distance (m)		223.2			178.2			722.6			196.4	
Travel Time (s)		11.5			10.7			32.5			8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	0%	2%	0%	2%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	7	92	20	197	540	191	188	1524	137	160	1252	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	112	0	197	731	0	188	1661	0	160	1347	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.86	0.86	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

PM Peak Period
09-20-2019



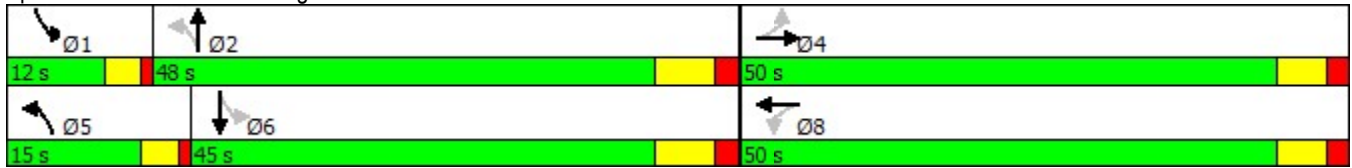
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	25.0		7.0	25.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	32.0		11.0	32.0	
Total Split (s)	50.0	50.0		50.0	50.0		15.0	48.0		12.0	45.0	
Total Split (%)	45.5%	45.5%		45.5%	45.5%		13.6%	43.6%		10.9%	40.9%	
Maximum Green (s)	44.0	44.0		44.0	44.0		11.0	41.0		8.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		4.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	42.4	42.4		42.4	42.4		54.4	41.0		51.6	38.6	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.50	0.38		0.48	0.36	
v/c Ratio	0.10	0.16		0.39	0.91		0.76	0.86		0.72	0.74	
Control Delay	25.1	19.5		26.4	46.9		40.0	36.6		39.0	33.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.1	19.5		26.4	46.9		40.0	36.6		39.0	33.7	
LOS	C	B		C	D		D	D		D	C	
Approach Delay		19.9			42.6			36.9			34.2	
Approach LOS		B			D			D			C	
Queue Length 50th (m)	0.9	13.4		29.4	140.6		21.9	118.9		17.5	92.6	
Queue Length 95th (m)	4.4	25.2		48.7	#210.7		#53.1	139.3		#46.8	110.0	
Internal Link Dist (m)		199.2			154.2			698.6			172.4	
Turn Bay Length (m)	90.0			140.0			160.0			160.0		
Base Capacity (vph)	73	742		524	836		260	1935		223	1820	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.15		0.38	0.87		0.72	0.86		0.72	0.74	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 108.4
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 36.7
 Intersection Capacity Utilization 91.8%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service F

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

Splits and Phases: 1: Trafalgar Rd & E Lower Base Line



Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↕	↗	↖	↕			↕	↗
Traffic Volume (vph)	8	0	29	271	11	53	8	1940	0	0	1519	3
Future Volume (vph)	8	0	29	271	11	53	8	1940	0	0	1519	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		75.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.895			0.994	0.850						
Flt Protected		0.989		0.950	0.958		0.950					
Satd. Flow (prot)	0	1612	0	1667	1587	1551	1825	5092	0	0	5142	0
Flt Permitted		0.920		0.730	0.721		0.108					
Satd. Flow (perm)	0	1500	0	1281	1194	1551	207	5092	0	0	5142	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		79			2	79						
Link Speed (k/h)		50			60			80				80
Link Distance (m)		69.8			298.3			34.5				722.6
Travel Time (s)		5.0			17.9			1.6				32.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	7%	4%	18%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	9	0	32	295	12	58	9	2109	0	0	1651	3
Shared Lane Traffic (%)				47%		10%						
Lane Group Flow (vph)	0	41	0	156	157	52	9	2109	0	0	1654	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	2	1	1	2				2
Detector Template	Left			Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	0.0		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	0.0		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA				NA
Protected Phases		4			8		5	2				6

Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-20-2019

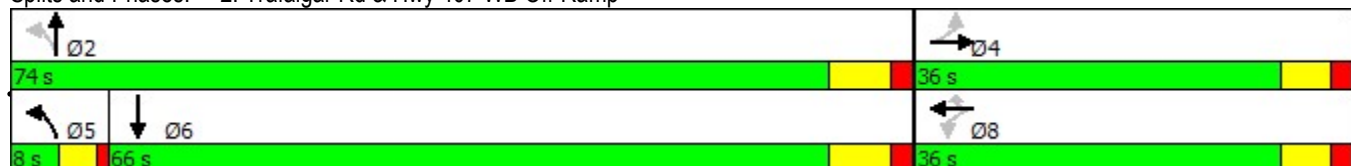


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2					
Detector Phase	4	4		8	8	8	5	2				6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	4.0	20.0				20.0
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	8.0	27.0				27.0
Total Split (s)	36.0	36.0		36.0	36.0	36.0	8.0	74.0				66.0
Total Split (%)	32.7%	32.7%		32.7%	32.7%	32.7%	7.3%	67.3%				60.0%
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	4.0	67.0				59.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	5.0				5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0				2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	7.0				7.0
Lead/Lag							Lead					Lag
Lead-Lag Optimize?							Yes					Yes
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	None	None	Max				Max
Act Effct Green (s)		15.8		18.0	18.0	18.0	70.2	67.2				65.8
Actuated g/C Ratio		0.16		0.18	0.18	0.18	0.71	0.68				0.67
v/c Ratio		0.13		0.66	0.71	0.15	0.04	0.61				0.48
Control Delay		2.2		51.0	54.9	3.9	6.1	10.1				9.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Delay		2.2		51.0	54.9	3.9	6.1	10.1				9.8
LOS		A		D	D	A	A	B				A
Approach Delay		2.2			46.0			10.1				9.8
Approach LOS		A			D			B				A
Queue Length 50th (m)		0.0		29.2	30.6	0.0	0.4	69.0				46.8
Queue Length 95th (m)		2.1		50.6	53.4	4.8	2.3	112.7				95.0
Internal Link Dist (m)		45.8			274.3			10.5				698.6
Turn Bay Length (m)						75.0	75.0					
Base Capacity (vph)		514		392	366	529	214	3482				3440
Starvation Cap Reductn		0		0	0	0	0	0				0
Spillback Cap Reductn		0		0	0	0	0	0				0
Storage Cap Reductn		0		0	0	0	0	0				0
Reduced v/c Ratio		0.08		0.40	0.43	0.10	0.04	0.61				0.48

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 98.3
 Natural Cycle: 55
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 13.0
 Intersection Capacity Utilization 65.0%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 2: Trafalgar Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Traffic Volume (vph)	75	44	0	2399	1735	0	
Future Volume (vph)	75	44	0	2399	1735	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00	
Ped Bike Factor							
Frt	0.850						
Flt Protected	0.950						
Satd. Flow (prot)	1738	1317	0	5092	5092	0	
Flt Permitted	0.950						
Satd. Flow (perm)	1738	1317	0	5092	5092	0	
Right Turn on Red	Yes						Yes
Satd. Flow (RTOR)	39						
Link Speed (k/h)	60			80	80		
Link Distance (m)	275.6			82.5	116.1		
Travel Time (s)	16.5			3.7	5.2		
Confl. Peds. (#/hr)			1			1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	5%	24%	0%	3%	3%	0%	
Adj. Flow (vph)	82	48	0	2608	1886	0	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	82	48	0	2608	1886	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(m)	3.7			0.0	0.0		
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	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24	14	24			14	
Number of Detectors	1	1	2		2		
Detector Template	Left	Right	Thru		Thru		
Leading Detector (m)	6.1	6.1	30.5		30.5		
Trailing Detector (m)	0.0		0.0		0.0		
Detector 1 Position(m)	0.0		0.0		0.0		
Detector 1 Size(m)	6.1	6.1	1.8		1.8		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0		0.0		
Detector 1 Queue (s)	0.0		0.0		0.0		
Detector 1 Delay (s)	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	NA		NA		
Protected Phases	4		2		6		
Permitted Phases	4						

Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		27.0	27.0	
Total Split (s)	19.0	19.0		91.0	91.0	
Total Split (%)	17.3%	17.3%		82.7%	82.7%	
Maximum Green (s)	13.0	13.0		84.0	84.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effect Green (s)	10.1	10.1		88.5	88.5	
Actuated g/C Ratio	0.09	0.09		0.82	0.82	
v/c Ratio	0.51	0.30		0.62	0.45	
Control Delay	57.1	23.0		5.6	4.1	
Queue Delay	0.0	0.0		0.1	0.0	
Total Delay	57.1	23.0		5.7	4.1	
LOS	E	C		A	A	
Approach Delay	44.5			5.7	4.1	
Approach LOS	D			A	A	
Queue Length 50th (m)	16.5	1.8		72.0	40.3	
Queue Length 95th (m)	31.5	12.7		94.9	53.9	
Internal Link Dist (m)	251.6			58.5	92.1	
Turn Bay Length (m)						
Base Capacity (vph)	210	193		4186	4186	
Starvation Cap Reductn	0	0		445	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.25		0.70	0.45	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	107.6
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	6.1
Intersection LOS:	A
Intersection Capacity Utilization:	62.2%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 6: Trafalgar Rd & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	36	39	23	2179	1906	20
Future Volume (vph)	36	39	23	2179	1906	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1460	1555	1755	5092	5142	1633
Flt Permitted	0.950		0.072			
Satd. Flow (perm)	1460	1555	133	5092	5142	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		42				16
Link Speed (k/h)	50			80	80	
Link Distance (m)	123.2			686.4	170.4	
Travel Time (s)	8.9			30.9	7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	5%	4%	3%	2%	0%
Adj. Flow (vph)	39	42	25	2368	2072	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	42	25	2368	2072	22
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	26.0	26.0	8.0	84.0	76.0	76.0
Total Split (%)	23.6%	23.6%	7.3%	76.4%	69.1%	69.1%
Maximum Green (s)	20.0	20.0	4.0	77.0	69.0	69.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	8.6	8.6	88.3	86.8	83.5	83.5
Actuated g/C Ratio	0.08	0.08	0.85	0.83	0.80	0.80
v/c Ratio	0.33	0.25	0.14	0.56	0.50	0.02
Control Delay	51.4	16.9	3.7	4.4	5.6	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	16.9	3.7	4.4	5.6	2.6
LOS	D	B	A	A	A	A
Approach Delay	33.5			4.4	5.6	
Approach LOS	C			A	A	
Queue Length 50th (m)	8.1	0.0	0.6	51.9	40.6	0.3
Queue Length 95th (m)	17.0	9.7	2.2	72.6	82.1	2.6
Internal Link Dist (m)	99.2			662.4	146.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	280	333	175	4241	4119	1311
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.14	0.56	0.50	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	104.2
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.56
Intersection Signal Delay:	5.5
Intersection Capacity Utilization	58.8%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	B

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	121	47	96	328	211	213	1780	83	160	1401	141
Future Volume (vph)	43	121	47	96	328	211	213	1780	83	160	1401	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.958			0.941			0.993			0.986	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1817	0	1825	1797	0	1825	5061	0	1825	5034	0
Flt Permitted	0.112			0.601			0.082			0.089		
Satd. Flow (perm)	211	1817	0	1155	1797	0	158	5061	0	171	5034	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			32			8			18	
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		160.6			183.5			210.4			686.4	
Travel Time (s)		9.6			11.0			9.5			30.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	3%	1%	0%	3%	0%
Adj. Flow (vph)	47	132	51	104	357	229	232	1935	90	174	1523	153
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	183	0	104	586	0	232	2025	0	174	1676	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	20.0		7.0	20.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		11.0	26.0		11.0	26.0	
Total Split (s)	43.0	43.0		43.0	43.0		17.0	55.0		12.0	50.0	
Total Split (%)	39.1%	39.1%		39.1%	39.1%		15.5%	50.0%		10.9%	45.5%	
Maximum Green (s)	37.0	37.0		37.0	37.0		13.0	49.0		8.0	44.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	4.6		3.0	4.6	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.0	1.4		1.0	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		-1.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		3.0	6.0		4.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
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	
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	35.8	35.8		35.8	35.8		63.6	49.0		55.0	45.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.58	0.45		0.51	0.41	
v/c Ratio	0.68	0.30		0.27	0.96		0.79	0.89		0.84	0.80	
Control Delay	80.5	25.7		29.2	61.9		44.1	33.4		55.0	31.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	80.5	25.7		29.2	61.9		44.1	33.4		55.0	31.8	
LOS	F	C		C	E		D	C		E	C	
Approach Delay		36.9			57.0			34.5			34.0	
Approach LOS		D			E			C			C	
Queue Length 50th (m)	8.6	25.5		16.2	115.6		31.4	143.0		20.6	115.1	
Queue Length 95th (m)	#29.4	43.2		30.2	#184.1		#66.9	165.3		#58.2	134.8	
Internal Link Dist (m)		136.6			159.5			186.4			662.4	
Turn Bay Length (m)	30.0			20.0			70.0			65.0		
Base Capacity (vph)	71	630		392	632		307	2283		208	2091	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.66	0.29		0.27	0.93		0.76	0.89		0.84	0.80	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 108.8
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 37.5
 Intersection LOS: D
 Intersection Capacity Utilization 101.9%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Appendix C-: Future Total Conditions Synchro Output

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	426	144	153	89	88	22	1284	141	257	1829	18
Future Volume (vph)	95	426	144	153	89	88	22	1284	141	257	1829	18
Ideal Flow (vphpl)	1900	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	140.0		0.0	160.0		0.0	160.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.962			0.925			0.985			0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1993	0	1807	1623	0	1738	4986	0	1722	5029	0
Flt Permitted	0.646			0.100			0.101			0.092		
Satd. Flow (perm)	1217	1993	0	190	1623	0	185	4986	0	167	5029	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			49			16			2	
Link Speed (k/h)		70			60			80			80	
Link Distance (m)		223.2			178.2			708.1			196.3	
Travel Time (s)		11.5			10.7			31.9			8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	1%	7%	1%	3%	16%	5%	4%	0%	6%	4%	22%
Adj. Flow (vph)	95	426	144	153	89	88	22	1284	141	257	1829	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	570	0	153	177	0	22	1425	0	257	1847	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.86	0.86	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		8		7	4			2		1	6	

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8			4			2			6		
Detector Phase	8	8		7	4		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		25.0	25.0		7.0	25.0	
Minimum Split (s)	24.0	24.0		11.0	24.0		32.0	32.0		11.0	32.0	
Total Split (s)	43.0	43.0		11.0	54.0		46.0	46.0		20.0	66.0	
Total Split (%)	35.8%	35.8%		9.2%	45.0%		38.3%	38.3%		16.7%	55.0%	
Maximum Green (s)	37.0	37.0		7.0	48.0		39.0	39.0		16.0	59.0	
Yellow Time (s)	4.0	4.0		3.0	4.0		5.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0		1.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		7.0	7.0		4.0	7.0	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	5.0	5.0		3.0	5.0		5.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Act Effct Green (s)	36.1	36.1		49.1	47.1		39.7	39.7		62.0	59.0	
Actuated g/C Ratio	0.30	0.30		0.41	0.40		0.33	0.33		0.52	0.50	
v/c Ratio	0.26	0.93		0.88	0.26		0.35	0.85		0.90	0.74	
Control Delay	33.6	62.3		70.3	18.4		50.6	42.8		62.7	26.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.6	62.3		70.3	18.4		50.6	42.8		62.7	26.4	
LOS	C	E		E	B		D	D		E	C	
Approach Delay		58.2			42.5			43.0			30.8	
Approach LOS		E			D			D			C	
Queue Length 50th (m)	16.8	126.1		22.6	19.4		4.0	114.3		43.5	123.9	
Queue Length 95th (m)	31.1	#191.4		#57.4	35.6		13.4	133.8		#89.3	142.4	
Internal Link Dist (m)		199.2			154.2			684.1			172.3	
Turn Bay Length (m)	90.0			140.0			160.0			160.0		
Base Capacity (vph)	378	629		173	683		62	1674		295	2492	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.25	0.91		0.88	0.26		0.35	0.85		0.87	0.74	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 119.1
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 39.5
 Intersection LOS: D
 Intersection Capacity Utilization 113.3%
 ICU Level of Service H
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Trafalgar Rd & E Lower Base Line



Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

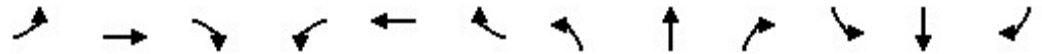
AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↙	↕	↗	↙	↕↕↕			↕↕↕	
Traffic Volume (vph)	1	0	3	139	0	10	0	1460	0	0	2315	2
Future Volume (vph)	1	0	3	139	0	10	0	1460	0	0	2315	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		75.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.91	1.00	1.00	0.91	0.91
Ped Bike Factor											1.00	
Frt		0.899			0.998	0.850						
Flt Protected		0.988		0.950	0.953							
Satd. Flow (prot)	0	1706	0	1445	1389	1551	1921	4995	0	0	5041	0
Flt Permitted		0.935		0.755	0.727							
Satd. Flow (perm)	0	1615	0	1148	1059	1551	1921	4995	0	0	5041	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		73			73	73						
Link Speed (k/h)		50			60			80				80
Link Distance (m)		134.2			294.5			40.0				708.1
Travel Time (s)		9.7			17.7			1.8				31.9
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	20%	0%	0%	0%	5%	0%	0%	4%	50%
Adj. Flow (vph)	1	0	3	151	0	11	0	1587	0	0	2516	2
Shared Lane Traffic (%)				50%		10%						
Lane Group Flow (vph)	0	4	0	75	77	10	0	1587	0	0	2518	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2				2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-20-2019

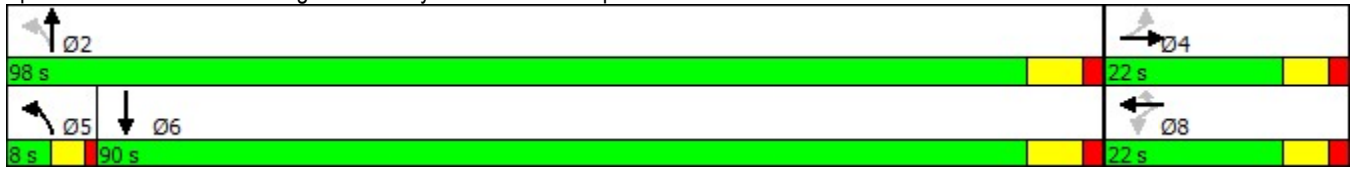


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2					
Detector Phase	4	4		8	8	8	5	2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	4.0	20.0			20.0	
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	8.0	27.0			27.0	
Total Split (s)	22.0	22.0		22.0	22.0	22.0	8.0	98.0			90.0	
Total Split (%)	18.3%	18.3%		18.3%	18.3%	18.3%	6.7%	81.7%			75.0%	
Maximum Green (s)	16.0	16.0		16.0	16.0	16.0	4.0	91.0			83.0	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	5.0			5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0			2.0	
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0			0.0	
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	7.0			7.0	
Lead/Lag							Lead				Lag	
Lead-Lag Optimize?							Yes				Yes	
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	None	None	Max			Max	
Act Effct Green (s)		8.8		12.3	12.3	12.3		91.1			91.1	
Actuated g/C Ratio		0.08		0.11	0.11	0.11		0.78			0.78	
v/c Ratio		0.02		0.62	0.44	0.04		0.41			0.64	
Control Delay		0.2		71.8	20.0	0.3		4.6			6.7	
Queue Delay		0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay		0.2		71.8	20.0	0.3		4.6			6.7	
LOS		A		E	C	A		A			A	
Approach Delay		0.3			42.8			4.6			6.7	
Approach LOS		A			D			A			A	
Queue Length 50th (m)		0.0		17.4	0.8	0.0		35.7			77.5	
Queue Length 95th (m)		0.0		34.2	16.3	0.0		47.9			101.3	
Internal Link Dist (m)		110.2			270.5			16.0			684.1	
Turn Bay Length (m)						75.0						
Base Capacity (vph)		285		158	208	276		3909			3945	
Starvation Cap Reductn		0		0	0	0		0			0	
Spillback Cap Reductn		0		0	0	0		0			0	
Storage Cap Reductn		0		0	0	0		0			0	
Reduced v/c Ratio		0.01		0.47	0.37	0.04		0.41			0.64	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	116.4
Natural Cycle:	60
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	7.3
Intersection LOS:	A
Intersection Capacity Utilization:	66.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Trafalgar Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	140	143	0	1622	2320	0
Future Volume (vph)	140	143	0	1622	2320	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Fr _t	0.850					
Fl _t Protected	0.950					
Satd. Flow (prot)	1772	1471	0	4995	4995	0
Fl _t Permitted	0.950					
Satd. Flow (perm)	1772	1471	0	4995	4995	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		7				
Link Speed (k/h)	60			80	80	
Link Distance (m)	275.7			68.5	133.7	
Travel Time (s)	16.5			3.1	6.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	11%	0%	5%	5%	0%
Adj. Flow (vph)	152	155	0	1763	2522	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	152	155	0	1763	2522	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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	Perm	Perm		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Detector Phase	4	4		2	6	
Switch Phase						

Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

AM Peak Period
09-20-2019

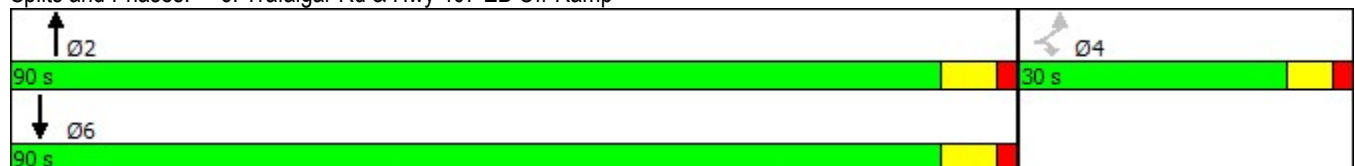


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		27.0	27.0	
Total Split (s)	30.0	30.0		90.0	90.0	
Total Split (%)	25.0%	25.0%		75.0%	75.0%	
Maximum Green (s)	24.0	24.0		83.0	83.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effct Green (s)	16.5	16.5		83.2	83.2	
Actuated g/C Ratio	0.15	0.15		0.74	0.74	
v/c Ratio	0.59	0.70		0.48	0.68	
Control Delay	54.1	60.5		7.0	9.7	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	54.1	60.5		7.0	9.7	
LOS	D	E		A	A	
Approach Delay	57.3			7.0	9.7	
Approach LOS	E			A	A	
Queue Length 50th (m)	31.6	31.3		49.5	92.7	
Queue Length 95th (m)	52.0	52.8		75.3	138.6	
Internal Link Dist (m)	251.7			44.5	109.7	
Turn Bay Length (m)						
Base Capacity (vph)	378	319		3686	3686	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.40	0.49		0.48	0.68	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	112.7
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.70
Intersection Signal Delay:	11.8
Intersection LOS:	B
Intersection Capacity Utilization:	64.5%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 6: Trafalgar Rd & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	46	64	194	2016	2075	53
Future Volume (vph)	46	64	194	2016	2075	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1313	1432	1690	5092	5043	1601
Flt Permitted	0.950		0.052			
Satd. Flow (perm)	1313	1432	92	5092	5043	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		70				39
Link Speed (k/h)	50			80	80	
Link Distance (m)	110.2			686.4	184.4	
Travel Time (s)	7.9			30.9	8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	39%	14%	8%	3%	4%	2%
Adj. Flow (vph)	50	70	211	2191	2255	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	70	211	2191	2255	58
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	24.0	24.0	10.0	96.0	86.0	86.0
Total Split (%)	20.0%	20.0%	8.3%	80.0%	71.7%	71.7%
Maximum Green (s)	18.0	18.0	6.0	89.0	79.0	79.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	9.9	9.9	93.9	92.4	80.9	80.9
Actuated g/C Ratio	0.09	0.09	0.85	0.83	0.73	0.73
v/c Ratio	0.43	0.37	1.29	0.52	0.61	0.05
Control Delay	59.7	16.8	193.7	4.3	9.2	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.7	16.8	193.7	4.3	9.2	2.8
LOS	E	B	F	A	A	A
Approach Delay	34.7			21.0	9.0	
Approach LOS	C			C	A	
Queue Length 50th (m)	10.6	0.0	~42.9	49.3	83.9	1.1
Queue Length 95th (m)	22.9	13.1	#94.6	71.7	112.0	5.2
Internal Link Dist (m)	86.2			662.4	160.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	212	290	164	4235	3673	1176
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	1.29	0.52	0.61	0.05

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	111.1
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	1.29
Intersection Signal Delay:	15.6
Intersection LOS:	B
Intersection Capacity Utilization:	70.8%
ICU Level of Service:	C
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.

Lanes, Volumes, Timings
 8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
 09-20-2019

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

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	348	153	58	75	131	46	1765	113	258	1597	37
Future Volume (vph)	79	348	153	58	75	131	46	1765	113	258	1597	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.954			0.905			0.991			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1791	0	1755	1667	0	1496	5006	0	1789	4891	0
Flt Permitted	0.530			0.108			0.111			0.074		
Satd. Flow (perm)	979	1791	0	199	1667	0	175	5006	0	139	4891	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			78			10			5	
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		160.5			183.6			210.4			686.4	
Travel Time (s)		9.6			11.0			9.5			30.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	3%	4%	3%	5%	22%	4%	1%	2%	7%	3%
Adj. Flow (vph)	86	378	166	63	82	142	50	1918	123	280	1736	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	544	0	63	224	0	50	2041	0	280	1776	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4				8		2		6			
Detector Phase	4	4			8	8	2	2	1	6		
Switch Phase												
Minimum Initial (s)	10.0	10.0			10.0	10.0	20.0	20.0			7.0	20.0
Minimum Split (s)	16.0	16.0			16.0	16.0	26.0	26.0			11.0	26.0
Total Split (s)	46.0	46.0			46.0	46.0	56.0	56.0			18.0	74.0
Total Split (%)	38.3%	38.3%			38.3%	38.3%	46.7%	46.7%			15.0%	61.7%
Maximum Green (s)	40.0	40.0			40.0	40.0	50.0	50.0			14.0	68.0
Yellow Time (s)	3.7	3.7			3.7	3.7	4.6	4.6			3.0	4.6
All-Red Time (s)	2.3	2.3			2.3	2.3	1.4	1.4			1.0	1.4
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Lost Time (s)	6.0	6.0			6.0	6.0	6.0	6.0			4.0	6.0
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
Recall Mode	None	None			None	None	Max	Max			None	Max
Act Effct Green (s)	37.5	37.5			37.5	37.5	50.1	50.1			70.1	68.1
Actuated g/C Ratio	0.32	0.32			0.32	0.32	0.43	0.43			0.60	0.58
v/c Ratio	0.28	0.93			1.00	0.38	0.68	0.96			1.00	0.63
Control Delay	32.4	62.1			156.8	21.6	75.3	44.7			87.9	17.9
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	32.4	62.1			156.8	21.6	75.3	44.7			87.9	17.9
LOS	C	E			F	C	E	D			F	B
Approach Delay	58.1				51.3		45.5		27.5			
Approach LOS	E				D		D		C			
Queue Length 50th (m)	14.7	118.0			14.4	25.2	9.5	169.6			~53.8	98.9
Queue Length 95th (m)	28.4	#181.4			#43.5	46.3	#32.6	#207.5			#107.6	114.0
Internal Link Dist (m)	136.5				159.6		186.4		662.4			
Turn Bay Length (m)	30.0				20.0		70.0		65.0			
Base Capacity (vph)	333	621			67	618	74	2136			279	2833
Starvation Cap Reductn	0	0			0	0	0	0			0	0
Spillback Cap Reductn	0	0			0	0	0	0			0	0
Storage Cap Reductn	0	0			0	0	0	0			0	0
Reduced v/c Ratio	0.26	0.88			0.94	0.36	0.68	0.96			1.00	0.63

Intersection Summary

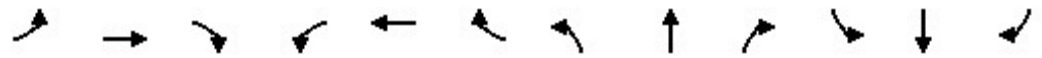
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 117.6
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 40.1
 Intersection LOS: D
 Intersection Capacity Utilization 105.2%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	92	20	204	540	191	188	1543	156	160	1259	95
Future Volume (vph)	7	92	20	204	540	191	188	1543	156	160	1259	95
Ideal Flow (vphpl)	1900	1900	1900	1900	2100	2100	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		0.0	140.0		0.0	160.0		0.0	160.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.973			0.961			0.986			0.989	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	1810	0	1789	2030	0	1825	5079	0	1789	5092	0
Flt Permitted	0.094			0.685			0.097			0.101		
Satd. Flow (perm)	181	1810	0	1290	2030	0	186	5079	0	190	5092	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			19			17			12	
Link Speed (k/h)		70			60			80			80	
Link Distance (m)		223.2			178.2			722.6			196.4	
Travel Time (s)		11.5			10.7			32.5			8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	4%	0%	2%	0%	2%	0%	2%	0%	2%	2%	0%
Adj. Flow (vph)	7	92	20	204	540	191	188	1543	156	160	1259	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	112	0	204	731	0	188	1699	0	160	1354	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.86	0.86	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings
1: Trafalgar Rd & E Lower Base Line

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	25.0		7.0	25.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		11.0	32.0		11.0	32.0	
Total Split (s)	50.0	50.0		50.0	50.0		15.0	48.0		12.0	45.0	
Total Split (%)	45.5%	45.5%		45.5%	45.5%		13.6%	43.6%		10.9%	40.9%	
Maximum Green (s)	44.0	44.0		44.0	44.0		11.0	41.0		8.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		-1.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		4.0	7.0		3.0	7.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		3.0	5.0		3.0	5.0	
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	42.4	42.4		42.4	42.4		54.4	41.0		51.6	38.6	
Actuated g/C Ratio	0.39	0.39		0.39	0.39		0.50	0.38		0.48	0.36	
v/c Ratio	0.10	0.16		0.40	0.91		0.76	0.88		0.72	0.74	
Control Delay	25.1	19.5		26.7	46.9		40.0	37.8		39.0	33.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	25.1	19.5		26.7	46.9		40.0	37.8		39.0	33.8	
LOS	C	B		C	D		D	D		D	C	
Approach Delay		19.9			42.5			38.0			34.3	
Approach LOS		B			D			D			C	
Queue Length 50th (m)	0.9	13.4		30.7	140.6		21.9	123.0		17.5	93.1	
Queue Length 95th (m)	4.4	25.2		50.4	#210.7		#53.1	143.8		#46.8	110.7	
Internal Link Dist (m)		199.2			154.2			698.6			172.4	
Turn Bay Length (m)	90.0			140.0			160.0			160.0		
Base Capacity (vph)	73	742		524	836		260	1933		223	1820	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.10	0.15		0.39	0.87		0.72	0.88		0.72	0.74	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 108.4
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 37.2
 Intersection Capacity Utilization 92.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service F

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

Splits and Phases: 1: Trafalgar Rd & E Lower Base Line



Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↖	↕	↗	↖	↕			↕	↗
Traffic Volume (vph)	8	0	29	275	11	53	8	1977	0	0	1532	3
Future Volume (vph)	8	0	29	275	11	53	8	1977	0	0	1532	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		75.0	75.0		0.0	0.0		0.0
Storage Lanes	0		0	1		1	1		0	0		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	0.95	0.91	0.95	1.00	0.91	1.00	1.00	0.91	0.91
Frt		0.895			0.994	0.850						
Flt Protected		0.989		0.950	0.958		0.950					
Satd. Flow (prot)	0	1612	0	1667	1587	1551	1825	5092	0	0	5142	0
Flt Permitted		0.920		0.730	0.721		0.106					
Satd. Flow (perm)	0	1500	0	1281	1194	1551	204	5092	0	0	5142	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		79			2	79						
Link Speed (k/h)		50			60			80				80
Link Distance (m)		69.8			298.3			34.5				722.6
Travel Time (s)		5.0			17.9			1.6				32.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	7%	4%	18%	0%	0%	3%	0%	0%	2%	0%
Adj. Flow (vph)	9	0	32	299	12	58	9	2149	0	0	1665	3
Shared Lane Traffic (%)				47%		10%						
Lane Group Flow (vph)	0	41	0	158	159	52	9	2149	0	0	1668	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	0		1	2	1	1	2				2
Detector Template	Left			Left	Thru	Right	Left	Thru				Thru
Leading Detector (m)	6.1	0.0		6.1	30.5	6.1	6.1	30.5				30.5
Trailing Detector (m)	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
Detector 1 Size(m)	6.1	0.0		6.1	1.8	6.1	6.1	1.8				1.8
Detector 1 Type	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
Detector 1 Queue (s)	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
Detector 2 Position(m)					28.7			28.7				28.7
Detector 2 Size(m)					1.8			1.8				1.8
Detector 2 Type					Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0				0.0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA				NA
Protected Phases		4			8			5				6

Lanes, Volumes, Timings
2: Trafalgar Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-20-2019

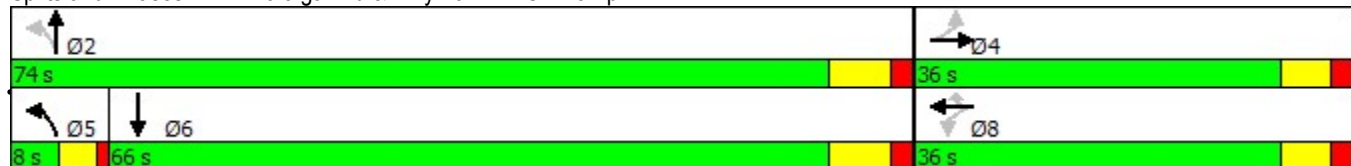


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8		8	2					
Detector Phase	4	4		8	8	8	5	2				6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0	7.0	4.0	20.0				20.0
Minimum Split (s)	13.0	13.0		13.0	13.0	13.0	8.0	27.0				27.0
Total Split (s)	36.0	36.0		36.0	36.0	36.0	8.0	74.0				66.0
Total Split (%)	32.7%	32.7%		32.7%	32.7%	32.7%	7.3%	67.3%				60.0%
Maximum Green (s)	30.0	30.0		30.0	30.0	30.0	4.0	67.0				59.0
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	3.0	5.0				5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0				2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Lost Time (s)		6.0		6.0	6.0	6.0	4.0	7.0				7.0
Lead/Lag							Lead					Lag
Lead-Lag Optimize?							Yes					Yes
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	None	None	Max				Max
Act Effct Green (s)		15.9		18.2	18.2	18.2	70.3	67.2				65.8
Actuated g/C Ratio		0.16		0.18	0.18	0.18	0.71	0.68				0.67
v/c Ratio		0.13		0.67	0.72	0.15	0.04	0.62				0.49
Control Delay		2.2		51.1	55.1	3.9	6.2	10.4				9.9
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0				0.0
Total Delay		2.2		51.1	55.1	3.9	6.2	10.4				9.9
LOS		A		D	E	A	A	B				A
Approach Delay		2.2			46.2			10.4				9.9
Approach LOS		A			D			B				A
Queue Length 50th (m)		0.0		29.6	31.0	0.0	0.4	71.8				47.8
Queue Length 95th (m)		2.1		50.8	54.0	4.8	2.3	117.0				96.6
Internal Link Dist (m)		45.8			274.3			10.5				698.6
Turn Bay Length (m)						75.0	75.0					
Base Capacity (vph)		513		391	366	528	211	3476				3434
Starvation Cap Reductn		0		0	0	0	0	0				0
Spillback Cap Reductn		0		0	0	0	0	0				0
Storage Cap Reductn		0		0	0	0	0	0				0
Reduced v/c Ratio		0.08		0.40	0.43	0.10	0.04	0.62				0.49

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	98.5
Natural Cycle:	55
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	13.2
Intersection LOS:	B
Intersection Capacity Utilization:	65.7%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Trafalgar Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	75	48	0	2445	1751	0
Future Volume (vph)	75	48	0	2445	1751	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor						
Frt	0.850					
Flt Protected	0.950					
Satd. Flow (prot)	1738	1317	0	5092	5092	0
Flt Permitted	0.950					
Satd. Flow (perm)	1738	1317	0	5092	5092	0
Right Turn on Red	Yes					
Satd. Flow (RTOR)	38					
Link Speed (k/h)	60		80		80	
Link Distance (m)	275.6		82.5		116.1	
Travel Time (s)	16.5		3.7		5.2	
Confl. Peds. (#/hr)			1		1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	24%	0%	3%	3%	0%
Adj. Flow (vph)	82	52	0	2658	1903	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	82	52	0	2658	1903	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0		0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	2		2	
Detector Template	Left	Right	Thru		Thru	
Leading Detector (m)	6.1	6.1	30.5		30.5	
Trailing Detector (m)	0.0		0.0		0.0	
Detector 1 Position(m)	0.0		0.0		0.0	
Detector 1 Size(m)	6.1	6.1	1.8		1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	
Detector 1 Queue (s)	0.0		0.0		0.0	
Detector 1 Delay (s)	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	NA		NA	
Protected Phases	4		2		6	
Permitted Phases	4					

Lanes, Volumes, Timings
6: Trafalgar Rd & Hwy 407 EB Off-Ramp

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	6.0	6.0		20.0	20.0	
Minimum Split (s)	12.0	12.0		27.0	27.0	
Total Split (s)	19.0	19.0		91.0	91.0	
Total Split (%)	17.3%	17.3%		82.7%	82.7%	
Maximum Green (s)	13.0	13.0		84.0	84.0	
Yellow Time (s)	4.0	4.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		7.0	7.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		Max	Max	
Act Effect Green (s)	10.1	10.1		88.5	88.5	
Actuated g/C Ratio	0.09	0.09		0.82	0.82	
v/c Ratio	0.51	0.33		0.63	0.45	
Control Delay	57.1	25.6		5.7	4.1	
Queue Delay	0.0	0.0		0.1	0.0	
Total Delay	57.1	25.6		5.9	4.1	
LOS	E	C		A	A	
Approach Delay	44.9			5.9	4.1	
Approach LOS	D			A	A	
Queue Length 50th (m)	16.5	2.7		74.9	40.9	
Queue Length 95th (m)	31.5	14.2		98.7	54.5	
Internal Link Dist (m)	251.6			58.5	92.1	
Turn Bay Length (m)						
Base Capacity (vph)	210	192		4186	4186	
Starvation Cap Reductn	0	0		435	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.39	0.27		0.71	0.45	

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	107.6
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	6.3
Intersection LOS:	A
Intersection Capacity Utilization:	63.1%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 6: Trafalgar Rd & Hwy 407 EB Off-Ramp



Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	92	168	66	2179	1906	24
Future Volume (vph)	92	168	66	2179	1906	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1460	1555	1755	5092	5142	1633
Flt Permitted	0.950		0.063			
Satd. Flow (perm)	1460	1555	116	5092	5142	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		71				19
Link Speed (k/h)	50			80	80	
Link Distance (m)	123.2			686.4	170.4	
Travel Time (s)	8.9			30.9	7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	5%	4%	3%	2%	0%
Adj. Flow (vph)	100	183	72	2368	2072	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	183	72	2368	2072	26
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	26.0	26.0	8.0	84.0	76.0	76.0
Total Split (%)	23.6%	23.6%	7.3%	76.4%	69.1%	69.1%
Maximum Green (s)	20.0	20.0	4.0	77.0	69.0	69.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	13.2	13.2	81.6	78.6	72.2	72.2
Actuated g/C Ratio	0.13	0.13	0.78	0.75	0.69	0.69
v/c Ratio	0.54	0.71	0.47	0.62	0.59	0.02
Control Delay	53.3	41.4	16.0	7.6	10.3	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	41.4	16.0	7.6	10.3	3.8
LOS	D	D	B	A	B	A
Approach Delay	45.6			7.8	10.2	
Approach LOS	D			A	B	
Queue Length 50th (m)	19.1	21.5	2.7	68.7	75.2	0.4
Queue Length 95th (m)	35.3	43.9	11.2	106.3	108.3	3.7
Internal Link Dist (m)	99.2			662.4	146.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	278	354	152	3817	3540	1130
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.52	0.47	0.62	0.59	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	104.8
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	11.1
Intersection Capacity Utilization	60.5%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	B

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	121	47	96	328	224	213	1811	83	197	1493	141
Future Volume (vph)	43	121	47	96	328	224	213	1811	83	197	1493	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.958			0.939			0.993			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1817	0	1825	1793	0	1825	5061	0	1825	5038	0
Flt Permitted	0.110			0.602			0.082			0.089		
Satd. Flow (perm)	207	1817	0	1157	1793	0	158	5061	0	171	5038	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			34			8			17	
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		160.6			183.5			210.4			686.4	
Travel Time (s)		9.6			11.0			9.5			30.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	3%	1%	0%	3%	0%
Adj. Flow (vph)	47	132	51	104	357	243	232	1968	90	214	1623	153
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	183	0	104	600	0	232	2058	0	214	1776	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	20.0		7.0	20.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		11.0	26.0		11.0	26.0	
Total Split (s)	43.0	43.0		43.0	43.0		17.0	55.0		12.0	50.0	
Total Split (%)	39.1%	39.1%		39.1%	39.1%		15.5%	50.0%		10.9%	45.5%	
Maximum Green (s)	37.0	37.0		37.0	37.0		13.0	49.0		8.0	44.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	4.6		3.0	4.6	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.0	1.4		1.0	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		-1.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		3.0	6.0		4.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
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	
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	36.4	36.4		36.4	36.4		63.6	49.0		54.9	44.9	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.58	0.45		0.50	0.41	
v/c Ratio	0.69	0.30		0.27	0.97		0.80	0.91		1.03	0.85	
Control Delay	81.5	25.6		29.1	64.5		44.3	35.1		99.8	34.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	81.5	25.6		29.1	64.5		44.3	35.1		99.8	34.4	
LOS	F	C		C	E		D	D		F	C	
Approach Delay		37.0			59.3			36.0			41.4	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	8.6	25.5		16.2	119.7		31.4	146.9		~33.6	125.9	
Queue Length 95th (m)	#29.6	43.2		30.2	#190.6		#66.9	169.9		#80.6	146.9	
Internal Link Dist (m)		136.6			159.5			186.4			662.4	
Turn Bay Length (m)	30.0			20.0			70.0			65.0		
Base Capacity (vph)	69	627		391	629		306	2272		207	2079	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.68	0.29		0.27	0.95		0.76	0.91		1.03	0.85	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 109.4
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 41.2
 Intersection LOS: D
 Intersection Capacity Utilization 105.4%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Appendix D-: Future Improvement Conditions Synchro Output

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	46	64	194	2016	2075	53
Future Volume (vph)	46	64	194	2016	2075	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1313	1432	1690	5092	5043	1601
Flt Permitted	0.950		0.052			
Satd. Flow (perm)	1313	1432	92	5092	5043	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		70				29
Link Speed (k/h)	50			80	80	
Link Distance (m)	110.2			686.4	184.4	
Travel Time (s)	7.9			30.9	8.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	39%	14%	8%	3%	4%	2%
Adj. Flow (vph)	50	70	211	2191	2255	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	70	211	2191	2255	58
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

AM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	24.0	24.0	24.0	96.0	72.0	72.0
Total Split (%)	20.0%	20.0%	20.0%	80.0%	60.0%	60.0%
Maximum Green (s)	18.0	18.0	20.0	89.0	65.0	65.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	9.9	9.9	93.9	92.4	73.3	73.3
Actuated g/C Ratio	0.09	0.09	0.85	0.83	0.66	0.66
v/c Ratio	0.43	0.37	0.77	0.52	0.68	0.05
Control Delay	59.7	16.8	46.0	4.3	15.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.7	16.8	46.0	4.3	15.1	6.1
LOS	E	B	D	A	B	A
Approach Delay	34.7			8.0	14.9	
Approach LOS	C			A	B	
Queue Length 50th (m)	10.6	0.0	29.3	49.3	109.5	2.2
Queue Length 95th (m)	22.9	13.1	55.1	71.7	162.4	8.7
Internal Link Dist (m)	86.2			662.4	160.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	212	291	365	4235	3327	1066
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	0.58	0.52	0.68	0.05

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	111.1
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	12.0
Intersection LOS:	B
Intersection Capacity Utilization:	70.8%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	348	153	58	75	131	46	1765	113	258	1597	37
Future Volume (vph)	79	348	153	58	75	131	46	1765	113	258	1597	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.954			0.905			0.991			0.997	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1791	0	1755	1667	0	1496	5006	0	1789	4891	0
Flt Permitted	0.522			0.108			0.114			0.071		
Satd. Flow (perm)	964	1791	0	199	1667	0	180	5006	0	134	4891	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			75			10			5	
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		160.5			183.6			210.4			686.4	
Travel Time (s)		9.6			11.0			9.5			30.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	3%	4%	3%	5%	22%	4%	1%	2%	7%	3%
Adj. Flow (vph)	86	378	166	63	82	142	50	1918	123	280	1736	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	544	0	63	224	0	50	2041	0	280	1776	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

AM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		7.0	20.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		26.0	26.0		11.0	26.0	
Total Split (s)	43.0	43.0		43.0	43.0		58.0	58.0		19.0	77.0	
Total Split (%)	35.8%	35.8%		35.8%	35.8%		48.3%	48.3%		15.8%	64.2%	
Maximum Green (s)	37.0	37.0		37.0	37.0		52.0	52.0		15.0	71.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		4.6	4.6		3.0	4.6	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.4	1.4		1.0	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		4.0	6.0	
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	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Act Effct Green (s)	37.0	37.0		37.0	37.0		52.0	52.0		73.0	71.0	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.43	0.43		0.61	0.59	
v/c Ratio	0.29	0.96		1.03	0.40		0.64	0.94		0.97	0.61	
Control Delay	34.9	69.7		168.7	23.7		66.8	42.1		79.9	16.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.9	69.7		168.7	23.7		66.8	42.1		79.9	16.8	
LOS	C	E		F	C		E	D		E	B	
Approach Delay		64.9			55.5			42.7			25.4	
Approach LOS		E			E			D			C	
Queue Length 50th (m)	15.4	122.3		~15.8	26.9		9.1	164.3		50.0	92.4	
Queue Length 95th (m)	29.6	#191.8		#44.7	48.9		#31.4	#192.4		#103.9	106.7	
Internal Link Dist (m)		136.5			159.6			186.4			662.4	
Turn Bay Length (m)	30.0			20.0			70.0			65.0		
Base Capacity (vph)	297	565		61	565		78	2174		288	2895	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.29	0.96		1.03	0.40		0.64	0.94		0.97	0.61	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Natural Cycle: 80
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 39.2
 Intersection LOS: D
 Intersection Capacity Utilization 105.2%
 ICU Level of Service G
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	92	168	66	2179	1906	24
Future Volume (vph)	92	168	66	2179	1906	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	120.0			40.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1460	1555	1755	5092	5142	1633
Flt Permitted	0.950		0.061			
Satd. Flow (perm)	1460	1555	113	5092	5142	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		114				17
Link Speed (k/h)	50			80	80	
Link Distance (m)	123.2			686.4	170.4	
Travel Time (s)	8.9			30.9	7.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	5%	4%	3%	2%	0%
Adj. Flow (vph)	100	183	72	2368	2072	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	183	72	2368	2072	26
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	

Lanes, Volumes, Timings
8: Trafalgar Rd & Hwy 407 Carpool Lot

PM Peak Period
09-20-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	4.0	20.0	20.0	20.0
Minimum Split (s)	24.0	24.0	8.0	27.0	27.0	27.0
Total Split (s)	27.0	27.0	11.0	83.0	72.0	72.0
Total Split (%)	24.5%	24.5%	10.0%	75.5%	65.5%	65.5%
Maximum Green (s)	21.0	21.0	7.0	76.0	65.0	65.0
Yellow Time (s)	4.0	4.0	3.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	7.0	7.0	7.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	Max	Max	Max
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	12.3	12.3	80.6	77.6	69.1	69.1
Actuated g/C Ratio	0.12	0.12	0.78	0.75	0.67	0.67
v/c Ratio	0.57	0.64	0.38	0.62	0.60	0.02
Control Delay	55.3	27.7	11.5	7.1	11.3	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	27.7	11.5	7.1	11.3	4.5
LOS	E	C	B	A	B	A
Approach Delay	37.4			7.2	11.2	
Approach LOS	D			A	B	
Queue Length 50th (m)	18.8	12.7	2.6	66.0	79.5	0.6
Queue Length 95th (m)	35.1	34.0	11.0	97.5	110.8	4.0
Internal Link Dist (m)	99.2			662.4	146.4	
Turn Bay Length (m)			120.0			40.0
Base Capacity (vph)	298	408	200	3839	3453	1102
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.45	0.36	0.62	0.60	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	102.9
Natural Cycle:	65
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.64
Intersection Signal Delay:	10.7
Intersection Capacity Utilization	60.5%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	B

Splits and Phases: 8: Trafalgar Rd & Hwy 407 Carpool Lot



Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	121	47	96	328	224	213	1811	83	197	1493	141
Future Volume (vph)	43	121	47	96	328	224	213	1811	83	197	1493	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0		0.0	20.0		0.0	70.0		0.0	65.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.958			0.939			0.993			0.987	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1817	0	1825	1793	0	1825	5061	0	1825	5038	0
Flt Permitted	0.110			0.602			0.083			0.089		
Satd. Flow (perm)	207	1817	0	1157	1793	0	159	5061	0	171	5038	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			34			8			17	
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		160.6			183.5			210.4			686.4	
Travel Time (s)		9.6			11.0			9.5			30.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	3%	1%	0%	3%	0%
Adj. Flow (vph)	47	132	51	104	357	243	232	1968	90	214	1623	153
Shared Lane Traffic (%)												
Lane Group Flow (vph)	47	183	0	104	600	0	232	2058	0	214	1776	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	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	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	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	
Detector 1 Queue (s)	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	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	

Lanes, Volumes, Timings
9: Trafalgar Rd & Burnhamthorpe Rd E

PM Peak Period
09-20-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		7.0	20.0		7.0	20.0	
Minimum Split (s)	16.0	16.0		16.0	16.0		11.0	26.0		11.0	26.0	
Total Split (s)	43.0	43.0		43.0	43.0		17.0	53.0		14.0	50.0	
Total Split (%)	39.1%	39.1%		39.1%	39.1%		15.5%	48.2%		12.7%	45.5%	
Maximum Green (s)	37.0	37.0		37.0	37.0		13.0	47.0		10.0	44.0	
Yellow Time (s)	3.7	3.7		3.7	3.7		3.0	4.6		3.0	4.6	
All-Red Time (s)	2.3	2.3		2.3	2.3		1.0	1.4		1.0	1.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		-1.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		3.0	6.0		4.0	6.0	
Lead/Lag							Lead	Lag		Lead	Lag	
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	
Recall Mode	None	None		None	None		None	Max		None	Max	
Act Effct Green (s)	36.4	36.4		36.4	36.4		63.2	47.0		56.9	44.9	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.58	0.43		0.52	0.41	
v/c Ratio	0.69	0.30		0.27	0.97		0.80	0.94		0.89	0.86	
Control Delay	81.5	25.6		29.1	64.5		44.2	40.3		62.4	34.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	81.5	25.6		29.1	64.5		44.2	40.3		62.4	34.4	
LOS	F	C		C	E		D	D		E	C	
Approach Delay		37.0			59.3			40.7			37.4	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	8.6	25.5		16.2	119.7		31.3	152.3		29.3	125.9	
Queue Length 95th (m)	#29.6	43.2		30.2	#190.6		#66.7	#189.0		#72.9	146.9	
Internal Link Dist (m)		136.6			159.5			186.4			662.4	
Turn Bay Length (m)	30.0			20.0			70.0			65.0		
Base Capacity (vph)	69	627		391	629		306	2180		240	2077	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.68	0.29		0.27	0.95		0.76	0.94		0.89	0.86	

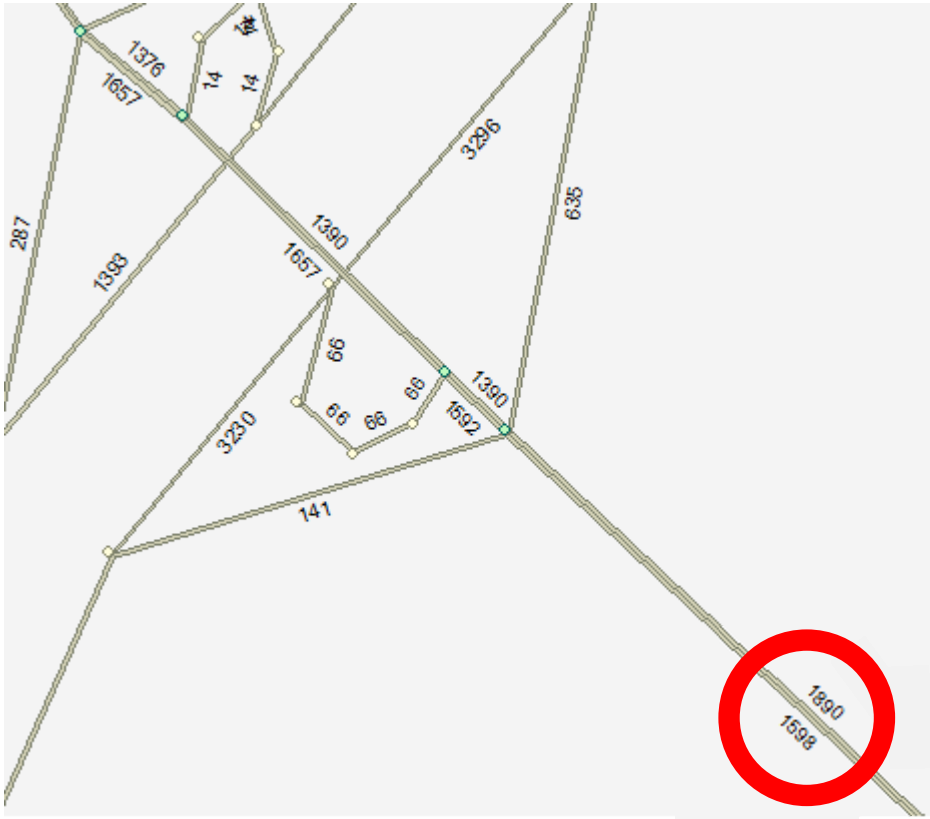
Intersection Summary

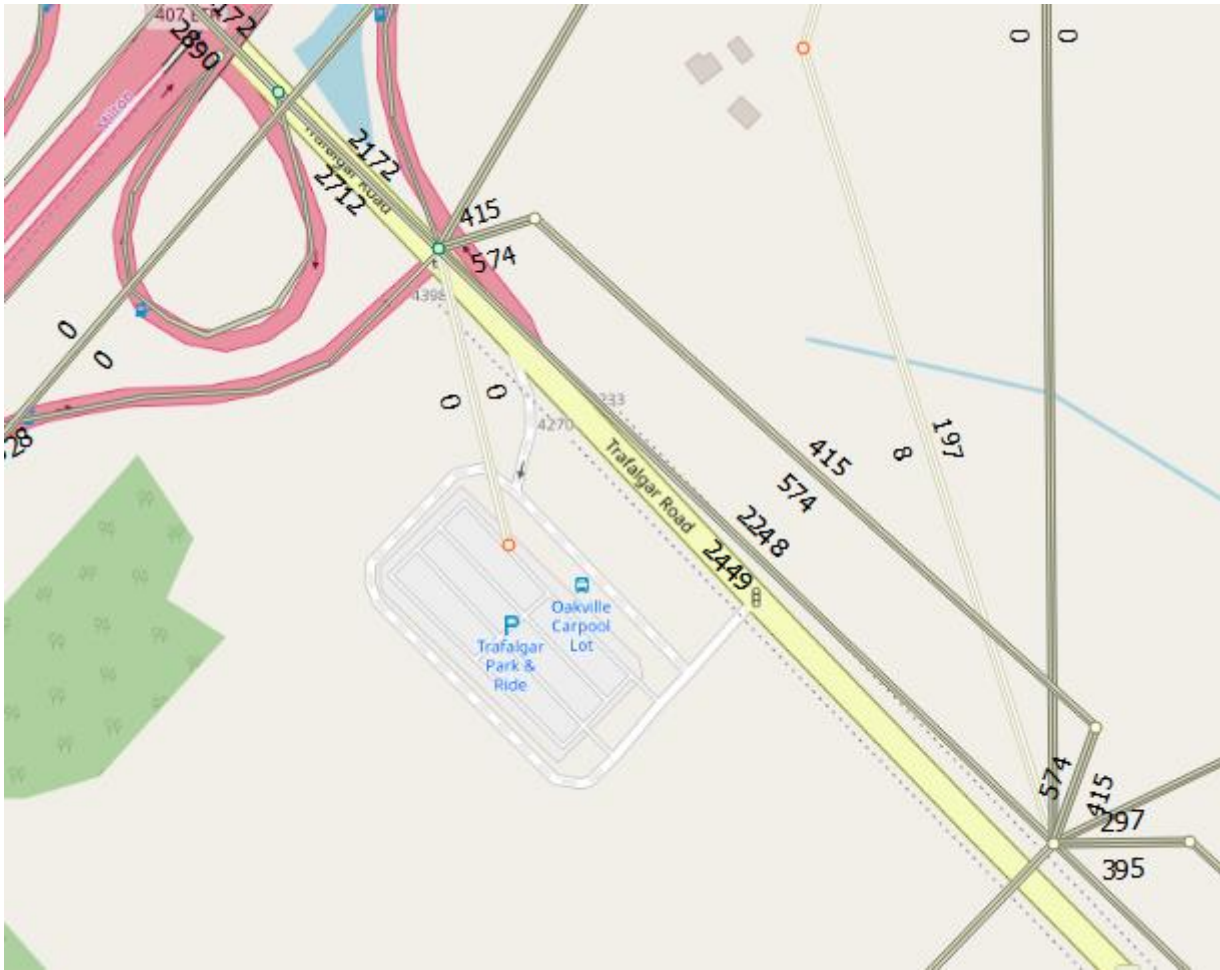
Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 109.4
 Natural Cycle: 90
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 41.8
 Intersection LOS: D
 Intersection Capacity Utilization 105.4%
 ICU Level of Service G
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

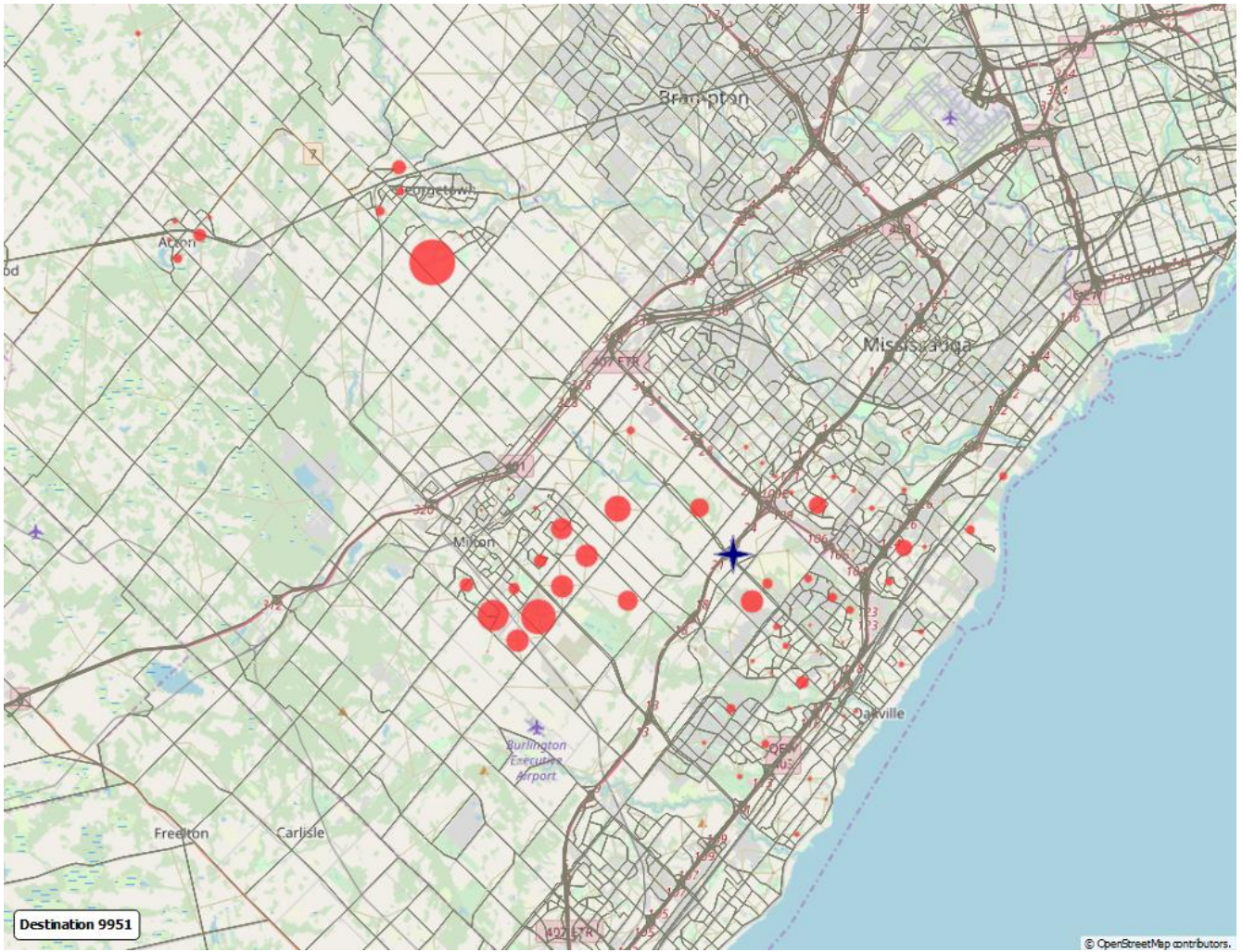
Splits and Phases: 9: Trafalgar Rd & Burnhamthorpe Rd E



Appendix E-: EMME Output









Final Report

Britannia Station Traffic Impact Study

Highway 407 Transitway-4



Prepared for Ministry of Transportation, Ontario
by IBI Group
November 15, 2019

Document Control Page

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1 Introduction

This report is a traffic impact study for the proposed 407 Transitway Station located near the interchange of Highway 407 and Britannia Road in Mississauga, Ontario. This report was prepared as part of the Environmental Assessment of the 407 Transitway, Brant Street to West of Hurontario Street.

The purpose of this report is to provide an assessment of traffic, transit, walking and cycling access to the proposed station. The assessment includes operations analysis and review of local road network configuration to identify needs and opportunities for transportation-related changes and coordination to accommodate the station.

1.1 Transitway Overview

The Highway 407 Transitway is a rapid transit facility planned within the Greater Toronto and Hamilton Area (GTHA). The Transitway will be fully grade-separated with an exclusive right-of-way and will run parallel along the Highway 407 corridor. This Transitway project supports the Province's Growth Plan by meeting increased travel demands through alternative transportation modes, providing increased mobility for a wide variety of users, and supporting transit-oriented development and associated land uses. The Transitway is initially designed to support busway service (BRT) with provisions for future conversion to light-rail transit (LRT) technology.

The section under the current EA spans approximately 43 kilometres from Brant Street in Burlington to west of Hurontario Street (west of proposed Hurontario Station) in Mississauga. This section of the Transitway provides opportunities to connect numerous Urban Growth Centres (e.g. Hamilton, Oakville, Milton and Mississauga City Centres) as well as to a number of higher order transit systems, supporting development within both the Region of Halton and Peel. The Transitway is being planned to the 2041 horizon. Traffic analysis is to the 2031 horizon due to uncertainties in development levels and traffic trends beyond 2031.

1.2 Study Area

The proposed station is located south of Britannia Road just east of the Highway 407 and Britannia Road interchange in Mississauga as shown in Exhibit 1-1. This location was developed through consultation with the City of Mississauga and accommodates the Transitway alignment east of the Highway 407. The study area includes the following intersections:

- Britannia Road & Eighth Line (*unsignalized*);
- Britannia Road & Highway 407 WB Off-Ramp (*signalized*);
- Britannia Road & Highway 407 EB Off-Ramp (*signalized*);
- Britannia Road & Ninth Line (*signalized*);
- Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard (*signalized*);
- Ninth Line & Freeman Terrace (*unsignalized*);
- Ninth Line & Manatee Way (*unsignalized*); and
- Ninth Line & McDowell Drive (*unsignalized*).

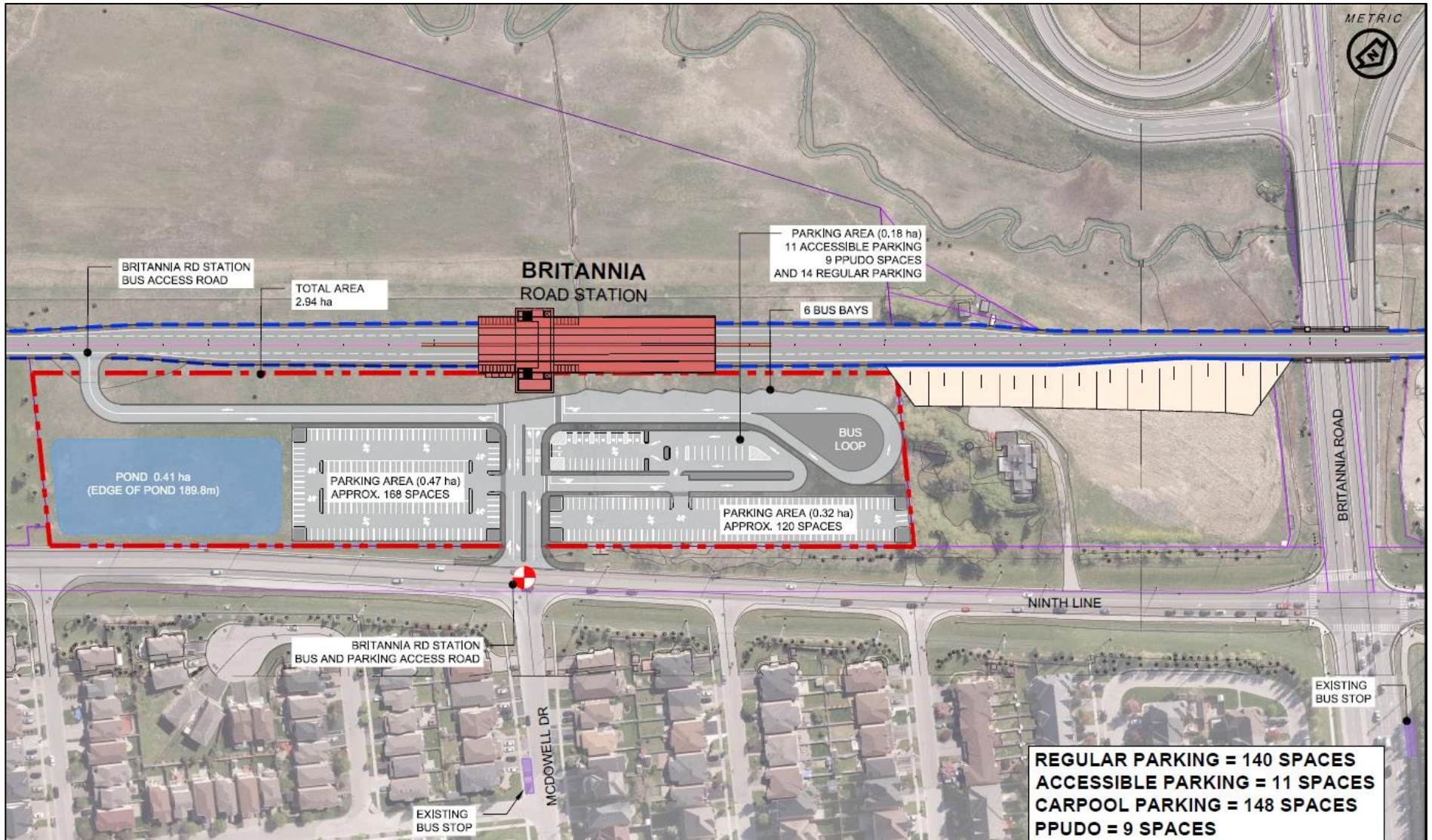
1.3 Station Plan

The proposed station layout is provided in Exhibit 1-2. The site plan illustrates that the station connects to Ninth Line a full movement signalized access at McDowell Drive. Further commentary on station layout and internal circulation is provided in Section 4 of this report.

Exhibit 1-1: Study Area



Exhibit 1-2: Proposed Station Layout



2 Existing Conditions

This section documents the existing road network, facilities, and weekday peak hour operations at the studied intersections.

2.1 Road Network

Britannia Road is an east-west arterial regional road within Halton Region (west of Highway 407) and Region of Peel (east of Highway 407). The road spans from the City of Burlington to the City of Mississauga. West of Highway 407, Britannia Road has two lanes with a posted speed limit of 80 km/h and transitions to four lanes with a posted speed limit of 70 km/h to the east.

Highway 407 is a tolled 400-series highway with a six lane cross section. It connects the City of Burlington to the City of Pickering. 400-series highways have a speed limit of 100 km/h. A full interchange is located at Highway 407 and Britannia Road.

Eighth Line is a two lane north-south collector road in the Town of Milton. The road starts at East Lower Base Line and ends one kilometre north of Derry Road. Currently, it provides access to farm land with some residential units. Eighth Line has a posted speed limit of 60 km/h.

Ninth Line is a two lane north-south arterial road in the City of Mississauga. The road starts from Ford Drive at Upper Middle Road East and ends at Steeles Avenue. The east side of Ninth Line is developed as a residential area and the west side is currently undeveloped. Ninth Line has a posted speed limit of 70 km/h.

Maple Gate Circle is a two lane local road in the City of Mississauga providing access to residential properties. It has a speed limit of 50 km/h.

Churchill Meadows Boulevard is a two lane north-south minor collector road in the City of Mississauga. The road starts at Eglinton Avenue West and ends at Britannia Road West and provides access to residential properties. A commercial plaza is located at the southwest corner of Britannia Road at Churchill Meadows Boulevard. Churchill Meadows Boulevard has a posted speed limit of 50 km/h.

Freeman Terrace is a two lane local road in the City of Mississauga providing access to residential properties. It has a speed limit of 50 km/h.

Manatee Way is a two lane local road in the City of Mississauga providing access to residential properties. It has a speed limit of 50 km/h.

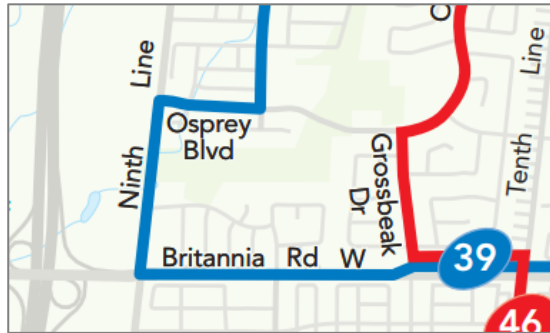
McDowell Drive is a two lane local road in the City of Mississauga providing access to residential properties. It has a speed limit of 50 km/h.

2.2 Transit

MiWay (Mississauga Transit) operates **Route 39 (Britannia)** along Britannia Road and connects Renforth Station to Meadowvale Town Centre at approximately 20 minute headways.

Exhibit 2-1 illustrates the MiWay route map within the study area.

Exhibit 2-1: MiWay Route 39 within Study Area



Source: MiWay System Map (2019)

2.3 Active Transportation

North of Britannia Road there is a multi-use path, Lisgar Meadow Brook Trail, on the east side of Ninth Line connecting to Johnny Bower Park and May Meadow Park. South of Britannia Road, Ninth Line is semi-rural without sidewalks or paths, however the road is planned for future widening with active transportation facilities subject to a future EA at the City of Mississauga.

Britannia Road has active transportation facilities consisting of a sidewalk and multi-use path to the east of Ninth Line. West of Ninth Line, no facilities are provided crossing the interchange with Highway 407.

2.4 Traffic Conditions

2.4.1 Traffic Counts & Signal Timing Data

Traffic count data and signal timing information was collected from Halton Region, Region of Peel and 407 ETR. All turning movement counts modelled for the purposes of this study were conducted recently (within the past five years) and so should reflect current traffic patterns within the study area. Exhibit 2-2 provides a summary of dates on which this information was collected/recorded.

Exhibit 2-2: Traffic Count and Signal Timing Data

INTERSECTION	CONTROL TYPE	DATE OF TMC	DATE OF SIGNAL DATA
Britannia Road & Eighth Line	Unsignalized	2017-06-22	-
Britannia Road & Highway 407 WB Off-Ramp	Signalized	2018-12-05	NA
Britannia Road & Highway 407 EB Off-Ramp	Signalized	2018-12-05	NA
Britannia Road & Ninth Line	Signalized	2016-11-16	2018-10-12
Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard	Signalized	2016-11-16	2018-10-12
Ninth Line & Freeman Terrace	Unsignalized	2016-11-16	-
Ninth Line & Manatee Way	Unsignalized	2016-11-16	-
Ninth Line & McDowell Drive	Unsignalized	2016-11-16	-

2.4.2 Approach

Traffic analysis was conducted using Synchro (version 9) software and follows Highway Capacity Manual (HCM 2000) methodologies of intersection operation analysis. Critical movements were defined as follows.

For signalized intersections,

- V/C ratios for overall intersection operations, through movements or shared through/turning movements equal 0.80 or above;
- V/C ratios for exclusive movements equal 0.85 or above; or,
- Queues for an individual movement are projected to exceed available turning lane storage.

For unsignalized intersections,

- Level-of-service, based on average delay per vehicle or on individual movements is “LOS D” or greater; or
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

Level-of-service (LOS) is a measure of performance based on control delay, defined as follows in Exhibit 2-3.

Exhibit 2-3: Intersection LOS Reference

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The Synchro traffic models were calibrated to better represent measured field conditions. This was accomplished by adjusting the lane utilization factor and via lost time adjustment. The “lane utilization factor” (LUF) was altered when calibrating through movements. This parameter is used to dictate the distribution of traffic across the available lanes, with a value of 1.0 representing a uniform distribution across all lanes. During non-congested periods, there is often more traffic distributed amongst the right-most lanes as compared to the left-most lanes. However, in over-saturated conditions, the distribution of traffic is typically more evenly split, as drivers quickly fill any available gap in traffic.

In existing models, the LUF was adjusted to a value of 1.0 for all through movements initially identified as having a v/c greater than 1.0. These adjustments were then carried forward to their respective movements to the future models (for the same peak period). Additionally, because the above-mentioned driver behaviour is quite predictable, this adjustment was also made to any new critical through movements (having a v/c ratio > 1.0) identified in the future models.

The “lost time adjustment” (LTA) was also altered in order to calibrate left-turn movements. Adjusting this parameter to negative value effectively increases the clearance time available for left-turning traffic to clear the intersection during the amber and/or all-red signal phases.

During oversaturated conditions where left-turn queues are excessively long and/or there are limited gap available in the opposing traffic to make the left-turn (under permissive phasing), drivers are typically more aggressive and willing to turn during the amber/all-red phases.

In existing models, the LTA was changed for all left-turn movements identified as being well over capacity – defined as having a v/c greater than 1.2 – since these turning volumes were explicitly measured in the field. Values were assigned based on the initial v/c ratio for that movement:

- If the v/c ratio was between 1.2 and 1.5, the LTA was set to ‘-1’; and,
- If the v/c ratio exceeded 1.5, the LTA was set to ‘-2’.

Subsequently, all adjustments made to the LTA in the existing models were carried forward to the respective movements in the future models (for the same peak periods). However, because this driving behaviour is believed to be less predictable, no additional LTA changes were made to “new critical left-turn movements (having a v/c ratio > 1.2) identified in the future model, which did not exist previously in the existing models.

2.4.3 Model Calibration

The existing traffic models were calibrated to better reflect measured field conditions accomplished by adjusting the lane utilization factor (LUF) and/or lost time adjustment (LTA) for certain movements.

The adjustments made to the existing models are outlined in Exhibit 2-4.

Exhibit 2-4: Existing Model Calibration Adjustments

PERIOD	INTERSECTION	MOVEMENT	ADJUSTED PARAMETER	ADJUSTED VALUE
AM Peak	Britannia Road & Ninth Line	EBT	LUF	1.0
PM Peak	(no adjustments)	-	-	-

2.4.4 Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the existing conditions. An annual compound growth rate of 1.0% was applied to all count volumes obtained in years prior to 2019 in order to bring all counts to a consistent base year. Existing conditions traffic volumes are shown in Exhibit 2-6.

A summary of the Synchro analysis including delay, v/c, 95th percentile queue lengths and LOS indicators are shown in Exhibit 2-5, with detailed Synchro reports provided in Appendix A. The study intersections are currently operating as follows:

- Britannia Road & Eighth Line is operating with two critical approaches during both peak hours. Due to stop control nature of the minor approaches and high E-W movements, vehicles on the NB and SB approach experience significant delays finding available gaps to complete their maneuver.
- Both Highway 407 EB and WB Off-Ramps are expected to operate well at LOS A during both peak hours. This indicates general free-flow conditions.
- Britannia Road & Ninth Line is expected to operate at LOS E during both peak hours. In the a.m. peak, due to priority given to the through movements, the left-turn movements WBL, NBL, and SBT are operating at / over capacity with v/c = 1.15, 1.11, and 1.00. In the p.m. peak hour, NBT movement is at capacity with v/c = 1.00

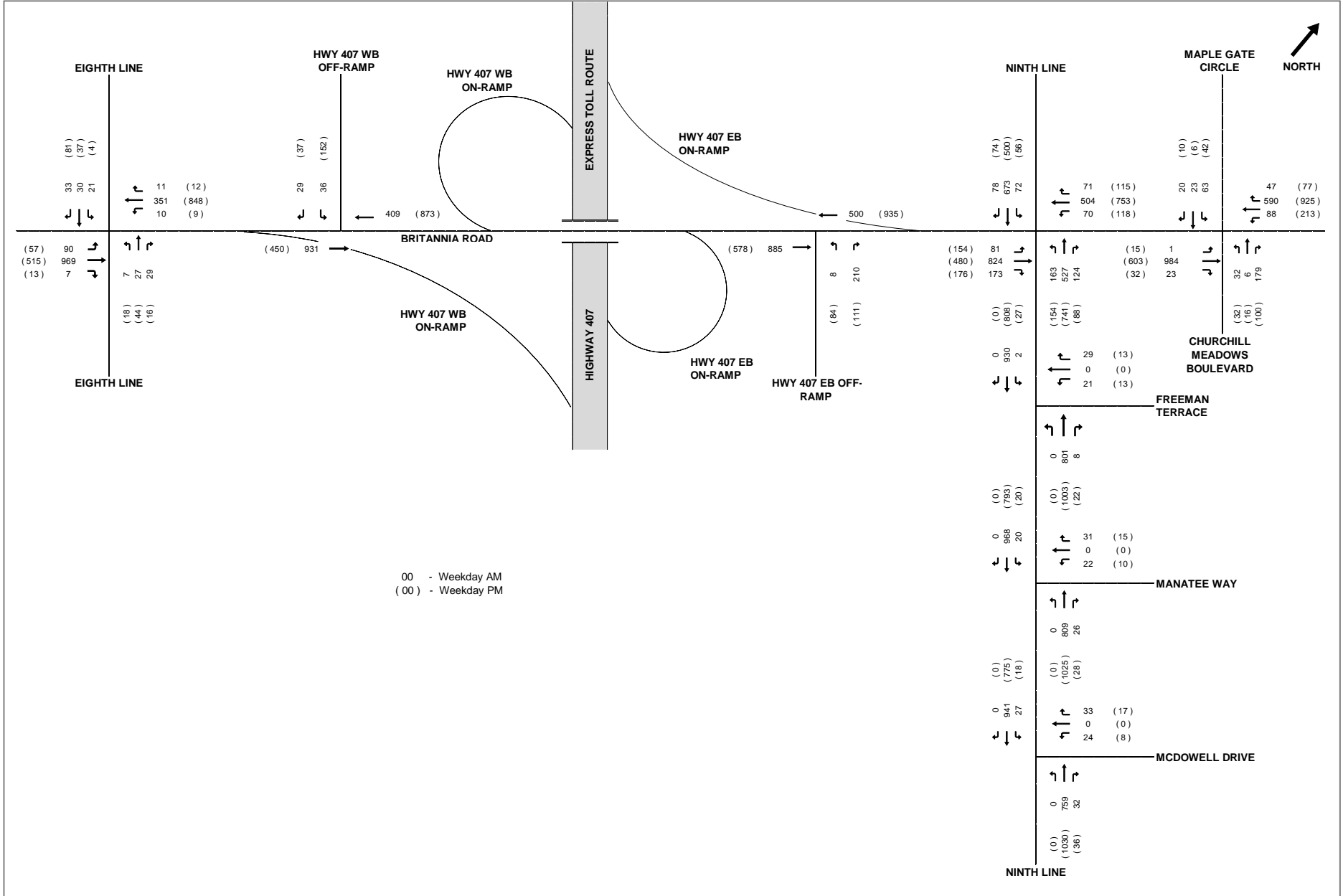
due to high observed evening peak volumes and some priority given to the high observed WBT evening peak volumes.

- Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard is expected to operate well at LOS B during both peak hours, with no critical movements.
- During both peak periods, all unsignalized intersections on Ninth Line (i.e. Freeman Terrace, Manatee Way, McDowell Drive) are expected to operate near / at capacity on its WB approach, due to high N-S volumes, with limited available gaps.

Exhibit 2-5: Synchro Analysis: Existing Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Britannia Road & Eighth Line <i>(unsignalized)</i>	-	NBLTR SBLTR	F F	0.73 1.11	28 49	-	NBLTR SBLTR	F F	1.27 0.84	52 43
Britannia Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	A	SBL	D	0.34	13	A	No critical movements.			
Britannia Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	No critical movements.				A	No critical movements.			
Britannia Road & Ninth Line <i>(signalized)</i>	E	EBT	D	0.80	187	E	EBL	E	74	0.88
		WBL	F	1.15	63		EBT	D	40	0.52
		WBT	E	0.50	108		WBL	F	81	0.70
		NBL	F	1.11	97		WBT	E	68	0.77
		NBT	D	0.88	282		WBR	D	36	0.09
		SBT	E	1.00	349		NBT	E	73	1.00
Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard <i>(signalized)</i>	B	NBL	D	0.11	19	B	NBL	D	46	0.10
		NBT	D	0.26	43		NBT	D	46	0.11
		SBL	D	0.28	33		SBL	D	47	0.15
		SBT	D	0.07	17		SBT	D	45	0.02
Ninth Line & Freeman Terrace <i>(unsignalized)</i>	-	WBLTR	F	0.94	33	-	WBLTR	F	0.52	15
Ninth Line & Mantee Way <i>(unsignalized)</i>	-	WBLTR	F	1.19	40	-	WBLTR	F	0.40	12
Ninth Line & McDowell Drive <i>(unsignalized)</i>	-	WBLTR	F	1.01	37	-	WBLTR	F	0.31	9

Exhibit 2-6: Existing Traffic Volumes in the AM (PM) Peak Hour



3 Future Conditions

This section documents the future traffic conditions with considerations to background traffic growth and traffic expected to be generated from the Transitway station.

3.1 Future Roadway Network

The future horizon year of 2031 has several confirmed changes in the road network within the study area according to the *Halton Region Budget and Business Plan (2019)*, the Peel Region Ten Year Combined Capital Program (2019), and the Ninth Line Lands Study Transportation Assessment (2017). The following are anticipated improvements in the study area:

- Road widening on Britannia Road between Bronte Road and Highway 407 from four to six lanes of travel, with construction beginning in November 2019 and expected to end in May 2022. For the purpose of this study, six lanes were assumed for Eighth Line intersection only due to huge undertaking required (bridge widening) to include the two Highway 407 Off-ramps;
- Road widening on Ninth Line between Burnhamthorpe Road and Highway 407 from two to four lanes of travel, with construction planned for 2023. For the purpose of this study, no turning lanes were assumed; and
- Additional eastbound right-turn and northbound right-turn lanes and extensions of westbound left-turn, northbound left-turn, and eastbound left-turn lanes at Britannia Road & Ninth Line, with construction planned for 2023.

3.2 Transit

The 407 Transitway is the most significant future transit service proposed in the immediate area, however as Ninth Line and the area west of it develops, there will likely be an increase in bus service along the corridor and on connecting streets including Britannia Road.

3.3 Active Transportation

The City of Mississauga's 2018 Cycling Master Plan identifies Ninth Line as planned multi-use path. The plan also proposes a multi-use path within the development plans to the west of Ninth Line. McDowell Drive, south of Britannia, is also indicated as a 'shared route'.

Planning of the 407 Transitway Station should incorporate connections to the above facilities.

3.4 Station Traffic

Traffic to and from the station consists of park-and-ride traffic and pick-up and drop-off traffic. Site traffic was estimated using the park-and-ride forecasts from the System Planning component of the Environmental Assessment.

3.4.1 Station Trip Generation

Ridership forecasts were provided by MTO and sourced from MTO's Greater Golden Horseshoe Travel Demand Model V4. The model is an advanced state-of-practice multi-modal travel demand model that estimates future travel demands within the Greater Golden Horseshoe. The GGHM was developed to forecast peak period demand in support of the Growth Plan policies and has the capability of predicting mode shifts resulting from new public transit infrastructure. It

can also be used to test network response to changes in link characteristics such as transit vehicle frequency, operating speed, station location, and parking availability.

The GGH model accounts for planned and committed road and transit projects sourced from Metrolinx Regional Transportation Plan and local transportation plans. While it is possible that additional projects will be funded over the upcoming years, this model presents a conservative approach.

With input from the MTO, a horizon year of 2031 was selected as the baseline for determining road and intersection requirements as part of this traffic impact study. As MTO's GGH model is to a 2041 horizon, ridership projections for 2031 were not available. Therefore the 2041 demands were carried forward on the basis that entry and exit volumes would be conservative (the resulting turning lanes and queue storage would accommodate 2031 demand) as provided in Exhibit 3-1.

Exhibit 3-1: 2041 AM Peak (2-hour) Boardings

STATION	TOTAL 2-HR BOARDINGS	2-HR PARK-AND-RIDE	2-HR WALK / TRANSIT	% PARK-AND-RIDE	% WALK / TRANSIT
Dundas	923	510	413	55%	45%
Appleby	227	207	20	91%	9%
Bronte	306	90	216	29%	71%
Trafalgar	3,095	436	2,659	14%	86%
Britannia	523	136	387	26%	74%
Derry	911	334	577	37%	63%
Mississauga	982	82	900	8%	92%
Total:	6,967	1,795	5,172	26%	74%

From the above exhibit, two hour park-and-ride boardings were equated to two hour inbound vehicle trips at an assumed factor of 10:11, or 1.1 riders per park-and-ride vehicle. To convert to a.m. inbound peak hour volumes, a factor of 0.56 was applied. This factor was developed through a review of existing travel patterns using Transportation Tomorrow Survey (TTS 2016) data. The resulting a.m. peak hour inbound vehicle flow is 69 vph and rounded to 70 vph.

Further processing of forecasts was required to estimate a.m. outbound traffic, associated with kiss-n-ride drop off trips, and p.m. peak hour traffic. The ITE Trip Generation Manual (9th edition) provided ratios of inbound to outbound and a.m. to p.m. traffic for typical park-and-ride bus stations. Average trip generation rates for bus stations with park-and-ride lots are indicated in Exhibit 3-2. Using the ratios provided, Exhibit 3-3 lists the estimated station traffic generated give the above assumptions.

Exhibit 3-2: ITE Trip Generation Rates for Park-and-Ride Lots

LAND USE (CODE)	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		Trip Rate	Inbound / Outbound	Trip Rate	Inbound / Outbound
Park-and-ride with bus service (090)	/ parking space	0.71	79% / 21%	0.62	25% / 75%

Exhibit 3-3: Estimated Vehicle Trips Generated by Station

AM PEAK TRIPS		PM PEAK TRIPS	
Inbound	Outbound	Inbound	Outbound
70*	19	19	58

* Calculated based on forecasted 2031 a.m. park-and-ride 2 hrs boardings, at a factor 1.0 inbound vehicles per 1.1 boardings. To convert to a.m. peak hour trips, a factor of 0.56 was multiplied.

3.4.2 Trip Distribution

A map showing the origin of park-and-ride trips destined to Britannia station was extracted from the 2031 GGHM and can be found attached in Appendix E. Using this map, inbound trips were tabulated in terms of general direction of origin (i.e. north, south, east, and west) and assigned to the study area intersections as a percentage of total inbound trips. Distribution of outbound trips was assumed to be the same as inbound trips. Resulting trip assignments are illustrated in Exhibit 3-4. Site generated traffic was assigned to study area intersections and is indicated in Exhibit 3-5.

Exhibit 3-4: Trip Distribution in AM and PM Peak Hours

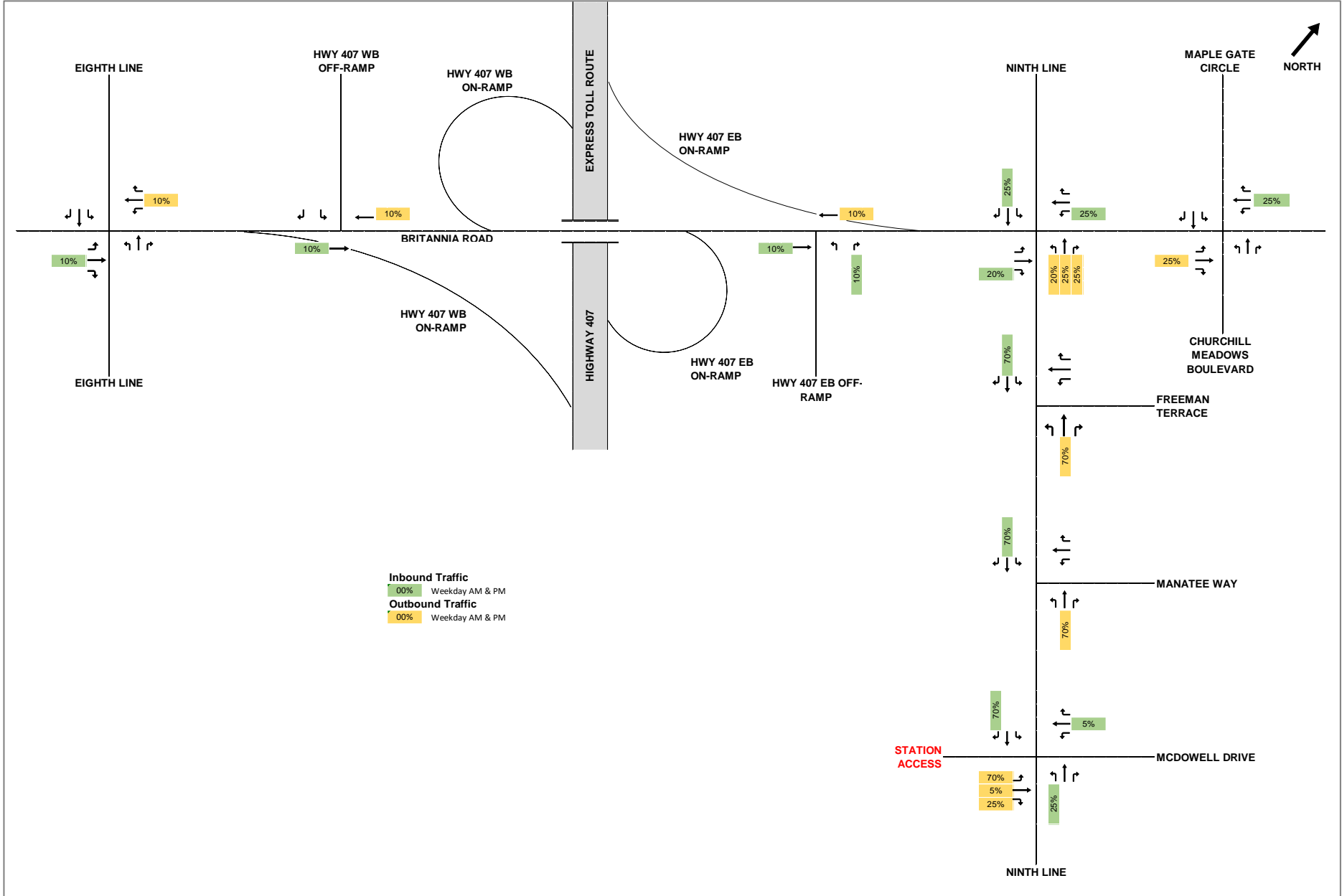
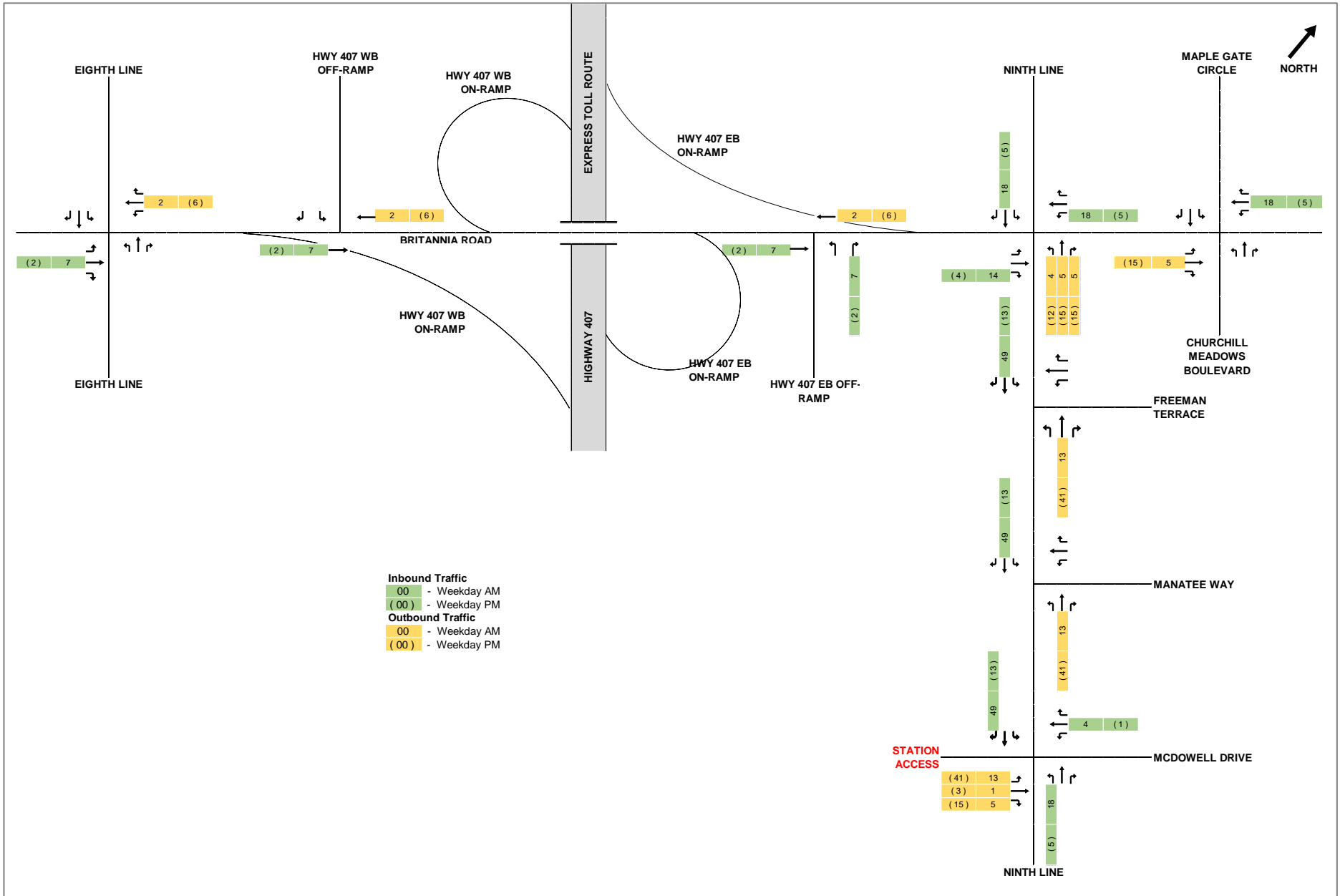


Exhibit 3-5: Site Generated Traffic in AM Peak Hour and PM Peak Hour



3.4.3 Parking Demands

Part of the scope of the traffic study was to provide a recommended parking lot size for each station. This was developed using the ratio of ridership to parking lot sizes taken from GO transit stations. The intent of this approach is to account for typical daily utilization of the lot for a robust and nearly full transit service with low but non-zero spare capacity across the system. The following provides the approach:

- The average number of inbound vehicle trips (auto drivers) made to each of these GO stations during the a.m. peak period (defined as 6:30-9:30 am) were determined using 2016 Transportation Tomorrow Survey (TTS) data.
- Parking data for the GO transit stations was obtained from the GO Rail Station Access Plan (2016) prepared by Metrolinx. The report notes the total capacity and average utilization of each GO station parking lot, which were used to calculate average parking demands.
- A “parking rate” or ratio between demand and auto driver trips was determined. These values are indicated in the below Exhibit 3-6.

Exhibit 3-6: Parking Demand Factors for nearby GO Transit Stations

2016 TTS AM PEAK PERIOD		2016 GO STATION PARKING *			PARKING RATE (Spaces / Driver)
GO Station	Auto Drivers *	Lot Capacity **	Lot Utilization **	Demand	
Brampton	861	863	96%	828	0.962
Bramalea	1,360	2,371	86%	2,039	1.499
Malton	580	698	96%	670	1.155
Erindale	1,370	2,183	76%	1,659	1.211
Burlington	1,270	2,076	86%	1,785	1.406
Appleby	2,080	2,818	86%	2,423	1.165
Bronte	2,460	2,971	86%	2,555	1.039
Oakville	2,820	4,401	86%	3,785	1.342
Lisgar	350	715	66%	472	1.348
Milton	1,330	1,472	100%	1,472	1.107
Meadowvale	1,080	1,652	96%	1,586	1.468
Streetsville	1,650	1,541	96%	1,479	0.897
Clarkson	2,520	3,800	86%	3,268	1.159
Aldershot	870	1,640	96%	1,574	1.810
<i>Total</i>	<i>20,601</i>	<i>29,201</i>	<i>88%</i>	<i>25,597</i>	1.243

* AM peak period inbound vehicles estimated using 2016 TTS data, and rounded to the nearest 10.

** GO parking data obtained from "GO Rail Station Access Plan" (2016) and dated December 2016

This “parking factor” was then applied to the a.m. peak period inbound trips estimated at each Transitway station. Note that park-and-ride (2-hrs) forecasts (and congruently, estimated inbound vehicle trips) for the a.m. peak two hours can be converted to a.m. peak period forecasts by applying a factor of 1.370, as analysis of the TTS indicate that 73% of 3-hour a.m. peak period trips occur within the two a.m. peak hour.

The resulting estimated parking demands at each Transitway station are provided in Exhibit 3-7. Parking demands are provided for the 2041 horizon, representing the “ultimate” conditions. From discussions with MTO, the station is being moved southward on Ninth Line, eliminating the potential second access off Freeman Terrace. With this relocation, the latest site plan (as shown in Exhibit 1-2) show a total parking supply of 288 spaces which is a surplus of 78 spaces from the recommended parking lot size.

Exhibit 3-7: Estimated Parking Demands for each Transitway Station

STATION	GGHM INBOUND TRIPS		PARKING LOT SIZE ***
	AM Peak 2-Hour*	AM Peak Period **	
	2041	2041	2041
Dundas	460	640	800
Appleby	190	260	320
Bronte	80	110	140
Trafalgar	400	540	680
Britannia	120	170	210
Derry	300	420	520
Mississauga	70	100	128

* Calculated based on forecasted a.m. park-and-ride boardings, at a factor 1.0 inbound vehicles per 1.1 boardings.

** Peak 2-hour trips can be converted to peak period trips at a factor of 1.370, based on TTS 2016 outputs.

*** Parking lot size calculated by multiplying estimated a.m. peak period inbound trips by a factor of 1.243.

3.5 Background Traffic Growth

Future background traffic volumes were estimated for the study area using GGHM (discussed in Section 3.1) demand model supplemented with manual refinements considering local conditions. Macro models can be limited with respect to specific hourly forecasts, and the 2011 base-year model (used in the comparative analysis) is also aging, therefore refinements included review of municipal transportation master plans (TMPs), land-use, background population and employment growth, and adjustments for local developments or changes to the road network.

The GGHM demand model growth from 2011 base to 2031 on Britannia Road has peak direction link flow of 1347vph to 2020vph or 2.05% annual compound growth rate. The peak link volumes along Ninth Line is 710vph in 2011 and is forecasted to grow to 1788vph in 2031 or a 4.73% annual rate, indicating significant development growth. Model output figures are provided in Appendix E. It is noted that current volumes along Ninth Line are approaching 1,000vph in the peak direction and this calculated growth rate is extremely high in terms of long-term sustainability, and may be inappropriate as it is tied to a lower base volume. Therefore, further sources of background growth were also reviewed and considered.

The City of Mississauga and Region of Peel population and employment forecasts were considered in the development of traffic growth rates. Relevant documents are listed as follows:

- Greater Toronto and Hamilton Area – “Growth Plan for the Greater Golden Horseshoe” (2017);
- City of Mississauga – “Mississauga Official Plan” (2016); “Population, Demographics & Housing” (2013); and “Moving Mississauga” (2011); and,
- Region of Peel – “Long Range Transportation Plan” (2012).

Review of the above documents showed that population growth is estimated to be 0.5% to 0.6% per year between 2011 and 2031, while trip ends from the demand model are forecasted to increase by 0.9% to 1.0% per year during that same period time.

A background review on the *Ninth Line Lands Transportation Study (2017)* by MMM Group was completed. Ninth Line study evaluated various future conditions of the Emerging Land Use Concept (dated September 18, 2016) of Ninth Line Lands, which is located on the western boundary of Mississauga. The report recommends an approximate 1% growth along Ninth Line with no widening and an approximate 2% along Britannia Road during peak hours in the busiest direction. It is noted that the growth rates used does not assume the widening of Ninth Line, since the widening is primarily associated with the development of the Emerging Land Use Scenario for future total conditions.

In summary, based on the information presented, a 2% compound growth rate will be applied to existing traffic volumes on both Ninth Line and Britannia Road. This rate was applied to all 'major' movements, which is defined as all through movements along arterial roads or turning movements between two arterial roads. This chosen rate is with the assumption that additional development traffic will need to be included, as discussed in Section 3.5.1 below.

3.5.1 Nearby Developments

The *Ninth Line Lands Transportation Study (2017)* evaluates the future land use concept accounting for varying non-auto modal split scenarios (5%, 10%, and 20%) to evaluate the potential degree of success of the Highway 407 Transitway program. From this study, the Emerging Land-Use volumes 5% non-auto modal split, symbolizing worst-case scenario, was extracted and included in the future background volume. In addition, the Ninth Line study also referenced a large background development (Erin Mills Development) comprising of approximately 112,630 m² of industrial park, 6,762 m² of retail and 8,074 m² of office use located on the northeast quadrant of Highway 403/407. The resulting site-generated traffic was also incorporated into the future background volume of this report.

3.6 Future Model Calibration

The future Synchro models were calibrated to better reflect expected conditions accomplished by adjusting either the Lane Utilization Factor (LUF) or Lost Time Adjustments (LTA) for certain movements.

Adjustments made to the future traffic models are summarized in Exhibit 3-8.

Exhibit 3-8: Future Model Calibration Adjustments

PERIOD	INTERSECTION	MOVEMENT	ADJUSTED PARAMETER	ADJUSTED VALUE
AM Peak	Britannia & Ninth Line	EBT	LUF	1.0
PM Peak	(no adjustments)	-	-	-

3.7 Future Background Operations

To analyze future background conditions, the existing traffic volumes were grown using the growth rates discussed in Section 3.5. Future background conditions include planned improvements discussed in Section 3.1. Exhibit 3-9 illustrates future background traffic volumes during the a.m. and p.m. peak hours.

A summary of critical movements identified during the future background condition analysis is provided in Exhibit 3-7, with detailed output of the Synchro analysis provided in Appendix B.

With background growth added, the study intersection are expected to operate as follows:

- Britannia Road & Eighth Line is expected to continue to operate poorly on the two minor approaches. With limited gaps available in E-W traffic, the NB and SB approaches will not sufficiently accommodate demands, with v/c ratios greater than 1.30 during both peak periods. This indicate severe congestion and long queues for the two shared movements.
- Both Highway 407 EB and WB Off-Ramps are expected to operate well at LOS B or better. This indicates general free-flow conditions.
- Britannia Road & Ninth Line is expected to continue operating at LOS E during both peak periods. With the roadway improvements planned for this intersection, additional capacity is given to the left-turning and through volumes. However, with planned growth in the area, there are high demands on all approaches which competes for available green time. Overall, all movements are expected to operate within acceptable levels-of-service ($v/c < 1.0$), with the exception of the SBT movement which operates at capacity in the a.m. peak period ($v/c = 1.02$).
- Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard is expected to operate at LOS B during both peak hours. Some delays are expected to be experienced by the minor approaches and the WBL movement during both peak periods.
- During both peak periods, all unsignalized intersections on Ninth Line (i.e. Freeman Terrace, Manatee Way, McDowell Drive) are expected to operate well with no critical movements, given the widening of Ninth Line.

Exhibit 3-9: Future Background Traffic Volumes for the AM (PM) Peak Hour

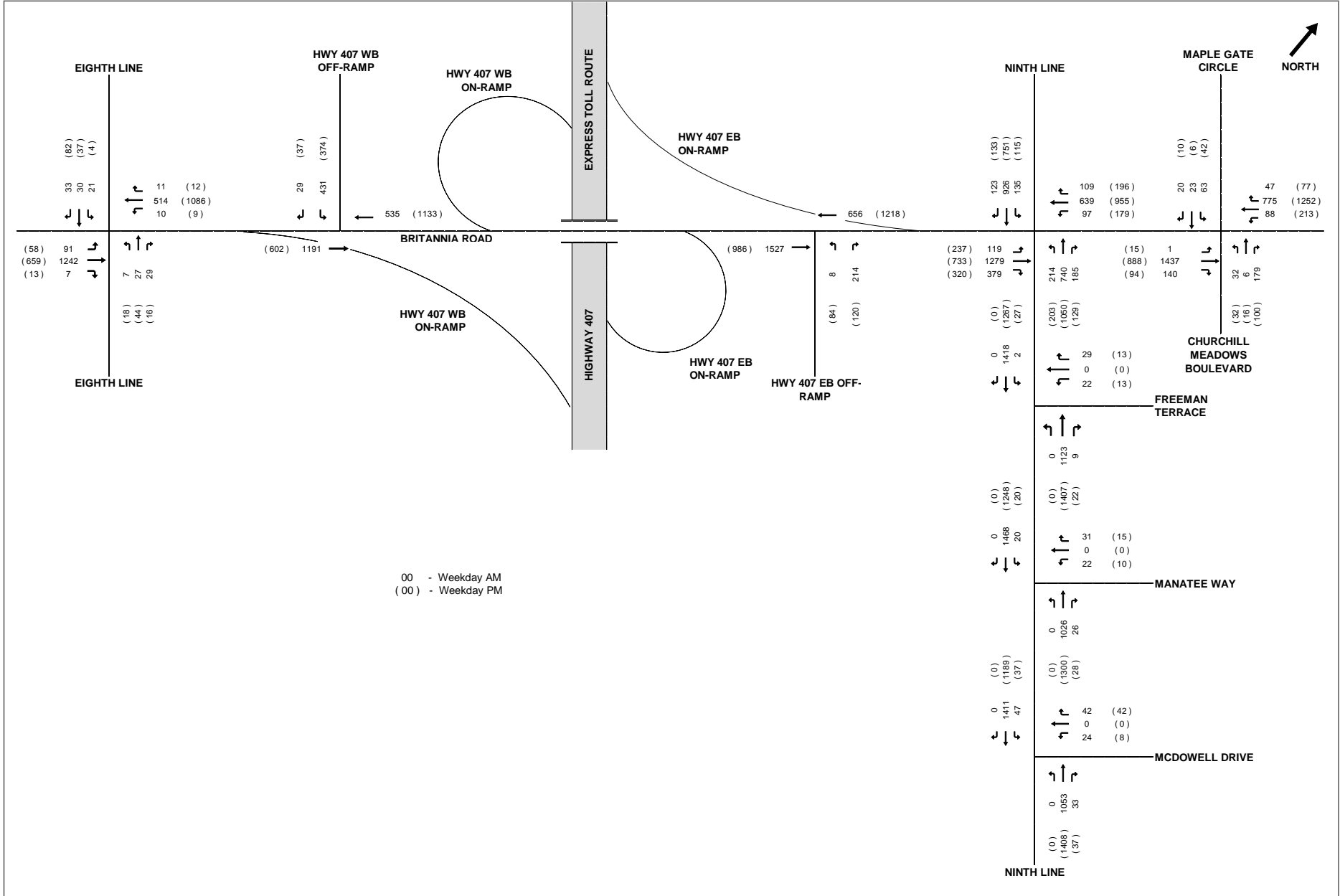


Exhibit 3-10: Synchro Analysis: Future Background Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Britannia Road & Eighth Line <i>(unsignalized)</i>	-	NBLTR SBLTR	F F	1.32 1.32	47 56	-	NBLTR SBLTR	F F	1.85 1.78	65 88
Britannia Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	B	SBL	D	0.84	105	B	No critical movements.			
Britannia Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	B	NBR	D	0.70	55	A	NBL NBR	D D	0.43 0.08	27 15
Britannia Road & Ninth Line <i>(signalized)</i>	E	EBT	E	0.96	273	E	EBL	E	0.91	110
		EBR	D	0.39	64		EBT	D	0.56	130
		WBL	F	0.85	51		WBL	E	0.60	78
		NBL	F	0.97	114		WBT	F	0.81	203
		NBT	D	0.69	144		NBL	F	0.92	99
		NBR	D	0.20	34		NBT	E	0.94	224
		SBL	D	0.58	41		NBR	D	0.16	30
		SBT	F	1.02	244		SBL	E	0.84	59
Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard <i>(signalized)</i>	B	WBL	D	0.72	58	B	WBL	C	0.69	83
		NBL	D	0.11	19		NBL	D	0.10	19
		NBT	E	0.43	69		NBT	D	0.11	22
		SBL	D	0.31	34		SBL	D	0.16	24
		SBT	D	0.08	17		SBT	D	0.02	9
Ninth Line & Freeman Terrace <i>(unsignalized)</i>	-	No critical movements.				-	No critical movements.			
Ninth Line & Manatee Way <i>(unsignalized)</i>	-	No critical movements.				-	No critical movements.			
Ninth Line & McDowell Drive <i>(unsignalized)</i>	-	No critical movements.				-	No critical movements.			

3.8 Future Total Operations

Future total volumes were calculated adding the station-generated traffic to the future volumes with background growth applied. The future scenarios accounts for all vehicular traffic that is estimated to year 2031 following implementation of the Transitway.

Future total volumes which includes background growth and station-generated traffic are illustrated in Exhibit 3-12.

A summary of critical movements identified during the future total condition analysis is provided in Exhibit 3-13, with detailed output of the Synchro analysis provided in Appendix C.

With the new Transitway demands added to future background conditions, the study intersections are expected to operate as follows:

- Limited station traffic is added to both the EBT and WBT movements at Britannia Road & Eighth Line. Overall, the minor approaches is expected to operate with long delays and queues. Because the two approaches are marginally affected by station demands, improvements for this intersection does not fall within the scope / responsibility of the Transitway-4 project. It is likely that Halton Region would

explore improvements at the intersection tied to improvements along Britannia Road.

- The two Highway 407 Off-Ramps are expected to operate with little to no change with the addition of the station demands.
- Britannia Road & Ninth Line is expected to continue operating at LOS E during both peak periods. With the added traffic, several of the critical movements ($v/c > 0.85$) now operate close to capacity. In the a.m. peak, the SBT and its conflicting NBL movements are expected to operate past capacity. During the p.m. peak, most movements show little change and will continue to operate below the capacity threshold. Overall, this intersection is expected to sufficiently accommodate the station demands, however, improvements should be considered to address concerns for both the NBT and SBL movements.
- With moderate demands added to Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard EBT and WBT movements, the intersection will continue to operate well at LOS B during both peak periods.
- Ninth Line and Manatee Way intersection, is expected to operate sufficiently with no critical movements. Due to low turning volumes, it is expected that queues for this intersection will not impact adjacent intersections on Ninth Line.

3.8.1 Station Access Analysis

A single access to the park-and-ride lot is proposed: a signalized access at Ninth Line & McDowell Road. Due to property acquisition issues, the MTO has decided move the station southward on Ninth Line, eliminating the potential for a second access. A single access is less desirable from a traffic operations standpoint, where if one access is blocked, an alternative is available. The below Exhibit 3-11 indicates that with the single access, station demands continue to be well served under the proposed configuration (as shown in Exhibit 1-2).

Exhibit 3-11: Station Access Operations Summary

ACCESS	AM PEAK					PM PEAK				
	LOS	Inbound/Outbound Movement				LOS	Inbound/Outbound Movement			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Ninth Line & McDowell Drive / Station Access <i>(signalized - proposed)</i>	B	NBL	A	0.09	3	B	NBL	A	0.02	1
		WBT	B	0.21	16		WBT	B	0.6	11
		SBR	A	0.03	3		SBR	A	0.01	0
		EBL	C	0.05	7		EBL	C	0.15	15
		EBTR	C	0.01	3		EBTR	B	0.02	6

As shown above, the access is expected to operate well during both the a.m. peak and p.m. peak hour. Due to green time prioritized for N-S movements along Ninth Line, egressing traffic from the station may experience minor delays. While small delays are anticipated, the v/c ratios for the single access are very low and excessive queueing are not anticipated.

Exhibit 3-12: Future Total Traffic Volumes for the AM (PM) Peak Hour

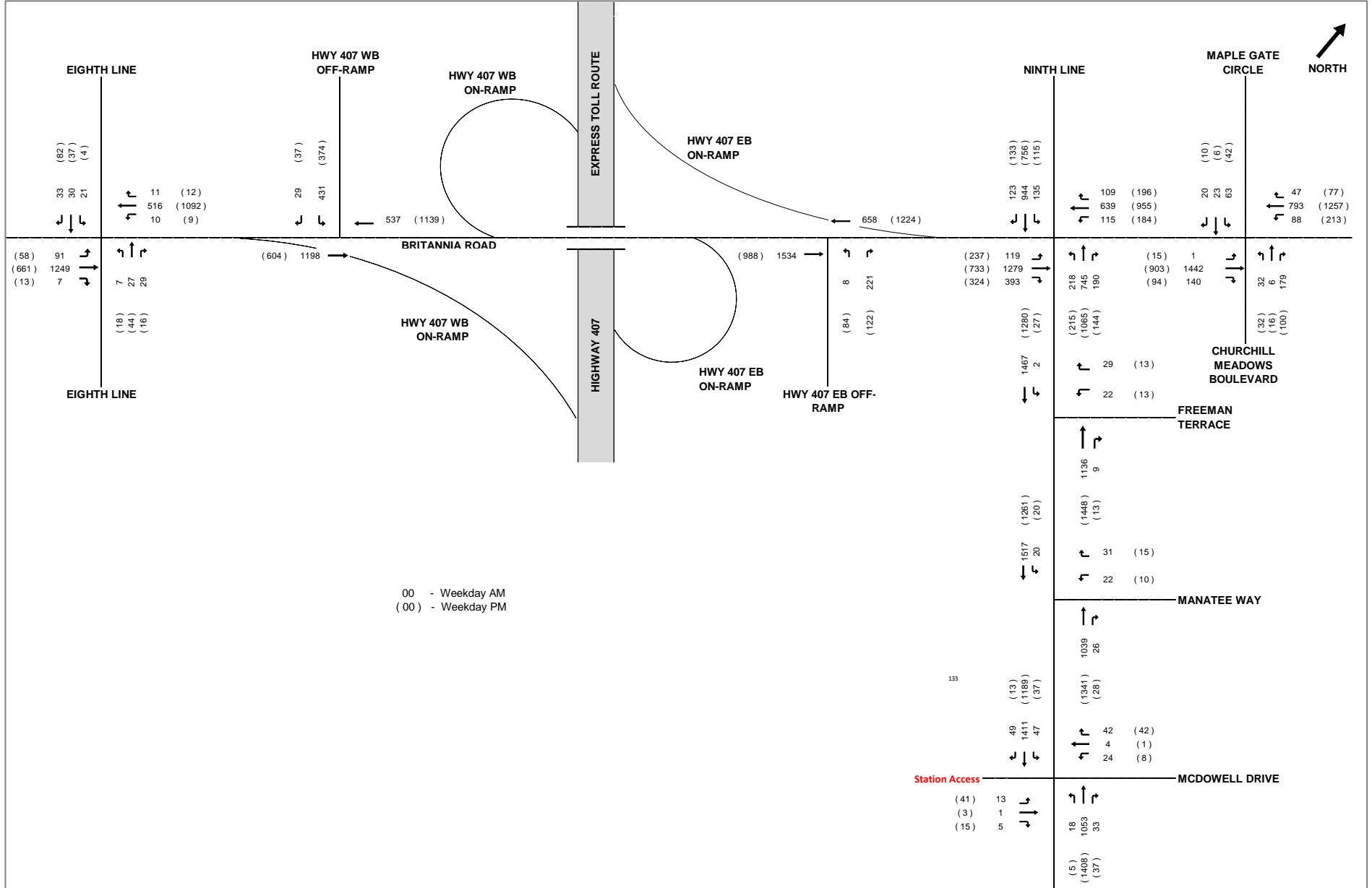


Exhibit 3-13: Synchro Analysis: Future Total Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Britannia Road & Eighth Line <i>(unsignalized)</i>	-	NBLTR SBLTR	F F	1.36 1.35	48 57	-	NBLTR SBLTR	F F	1.91 3.69	66 Err*
Britannia Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	B	SBL	D	0.84	105	B	No critical movements.			
Britannia Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	B	NBR	D	0.71	56	A	NBL NBR	D D	0.43 0.08	27 15
Britannia Road & Ninth Line <i>(signalized)</i>	E	EBT	E	0.97	276	E	EBL	F	0.92	113
		EBR	D	0.42	72		EBT	D	0.57	132
		WBL	F	0.90	63		EBR	D	0.27	37
		NBL	F	1.01	118		WBL	E	0.62	82
		NBT	D	0.70	146		WBT	F	0.82	206
		NBR	D	0.21	35		NBL	F	0.93	105
		SBL	D	0.59	41		NBT	E	0.94	226
		SBT	F	1.04	250		NBR	D	0.19	36
Britannia Road & Maple Gate Circle / Churchill Meadows Boulevard <i>(signalized)</i>	B	WBL	D	0.73	58	B	WBL	C	0.70	87
		NBL	D	0.11	19		NBL	D	0.10	19
		NBT	E	0.44	69		NBT	D	0.11	22
		SBL	D	0.31	34		SBL	D	0.16	24
		SBT	D	0.08	17		SBT	D	0.02	9
Ninth Line & Freeman Terrace <i>(unsignalized)</i>	-	No critical movements				-	No critical movements			
Ninth Line & Manatee Way <i>(unsignalized)</i>	-	No critical movements				-	No critical movements			

*Err – indicates severe congestion may occur outside of model parameters
 Station Accesses Analysis – Refer to Exhibit 3-11

4 Potential Improvement Measures

4.1 Transit

Based on the operational analysis, no special transit priority measures appear warranted for entrance into and out of the station site. The entrances operate well and buses entering and exiting the station are not expected to incur significant delay. The station layout appears to provide a reasonable and direct routing between the bus turnaround / drop-off facility and Ninth Line with limited potential for background queues to interfere.

4.2 Active Transportation

No specific active transportation measures such as pedestrian crossovers appear necessary as the proposed access configuration will provide crossing opportunity for pedestrians from the east side of Ninth Line (refer to Exhibit 1-2). The station layout should be reviewed under the future Ninth Line Environmental Assessment to ensure active transportation connections are provided between the proposed multi-use path and the station.

4.3 Traffic

4.3.1 Britannia Road & Ninth Line

The below improvement measures were analyzed in Synchro (given Future total volumes) with results presented in Exhibit 4-1.

- Dedicated SBR lane; and
- Optimized signal splits.

Exhibit 4-1: Analysis of Improvements to Britannia Road & Ninth Line

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Britannia Road & Ninth Line (<i>planned configuration*</i>)	1.01	EBL	C	0.42	36	0.96	EBL	F	0.92	113
		EBT	E	0.97	276		EBT	D	0.57	132
		EBR	D	0.42	72		EBR	D	0.27	37
		WBL	F	0.90	63		WBL	E	0.62	82
		WBT	C	0.50	78		WBT	F	0.82	206
		WBR	C	0.08	10		WBR	C	0.29	44
		NBL	F	1.01	118		NBL	F	0.93	105
		NBT	D	0.70	146		NBT	E	0.94	226
		NBR	D	0.21	35		NBR	D	0.19	36
		SBL	D	0.59	41		SBL	E	0.84	59
		SBT	F	1.04	250		SBT	E	0.93	195
		Britannia Road & Ninth Line (<i>with improvements</i>)	0.98	EBL	C		0.40	34	0.95	EBL
EBT	E			0.94	267	EBT	D	0.57		132
EBR	D			0.42	73	EBR	C	0.25		32
WBL	F			0.90	63	WBL	E	0.62		82
WBT	C			0.48	76	WBT	F	0.82		206
WBR	C			0.08	9	WBR	C	0.30		48
NBL	F			0.98	114	NBL	E	0.89		96
NBT	D			0.73	146	NBT	E	0.94		226
NBR	D			0.21	36	NBR	D	0.19		36
SBL	D			0.63	43	SBL	E	0.84		60
SBT	E			0.97	214	SBT	E	0.84		167
SBR	D			0.27	51	SBR	D	0.17		32

*refer to Future Roadway Network (Section 3.1)

The following was observed:

- Implementing a dedicated right turn will help facilitate SBT movement, freeing some green time for opposing NBL movement.
- Slight reduction in average v/c in both peak hours.

While providing a dedicated right-turn lane add some capacity for NB and SB approaches, there are safety concerns between the vehicles making SBR turns and vehicles wishing to turn onto the Highway 407 on-ramp. Further feasibility review should be considered under the design component of the Ninth Line corridor EA currently underway.

5 Summary and Recommendations

This report provides an analysis of traffic operations for the proposed Highway 407 Transitway station located near the intersection of Derry Road & Ninth Line in the City of Mississauga. The report also includes commentary on transit and active transportation access to the proposed station.

The traffic analysis found that existing conditions has some movements experiencing long delays in particular at intersections of Britannia Road and Eight Line and Britannia Road and Ninth Line. At Eighth Line, delay is mainly incurred by side-street traffic due to long cycle lengths and priority given to east-west traffic. At Ninth Line, there are congested movements including left turns, however it is noted that the City of Mississauga is planning to widen Ninth Line and the corridor is currently under an EA.

Future conditions during the a.m. and p.m. peak hours were modelled and analyzed based on a horizon year of 2031. Forecasts were developed using background growth rates informed by MTO's travel demand model. Forecasts for traffic to and from the proposed station was estimated based on ridership (park-and-ride) demand. The study accounts for the planned widening of Britannia Road from four lanes to six lanes west of Highway 407, and the widening of Ninth Line from two lanes to four lanes.

The study indicates that future 2031 background traffic conditions has some turning movements critical including westbound left and northbound left turns at Britannia Road and Ninth Line. A dedicated southbound right turn lane can improve operations. Other study area intersections are operating well with a few movements' volume to capacity ratios at or approaching 1.0 indicating busy traffic operations, however as movements were not severely congested additional improvements were not recommended. The future Ninth Line EA at the City should account for station demands.

Due to property concerns, the station is limited to a single access off Ninth Line at McDowell Road. Although less desirable than two accesses, the traffic model indicates that vehicles accessing and egressing is well served with no major queueing and delays anticipated.

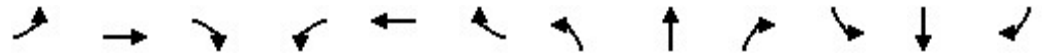
Transit access to the station is via Ninth Line and the main proposed station entrance. A bus turnaround facility is proposed within the station.

Walking and cycling access to the station will include linkages to the planned multi-use path on Ninth Line as identified in Mississauga's long-term cycling plan. The City's plans also identify an internal multi-use path west of Ninth Line in the new development lands, providing another opportunity for active transportation access.

Appendix A-: Existing Conditions Synchro Output

Lanes, Volumes, Timings
1: Eighth Line & Britannia Rd

AM Peak Period
09-18-2019



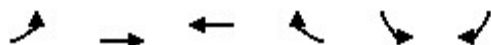
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	91	979	7	10	405	11	7	27	29	21	30	33
Future Volume (vph)	91	979	7	10	405	11	7	27	29	21	30	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.997			0.937			0.947	
Flt Protected		0.996			0.999			0.994			0.988	
Satd. Flow (prot)	0	1859	0	0	1815	0	0	1658	0	0	1775	0
Flt Permitted		0.996			0.999			0.994			0.988	
Satd. Flow (perm)	0	1859	0	0	1815	0	0	1658	0	0	1775	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		160.0			718.9			151.3			170.6	
Travel Time (s)		12.0			53.9			11.3			12.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	14%	0%	5%	27%	14%	4%	10%	5%	0%	0%
Adj. Flow (vph)	99	1064	8	11	440	12	8	29	32	23	33	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1171	0	0	463	0	0	69	0	0	92	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	98.4%
ICU Level of Service	F
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	931	409	0	36	29
Future Volume (vph)	0	931	409	0	36	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	65.0
Storage Lanes	0			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3579	3544	0	1722	1350
Flt Permitted					0.950	
Satd. Flow (perm)	0	3579	3544	0	1722	1350
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						32
Link Speed (k/h)		80	80		60	
Link Distance (m)		82.0	116.0		252.4	
Travel Time (s)		3.7	5.2		15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	0%	6%	21%
Adj. Flow (vph)	0	1012	445	0	39	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1012	445	0	39	32
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019

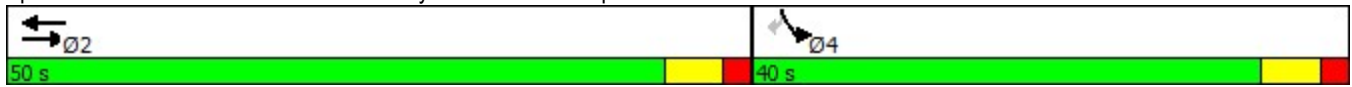


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		45.0	45.0		8.0	8.0
Minimum Split (s)		51.0	51.0		22.5	22.5
Total Split (s)		50.0	50.0		40.0	40.0
Total Split (%)		55.6%	55.6%		44.4%	44.4%
Maximum Green (s)		44.0	44.0		34.0	34.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		5.0	5.0		4.0	4.0
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		60.8	60.8		8.7	8.7
Actuated g/C Ratio		0.84	0.84		0.12	0.12
v/c Ratio		0.34	0.15		0.19	0.17
Control Delay		3.3	2.6		32.6	13.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		3.3	2.6		32.6	13.8
LOS		A	A		C	B
Approach Delay		3.3	2.6		24.1	
Approach LOS		A	A		C	
Queue Length 50th (m)		22.3	8.1		5.5	0.0
Queue Length 95th (m)		33.8	13.4		12.9	7.1
Internal Link Dist (m)		58.0	92.0		228.4	
Turn Bay Length (m)						65.0
Base Capacity (vph)		2995	2966		811	653
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.34	0.15		0.05	0.05

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.7
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.34
Intersection Signal Delay:	4.0
Intersection Capacity Utilization	54.2%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 3: Britannia Rd & Hwy 407 WB Off-Ramp



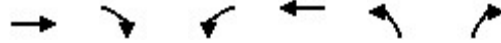
Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

AM Peak Period
09-18-2019

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Traffic Volume (vph)	885	0	0	500	8	210
Future Volume (vph)	885	0	0	500	8	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.6		7.6	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3614	0	0	3544	1615	1617
Flt Permitted					0.950	
Satd. Flow (perm)	3614	0	0	3544	1615	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						79
Link Speed (k/h)	80			70	60	
Link Distance (m)	117.5			86.9	257.9	
Travel Time (s)	5.3			4.5	15.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	13%	1%
Adj. Flow (vph)	962	0	0	543	9	228
Shared Lane Traffic (%)						
Lane Group Flow (vph)	962	0	0	543	9	228
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	20.0			20.0	8.0	8.0
Minimum Split (s)	26.0			26.0	14.0	14.0
Total Split (s)	50.0			50.0	40.0	40.0
Total Split (%)	55.6%			55.6%	44.4%	44.4%
Maximum Green (s)	44.0			44.0	34.0	34.0
Yellow Time (s)	4.0			4.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0			6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	5.0			5.0	4.0	4.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	49.6			49.6	13.4	13.4
Actuated g/C Ratio	0.66			0.66	0.18	0.18
v/c Ratio	0.40			0.23	0.03	0.65
Control Delay	7.1			6.0	22.6	26.3
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	7.1			6.0	22.6	26.3
LOS	A			A	C	C
Approach Delay	7.1			6.0	26.1	
Approach LOS	A			A	C	
Queue Length 50th (m)	27.9			13.6	1.0	18.7
Queue Length 95th (m)	49.0			25.5	4.2	36.9
Internal Link Dist (m)	93.5			62.9	233.9	
Turn Bay Length (m)						80.0
Base Capacity (vph)	2390			2343	733	776
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.40			0.23	0.01	0.29

Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	75
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.65
Intersection Signal Delay:	9.3
Intersection Capacity Utilization	47.5%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Britannia Rd



Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	824	173	70	504	71	163	527	124	72	673	78
Future Volume (vph)	81	824	173	70	504	71	163	527	124	72	673	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		0.0	65.0		65.0	55.0		0.0	55.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	7.6			20.0			7.6			7.6		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								1.00				
Frt		0.974				0.850		0.971			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3520	0	1825	3614	1498	1807	1728	0	1615	1794	0
Flt Permitted	0.290			0.114			0.054			0.138		
Satd. Flow (perm)	557	3520	0	219	3614	1498	103	1728	0	235	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				77		10				5
Link Speed (k/h)		70			70			70				48
Link Distance (m)		109.7			468.6			203.4				261.6
Travel Time (s)		5.6			24.1			10.5				19.6
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	1%	9%	1%	9%	2%	13%	6%	0%
Adj. Flow (vph)	88	896	188	76	548	77	177	573	135	78	732	85
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	1084	0	76	548	77	177	708	0	78	817	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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	6.1	1.8		6.1	1.8	
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
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA	custom	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6		8	4			8		
Detector Phase	5	2		6	6	8	7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	12.0		12.0	12.0	12.0	5.0	12.0		5.0	12.0	
Minimum Split (s)	9.5	26.1		26.1	26.1	47.7	9.5	47.7		9.5	47.7	
Total Split (s)	13.0	67.0		54.0	54.0	80.0	13.0	80.0		13.0	80.0	
Total Split (%)	8.1%	41.9%		33.8%	33.8%	50.0%	8.1%	50.0%		8.1%	50.0%	
Maximum Green (s)	10.0	60.9		47.9	47.9	72.3	10.0	72.3		10.0	72.3	
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.1		2.1	2.1	3.7	0.0	3.7		0.0	3.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.1		6.1	6.1	7.7	3.0	7.7		3.0	7.7	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		None	None	None	None	None		None	None	
Walk Time (s)		7.0		7.0	7.0	13.0		13.0			13.0	
Flash Dont Walk (s)		13.0		13.0	13.0	27.0		27.0			27.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	64.0	60.9		48.7	48.7	72.3	88.2	73.6		85.7	72.3	
Actuated g/C Ratio	0.40	0.38		0.30	0.30	0.45	0.55	0.46		0.54	0.45	
v/c Ratio	0.30	0.80		1.15	0.50	0.11	1.09	0.89		0.39	1.00	
Control Delay	33.1	49.0		223.6	73.3	5.9	132.6	53.2		22.0	75.6	
Queue Delay	0.0	8.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.1	57.0		223.6	73.3	5.9	132.6	53.2		22.0	75.6	
LOS	C	E		F	E	A	F	D		C	E	
Approach Delay		55.2			82.2			69.1			70.9	
Approach LOS		E			F			E			E	
Queue Length 50th (m)	17.6	159.2		~26.8	87.4	4.9	~46.0	201.4		11.1	~259.4	
Queue Length 95th (m)	29.9	187.0		#63.0	107.6	15.9	#97.2	#282.3		19.4	#348.9	
Internal Link Dist (m)		85.7			444.6			179.4			237.6	
Turn Bay Length (m)	65.0			65.0		65.0	55.0			55.0		
Base Capacity (vph)	302	1350		66	1099	719	163	800		214	813	
Starvation Cap Reductn	0	235		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.29	0.97		1.15	0.50	0.11	1.09	0.89		0.36	1.00	

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	142 (89%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	95
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.15
Intersection Signal Delay:	67.6
Intersection LOS:	E

Lanes, Volumes, Timings
 8: Ninth Line & Britannia Rd

AM Peak Period
 09-18-2019

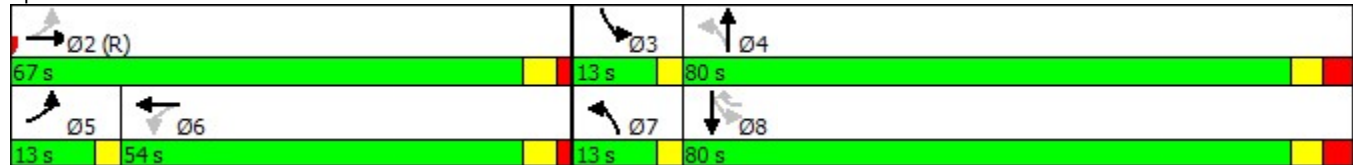
Intersection Capacity Utilization 107.4% ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

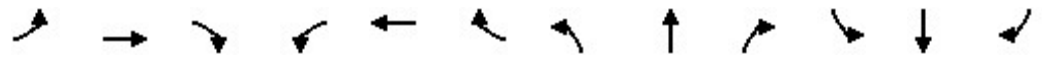
95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Ninth Line & Britannia Rd



Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	984	23	88	590	47	32	6	179	63	23	20
Future Volume (vph)	1	984	23	88	590	47	32	6	179	63	23	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	60.0		60.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			12.0			12.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97	1.00		0.97	0.99	0.99		1.00	0.99	
Frt			0.850			0.850		0.855			0.930	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3579	1445	1738	3579	1526	1722	1604	0	1789	1655	0
Flt Permitted	0.384			0.221			0.726			0.508		
Satd. Flow (perm)	736	3579	1397	403	3579	1487	1305	1604	0	955	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			28			51			126			22
Link Speed (k/h)		70			70			50				50
Link Distance (m)		468.6			144.7			104.9				98.6
Travel Time (s)		24.1			7.4			7.6				7.1
Confl. Peds. (#/hr)	2		5	5		2	7		2	2		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	13%	5%	2%	7%	6%	0%	1%	2%	13%	0%
Adj. Flow (vph)	1	1070	25	96	641	51	35	7	195	68	25	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	1070	25	96	641	51	35	202	0	68	47	0
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)		7.4			7.4			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	35.3	35.3	35.3	35.3	35.3	35.3	44.1	44.1		44.1	44.1	
Total Split (s)	112.0	112.0	112.0	112.0	112.0	112.0	48.0	48.0		48.0	48.0	
Total Split (%)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	105.7	105.7	105.7	105.7	105.7	105.7	40.9	40.9		40.9	40.9	
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)	2.3	2.3	2.3	2.3	2.3	2.3	3.1	3.1		3.1	3.1	
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)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1		7.1	7.1	
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	Max	Max	Max	Max	Max	Max	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	11.0	11.0	11.0	11.0	11.0	11.0	12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)	105.7	105.7	105.7	105.7	105.7	105.7	40.9	40.9		40.9	40.9	
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.26	0.26		0.26	0.26	
v/c Ratio	0.00	0.45	0.03	0.36	0.27	0.05	0.11	0.40		0.28	0.11	
Control Delay	4.0	9.5	0.6	16.8	11.6	2.4	46.8	21.0		51.5	28.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	4.0	9.5	0.6	16.8	11.6	2.4	46.8	21.0		51.5	28.1	
LOS	A	A	A	B	B	A	D	C		D	C	
Approach Delay		9.3			11.6			24.8			42.0	
Approach LOS		A			B			C			D	
Queue Length 50th (m)	0.1	123.8	0.3	12.8	41.9	0.0	8.6	19.1		17.5	6.1	
Queue Length 95th (m)	m0.0	112.1	m0.4	25.7	51.3	4.7	18.5	43.3		32.5	16.9	
Internal Link Dist (m)		444.6			120.7			80.9			74.6	
Turn Bay Length (m)				60.0		60.0	30.0			30.0		
Base Capacity (vph)	486	2364	932	266	2364	999	333	503		244	439	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.00	0.45	0.03	0.36	0.27	0.05	0.11	0.40		0.28	0.11	

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	128 (80%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.45
Intersection Signal Delay:	13.4
Intersection LOS:	B

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
 09-18-2019











Intersection Capacity Utilization 97.0% ICU Level of Service F
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd



Lanes, Volumes, Timings
10: Freeman Terrace & Ninth Line

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	21	29	801	8	2	930
Future Volume (vph)	21	29	801	8	2	930
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	25.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				10.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.921		0.999			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1734	0	1882	0	1825	1883
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1734	0	1882	0	1825	1883
Link Speed (k/h)	48		70			48
Link Distance (m)	109.2		89.3			203.4
Travel Time (s)	8.2		4.6			15.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	23	32	871	9	2	1011
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	880	0	2	1011
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	58.9%			ICU Level of Service B		
Analysis Period (min)	15					

Lanes, Volumes, Timings
11: Ninth Line & Manatee Way

AM Peak Period
09-18-2019














Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	22	31	809	26	20	968
Future Volume (vph)	22	31	809	26	20	968
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				10.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.921		0.996			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1734	0	1877	0	1825	1883
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1734	0	1877	0	1825	1883
Link Speed (k/h)	48		70			48
Link Distance (m)	107.0		89.1			89.3
Travel Time (s)	8.0		4.6			6.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	24	34	879	28	22	1052
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	907	0	22	1052
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.9%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
12: Ninth Line & McDowell Drive

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	33	759	32	27	941
Future Volume (vph)	24	33	759	32	27	941
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		20.0	25.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	2.5				10.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.922			0.850		
Flt Protected	0.979				0.950	
Satd. Flow (prot)	1734	0	1883	1633	1825	1883
Flt Permitted	0.979				0.950	
Satd. Flow (perm)	1734	0	1883	1633	1825	1883
Link Speed (k/h)	48		70			48
Link Distance (m)	113.5		117.1			89.1
Travel Time (s)	8.5		6.0			6.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	26	36	825	35	29	1023
Shared Lane Traffic (%)						
Lane Group Flow (vph)	62	0	825	35	29	1023
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.5%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Eighth Line & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	58	520	13	9	856	12	18	44	16	4	37	82
Future Volume (vph)	58	520	13	9	856	12	18	44	16	4	37	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.998			0.973			0.910	
Flt Protected		0.995			0.999			0.988			0.998	
Satd. Flow (prot)	0	1844	0	0	1879	0	0	1847	0	0	1729	0
Flt Permitted		0.995			0.999			0.988			0.998	
Satd. Flow (perm)	0	1844	0	0	1879	0	0	1847	0	0	1729	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		159.9			732.9			151.2			170.7	
Travel Time (s)		12.0			55.0			11.3			12.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	15%	0%	2%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	63	565	14	10	930	13	20	48	17	4	40	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	642	0	0	953	0	0	85	0	0	133	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other

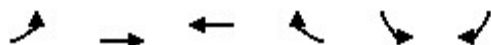
Control Type: Unsignalized

Intersection Capacity Utilization 83.7% ICU Level of Service E

Analysis Period (min) 15

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

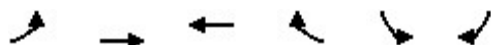
PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	450	873	0	152	37
Future Volume (vph)	0	450	873	0	152	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	65.0
Storage Lanes	0			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3579	3614	0	1807	1585
Flt Permitted					0.950	
Satd. Flow (perm)	0	3579	3614	0	1807	1585
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						40
Link Speed (k/h)		80	80		60	
Link Distance (m)		65.7	118.3		257.9	
Travel Time (s)		3.0	5.3		15.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	1%	3%
Adj. Flow (vph)	0	489	949	0	165	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	489	949	0	165	40
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		45.0	45.0		8.0	8.0
Minimum Split (s)		51.0	51.0		22.5	22.5
Total Split (s)		50.0	50.0		40.0	40.0
Total Split (%)		55.6%	55.6%		44.4%	44.4%
Maximum Green (s)		44.0	44.0		34.0	34.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		5.0	5.0		4.0	4.0
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		50.9	50.9		13.0	13.0
Actuated g/C Ratio		0.67	0.67		0.17	0.17
v/c Ratio		0.20	0.39		0.53	0.13
Control Delay		5.4	6.6		34.1	9.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		5.4	6.6		34.1	9.3
LOS		A	A		C	A
Approach Delay		5.4	6.6		29.2	
Approach LOS		A	A		C	
Queue Length 50th (m)		11.9	27.0		21.3	0.0
Queue Length 95th (m)		20.8	44.1		35.6	6.9
Internal Link Dist (m)		41.7	94.3		233.9	
Turn Bay Length (m)						65.0
Base Capacity (vph)		2399	2422		809	732
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.20	0.39		0.20	0.05

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	76
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.53
Intersection Signal Delay:	9.1
Intersection Capacity Utilization	55.9%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	B

Splits and Phases: 3: Britannia Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

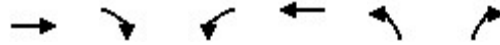
PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Traffic Volume (vph)	578	0	0	935	84	111
Future Volume (vph)	578	0	0	935	84	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		1	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3579	0	0	3614	1755	1633
Flt Permitted					0.950	
Satd. Flow (perm)	3579	0	0	3614	1755	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						121
Link Speed (k/h)	80			70	60	
Link Distance (m)	112.6			94.0	243.9	
Travel Time (s)	5.1			4.8	14.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	4%	0%
Adj. Flow (vph)	628	0	0	1016	91	121
Shared Lane Traffic (%)						
Lane Group Flow (vph)	628	0	0	1016	91	121
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	20.0			20.0	8.0	8.0
Minimum Split (s)	26.0			26.0	14.0	14.0
Total Split (s)	50.0			50.0	40.0	40.0
Total Split (%)	55.6%			55.6%	44.4%	44.4%
Maximum Green (s)	44.0			44.0	34.0	34.0
Yellow Time (s)	4.0			4.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0			6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	5.0			5.0	4.0	4.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	50.6			50.6	10.2	10.2
Actuated g/C Ratio	0.70			0.70	0.14	0.14
v/c Ratio	0.25			0.40	0.37	0.36
Control Delay	4.7			5.6	31.2	8.9
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	4.7			5.6	31.2	8.9
LOS	A			A	C	A
Approach Delay	4.7			5.6	18.4	
Approach LOS	A			A	B	
Queue Length 50th (m)	13.5			25.0	11.2	0.0
Queue Length 95th (m)	22.5			40.1	21.9	12.0
Internal Link Dist (m)	88.6			70.0	219.9	
Turn Bay Length (m)						80.0
Base Capacity (vph)	2486			2510	821	828
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.25			0.40	0.11	0.15

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	72.8
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.40
Intersection Signal Delay:	6.7
Intersection Capacity Utilization:	42.5%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Britannia Rd



Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	480	176	118	753	115	154	741	88	56	500	74
Future Volume (vph)	154	480	176	118	753	115	154	741	88	56	500	74
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	65.0		0.0	65.0		65.0	55.0		0.0	55.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						0.98		1.00				
Frt		0.960				0.850		0.984			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3495	0	1825	3614	1555	1789	1887	0	1674	1885	0
Flt Permitted	0.122			0.326			0.195			0.055		
Satd. Flow (perm)	232	3495	0	626	3614	1521	367	1887	0	97	1885	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38				114		5				6
Link Speed (k/h)		70			70			70				70
Link Distance (m)		126.1			468.7			199.8				195.3
Travel Time (s)		6.5			24.1			10.3				10.0
Confl. Peds. (#/hr)	1					1			2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	1%	5%	2%	0%	0%	9%	0%	0%
Adj. Flow (vph)	167	522	191	128	818	125	167	805	96	61	543	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	713	0	128	818	125	167	901	0	61	623	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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	6.1	1.8		6.1	1.8	
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
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		Perm	NA	custom	pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6		8	4			8		
Detector Phase	5	2		6	6	8	7	4		3	8	
Switch Phase												
Minimum Initial (s)	5.0	12.0		12.0	12.0	12.0	5.0	12.0		5.0	12.0	
Minimum Split (s)	9.5	26.1		26.1	26.1	47.7	9.5	47.7		9.5	47.7	
Total Split (s)	13.0	67.0		54.0	54.0	80.0	13.0	80.0		13.0	80.0	
Total Split (%)	8.1%	41.9%		33.8%	33.8%	50.0%	8.1%	50.0%		8.1%	50.0%	
Maximum Green (s)	10.0	60.9		47.9	47.9	72.3	10.0	72.3		10.0	72.3	
Yellow Time (s)	3.0	4.0		4.0	4.0	4.0	3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.1		2.1	2.1	3.7	0.0	3.7		0.0	3.7	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.1		6.1	6.1	7.7	3.0	7.7		3.0	7.7	
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max	None	None	None		None	None	
Walk Time (s)		7.0		7.0	7.0	13.0		13.0			13.0	
Flash Dont Walk (s)		13.0		13.0	13.0	27.0		27.0			27.0	
Pedestrian Calls (#/hr)		0		0	0	0		0			0	
Act Effct Green (s)	64.3	61.2		47.9	47.9	72.2	88.5	75.8		85.0	72.2	
Actuated g/C Ratio	0.40	0.38		0.30	0.30	0.45	0.55	0.47		0.53	0.45	
v/c Ratio	0.86	0.52		0.68	0.76	0.17	0.58	1.01		0.47	0.73	
Control Delay	71.1	37.7		80.8	67.1	8.0	25.5	72.8		30.6	41.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	71.1	37.7		80.8	67.1	8.0	25.5	72.8		30.6	41.7	
LOS	E	D		F	E	A	C	E		C	D	
Approach Delay		44.0			61.9			65.4			40.7	
Approach LOS		D			E			E			D	
Queue Length 50th (m)	35.0	87.4		32.0	108.3	13.8	24.9	~303.8		8.6	158.9	
Queue Length 95th (m)	#69.8	107.0		#63.7	131.5	26.0	37.7	#392.0		18.9	206.6	
Internal Link Dist (m)		102.1			444.7			175.8			171.3	
Turn Bay Length (m)	65.0			65.0		65.0	55.0			55.0		
Base Capacity (vph)	194	1359		187	1081	749	291	896		151	855	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.86	0.52		0.68	0.76	0.17	0.57	1.01		0.40	0.73	

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 21 (13%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.01
 Intersection Signal Delay: 54.7
 Intersection LOS: D

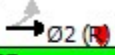



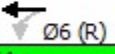

Intersection Capacity Utilization 102.4% ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

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

Splits and Phases: 8: Ninth Line & Britannia Rd

 Ø2 (R)	 Ø3	 Ø4
67 s	13 s	80 s
 Ø5	 Ø6 (R)	 Ø7
13 s	54 s	80 s

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

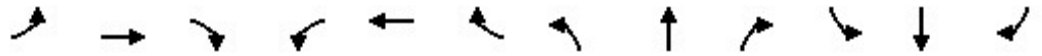
PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	603	32	213	925	77	32	16	100	42	6	10
Future Volume (vph)	15	603	32	213	925	77	32	16	100	42	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		25.0	60.0		60.0	30.0		30.0	30.0		30.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00	0.99		1.00	0.99	
Frt			0.850			0.850		0.870			0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3614	1585	1825	3614	1633	1825	1619	0	1825	1729	0
Flt Permitted	0.241			0.378			0.746			0.645		
Satd. Flow (perm)	463	3614	1549	725	3614	1596	1430	1619	0	1234	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29			84		109			11	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		468.7			144.7			104.9			91.6	
Travel Time (s)		24.1			7.4			7.6			6.6	
Confl. Peds. (#/hr)	1		1	1		1	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	16	655	35	232	1005	84	35	17	109	46	7	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	655	35	232	1005	84	35	126	0	46	18	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Minimum Split (s)	35.3	35.3	35.3	35.3	35.3	35.3	44.1	44.1		44.1	44.1	
Total Split (s)	112.0	112.0	112.0	112.0	112.0	112.0	48.0	48.0		48.0	48.0	
Total Split (%)	70.0%	70.0%	70.0%	70.0%	70.0%	70.0%	30.0%	30.0%		30.0%	30.0%	
Maximum Green (s)	105.7	105.7	105.7	105.7	105.7	105.7	40.9	40.9		40.9	40.9	
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)	2.3	2.3	2.3	2.3	2.3	2.3	3.1	3.1		3.1	3.1	
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)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0	11.0	11.0	11.0	11.0	12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effect Green (s)	105.7	105.7	105.7	105.7	105.7	105.7	40.9	40.9		40.9	40.9	
Actuated g/C Ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.26	0.26		0.26	0.26	
v/c Ratio	0.05	0.27	0.03	0.49	0.42	0.08	0.10	0.26		0.15	0.04	
Control Delay	4.7	5.4	0.2	17.8	13.4	1.9	46.5	12.1		47.7	26.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	4.7	5.4	0.2	17.8	13.4	1.9	46.5	12.1		47.7	26.8	
LOS	A	A	A	B	B	A	D	B		D	C	
Approach Delay		5.1			13.5			19.5				41.8
Approach LOS		A			B			B				D
Queue Length 50th (m)	0.8	16.0	0.2	34.8	74.7	0.0	8.6	4.1		11.4	1.7	
Queue Length 95th (m)	m1.3	m17.9	m0.0	57.1	88.0	5.9	18.4	21.2		22.9	8.5	
Internal Link Dist (m)		444.7			120.7			80.9				67.6
Turn Bay Length (m)	50.0		25.0	60.0		60.0	30.0			30.0		
Base Capacity (vph)	305	2387	1033	478	2387	1082	365	494		315	450	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.05	0.27	0.03	0.49	0.42	0.08	0.10	0.26		0.15	0.04	

Intersection Summary











Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 145 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Pretimed
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 12.1 Intersection LOS: B
 Intersection Capacity Utilization 83.2% ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd













Lanes, Volumes, Timings
10: Freeman Terrace & Ninth Line

PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	13	1003	22	27	808
Future Volume (vph)	13	13	1003	22	27	808
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	25.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.932		0.997			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1748	0	1879	0	1825	1883
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1748	0	1879	0	1825	1883
Link Speed (k/h)	48		70			48
Link Distance (m)	116.1		88.5			199.8
Travel Time (s)	8.7		4.6			15.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	14	14	1090	24	29	878
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	1114	0	29	878
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	64.1%			ICU Level of Service C		
Analysis Period (min)	15					












Lanes, Volumes, Timings
11: Ninth Line & Manatee Way

PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	15	1025	28	20	793
Future Volume (vph)	10	15	1025	28	20	793
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.920		0.996			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1732	0	1877	0	1825	1883
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1732	0	1877	0	1825	1883
Link Speed (k/h)	48		70			48
Link Distance (m)	108.3		91.8			88.5
Travel Time (s)	8.1		4.7			6.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	11	16	1114	30	22	862
Shared Lane Traffic (%)						
Lane Group Flow (vph)	27	0	1144	0	22	862
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	65.6%			ICU Level of Service C		
Analysis Period (min)	15					

Lanes, Volumes, Timings
12: Ninth Line & McDowell Drive

PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	17	1030	36	18	775
Future Volume (vph)	8	17	1030	36	18	775
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		20.0	25.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.910			0.850		
Flt Protected	0.984				0.950	
Satd. Flow (prot)	1720	0	1883	1633	1825	1883
Flt Permitted	0.984				0.950	
Satd. Flow (perm)	1720	0	1883	1633	1825	1883
Link Speed (k/h)	48		70			48
Link Distance (m)	111.8		227.5			91.8
Travel Time (s)	8.4		11.7			6.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	9	18	1120	39	20	842
Shared Lane Traffic (%)						
Lane Group Flow (vph)	27	0	1120	39	20	842
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	64.2%			ICU Level of Service C		
Analysis Period (min)	15					

Appendix B-: Future Background Conditions Synchro Output

Lanes, Volumes, Timings
1: Eighth Line & Britannia Rd

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕↕			↕↕↕			↕			↕	
Traffic Volume (vph)	91	1242	7	10	514	11	7	27	29	21	30	33
Future Volume (vph)	91	1242	7	10	514	11	7	27	29	21	30	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.999			0.997			0.937			0.947	
Fl _t Protected		0.997			0.999			0.994			0.988	
Satd. Flow (prot)	0	5079	0	0	4958	0	0	1658	0	0	1775	0
Fl _t Permitted		0.997			0.999			0.994			0.988	
Satd. Flow (perm)	0	5079	0	0	4958	0	0	1658	0	0	1775	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		160.0			718.9			151.3			170.6	
Travel Time (s)		12.0			53.9			11.3			12.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	14%	0%	5%	27%	14%	4%	10%	5%	0%	0%
Adj. Flow (vph)	99	1350	8	11	559	12	8	29	32	23	33	36
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1457	0	0	582	0	0	69	0	0	92	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.2%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	1191	535	0	431	29
Future Volume (vph)	0	1191	535	0	431	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	65.0
Storage Lanes	0			0	1	1
Taper Length (m)	7.6				7.6	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3579	3544	0	1722	1350
Flt Permitted					0.950	
Satd. Flow (perm)	0	3579	3544	0	1722	1350
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						32
Link Speed (k/h)		80	80		60	
Link Distance (m)		82.0	116.0		252.4	
Travel Time (s)		3.7	5.2		15.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	0%	6%	21%
Adj. Flow (vph)	0	1295	582	0	468	32
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1295	582	0	468	32
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		45.0	45.0		8.0	8.0
Minimum Split (s)		51.0	51.0		22.5	22.5
Total Split (s)		51.0	51.0		39.0	39.0
Total Split (%)		56.7%	56.7%		43.3%	43.3%
Maximum Green (s)		45.0	45.0		33.0	33.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		5.0	5.0		4.0	4.0
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		45.6	45.6		27.5	27.5
Actuated g/C Ratio		0.54	0.54		0.32	0.32
v/c Ratio		0.68	0.31		0.84	0.07
Control Delay		17.5	12.3		41.3	7.3
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.5	12.3		41.3	7.3
LOS		B	B		D	A
Approach Delay		17.5	12.3		39.1	
Approach LOS		B	B		D	
Queue Length 50th (m)		78.7	27.0		69.2	0.0
Queue Length 95th (m)		112.2	41.2		105.3	5.6
Internal Link Dist (m)		58.0	92.0		228.4	
Turn Bay Length (m)						65.0
Base Capacity (vph)		1916	1898		669	544
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.68	0.31		0.70	0.06

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	85.1
Natural Cycle:	80
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	20.8
Intersection Capacity Utilization	71.4%
Analysis Period (min)	15
Intersection LOS:	C
ICU Level of Service	C

Splits and Phases: 3: Britannia Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Traffic Volume (vph)	1527	0	0	656	8	214
Future Volume (vph)	1527	0	0	656	8	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		1	1
Taper Length (m)			7.6		7.6	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3614	0	0	3544	1615	1617
Flt Permitted					0.950	
Satd. Flow (perm)	3614	0	0	3544	1615	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						34
Link Speed (k/h)	80			70	60	
Link Distance (m)	117.5			86.9	257.9	
Travel Time (s)	5.3			4.5	15.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	0%	3%	13%	1%
Adj. Flow (vph)	1660	0	0	713	9	233
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1660	0	0	713	9	233
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	20.0			20.0	8.0	8.0
Minimum Split (s)	26.0			26.0	14.0	14.0
Total Split (s)	64.0			64.0	26.0	26.0
Total Split (%)	71.1%			71.1%	28.9%	28.9%
Maximum Green (s)	58.0			58.0	20.0	20.0
Yellow Time (s)	4.0			4.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0			6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	5.0			5.0	4.0	4.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	63.4			63.4	16.6	16.6
Actuated g/C Ratio	0.69			0.69	0.18	0.18
v/c Ratio	0.67			0.29	0.03	0.73
Control Delay	10.5			6.4	28.5	43.2
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	10.5			6.4	28.5	43.2
LOS	B			A	C	D
Approach Delay	10.5			6.4	42.6	
Approach LOS	B			A	D	
Queue Length 50th (m)	79.9			23.2	1.3	32.8
Queue Length 95th (m)	112.8			34.4	5.0	54.6
Internal Link Dist (m)	93.5			62.9	233.9	
Turn Bay Length (m)						80.0
Base Capacity (vph)	2489			2441	350	377
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.67			0.29	0.03	0.62

























Intersection Summary	
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	92.1
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	12.4
Intersection Capacity Utilization	65.5%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	C

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Britannia Rd



Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	1279	379	97	639	109	214	740	185	135	926	123
Future Volume (vph)	119	1279	379	97	639	109	214	740	185	135	926	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	7.6			20.0			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850		0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3614	1617	1825	3614	1498	1807	3349	1601	1615	3404	0
Flt Permitted	0.257			0.065			0.072			0.209		
Satd. Flow (perm)	494	3614	1617	125	3614	1498	137	3349	1580	355	3404	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			265			113			142			10
Link Speed (k/h)		70			70			70				48
Link Distance (m)		109.7			468.6			203.4				261.6
Travel Time (s)		5.6			24.1			10.5				19.6
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	1%	9%	1%	9%	2%	13%	6%	0%
Adj. Flow (vph)	129	1390	412	105	695	118	233	804	201	147	1007	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	1390	412	105	695	118	233	804	201	147	1141	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1		2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	
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	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	
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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4		4	8		
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	
Minimum Split (s)	9.5	26.1	26.1	9.5	26.1	26.1	9.5	47.7	47.7	9.5	47.7	
Total Split (s)	12.4	70.4	70.4	9.6	67.6	67.6	20.0	60.3	60.3	19.7	60.0	
Total Split (%)	7.8%	44.0%	44.0%	6.0%	42.3%	42.3%	12.5%	37.7%	37.7%	12.3%	37.5%	
Maximum Green (s)	9.4	64.3	64.3	6.6	61.5	61.5	17.0	52.6	52.6	16.7	52.3	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	0.0	2.1	2.1	0.0	2.1	2.1	0.0	3.7	3.7	0.0	3.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	7.7	7.7	3.0	7.7	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		13.0	13.0		13.0	
Flash Dont Walk (s)		13.0	13.0		13.0	13.0		27.0	27.0		27.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	76.6	64.3	64.3	71.4	61.7	61.7	76.1	55.8	55.8	70.5	52.3	
Actuated g/C Ratio	0.48	0.40	0.40	0.45	0.39	0.39	0.48	0.35	0.35	0.44	0.33	
v/c Ratio	0.41	0.96	0.51	0.84	0.50	0.18	0.96	0.69	0.31	0.56	1.02	
Control Delay	27.4	61.8	14.3	95.5	34.1	4.8	92.2	48.8	13.5	32.6	83.8	
Queue Delay	0.0	43.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	27.4	105.1	14.7	95.5	34.1	4.8	92.2	48.8	13.5	32.6	83.8	
LOS	C	F	B	F	C	A	F	D	B	C	F	
Approach Delay		80.6			37.4			51.2			77.9	
Approach LOS		F			D			D			E	
Queue Length 50th (m)	22.6	225.2	32.9	25.4	66.1	0.0	57.4	115.8	12.7	26.3	~200.4	
Queue Length 95th (m)	35.7	#272.8	63.9	#50.9	77.6	10.0	#113.5	143.5	34.0	41.0	#244.0	
Internal Link Dist (m)		85.7			444.6			179.4			237.6	
Turn Bay Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		
Base Capacity (vph)	315	1452	808	125	1394	647	242	1167	643	295	1119	
Starvation Cap Reductn	0	275	112	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.41	1.18	0.59	0.84	0.50	0.18	0.96	0.69	0.31	0.50	1.02	

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	125
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	65.8
Intersection LOS:	E

Lanes, Volumes, Timings
 8: Ninth Line & Britannia Rd

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 100.3% ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 8: Ninth Line & Britannia Rd

Ø1	Ø2 (R)	Ø3	Ø4
9.6 s	70.4 s	19.7 s	60.3 s
Ø5	Ø6	Ø7	Ø8
12.4 s	67.6 s	20 s	60 s

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1437	140	88	775	47	32	6	179	63	23	20
Future Volume (vph)	1	1437	140	88	775	47	32	6	179	63	23	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		25.0	60.0		60.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			12.0			12.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.97			0.97	0.99	0.99		1.00	0.99	
Frt			0.850			0.850		0.855			0.930	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3579	1445	1738	3579	1526	1722	1604	0	1789	1655	0
Flt Permitted	0.303			0.108			0.726			0.492		
Satd. Flow (perm)	581	3579	1397	198	3579	1487	1305	1604	0	925	1655	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			56			51		49			22	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		468.6			144.7			104.9			98.6	
Travel Time (s)		24.1			7.4			7.6			7.1	
Confl. Peds. (#/hr)	2		5	5		2	7		2	2		7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	13%	5%	2%	7%	6%	0%	1%	2%	13%	0%
Adj. Flow (vph)	1	1562	152	96	842	51	35	7	195	68	25	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	1562	152	96	842	51	35	202	0	68	47	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
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	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	35.3	35.3	35.3	35.3	35.3	35.3	44.1	44.1		44.1	44.1	
Total Split (s)	115.0	115.0	115.0	115.0	115.0	115.0	45.0	45.0		45.0	45.0	
Total Split (%)	71.9%	71.9%	71.9%	71.9%	71.9%	71.9%	28.1%	28.1%		28.1%	28.1%	
Maximum Green (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
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)	2.3	2.3	2.3	2.3	2.3	2.3	3.1	3.1		3.1	3.1	
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)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1		7.1	7.1	
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	Max	Max	Max	Max	Max	Max	C-Max	C-Max		C-Max	C-Max	
Walk Time (s)	11.0	11.0	11.0	11.0	11.0	11.0	12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68	0.24	0.24		0.24	0.24	
v/c Ratio	0.00	0.64	0.16	0.72	0.35	0.05	0.11	0.48		0.31	0.12	
Control Delay	3.0	2.8	0.3	48.8	11.2	2.1	49.2	43.8		55.0	29.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.0	2.8	0.3	48.8	11.2	2.1	49.2	43.8		55.0	29.6	
LOS	A	A	A	D	B	A	D	D		E	C	
Approach Delay		2.6			14.4			44.6			44.6	
Approach LOS		A			B			D			D	
Queue Length 50th (m)	0.0	17.1	0.0	17.8	55.4	0.0	8.8	42.2		18.0	6.2	
Queue Length 95th (m)	m0.0	m22.2	m0.0	#57.8	66.1	4.5	19.0	68.6		33.5	17.4	
Internal Link Dist (m)		444.6			120.7			80.9			74.6	
Turn Bay Length (m)	50.0		25.0	60.0		60.0	30.0			30.0		
Base Capacity (vph)	394	2431	967	134	2431	1026	309	417		219	408	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.00	0.64	0.16	0.72	0.35	0.05	0.11	0.48		0.31	0.12	

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 128 (80%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 11.3
 Intersection LOS: B

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 109.6% ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.













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

Splits and Phases: 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd















Lanes, Volumes, Timings
10: Freeman Terrace & Ninth Line

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	22	29	1123	9	2	1418
Future Volume (vph)	22	29	1123	9	2	1418
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	25.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				10.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.923		0.999			
Flt Protected	0.979				0.950	
Satd. Flow (prot)	1736	0	3576	0	1825	3579
Flt Permitted	0.979				0.950	
Satd. Flow (perm)	1736	0	3576	0	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	109.2		89.3			203.4
Travel Time (s)	8.2		4.6			15.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	24	32	1221	10	2	1541
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	1231	0	2	1541
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	49.2%			ICU Level of Service A		
Analysis Period (min)	15					












Lanes, Volumes, Timings
11: Ninth Line & Manatee Way

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	22	31	1026	26	20	1468
Future Volume (vph)	22	31	1026	26	20	1468
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				10.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.921		0.996			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1734	0	3566	0	1825	3579
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1734	0	3566	0	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	107.0		89.1			89.3
Travel Time (s)	8.0		4.6			6.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	24	34	1115	28	22	1596
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	1143	0	22	1596
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	50.6%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
12: Ninth Line & McDowell Drive

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	24	42	1053	33	47	1411
Future Volume (vph)	24	42	1053	33	47	1411
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		20.0	25.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	2.5				10.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.914			0.850		
Flt Protected	0.982				0.950	
Satd. Flow (prot)	1724	0	3579	1633	1825	3579
Flt Permitted	0.982				0.950	
Satd. Flow (perm)	1724	0	3579	1633	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	113.5		117.1			89.1
Travel Time (s)	8.5		6.0			6.7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	26	46	1145	36	51	1534
Shared Lane Traffic (%)						
Lane Group Flow (vph)	72	0	1145	36	51	1534
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	49.6%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
1: Eighth Line & Britannia Rd

PM Peak Period
09-18-2019



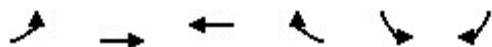
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔↔			↔↔↔			↕			↕	
Traffic Volume (vph)	58	659	13	9	1086	12	18	44	16	4	37	82
Future Volume (vph)	58	659	13	9	1086	12	18	44	16	4	37	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.997			0.998			0.973			0.910	
Fl _t Protected		0.996						0.988			0.998	
Satd. Flow (prot)	0	5042	0	0	5133	0	0	1847	0	0	1729	0
Fl _t Permitted		0.996						0.988			0.998	
Satd. Flow (perm)	0	5042	0	0	5133	0	0	1847	0	0	1729	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		159.9			732.9			151.2			170.7	
Travel Time (s)		12.0			55.0			11.3			12.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	15%	0%	2%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	63	716	14	10	1180	13	20	48	17	4	40	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	793	0	0	1203	0	0	85	0	0	133	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.6%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	602	1133	0	374	37
Future Volume (vph)	0	602	1133	0	374	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	65.0
Storage Lanes	0			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3579	3614	0	1807	1585
Flt Permitted					0.950	
Satd. Flow (perm)	0	3579	3614	0	1807	1585
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						40
Link Speed (k/h)		80	80		60	
Link Distance (m)		65.7	118.3		257.9	
Travel Time (s)		3.0	5.3		15.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	1%	3%
Adj. Flow (vph)	0	654	1232	0	407	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	654	1232	0	407	40
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019

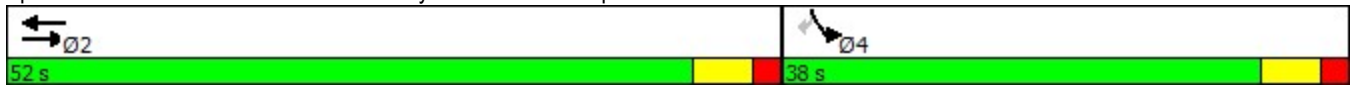


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		45.0	45.0		8.0	8.0
Minimum Split (s)		51.0	51.0		22.5	22.5
Total Split (s)		52.0	52.0		38.0	38.0
Total Split (%)		57.8%	57.8%		42.2%	42.2%
Maximum Green (s)		46.0	46.0		32.0	32.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		5.0	5.0		4.0	4.0
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		47.1	47.1		24.0	24.0
Actuated g/C Ratio		0.57	0.57		0.29	0.29
v/c Ratio		0.32	0.60		0.78	0.08
Control Delay		10.9	14.4		38.0	7.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		10.9	14.4		38.0	7.0
LOS		B	B		D	A
Approach Delay		10.9	14.4		35.2	
Approach LOS		B	B		D	
Queue Length 50th (m)		26.6	62.3		57.7	0.0
Queue Length 95th (m)		45.5	100.8		87.9	6.3
Internal Link Dist (m)		41.7	94.3		233.9	
Turn Bay Length (m)						65.0
Base Capacity (vph)		2026	2046		698	636
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.32	0.60		0.58	0.06

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	83.1
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	17.4
Intersection LOS:	B
Intersection Capacity Utilization:	68.2%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 3: Britannia Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Traffic Volume (vph)	986	0	0	1218	84	120
Future Volume (vph)	986	0	0	1218	84	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		1	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3579	0	0	3614	1755	1633
Flt Permitted					0.950	
Satd. Flow (perm)	3579	0	0	3614	1755	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						130
Link Speed (k/h)	80			70	60	
Link Distance (m)	112.6			94.0	243.9	
Travel Time (s)	5.1			4.8	14.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	4%	0%
Adj. Flow (vph)	1072	0	0	1324	91	130
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1072	0	0	1324	91	130
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	20.0			20.0	8.0	8.0
Minimum Split (s)	26.0			26.0	14.0	14.0
Total Split (s)	68.0			68.0	22.0	22.0
Total Split (%)	75.6%			75.6%	24.4%	24.4%
Maximum Green (s)	62.0			62.0	16.0	16.0
Yellow Time (s)	4.0			4.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0			6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	5.0			5.0	4.0	4.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	68.2			68.2	11.1	11.1
Actuated g/C Ratio	0.75			0.75	0.12	0.12
v/c Ratio	0.40			0.49	0.43	0.42
Control Delay	5.0			5.7	41.9	10.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	5.0			5.7	41.9	10.7
LOS	A			A	D	B
Approach Delay	5.0			5.7	23.5	
Approach LOS	A			A	C	
Queue Length 50th (m)	28.7			39.3	14.8	0.0
Queue Length 95th (m)	45.1			60.7	27.4	14.5
Internal Link Dist (m)	88.6			70.0	219.9	
Turn Bay Length (m)						80.0
Base Capacity (vph)	2672			2698	307	393
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.40			0.49	0.30	0.33

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	91.4
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	6.9
Intersection Capacity Utilization	50.3%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Britannia Rd



Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	733	320	179	955	196	203	1050	129	115	751	133
Future Volume (vph)	237	733	320	179	955	196	203	1050	129	115	751	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.99			0.99	1.00		
Frt			0.850			0.850			0.850		0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3650	1617	1825	3614	1555	1789	3650	1633	1674	3566	0
Flt Permitted	0.082			0.239			0.081			0.087		
Satd. Flow (perm)	156	3650	1617	459	3614	1535	153	3650	1610	153	3566	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			290			118			82			13
Link Speed (k/h)		70			70			70				70
Link Distance (m)		126.1			468.7			199.8				195.3
Travel Time (s)		6.5			24.1			10.3				10.0
Confl. Peds. (#/hr)	1					1			2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	1%	5%	2%	0%	0%	9%	0%	0%
Adj. Flow (vph)	258	797	348	195	1038	213	221	1141	140	125	816	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	258	797	348	195	1038	213	221	1141	140	125	961	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	0	1	2	1	1	2	0	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	0.0	6.1	30.5	6.1	6.1	30.5	0.0	6.1	30.5	
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	0.0	6.1	1.8	6.1	6.1	1.8	0.0	6.1	1.8	
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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	custom	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		8	4		4	8		
Detector Phase	5	2	2	1	6	8	7	4	4	3	8	
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	
Minimum Split (s)	9.5	26.1	26.1	9.5	26.1	47.7	9.5	47.7	47.7	9.5	47.7	
Total Split (s)	24.0	64.4	64.4	20.6	61.0	54.0	21.0	62.0	62.0	13.0	54.0	
Total Split (%)	15.0%	40.3%	40.3%	12.9%	38.1%	33.8%	13.1%	38.8%	38.8%	8.1%	33.8%	
Maximum Green (s)	21.0	58.3	58.3	17.6	54.9	46.3	18.0	54.3	54.3	10.0	46.3	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	0.0	2.1	2.1	0.0	2.1	3.7	0.0	3.7	3.7	0.0	3.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	7.7	3.0	7.7	7.7	3.0	7.7	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	13.0		13.0	13.0		13.0	
Flash Dont Walk (s)		13.0	13.0		13.0	27.0		27.0	27.0		27.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	82.9	62.3	62.3	74.3	56.8	46.1	71.1	53.4	53.4	60.8	46.1	
Actuated g/C Ratio	0.52	0.39	0.39	0.46	0.36	0.29	0.44	0.33	0.33	0.38	0.29	
v/c Ratio	0.90	0.56	0.43	0.58	0.81	0.40	0.90	0.94	0.24	0.82	0.93	
Control Delay	72.9	40.7	8.7	49.0	85.7	13.0	78.7	66.0	17.1	71.0	69.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	72.9	40.7	8.7	49.0	85.7	13.0	78.7	66.0	17.1	71.0	69.7	
LOS	E	D	A	D	F	B	E	E	B	E	E	
Approach Delay		38.6			70.0			63.3			69.9	
Approach LOS		D			E			E			E	
Queue Length 50th (m)	61.1	105.2	11.8	52.1	181.5	27.9	52.5	183.8	12.7	23.4	155.1	
Queue Length 95th (m)	#109.9	129.8	38.1	78.3	203.4	44.2	#99.3	#223.8	29.5	#59.2	#193.5	
Internal Link Dist (m)		102.1			444.7			175.8			171.3	
Turn Bay Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		
Base Capacity (vph)	297	1422	806	372	1282	528	251	1238	600	153	1041	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.87	0.56	0.43	0.52	0.81	0.40	0.88	0.92	0.23	0.82	0.92	

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 60.0
 Intersection LOS: E

Lanes, Volumes, Timings
 8: Ninth Line & Britannia Rd

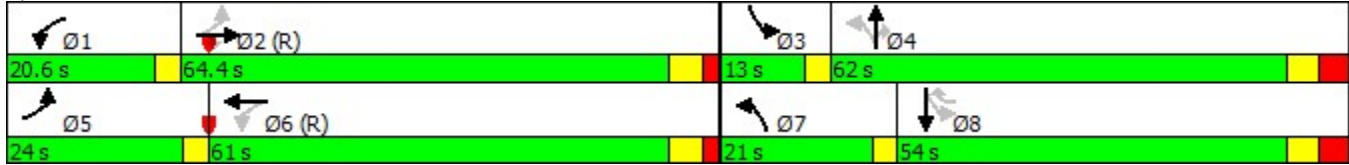
PM Peak Period
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Intersection Capacity Utilization 93.9% ICU Level of Service F

Analysis Period (min) 15

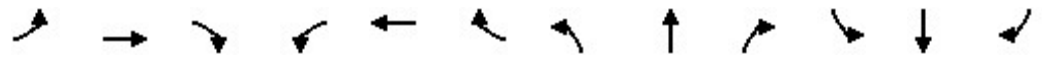
95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Ninth Line & Britannia Rd



Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

PM Peak Period
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	888	94	213	1252	77	32	16	100	42	6	10
Future Volume (vph)	15	888	94	213	1252	77	32	16	100	42	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		25.0	60.0		60.0	30.0		30.0	30.0		30.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00	0.99		1.00	0.99	
Frt			0.850			0.850		0.870			0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3614	1585	1825	3614	1633	1825	1619	0	1825	1729	0
Flt Permitted	0.149			0.259			0.746			0.639		
Satd. Flow (perm)	286	3614	1549	497	3614	1596	1430	1619	0	1222	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			60			73		109				11
Link Speed (k/h)		70			70			50				50
Link Distance (m)		468.7			144.7			104.9				91.6
Travel Time (s)		24.1			7.4			7.6				6.6
Confl. Peds. (#/hr)	1		1	1		1	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	16	965	102	232	1361	84	35	17	109	46	7	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	965	102	232	1361	84	35	126	0	46	18	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Minimum Split (s)	35.3	35.3	35.3	35.3	35.3	35.3	44.1	44.1		44.1	44.1	
Total Split (s)	115.0	115.0	115.0	115.0	115.0	115.0	45.0	45.0		45.0	45.0	
Total Split (%)	71.9%	71.9%	71.9%	71.9%	71.9%	71.9%	28.1%	28.1%		28.1%	28.1%	
Maximum Green (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
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)	2.3	2.3	2.3	2.3	2.3	2.3	3.1	3.1		3.1	3.1	
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)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0	11.0	11.0	11.0	11.0	12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effect Green (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68	0.24	0.24		0.24	0.24	
v/c Ratio	0.08	0.39	0.10	0.69	0.55	0.08	0.10	0.27		0.16	0.04	
Control Delay	4.1	10.4	1.7	28.5	14.3	2.4	48.9	12.8		50.3	28.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	4.1	10.4	1.7	28.5	14.3	2.4	48.9	12.8		50.3	28.2	
LOS	A	B	A	C	B	A	D	B		D	C	
Approach Delay		9.5			15.6			20.6			44.1	
Approach LOS		A			B			C			D	
Queue Length 50th (m)	1.1	117.1	4.7	41.7	109.8	1.1	8.8	4.2		11.7	1.7	
Queue Length 95th (m)	m1.3	129.0	m3.7	83.0	126.8	6.7	18.9	21.8		23.5	8.8	
Internal Link Dist (m)		444.7			120.7			80.9			67.6	
Turn Bay Length (m)	50.0		25.0	60.0		60.0	30.0			30.0		
Base Capacity (vph)	194	2455	1071	337	2455	1107	338	466		289	417	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.08	0.39	0.10	0.69	0.55	0.08	0.10	0.27		0.16	0.04	

Intersection Summary












Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 145 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 100
 Control Type: Pretimed
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 14.3
 Intersection LOS: B
 Intersection Capacity Utilization 91.9%
 ICU Level of Service F
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd



Lanes, Volumes, Timings
10: Freeman Terrace & Ninth Line

PM Peak Period
09-18-2019












						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	13	1407	22	27	1267
Future Volume (vph)	13	13	1407	22	27	1267
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	25.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.998			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1748	0	3572	0	1825	3579
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1748	0	3572	0	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	116.1		88.5			199.8
Travel Time (s)	8.7		4.6			15.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	14	14	1529	24	29	1377
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	1553	0	29	1377
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	49.6%
Analysis Period (min)	15
	ICU Level of Service A












Lanes, Volumes, Timings
11: Ninth Line & Manatee Way

PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	15	1300	28	20	1248
Future Volume (vph)	10	15	1300	28	20	1248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.920		0.997			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1732	0	3569	0	1825	3579
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1732	0	3569	0	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	108.3		91.8			88.5
Travel Time (s)	8.1		4.7			6.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	11	16	1413	30	22	1357
Shared Lane Traffic (%)						
Lane Group Flow (vph)	27	0	1443	0	22	1357
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.8%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
12: Ninth Line & McDowell Drive

PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	8	42	1408	37	37	1189
Future Volume (vph)	8	42	1408	37	37	1189
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		20.0	25.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.887			0.850		
Flt Protected	0.992				0.950	
Satd. Flow (prot)	1690	0	3579	1633	1825	3579
Flt Permitted	0.992				0.950	
Satd. Flow (perm)	1690	0	3579	1633	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	111.8		227.5			91.8
Travel Time (s)	8.4		11.7			6.9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	9	46	1530	40	40	1292
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	1530	40	40	1292
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	48.9%			ICU Level of Service A		
Analysis Period (min)	15					

Appendix C-: Future Total Conditions Synchro Output

HCM Unsignalized Intersection Capacity Analysis
1: Eighth Line & Britannia Rd

AM Peak Period
09-30-2019



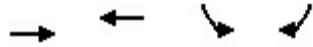
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↕↔			↔↕↔			↕↔			↕↔	
Traffic Volume (veh/h)	91	1249	7	10	516	11	7	27	29	21	30	33
Future Volume (Veh/h)	91	1249	7	10	516	11	7	27	29	21	30	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	99	1358	8	11	561	12	8	29	32	23	33	36
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	573			1366			1822	2155	457	1286	2153	193
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	573			1366			1822	2155	457	1286	2153	193
tC, single (s)	4.1			4.1			7.8	6.6	7.1	7.6	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.0	3.4	3.5	4.0	3.3
p0 queue free %	90			98			42	29	94	47	23	96
cM capacity (veh/h)	1010			509			14	41	530	43	43	822
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	438	679	348	151	280	152	69	92				
Volume Left	99	0	0	11	0	0	8	23				
Volume Right	0	0	8	0	0	12	32	36				
cSH	1010	1700	1700	509	1700	1700	51	68				
Volume to Capacity	0.10	0.40	0.20	0.02	0.17	0.09	1.36	1.35				
Queue Length 95th (m)	2.5	0.0	0.0	0.5	0.0	0.0	48.3	57.3				
Control Delay (s)	2.9	0.0	0.0	1.2	0.0	0.0	379.5	330.2				
Lane LOS	A			A			F	F				
Approach Delay (s)	0.9			0.3			379.5	330.2				
Approach LOS							F	F				
Intersection Summary												
Average Delay			26.2									
Intersection Capacity Utilization			55.4%		ICU Level of Service			B				
Analysis Period (min)			15									

Queues

AM Peak Period

3: Britannia Rd & Hwy 407 WB Off-Ramp

09-30-2019



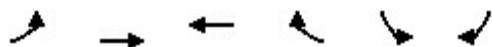
Lane Group	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	1302	584	468	32
v/c Ratio	0.68	0.31	0.84	0.07
Control Delay	17.6	12.3	41.3	7.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	17.6	12.3	41.3	7.3
Queue Length 50th (m)	79.3	27.1	69.2	0.0
Queue Length 95th (m)	113.1	41.4	105.3	5.6
Internal Link Dist (m)	58.0	92.0	228.4	
Turn Bay Length (m)				65.0
Base Capacity (vph)	1916	1898	669	544
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.68	0.31	0.70	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: Britannia Rd & Hwy 407 WB Off-Ramp

AM Peak Period
09-30-2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	1198	537	0	431	29
Future Volume (vph)	0	1198	537	0	431	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0
Lane Util. Factor		0.95	0.95		1.00	1.00
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3579	3544		1722	1350
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3579	3544		1722	1350
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1302	584	0	468	32
RTOR Reduction (vph)	0	0	0	0	0	22
Lane Group Flow (vph)	0	1302	584	0	468	10
Heavy Vehicles (%)	0%	2%	3%	0%	6%	21%
Turn Type		NA	NA		Prot	Perm
Protected Phases		2	2		4	
Permitted Phases						4
Actuated Green, G (s)		45.6	45.6		27.5	27.5
Effective Green, g (s)		45.6	45.6		27.5	27.5
Actuated g/C Ratio		0.54	0.54		0.32	0.32
Clearance Time (s)		6.0	6.0		6.0	6.0
Vehicle Extension (s)		5.0	5.0		4.0	4.0
Lane Grp Cap (vph)		1917	1899		556	436
v/s Ratio Prot		c0.36	0.16		c0.27	
v/s Ratio Perm						0.01
v/c Ratio		0.68	0.31		0.84	0.02
Uniform Delay, d1		14.4	11.0		26.8	19.6
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		2.0	0.4		11.5	0.0
Delay (s)		16.4	11.4		38.3	19.7
Level of Service		B	B		D	B
Approach Delay (s)		16.4	11.4		37.1	
Approach LOS		B	B		D	
Intersection Summary						
HCM 2000 Control Delay			19.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			85.1		Sum of lost time (s)	12.0
Intersection Capacity Utilization			71.4%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Queues
6: Hwy 407 EB Off-Ramp & Britannia Rd

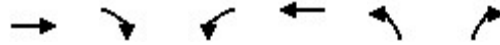
AM Peak Period
09-30-2019



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	1667	715	9	240
v/c Ratio	0.68	0.30	0.03	0.73
Control Delay	11.1	6.7	27.8	42.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.1	6.7	27.8	42.9
Queue Length 50th (m)	81.9	23.7	1.3	34.1
Queue Length 95th (m)	117.8	35.8	4.9	56.0
Internal Link Dist (m)	93.5	62.9	233.9	
Turn Bay Length (m)				80.0
Base Capacity (vph)	2459	2411	370	394
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.68	0.30	0.02	0.61
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
6: Hwy 407 EB Off-Ramp & Britannia Rd

AM Peak Period
09-30-2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Traffic Volume (vph)	1534	0	0	658	8	221
Future Volume (vph)	1534	0	0	658	8	221
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0			6.0	6.0	6.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3614			3544	1615	1617
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3614			3544	1615	1617
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1667	0	0	715	9	240
RTOR Reduction (vph)	0	0	0	0	0	25
Lane Group Flow (vph)	1667	0	0	715	9	215
Heavy Vehicles (%)	1%	0%	0%	3%	13%	1%
Turn Type	NA			NA	Prot	Perm
Protected Phases	2			2	4	
Permitted Phases						4
Actuated Green, G (s)	62.3			62.3	17.2	17.2
Effective Green, g (s)	62.3			62.3	17.2	17.2
Actuated g/C Ratio	0.68			0.68	0.19	0.19
Clearance Time (s)	6.0			6.0	6.0	6.0
Vehicle Extension (s)	5.0			5.0	4.0	4.0
Lane Grp Cap (vph)	2460			2413	303	303
v/s Ratio Prot	c0.46			0.20	0.01	
v/s Ratio Perm						c0.13
v/c Ratio	0.68			0.30	0.03	0.71
Uniform Delay, d1	8.7			5.8	30.3	34.8
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	1.5			0.3	0.1	7.9
Delay (s)	10.2			6.2	30.4	42.7
Level of Service	B			A	C	D
Approach Delay (s)	10.2			6.2	42.3	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	91.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queues
8: Ninth Line & Britannia Rd

AM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	129	1390	427	125	695	118	237	810	207	147	1160
v/c Ratio	0.41	0.97	0.54	0.89	0.49	0.18	1.00	0.70	0.32	0.57	1.04
Control Delay	27.1	64.8	16.2	102.9	34.0	4.8	103.6	49.6	14.0	33.2	88.0
Queue Delay	0.0	41.8	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	106.6	16.7	102.9	34.0	4.8	103.6	49.6	14.0	33.2	88.0
Queue Length 50th (m)	22.4	227.4	39.3	32.1	66.7	0.0	59.3	117.5	13.7	26.5	~207.2
Queue Length 95th (m)	35.5	#276.3	71.9	#62.8	78.0	10.1	#118.4	145.6	35.4	41.3	#250.4
Internal Link Dist (m)		85.7			444.6			179.4			237.6
Turn Bay Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0	
Base Capacity (vph)	318	1432	797	141	1405	651	236	1156	639	291	1119
Starvation Cap Reductn	0	262	103	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	1.19	0.62	0.89	0.49	0.18	1.00	0.70	0.32	0.51	1.04

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

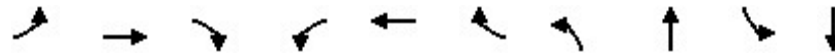
HCM Signalized Intersection Capacity Analysis
8: Ninth Line & Britannia Rd

AM Peak Period
09-30-2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	1279	393	115	639	109	218	745	190	135	944	123
Future Volume (vph)	119	1279	393	115	639	109	218	745	190	135	944	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	7.7	7.7	3.0	7.7	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	3614	1617	1825	3614	1498	1807	3349	1580	1615	3406	
Flt Permitted	0.26	1.00	1.00	0.06	1.00	1.00	0.07	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	509	3614	1617	124	3614	1498	138	3349	1580	343	3406	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	129	1390	427	125	695	118	237	810	207	147	1026	134
RTOR Reduction (vph)	0	0	156	0	0	69	0	0	94	0	6	0
Lane Group Flow (vph)	129	1390	271	125	695	49	237	810	113	147	1154	0
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	0%	1%	1%	0%	1%	9%	1%	9%	2%	13%	6%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4		4	8		
Actuated Green, G (s)	72.6	63.4	63.4	70.2	62.2	62.2	71.8	55.3	55.3	65.8	52.3	
Effective Green, g (s)	72.6	63.4	63.4	70.2	62.2	62.2	71.8	55.3	55.3	65.8	52.3	
Actuated g/C Ratio	0.45	0.40	0.40	0.44	0.39	0.39	0.45	0.35	0.35	0.41	0.33	
Clearance Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	7.7	7.7	3.0	7.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	306	1432	640	139	1404	582	234	1157	546	248	1113	
v/s Ratio Prot	c0.02	c0.38		c0.04	0.19		c0.10	0.24		0.05	0.34	
v/s Ratio Perm	0.17		0.17	0.35		0.03	c0.35		0.07	0.19		
v/c Ratio	0.42	0.97	0.42	0.90	0.50	0.08	1.01	0.70	0.21	0.59	1.04	
Uniform Delay, d1	27.2	47.4	35.0	38.8	37.0	30.9	51.7	45.2	36.9	32.5	53.9	
Progression Factor	1.00	1.00	1.00	1.83	0.88	0.74	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	17.7	2.0	45.6	0.3	0.1	62.2	1.9	0.2	3.8	37.0	
Delay (s)	28.1	65.1	37.1	116.5	32.8	22.8	113.8	47.1	37.1	36.3	90.8	
Level of Service	C	E	D	F	C	C	F	D	D	D	F	
Approach Delay (s)		56.5			42.7			58.1			84.7	
Approach LOS		E			D			E			F	
Intersection Summary												
HCM 2000 Control Delay			61.3			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)				19.8		
Intersection Capacity Utilization			102.0%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

Queues
9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	1	1567	152	96	862	51	35	202	68	47
v/c Ratio	0.00	0.64	0.16	0.72	0.35	0.05	0.11	0.49	0.31	0.12
Control Delay	3.0	2.9	0.3	49.8	11.3	2.1	49.2	44.1	55.0	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	2.9	0.3	49.8	11.3	2.1	49.2	44.1	55.0	29.6
Queue Length 50th (m)	0.0	17.1	0.0	18.0	57.1	0.0	8.8	42.5	18.0	6.2
Queue Length 95th (m)	m0.0	m21.5	m0.0	#58.3	68.1	4.5	19.0	68.9	33.5	17.4
Internal Link Dist (m)		444.6			120.7			80.9		74.6
Turn Bay Length (m)	50.0		25.0	60.0		60.0	30.0		30.0	
Base Capacity (vph)	384	2431	966	133	2431	1026	309	416	219	408
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.64	0.16	0.72	0.35	0.05	0.11	0.49	0.31	0.12

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

AM Peak Period
 09-30-2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	1	1442	140	88	793	47	32	6	179	63	23	20
Future Volume (vph)	1	1442	140	88	793	47	32	6	179	63	23	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1		7.1	7.1	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.86		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1823	3579	1397	1738	3579	1487	1707	1604		1786	1654	
Flt Permitted	0.30	1.00	1.00	0.11	1.00	1.00	0.73	1.00		0.49	1.00	
Satd. Flow (perm)	567	3579	1397	195	3579	1487	1305	1604		926	1654	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	1567	152	96	862	51	35	7	195	68	25	22
RTOR Reduction (vph)	0	0	18	0	0	16	0	37	0	0	17	0
Lane Group Flow (vph)	1	1567	134	96	862	35	35	165	0	68	30	0
Confl. Peds. (#/hr)	2		5	5		2	7		2	2		7
Heavy Vehicles (%)	0%	2%	13%	5%	2%	7%	6%	0%	1%	2%	13%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
Effective Green, g (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68	0.24	0.24		0.24	0.24	
Clearance Time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1		7.1	7.1	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	385	2431	949	132	2431	1010	309	379		219	391	
v/s Ratio Prot		0.44			0.24			c0.10			0.02	
v/s Ratio Perm	0.00		0.10	c0.49		0.02	0.03			0.07		
v/c Ratio	0.00	0.64	0.14	0.73	0.35	0.03	0.11	0.44		0.31	0.08	
Uniform Delay, d1	8.2	14.6	9.1	16.3	10.8	8.4	47.9	52.0		50.3	47.5	
Progression Factor	0.30	0.15	0.02	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.7	0.2	29.3	0.4	0.1	0.7	3.6		3.7	0.4	
Delay (s)	2.5	2.9	0.3	45.6	11.2	8.5	48.6	55.6		53.9	47.8	
Level of Service	A	A	A	D	B	A	D	E		D	D	
Approach Delay (s)		2.7			14.4			54.6			51.5	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	13.4
Intersection Capacity Utilization	109.7%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 10: Freeman Terrace & Ninth Line

AM Peak Period
 09-30-2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	29	1136	9	2	1467
Future Volume (Veh/h)	22	29	1136	9	2	1467
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)	24	32	1235	10	2	1595
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)			178		203	
pX, platoon unblocked	0.76	0.86			0.86	
vC, conflicting volume	2042	622			1245	
vC1, stage 1 conf vol	1240					
vC2, stage 2 conf vol	802					
vCu, unblocked vol	893	226			952	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	95			100	
cM capacity (veh/h)	285	671			625	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	56	823	422	2	798	798
Volume Left	24	0	0	2	0	0
Volume Right	32	0	10	0	0	0
cSH	425	1700	1700	625	1700	1700
Volume to Capacity	0.13	0.48	0.25	0.00	0.47	0.47
Queue Length 95th (m)	3.4	0.0	0.0	0.1	0.0	0.0
Control Delay (s)	14.8	0.0	0.0	10.8	0.0	0.0
Lane LOS	B		B			
Approach Delay (s)	14.8	0.0	0.0			
Approach LOS	B					

Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			50.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
11: Ninth Line & Manatee Way

AM Peak Period
09-30-2019



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	31	1039	26	20	1517
Future Volume (Veh/h)	22	31	1039	26	20	1517
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)	24	34	1129	28	22	1649
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL		TWLTL	
Median storage veh			2		2	
Upstream signal (m)			89		293	
pX, platoon unblocked	0.77	0.85			0.85	
vC, conflicting volume	2012	578			1157	
vC1, stage 1 conf vol	1143					
vC2, stage 2 conf vol	868					
vCu, unblocked vol	865	167			844	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	95			97	
cM capacity (veh/h)	324	730			685	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	58	753	404	22	824	824
Volume Left	24	0	0	22	0	0
Volume Right	34	0	28	0	0	0
cSH	481	1700	1700	685	1700	1700
Volume to Capacity	0.12	0.44	0.24	0.03	0.48	0.48
Queue Length 95th (m)	3.1	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	13.5	0.0	0.0	10.4	0.0	0.0
Lane LOS	B				B	
Approach Delay (s)	13.5	0.0			0.1	
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			51.9%		ICU Level of Service	A
Analysis Period (min)			15			

Queues
12: Ninth Line & McDowell Drive

AM Peak Period
09-30-2019



Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	14	6	76	20	1145	36	51	1534	53
v/c Ratio	0.05	0.02	0.21	0.09	0.46	0.03	0.19	0.74	0.06
Control Delay	29.8	19.7	16.6	4.7	6.9	2.1	11.1	16.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.8	19.7	16.6	4.7	6.9	2.1	11.1	16.9	1.8
Queue Length 50th (m)	2.0	0.2	4.3	0.9	40.2	0.4	3.9	95.5	0.0
Queue Length 95th (m)	6.9	3.3	15.5	2.7	51.5	2.8	10.0	121.6	3.4
Internal Link Dist (m)		67.9	90.1		93.1			65.1	
Turn Bay Length (m)				25.0		20.0	25.0		25.0
Base Capacity (vph)	280	333	359	228	2485	1142	275	2067	953
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.02	0.21	0.09	0.46	0.03	0.19	0.74	0.06

Intersection Summary

HCM Signalized Intersection Capacity Analysis
12: Ninth Line & McDowell Drive

AM Peak Period
09-30-2019



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	13	1	5	24	4	42	18	1053	33	47	1411	49
Future Volume (vph)	13	1	5	24	4	42	18	1053	33	47	1411	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.0	5.0	5.0	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.88			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1789	1648			1733		1789	3579	1633	1825	3579	1601
Flt Permitted	0.74	1.00			0.92		0.08	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	1401	1648			1613		143	3579	1633	476	3579	1601
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	1	5	26	4	46	20	1145	36	51	1534	53
RTOR Reduction (vph)	0	4	0	0	37	0	0	0	9	0	0	22
Lane Group Flow (vph)	14	2	0	0	39	0	20	1145	27	51	1534	31
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	2%	0%	0%	2%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	18.0	18.0			18.0		62.5	62.5	62.5	52.0	52.0	52.0
Effective Green, g (s)	18.0	18.0			18.0		62.5	62.5	62.5	52.0	52.0	52.0
Actuated g/C Ratio	0.20	0.20			0.20		0.69	0.69	0.69	0.58	0.58	0.58
Clearance Time (s)	4.5	4.5			4.5		4.0	5.0	5.0	4.5	4.5	4.5
Lane Grp Cap (vph)	280	329			322		227	2485	1134	275	2067	925
v/s Ratio Prot		0.00					0.01	c0.32			c0.43	
v/s Ratio Perm	0.01				c0.02		0.05		0.02	0.11		0.02
v/c Ratio	0.05	0.01			0.12		0.09	0.46	0.02	0.19	0.74	0.03
Uniform Delay, d1	29.1	28.8			29.5		9.7	6.2	4.3	9.0	14.0	8.2
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.0			0.8		0.8	0.6	0.0	1.5	2.5	0.1
Delay (s)	29.4	28.9			30.3		10.5	6.8	4.3	10.5	16.5	8.2
Level of Service	C	C			C		B	A	A	B	B	A
Approach Delay (s)		29.3			30.3			6.8			16.0	
Approach LOS		C			C			A			B	

Intersection Summary

HCM 2000 Control Delay	12.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
1: Eighth Line & Britannia Rd

PM Peak Period
09-30-2019



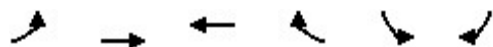
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔↔			↔↔↔			↕			↕	
Traffic Volume (vph)	58	661	13	9	1092	12	18	44	16	4	37	82
Future Volume (vph)	58	661	13	9	1092	12	18	44	16	4	37	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.997			0.998			0.973			0.910	
Fl _t Protected		0.996						0.988			0.998	
Satd. Flow (prot)	0	5042	0	0	5133	0	0	1847	0	0	1729	0
Fl _t Permitted		0.996						0.988			0.998	
Satd. Flow (perm)	0	5042	0	0	5133	0	0	1847	0	0	1729	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		159.9			732.9			151.2			170.7	
Travel Time (s)		12.0			55.0			11.3			12.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	3%	15%	0%	2%	0%	0%	0%	0%	0%	3%	0%
Adj. Flow (vph)	63	718	14	10	1187	13	20	48	17	4	40	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	795	0	0	1210	0	0	85	0	0	133	0
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)		0.0			0.0			0.0			0.0	
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												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	56.7%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↘	↘
Traffic Volume (vph)	0	604	1139	0	374	37
Future Volume (vph)	0	604	1139	0	374	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	65.0
Storage Lanes	0			0	1	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3579	3614	0	1807	1585
Flt Permitted					0.950	
Satd. Flow (perm)	0	3579	3614	0	1807	1585
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						40
Link Speed (k/h)		80	80		60	
Link Distance (m)		65.7	118.3		257.9	
Travel Time (s)		3.0	5.3		15.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	0%	1%	3%
Adj. Flow (vph)	0	657	1238	0	407	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	657	1238	0	407	40
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Britannia Rd & Hwy 407 WB Off-Ramp

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		45.0	45.0		8.0	8.0
Minimum Split (s)		51.0	51.0		22.5	22.5
Total Split (s)		52.0	52.0		38.0	38.0
Total Split (%)		57.8%	57.8%		42.2%	42.2%
Maximum Green (s)		46.0	46.0		32.0	32.0
Yellow Time (s)		4.0	4.0		4.0	4.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		5.0	5.0		4.0	4.0
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		47.1	47.1		24.0	24.0
Actuated g/C Ratio		0.57	0.57		0.29	0.29
v/c Ratio		0.32	0.61		0.78	0.08
Control Delay		11.0	14.4		38.0	7.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.0	14.4		38.0	7.0
LOS		B	B		D	A
Approach Delay		11.0	14.4		35.2	
Approach LOS		B	B		D	
Queue Length 50th (m)		26.8	62.7		57.7	0.0
Queue Length 95th (m)		45.7	101.6		87.9	6.3
Internal Link Dist (m)		41.7	94.3		233.9	
Turn Bay Length (m)						65.0
Base Capacity (vph)		2026	2046		698	636
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.32	0.61		0.58	0.06

Intersection Summary

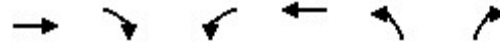
Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	83.1
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	17.4
Intersection Capacity Utilization	68.2%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	C

Splits and Phases: 3: Britannia Rd & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

PM Peak Period
09-30-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘	↗
Traffic Volume (vph)	988	0	0	1224	84	122
Future Volume (vph)	988	0	0	1224	84	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	80.0
Storage Lanes		0	0		1	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3579	0	0	3614	1755	1633
Flt Permitted					0.950	
Satd. Flow (perm)	3579	0	0	3614	1755	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						133
Link Speed (k/h)	80			70	60	
Link Distance (m)	112.6			94.0	243.9	
Travel Time (s)	5.1			4.8	14.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	1%	4%	0%
Adj. Flow (vph)	1074	0	0	1330	91	133
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1074	0	0	1330	91	133
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.7	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Britannia Rd

PM Peak Period
09-30-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	20.0			20.0	8.0	8.0
Minimum Split (s)	26.0			26.0	14.0	14.0
Total Split (s)	68.0			68.0	22.0	22.0
Total Split (%)	75.6%			75.6%	24.4%	24.4%
Maximum Green (s)	62.0			62.0	16.0	16.0
Yellow Time (s)	4.0			4.0	4.0	4.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0			6.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	5.0			5.0	4.0	4.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	68.2			68.2	11.1	11.1
Actuated g/C Ratio	0.75			0.75	0.12	0.12
v/c Ratio	0.40			0.49	0.43	0.42
Control Delay	5.0			5.7	41.9	10.7
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	5.0			5.7	41.9	10.7
LOS	A			A	D	B
Approach Delay	5.0			5.7	23.4	
Approach LOS	A			A	C	
Queue Length 50th (m)	28.9			39.6	14.7	0.0
Queue Length 95th (m)	45.1			61.4	27.4	14.6
Internal Link Dist (m)	88.6			70.0	219.9	
Turn Bay Length (m)						80.0
Base Capacity (vph)	2672			2697	307	396
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.40			0.49	0.30	0.34

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	91.3
Natural Cycle:	40
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	6.9
Intersection Capacity Utilization	50.5%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	A

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Britannia Rd



Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	733	324	184	955	196	215	1065	144	115	756	133
Future Volume (vph)	237	733	324	184	955	196	215	1065	144	115	756	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		0.0
Storage Lanes	1		1	1		1	1		1	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor						0.99			0.99	1.00		
Frt			0.850			0.850			0.850		0.978	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3650	1617	1825	3614	1555	1789	3650	1633	1674	3570	0
Flt Permitted	0.077			0.233			0.082			0.087		
Satd. Flow (perm)	146	3650	1617	448	3614	1535	154	3650	1610	153	3570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			298			118			79			13
Link Speed (k/h)		70			70			70			70	
Link Distance (m)		126.1			468.7			199.8			195.3	
Travel Time (s)		6.5			24.1			10.3			10.0	
Confl. Peds. (#/hr)	1					1			2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	1%	5%	2%	0%	0%	9%	0%	0%
Adj. Flow (vph)	258	797	352	200	1038	213	234	1158	157	125	822	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	258	797	352	200	1038	213	234	1158	157	125	967	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	0	1	2	1	1	2	0	1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	0.0	6.1	30.5	6.1	6.1	30.5	0.0	6.1	30.5	
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	0.0	6.1	1.8	6.1	6.1	1.8	0.0	6.1	1.8	
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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	custom	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		8	4		4	8		
Detector Phase	5	2	2	1	6	8	7	4	4	3	8	
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	
Minimum Split (s)	9.5	26.1	26.1	9.5	26.1	47.7	9.5	47.7	47.7	9.5	47.7	
Total Split (s)	24.0	62.8	62.8	21.2	60.0	54.0	22.0	63.0	63.0	13.0	54.0	
Total Split (%)	15.0%	39.3%	39.3%	13.3%	37.5%	33.8%	13.8%	39.4%	39.4%	8.1%	33.8%	
Maximum Green (s)	21.0	56.7	56.7	18.2	53.9	46.3	19.0	55.3	55.3	10.0	46.3	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	0.0	2.1	2.1	0.0	2.1	3.7	0.0	3.7	3.7	0.0	3.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	7.7	3.0	7.7	7.7	3.0	7.7	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None	None	
Walk Time (s)		7.0	7.0		7.0	13.0		13.0	13.0		13.0	
Flash Dont Walk (s)		13.0	13.0		13.0	27.0		27.0	27.0		27.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effct Green (s)	81.9	61.0	61.0	73.7	55.8	46.0	72.0	54.3	54.3	60.7	46.0	
Actuated g/C Ratio	0.51	0.38	0.38	0.46	0.35	0.29	0.45	0.34	0.34	0.38	0.29	
v/c Ratio	0.91	0.57	0.44	0.60	0.82	0.41	0.91	0.93	0.26	0.82	0.93	
Control Delay	77.8	41.9	8.5	51.1	87.8	12.9	79.9	65.0	19.5	71.1	70.5	
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	77.8	41.9	8.5	51.1	87.8	12.9	79.9	65.0	19.5	71.1	70.5	
LOS	E	D	A	D	F	B	E	E	B	E	E	
Approach Delay		40.1			71.8			62.6			70.6	
Approach LOS		D			E			E			E	
Queue Length 50th (m)	62.9	106.8	11.1	54.9	184.0	27.6	56.5	186.0	17.1	23.2	156.4	
Queue Length 95th (m)	#113.2	132.0	37.4	82.0	205.8	43.9	#105.3	#225.8	35.6	#59.2	#195.4	
Internal Link Dist (m)		102.1			444.7			175.8			171.3	
Turn Bay Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		
Base Capacity (vph)	292	1391	801	372	1260	528	263	1261	608	153	1042	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.88	0.57	0.44	0.54	0.82	0.40	0.89	0.92	0.26	0.82	0.93	

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 60.9
 Intersection LOS: E

Lanes, Volumes, Timings
 8: Ninth Line & Britannia Rd

PM Peak Period
 09-30-2019

Intersection Capacity Utilization 94.7% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 8: Ninth Line & Britannia Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21.2 s	62.8 s	13 s	63 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
24 s	60 s	22 s	54 s

Lanes, Volumes, Timings
9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	903	94	213	1257	77	32	16	100	42	6	10
Future Volume (vph)	15	903	94	213	1257	77	32	16	100	42	6	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		25.0	60.0		60.0	30.0		30.0	30.0		30.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00	0.99		1.00	0.99	
Frt			0.850			0.850		0.870			0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3614	1585	1825	3614	1633	1825	1619	0	1825	1729	0
Flt Permitted	0.148			0.253			0.746			0.639		
Satd. Flow (perm)	284	3614	1549	486	3614	1596	1430	1619	0	1222	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			59			73		109			11	
Link Speed (k/h)		70			70			50			50	
Link Distance (m)		468.7			144.7			104.9			91.6	
Travel Time (s)		24.1			7.4			7.6			6.6	
Confl. Peds. (#/hr)	1		1	1		1	2		4	4		2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	3%	0%	1%	0%	0%	0%	2%	0%	0%	0%
Adj. Flow (vph)	16	982	102	232	1366	84	35	17	109	46	7	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	982	102	232	1366	84	35	126	0	46	18	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		
Minimum Split (s)	35.3	35.3	35.3	35.3	35.3	35.3	44.1	44.1		44.1	44.1	
Total Split (s)	115.0	115.0	115.0	115.0	115.0	115.0	45.0	45.0		45.0	45.0	
Total Split (%)	71.9%	71.9%	71.9%	71.9%	71.9%	71.9%	28.1%	28.1%		28.1%	28.1%	
Maximum Green (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
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)	2.3	2.3	2.3	2.3	2.3	2.3	3.1	3.1		3.1	3.1	
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)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1		7.1	7.1	
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	11.0	11.0	11.0	11.0	11.0	11.0	12.0	12.0		12.0	12.0	
Flash Dont Walk (s)	18.0	18.0	18.0	18.0	18.0	18.0	25.0	25.0		25.0	25.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	

Lanes, Volumes, Timings
 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd

PM Peak Period
 09-30-2019

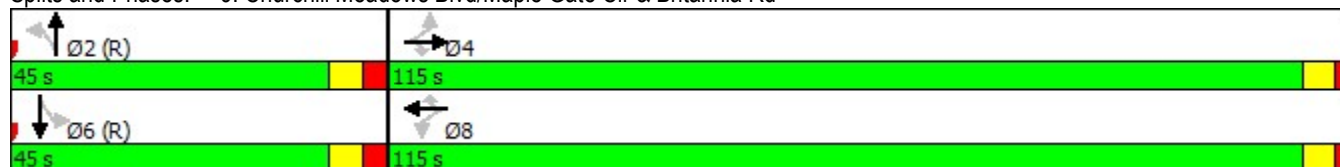


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Act Effect Green (s)	108.7	108.7	108.7	108.7	108.7	108.7	37.9	37.9		37.9	37.9	
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.68	0.68	0.24	0.24		0.24	0.24	
v/c Ratio	0.08	0.40	0.10	0.70	0.56	0.08	0.10	0.27		0.16	0.04	
Control Delay	3.9	10.3	1.6	29.9	14.3	2.4	48.9	12.8		50.3	28.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	3.9	10.3	1.6	29.9	14.3	2.4	48.9	12.8		50.3	28.2	
LOS	A	B	A	C	B	A	D	B		D	C	
Approach Delay		9.4			15.9			20.6			44.1	
Approach LOS		A			B			C			D	
Queue Length 50th (m)	1.0	118.5	4.3	42.5	110.5	1.1	8.8	4.2		11.7	1.7	
Queue Length 95th (m)	m1.2	117.7	m3.0	86.5	127.6	6.7	18.9	21.8		23.5	8.8	
Internal Link Dist (m)		444.7			120.7			80.9			67.6	
Turn Bay Length (m)	50.0		25.0	60.0		60.0	30.0			30.0		
Base Capacity (vph)	192	2455	1071	330	2455	1107	338	466		289	417	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.08	0.40	0.10	0.70	0.56	0.08	0.10	0.27		0.16	0.04	

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 145 (91%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 110
 Control Type: Pretimed
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 14.3 Intersection LOS: B
 Intersection Capacity Utilization 92.0% ICU Level of Service F
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Churchill Meadows Blvd/Maple Gate Cir & Britannia Rd



Lanes, Volumes, Timings
10: Freeman Terrace & Ninth Line

PM Peak Period
09-30-2019













Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	13	13	1448	13	27	1280
Future Volume (vph)	13	13	1448	13	27	1280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	25.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.932		0.999			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1748	0	3576	0	1825	3579
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1748	0	3576	0	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	116.1		88.5			199.8
Travel Time (s)	8.7		4.6			15.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	14	14	1574	14	29	1391
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	1588	0	29	1391
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.4%
Analysis Period (min)	15
	ICU Level of Service A






















Lanes, Volumes, Timings
11: Ninth Line & Manatee Way

PM Peak Period
09-30-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	15	1341	28	20	1261
Future Volume (vph)	10	15	1341	28	20	1261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	20.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	0.95	1.00	0.95
Frt	0.920		0.997			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1732	0	3569	0	1825	3579
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1732	0	3569	0	1825	3579
Link Speed (k/h)	48		70			48
Link Distance (m)	108.3		91.8			88.5
Travel Time (s)	8.1		4.7			6.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	11	16	1458	30	22	1371
Shared Lane Traffic (%)						
Lane Group Flow (vph)	27	0	1488	0	22	1371
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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			Yes			Yes
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	48.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
12: Ninth Line & McDowell Drive

PM Peak Period
09-30-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	3	15	8	1	42	5	1408	37	37	1189	13
Future Volume (vph)	41	3	15	8	1	42	5	1408	37	37	1189	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	25.0		20.0	25.0		25.0
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.874			0.889				0.850			0.850
Flt Protected	0.950				0.992		0.950			0.950		
Satd. Flow (prot)	1789	1646	0	0	1694	0	1789	3579	1633	1825	3579	1601
Flt Permitted	0.802				0.968		0.130			0.143		
Satd. Flow (perm)	1511	1646	0	0	1653	0	245	3579	1633	275	3579	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			46				24			67
Link Speed (k/h)		50			50			70			70	
Link Distance (m)		80.1			113.2			227.5			91.8	
Travel Time (s)		5.8			8.2			11.7			4.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	0%	2%	0%	2%	2%	0%	0%	2%	2%
Adj. Flow (vph)	45	3	16	9	1	46	5	1530	40	40	1292	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	19	0	0	56	0	5	1530	40	40	1292	14
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)		3.7			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane								Yes			Yes	
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	22.5	22.5		22.5	22.5		9.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0		23.0	23.0		10.0	67.0	67.0	57.0	57.0	57.0
Total Split (%)	25.6%	25.6%		25.6%	25.6%		11.1%	74.4%	74.4%	63.3%	63.3%	63.3%
Maximum Green (s)	18.5	18.5		18.5	18.5		6.0	62.5	62.5	52.5	52.5	52.5
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
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)	4.5	4.5			4.5		4.0	4.5	4.5	4.5	4.5	4.5
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Walk Time (s)	7.0	7.0		7.0	7.0			7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0			11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0			0	0	0	0	0
Act Effct Green (s)	18.5	18.5			18.5		63.0	62.5	62.5	52.5	52.5	52.5
Actuated g/C Ratio	0.21	0.21			0.21		0.70	0.69	0.69	0.58	0.58	0.58

Lanes, Volumes, Timings
12: Ninth Line & McDowell Drive

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
v/c Ratio	0.15	0.05			0.15		0.02	0.62	0.04	0.25	0.62	0.01
Control Delay	30.8	15.4			12.8		4.2	8.7	2.5	14.1	13.9	0.0
Queue Delay	0.0	0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	15.4			12.8		4.2	8.7	2.5	14.1	13.9	0.0
LOS	C	B			B		A	A	A	B	B	A
Approach Delay		26.2			12.8			8.5			13.7	
Approach LOS		C			B			A			B	
Queue Length 50th (m)	6.4	0.4			1.4		0.3	64.0	0.7	3.1	70.8	0.0
Queue Length 95th (m)	15.4	6.0			10.9		1.1	81.4	3.4	9.7	90.3	0.0
Internal Link Dist (m)		56.1			89.2			203.5			67.8	
Turn Bay Length (m)							25.0		20.0	25.0		25.0
Base Capacity (vph)	310	351			376		274	2485	1141	160	2087	961
Starvation Cap Reductn	0	0			0		0	0	0	0	0	0
Spillback Cap Reductn	0	0			0		0	0	0	0	0	0
Storage Cap Reductn	0	0			0		0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.05			0.15		0.02	0.62	0.04	0.25	0.62	0.01

Intersection Summary

Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.62
Intersection Signal Delay:	11.3
Intersection LOS:	B
Intersection Capacity Utilization	56.2%
ICU Level of Service	B
Analysis Period (min)	15

Splits and Phases: 12: Ninth Line & McDowell Drive



Appendix D-: Future Improvement Conditions Synchro Output

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

AM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	1279	393	115	639	109	218	745	190	135	944	123
Future Volume (vph)	119	1279	393	115	639	109	218	745	190	135	944	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		35.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Ped Bike Factor									0.99	1.00		
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3614	1617	1825	3614	1498	1807	3349	1601	1615	3444	1633
Fl _t Permitted	0.273			0.062			0.076			0.197		
Satd. Flow (perm)	524	3614	1617	119	3614	1498	145	3349	1580	335	3444	1633
Right Turn on Red			Yes			Yes			Yes			No
Satd. Flow (RTOR)			248			116			143			
Link Speed (k/h)		70			70			70				48
Link Distance (m)		109.7			468.6			203.4				261.6
Travel Time (s)		5.6			24.1			10.5				19.6
Confl. Peds. (#/hr)									1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	1%	0%	1%	9%	1%	9%	2%	13%	6%	0%
Adj. Flow (vph)	129	1390	427	125	695	118	237	810	207	147	1026	134
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	1390	427	125	695	118	237	810	207	147	1026	134
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

AM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.5	26.1	26.1	9.5	26.1	26.1	9.5	47.7	47.7	9.5	47.7	47.7
Total Split (s)	12.4	71.8	71.8	11.0	70.4	70.4	20.2	59.2	59.2	18.0	57.0	57.0
Total Split (%)	7.8%	44.9%	44.9%	6.9%	44.0%	44.0%	12.6%	37.0%	37.0%	11.3%	35.6%	35.6%
Maximum Green (s)	9.4	65.7	65.7	8.0	64.3	64.3	17.2	51.5	51.5	15.0	49.3	49.3
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.1	2.1	0.0	2.1	2.1	0.0	3.7	3.7	0.0	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	6.1	3.0	7.7	7.7	3.0	7.7	7.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		13.0	13.0		13.0	13.0
Flash Dont Walk (s)		13.0	13.0		13.0	13.0		27.0	27.0		27.0	27.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	78.0	65.7	65.7	75.6	64.5	64.5	73.9	53.4	53.4	67.1	49.3	49.3
Actuated g/C Ratio	0.49	0.41	0.41	0.47	0.40	0.40	0.46	0.33	0.33	0.42	0.31	0.31
v/c Ratio	0.39	0.94	0.53	0.89	0.48	0.18	0.97	0.73	0.33	0.60	0.97	0.27
Control Delay	25.4	57.8	16.4	102.2	32.3	4.2	92.8	51.7	14.6	36.3	74.8	43.5
Queue Delay	0.0	44.9	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	102.7	16.9	102.2	32.3	4.2	92.8	51.7	14.6	36.3	74.8	43.5
LOS	C	F	B	F	C	A	F	D	B	D	E	D
Approach Delay		78.7			38.1			53.4			67.3	
Approach LOS		E			D			D			E	
Queue Length 50th (m)	21.8	221.6	41.1	31.8	65.0	0.0	58.7	120.4	14.3	27.2	170.0	32.3
Queue Length 95th (m)	34.4	#267.3	73.2	#62.8	76.0	9.3	#114.2	146.4	35.9	42.5	#214.1	51.0
Internal Link Dist (m)		85.7			444.6			179.4			237.6	
Turn Bay Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		35.0
Base Capacity (vph)	332	1483	810	141	1457	673	245	1116	622	264	1061	503
Starvation Cap Reductn	0	293	119	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	1.17	0.62	0.89	0.48	0.18	0.97	0.73	0.33	0.56	0.97	0.27

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 125
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 63.1
 Intersection LOS: E

Lanes, Volumes, Timings
 8: Ninth Line & Britannia Rd








AM Peak Period
 09-30-2019

Intersection Capacity Utilization 98.1% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 8: Ninth Line & Britannia Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
11 s	71.8 s	18 s	59.2 s
 Ø5	 Ø6	 Ø7	 Ø8
12.4 s	70.4 s	20.2 s	57 s

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	237	733	324	184	955	196	215	1065	144	115	756	133
Future Volume (vph)	237	733	324	184	955	196	215	1065	144	115	756	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		35.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Ped Bike Factor						0.99			0.99	1.00		
Frt			0.850			0.850			0.850		0.997	0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1807	3650	1617	1825	3614	1555	1789	3650	1633	1674	3486	1486
Flt Permitted	0.077			0.233			0.093			0.088		
Satd. Flow (perm)	146	3650	1617	448	3614	1535	175	3650	1610	155	3486	1486
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			315			116			79			82
Link Speed (k/h)		70			70			70				70
Link Distance (m)		126.1			468.7			199.8				195.3
Travel Time (s)		6.5			24.1			10.3				10.0
Confl. Peds. (#/hr)	1					1			2	2		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	0%	1%	0%	1%	5%	2%	0%	0%	9%	0%	0%
Adj. Flow (vph)	258	797	352	200	1038	213	234	1158	157	125	822	145
Shared Lane Traffic (%)												10%
Lane Group Flow (vph)	258	797	352	200	1038	213	234	1158	157	125	837	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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	0	1	2	1	1	2	0	1	2	0
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	0.0	6.1	30.5	6.1	6.1	30.5	0.0	6.1	30.5	0.0
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	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	0.0
Detector 1 Size(m)	6.1	1.8	0.0	6.1	1.8	6.1	6.1	1.8	0.0	6.1	1.8	0.0
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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
8: Ninth Line & Britannia Rd

PM Peak Period
09-30-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	custom	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		8	4		4	8		8
Detector Phase	5	2	2	1	6	8	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	9.5	26.1	26.1	9.5	26.1	47.7	9.5	47.7	47.7	9.5	47.7	47.7
Total Split (s)	24.0	63.0	63.0	21.0	60.0	52.5	23.5	63.0	63.0	13.0	52.5	52.5
Total Split (%)	15.0%	39.4%	39.4%	13.1%	37.5%	32.8%	14.7%	39.4%	39.4%	8.1%	32.8%	32.8%
Maximum Green (s)	21.0	56.9	56.9	18.0	53.9	44.8	20.5	55.3	55.3	10.0	44.8	44.8
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.1	2.1	0.0	2.1	3.7	0.0	3.7	3.7	0.0	3.7	3.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	3.0	6.1	7.7	3.0	7.7	7.7	3.0	7.7	7.7
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	13.0		13.0	13.0		13.0	13.0
Flash Dont Walk (s)		13.0	13.0		13.0	27.0		27.0	27.0		27.0	27.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	82.0	61.1	61.1	73.7	55.8	45.5	72.0	54.3	54.3	60.2	45.5	45.5
Actuated g/C Ratio	0.51	0.38	0.38	0.46	0.35	0.28	0.45	0.34	0.34	0.38	0.28	0.28
v/c Ratio	0.91	0.57	0.43	0.60	0.82	0.41	0.87	0.93	0.26	0.82	0.84	0.27
Control Delay	77.6	41.8	7.3	51.2	87.8	13.6	69.4	65.0	19.5	71.8	63.0	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.6	41.8	7.3	51.2	87.8	13.6	69.4	65.0	19.5	71.8	63.0	19.1
LOS	E	D	A	D	F	B	E	E	B	E	E	B
Approach Delay		39.7			71.9			61.0			58.8	
Approach LOS		D			E			E			E	
Queue Length 50th (m)	62.9	106.8	7.6	54.9	184.0	28.6	53.5	186.0	17.1	23.5	139.3	12.5
Queue Length 95th (m)	#113.1	131.7	32.2	82.0	205.8	47.5	#96.0	#225.8	35.6	#59.7	166.9	32.3
Internal Link Dist (m)		102.1			444.7			175.8			171.3	
Turn Bay Length (m)	90.0		90.0	85.0		65.0	75.0		60.0	55.0		35.0
Base Capacity (vph)	292	1392	811	369	1259	519	285	1261	608	153	991	481
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.57	0.43	0.54	0.82	0.41	0.82	0.92	0.26	0.82	0.84	0.27

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	115
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	58.0
Intersection LOS:	E

Lanes, Volumes, Timings
 8: Ninth Line & Britannia Rd







PM Peak Period
 09-30-2019

Intersection Capacity Utilization 93.8% ICU Level of Service F

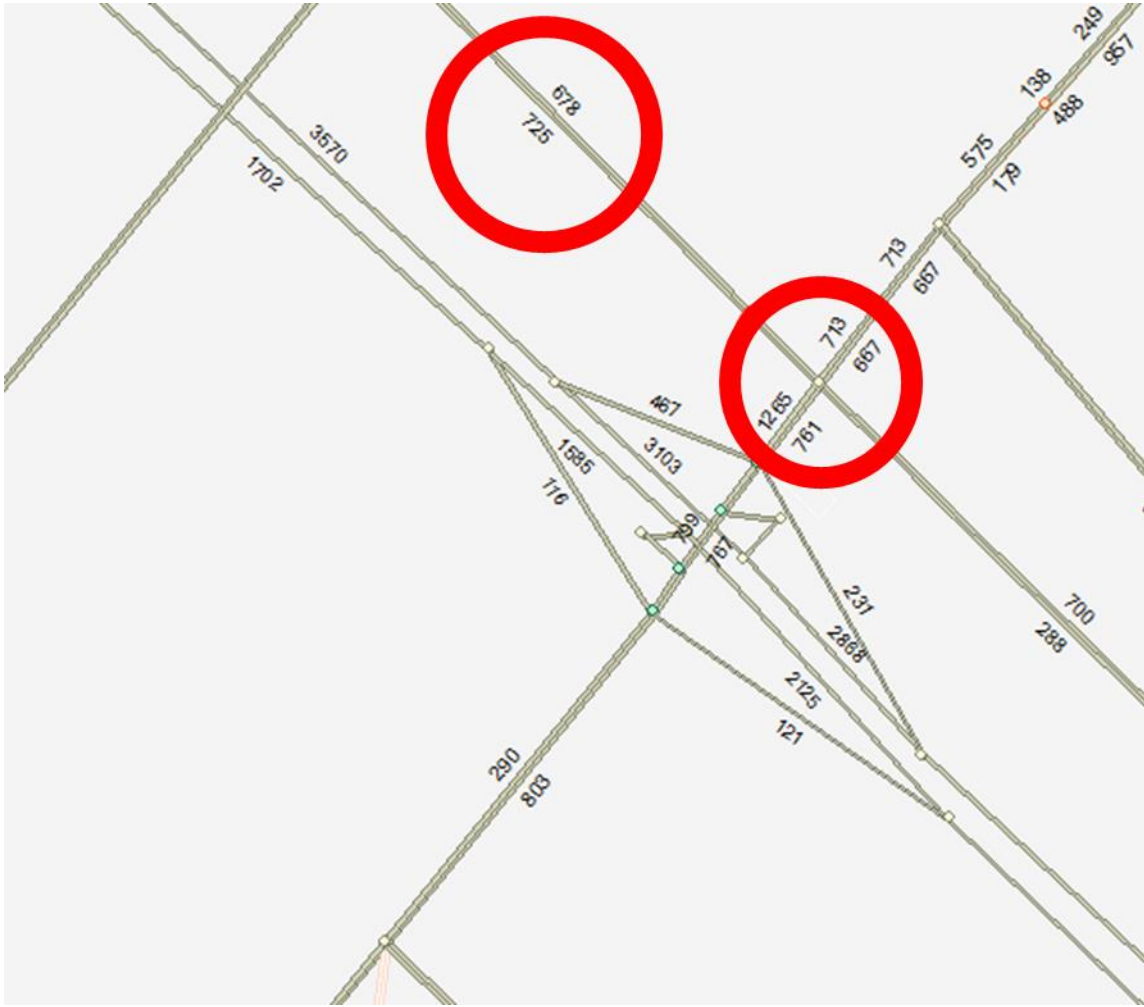
Analysis Period (min) 15

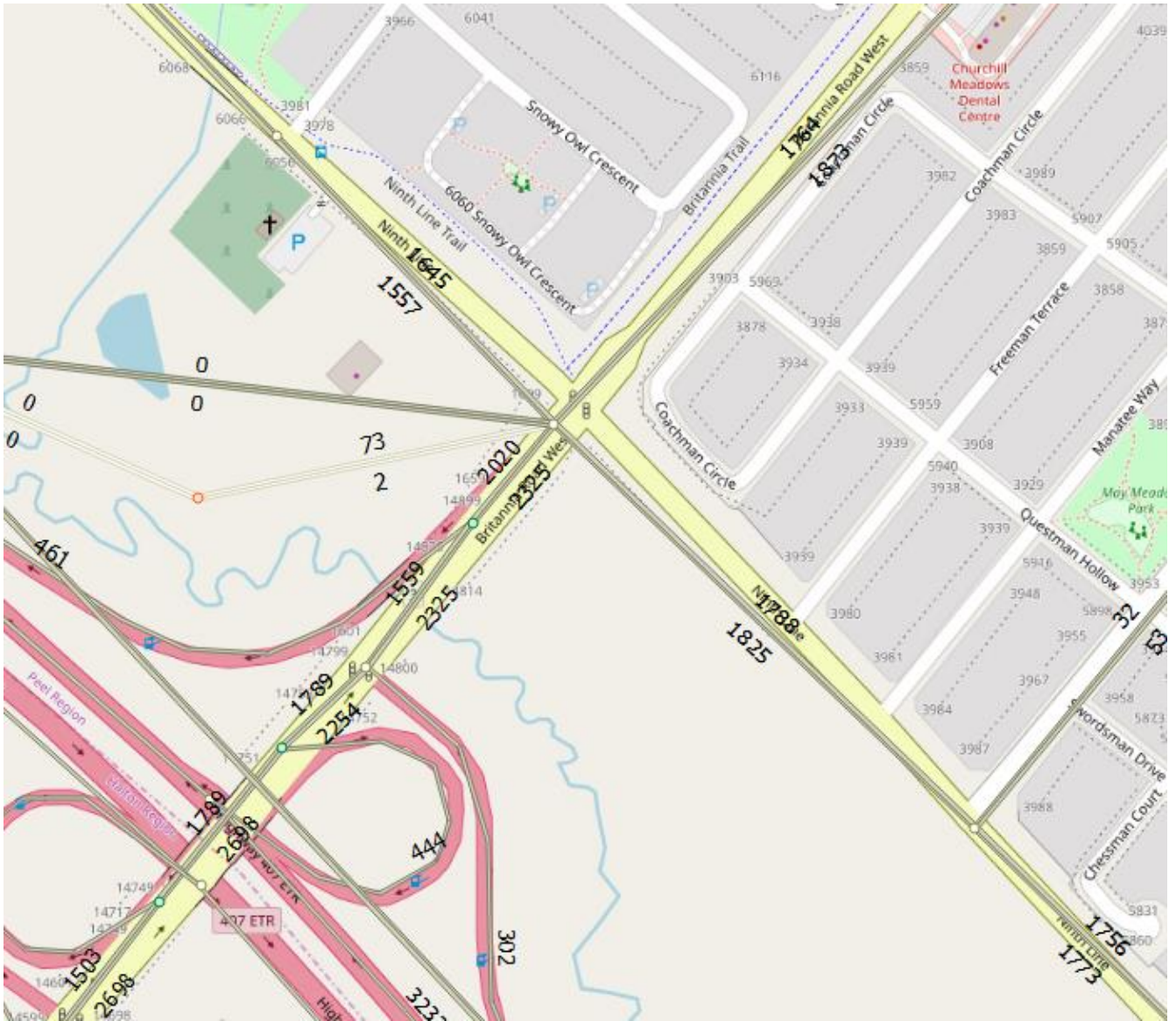
95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

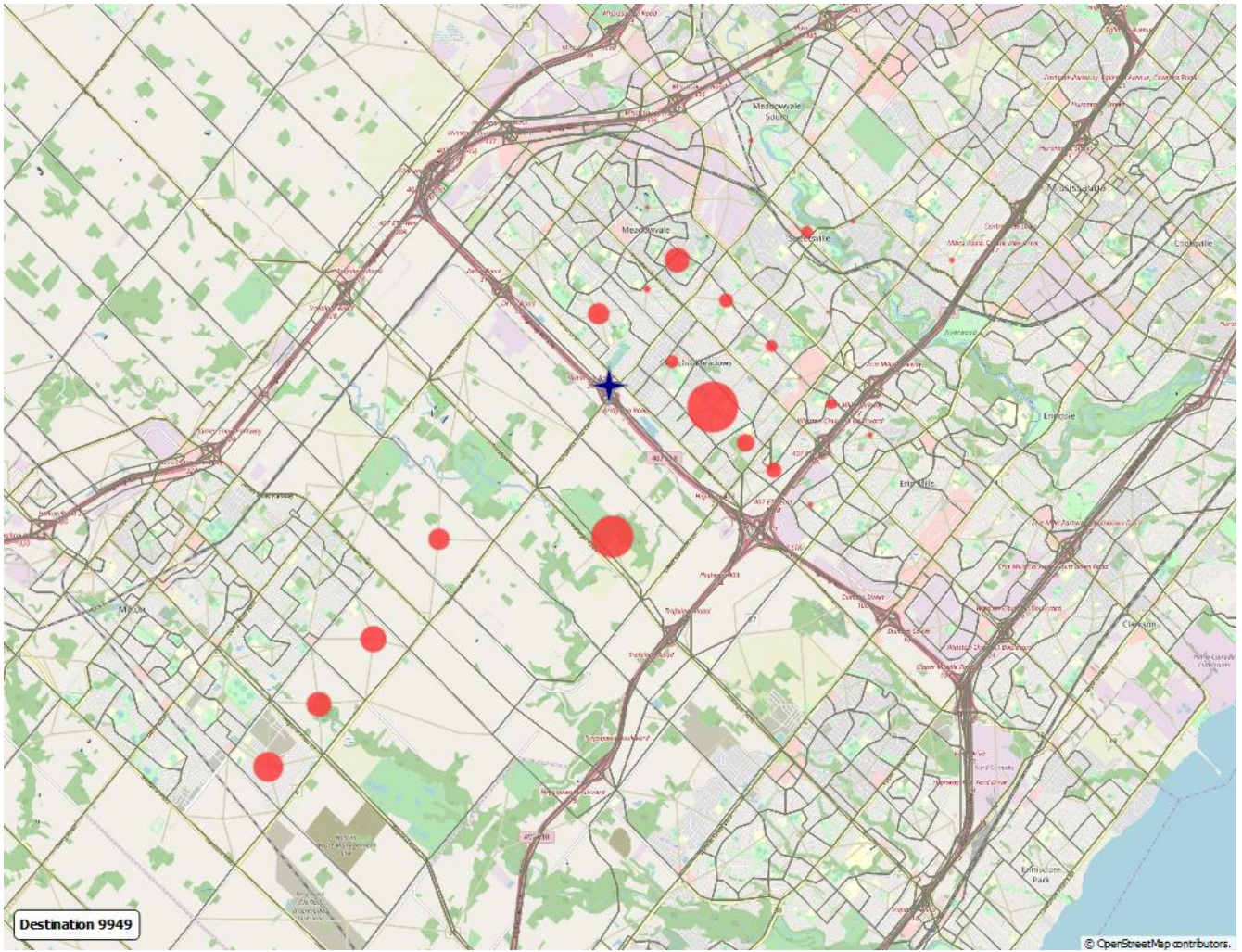
Splits and Phases: 8: Ninth Line & Britannia Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
21 s	63 s	13 s	63 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
24 s	60 s	23.5 s	52.5 s

Appendix E-: EMME Output









Final Report

Derry Station Traffic Impact Study

Highway 407 Transitway-4



Prepared for Ministry of Transportation, Ontario
by IBI Group
November 15, 2019

Document Control Page

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1 Introduction

This report is a traffic impact study for the proposed 407 Transitway Station located near the interchange of Highway 407 and Derry Road in Mississauga, Ontario. This report was prepared as part of the Environmental Assessment of the 407 Transitway, Brant Street to West of Hurontario Street.

The purpose of this report is to provide an assessment of traffic, transit, walking and cycling access to the proposed station. The assessment includes operations analysis and review of local road network configuration to identify needs and opportunities for transportation-related changes and coordination to accommodate the station.

1.1 Transitway Overview

The Highway 407 Transitway is a rapid transit facility planned within the Greater Toronto and Hamilton Area (GTHA). The Transitway will be fully grade-separated with an exclusive right-of-way and will run parallel along the Highway 407 corridor. This Transitway project supports the Province's Growth Plan by meeting increased travel demands through alternative transportation modes, providing increased mobility for a wide variety of users, and supporting transit-oriented development and associated land uses. The Transitway is initially designed to support busway service (BRT) with provisions for future conversion to light-rail transit (LRT) technology.

The section under the current EA spans approximately 43 kilometres from Brant Street in Burlington to west of Hurontario Street (west of proposed Hurontario Station) in Mississauga. This section of the Transitway provides opportunities to connect numerous Urban Growth Centres (e.g. Hamilton, Oakville, Milton and Mississauga City Centres) as well as to a number of higher order transit systems, supporting development within both the Region of Halton and Peel. The transitway is being planned to the 2041 horizon. Traffic analysis is to the 2031 horizon due to uncertainties in development levels and traffic trends beyond 2031.

1.2 Study Area

The proposed station is located north of Derry Road just east of the Highway 407 and Derry Road interchange in Mississauga as shown in Exhibit 1-1. This location was developed through consultation with the City of Mississauga and accommodates the Transitway alignment east of the Highway 407. The study area includes the following intersections:

- Derry Road & Eighth Line (*unsignalized*);
- Derry Road & Highway 407 WB Off-Ramp (*signalized*);
- Derry Road & Highway 407 EB Off-Ramp (*signalized*);
- Derry Road & Ninth Line (*signalized*);
- Derry Road West & Rosehurst Drive / Lisgar Drive (*signalized*); and
- Ninth Line & Hazelridge Road (*unsignalized*).

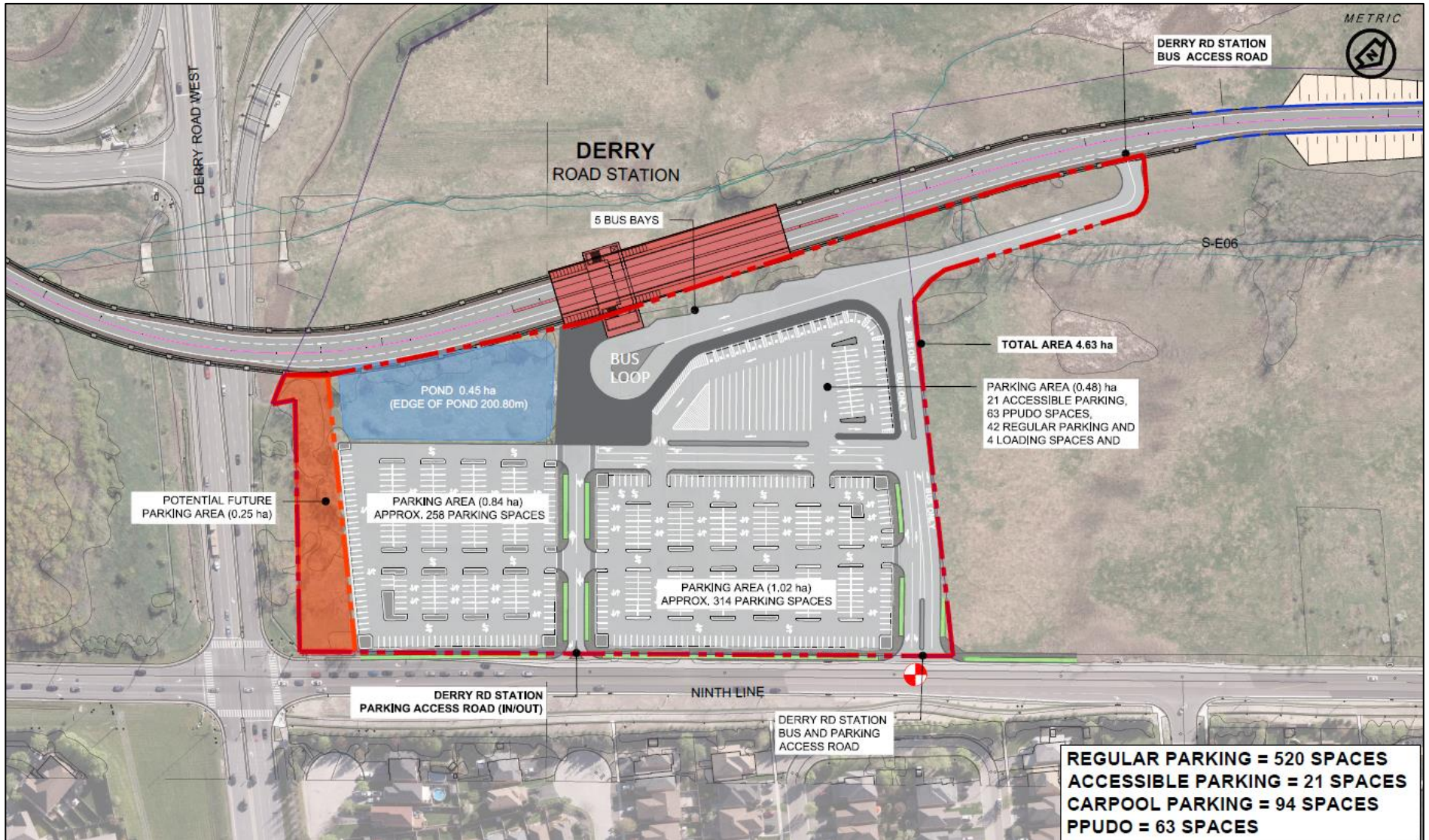
1.3 Station Plan

The proposed station layout is provided in Exhibit 1-2. The site plan illustrates that the station connects to Ninth Line at two locations, a right-in; right-out access and a signalized T-intersection and approximately 100 m south of Hazelridge Road. Further commentary on station layout and internal circulation is provided in Section 4 of this report.

Exhibit 1-1: Study Area



Exhibit 1-2: Proposed Station Layout



2 Existing Conditions

This section documents the existing road network, facilities, and weekday peak hour operations at the studied intersections.

2.1 Road Network

Derry Road is an east-west arterial regional road within Halton Region (west of Highway 407) and Region of Peel (east of Highway 407). It connects the Town of Milton to the Highway 427 border of Mississauga where it becomes Rexdale Boulevard in the City of Toronto. East of Ninth Line, Derry Road has a posted speed limit of 60 km/h and 80 km/h to the west.

Highway 407 is a tolled 400-series highway with a six lane cross section. It connects the City of Burlington to the City of Pickering. 400-series highways have a speed limit of 100 km/h. A full interchange is located at Highway 407 and Britannia Road.

Eighth Line is a two lane north-south collector road in the Town of Milton. The road starts at East Lower Base Line and ends one kilometre north of Derry Road. Currently, it provides access to farm land with some residential units and an industrial area. Eighth Line has a posted speed limit of 60 km/h.

Ninth Line is a two lane north-south arterial road in the City of Mississauga. The road starts from Ford Drive at Upper Middle Road East and ends at Steeles Avenue. The east side of Ninth Line is developed as a residential area and the west side is currently undeveloped with an industrial area southwest of Ninth Line and Derry Road. Ninth Line has a posted speed limit of 70 km/h.

Rosehurst Drive is a two lane north-south minor collector road in the City of Mississauga. It provides access to residential properties and an elementary school. Rosehurst Drive has a posted speed limit of 50 km/h.

Lisgar Drive is a two lane east-west local road in the City of Mississauga. It provides access to residential properties and a middle school. A commercial plaza is located on the southwest corner of Derry Road at Lisgar Drive. Lisgar Drive has a posted speed limit of 50 km/h.

Hazelridge Road is a two lane north-south minor collector road in the City of Mississauga. It provides access to residential properties and an elementary school. Hazelridge Road has a posted speed limit of 50 km/h.

2.2 Transit

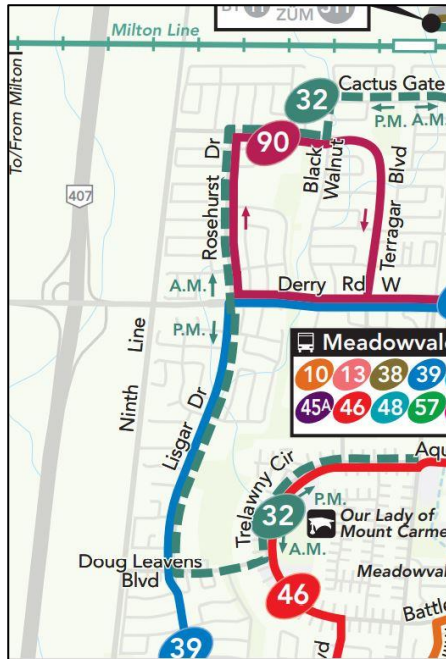
MiWay (Mississauga Transit) and GO Transit operate the following routes within the study area:

- **MiWay Route 32 (Lisgar GO)** connects residents to Lisgar GO station. This route operates during peak hours only. Route 32 travels northbound on Lisgar and Rosehurst Drive towards Lisgar GO station during AM peak and vice versa during PM peak. This route operates with 15 minute headways during peak hours.
- **MiWay Route 39 (Britannia)** operates along Lisgar Drive and connects Renforth Station to Meadowvale Town Centre at approximately 20 minute headways.
- **MiWay Route 90 (Terragar-Copenhagen Loop)** operates northbound along Rosehurst Drive with stops at Meadowvale Town Centre and Meadowvale GO Station. This route operates with 20 minute headways.
- **GO Route 21 (Milton)** operates along Derry Road and connects Union Station (Toronto) with Milton GO Station with 10 minute headways during peak hours.

- **GO Route 27 (Milton/North York)** operates along Derry Road and connects Finch Bus Terminal (Toronto) to Milton GO Station with approximately 15 minute headways during peak hours.
- **GO Route 48 (407 West)** operates along Derry Road and connects York University (Toronto) to the University of Guelph with one hour headways.

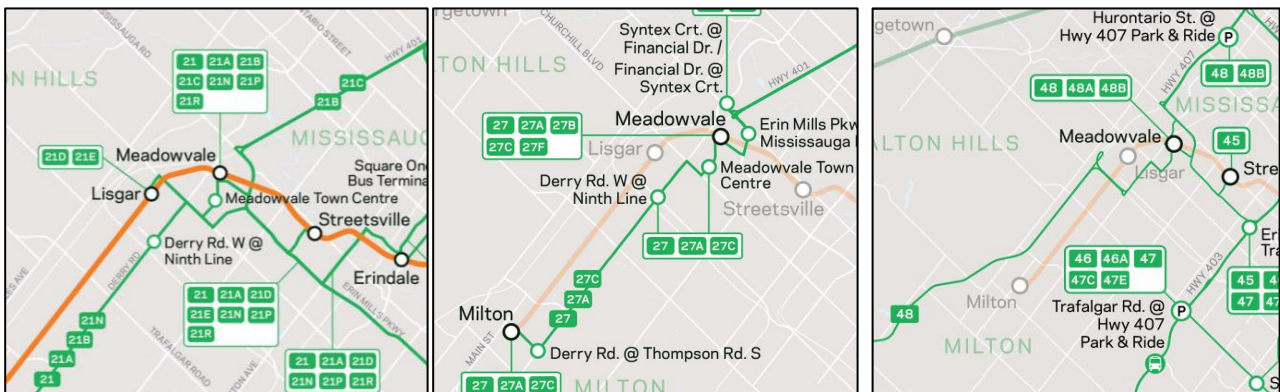
Exhibit 2-1 and Exhibit 2-2 provide maps of these MiWay and GO Transit bus routes.

Exhibit 2-1: MiWay Routes 32, 39, and 90 within Study Area



Source: MiWay System Map (2019)

Exhibit 2-2: GO Routes 21 (top left), 27 (top right), and 48 (bottom left) within Study Area



Source: GO Transit Route Maps (2019)

2.3 Active Transportation

North of Derry Road there is a multi-use path on the east side of Ninth Line. South of Derry Road, Ninth Line is semi-rural without sidewalks or paths, however the road is planned for future widening with active transportation facilities subject to a future EA at the City of Mississauga.

Derry Road has active transportation facilities consisting of a sidewalk and multi-use path to the east of Ninth Line. West of Ninth Line, no facilities are provided crossing the interchange with Highway 407.

2.4 Traffic Conditions

2.4.1 Traffic Counts & Signal Timing Data

Traffic count data and signal timing information was collected from Halton Region, Region of Peel and 407 ETR. All turning movement counts modelled for the purposes of this study were conducted recently (within the past five years) and so should reflect current traffic patterns within the study area. Exhibit 2-3 provides a summary of dates on which this information was collected/recorded.

Exhibit 2-3: Traffic Count and Signal Timing Data

INTERSECTION	CONTROL TYPE	DATE OF TMC	DATE OF SIGNAL DATA
Derry Road & Eighth Line	Unsignalized	2017-06-21	-
Derry Road & Highway 407 WB Off-Ramp	Signalized	2018-11-29	NA
Derry Road & Highway 407 EB Off-Ramp	Signalized	2018-11-29	NA
Derry Road & Ninth Line	Signalized	2017-10-25	2018-10-12
Derry Road West & Rosehurst Drive / Lisgar Drive	Signalized	2016-09-14	2018-10-12
Ninth Line & Hazelridge Road	Unsignalized	2016-09-14	-

2.4.2 Analysis Approach

Traffic analysis was conducted using Synchro (version 9) software and follows Highway Capacity Manual (HCM 2000) methodologies of intersection operation analysis. Critical movements were defined as follows:

For signalized intersections,

- V/C ratios for overall intersection operations, through movements or shared through/turning movements equal 0.80 or above;
- V/C ratios for exclusive movements equal 0.85 or above; or,
- Queues for an individual movement are projected to exceed available turning lane storage.

For unsignalized intersections,

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

Level-of-service (LOS) is a measure of performance based on control delay, defined as follows in Exhibit 2-4.

Exhibit 2-4: Intersection LOS Reference

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The Synchro traffic models were calibrated to better represent measured field conditions. This was accomplished by adjusting the lane utilization factor and via lost time adjustment. The “lane utilization factor” (LUF) was altered when calibrating through movements. This parameter is used to dictate the distribution of traffic across the available lanes, with a value of 1.0 representing a uniform distribution across all lanes. During non-congested periods, there is often more traffic distributed amongst the right-most lanes as compared to the left-most lanes. However, in over-saturated conditions, the distribution of traffic is typically more evenly split, as drivers quickly fill any available gap in traffic.

In existing models, the LUF was adjusted to a value of 1.0 for all through movements initially identified as having a v/c greater than 1.0. These adjustments were then carried forward to their respective movements to the future models (for the same peak period). Additionally, because the above-mentioned driver behaviour is quite predictable, this adjustment was also made to any new critical through movements (having a v/c ratio > 1.0) identified in the future models.

The “lost time adjustment” (LTA) was also altered in order to calibrate left-turn movements. Adjusting this parameter to negative value effectively increases the clearance time available for left-turning traffic to clear the intersection during the amber and/or all-red signal phases.

During oversaturated conditions where left-turn queues are excessively long and/or there are limited gap available in the opposing traffic to make the left-turn (under permissive phasing), drivers are typically more aggressive and willing to turn during the amber/all-red phases.

In existing models, the LTA was changed for all left-turn movements identified as being well over capacity – defined as having a v/c greater than 1.2 – since these turning volumes were explicitly measured in the field. Values were assigned based on the initial v/c ratio for that movement:

- If the v/c ratio was between 1.2 and 1.5, the LTA was set to ‘-1’; and,
- If the v/c ratio exceeded 1.5, the LTA was set to ‘-2’.

Subsequently, all adjustments made to the LTA in the existing models were carried forward to the respective movements in the future models (for the same peak periods). However, because this driving behaviour is believed to be less predictable, no additional LTA changes were made to “new critical left-turn movements (having a v/c ratio > 1.2) identified in the future model, which did not exist previously in the existing models.

2.4.3 Model Calibration

The existing traffic models were calibrated to better reflect measured field conditions accomplished by adjusting the lane utilization factor (LUF) and/or lost time adjustment (LTA) for certain movements.

The adjustments made to the existing models are outlined in Exhibit 2-5.

Exhibit 2-5: Existing Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Derry Road & Ninth Line	NBL	LTA	-1 seconds
PM Peak	Derry Road & Ninth Line	WBT	LUF	1.0

2.5 Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the existing conditions. An annual compound growth rate of 1.0% was applied to all count volumes obtained in years prior to 2019 in order to bring all counts to a consistent base year. Existing conditions traffic volumes are shown in Exhibit 2-7.

A summary of the Synchro analysis including delay, v/c, 95th percentile queue lengths and LOS indicators are shown in Exhibit 2-6, with detailed Synchro reports provided in Appendix A. The study intersections are currently operating as follows:

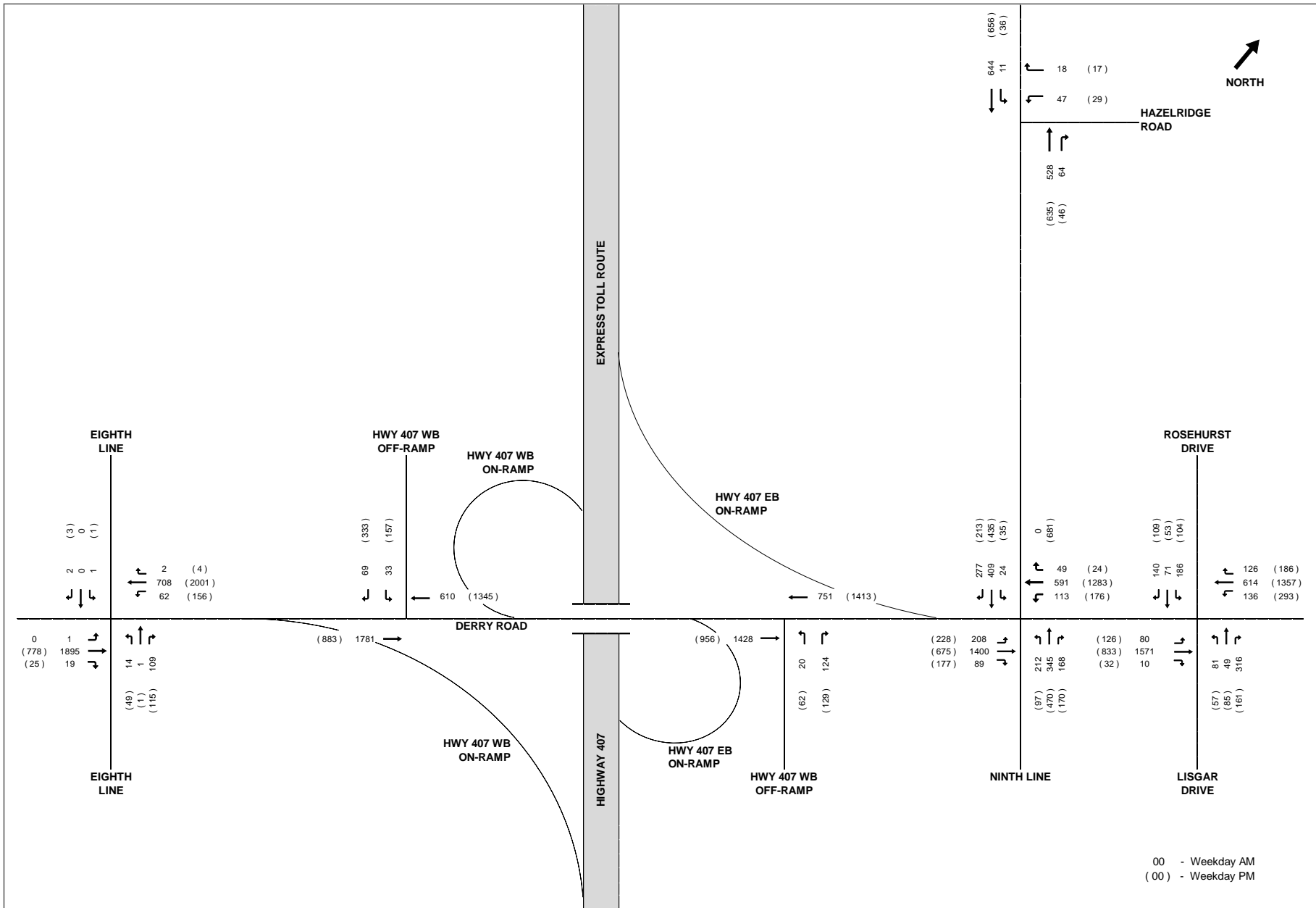
- Derry Road & Eighth Line is operating well for E-W movements. However, due to high eastbound and westbound through demands, the minor approaches experience significant delays in both the a.m. and p.m. peak hours.
- The two Highway 407 off-ramps are currently operating well during both peak hours, operating at LOS B or better.
- Derry Road & Ninth Line is operating satisfactorily at LOS D during both peak periods. Due to commuting patterns, the EBT movement during the a.m. peak and the WBT movement in the p.m. peak is expected to operate near capacity with long queues. During the a.m. peak hour, the NBL movement is at capacity (v/c = 1.04) with its opposing SBT movement operating near capacity (v/c = 0.95).
- Derry Road & Rosehurst Drive / Lisgar Drive is operating well at LOS C in the a.m. peak and LOS B in the p.m. peak. Due to high through demands on the major approaches, some delays are experienced by both the NB and SB approaches. However, no movements expected to operate at or near capacity.
- Ninth Line & Hazelridge Road is expected to operate well. With high N-S volumes, the minor WB approach is expected to operate with some delays, particularly vehicles making left-turns.

Exhibit 2-6: Synchro Analysis: Existing Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Derry Road & Eighth Line <i>(unsignalized)</i>	-	NBL NBTR SBL	F F F	1.47 0.09 0.03	20 2 1	-	NBL SBL	F F	3.08 0.32	Err* 4
Derry Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	A	(no critical movements)				B	SBR	D	0.78	82
Derry Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	A	NBR	D	0.54	32	A	(no critical movements)			
Derry Road & Ninth Line <i>(signalized)</i>	D	EBL EBT WBL NBL NBT NBR SBL SBT SBR	D D E F D D D F D	0.67 0.95 0.80 1.04 0.56 0.17 0.11 0.95 0.37	92 314 56 113 128 27 15 204 54	D	EBL WBL WBT NBL NBT SBL SBT SBR	F E D D D D E D	0.93 0.82 0.95 0.51 0.71 0.26 0.87 0.24	159 101 263 30 157 19 175 35
Derry Road & Rosehurst Drive / Lisgar Drive <i>(signalized)</i>	C	WBL NBL NBT NBR SBL SBT SBR	D E D E E D D	0.69 0.34 0.15 0.77 0.80 0.22 0.10	52 38 25 92 85 33 17	B	EBL NBL NBT NBR SBL SBT SBR	D E E E E E E	0.81 0.35 0.35 0.11 0.66 0.23 0.32	88 33 44 21 55 30 37
Ninth Line & Hazelridge Road <i>(unsignalized)</i>	-	WBLR	D	0.33	10	-	WBLR	D	0.28	8

*Err – indicates severe congestion may occur outside of model parameters

Exhibit 2-7: Existing Traffic Volumes in the AM (PM) Peak Hour



3 Future Conditions

This section documents the future traffic conditions with considerations to background traffic growth and traffic expected to be generated from the Transitway station.

3.1 Future Roadway Network

The future horizon year of 2031 has confirmed changes in the road network within the study area according to the Halton Region Budget and Business Plan (2019) and the Ninth Line Lands Study Transportation Assessment (2017). Ninth Line between Burnhamthorpe Road and Highway 407 is anticipated to be widened from two to four lanes of travel, with construction planned for 2023.

Road widening on Derry Road between Tremaine Road and Highway 407 from four to six lanes of travel is another confirmed change within the study area. However, since construction is scheduled for 2031, it is not expected to impact the study area by the 2031 horizon year.

3.2 Transit

The 407 Transitway is the most significant future transit service proposed in the immediate area, however as Ninth Line and the area west of it develops, there will likely be an increase in bus service along the corridor and on connecting streets including Derry Road.

3.3 Active Transportation

The City of Mississauga's 2018 Cycling Master Plan identifies Ninth Line as planned multi-use path. The plan also proposes a multi-use path within the development plans to the west of Ninth Line.

Planning of the 407 Transitway Station should incorporate connections to the above facilities.

3.4 Station Traffic

3.4.1 Station Trip Generation

Ridership forecasts were provided by MTO and sourced from MTO's Greater Golden Horseshoe Travel Demand Model V4. The model is an advanced state-of-practice multi-modal travel demand model that estimates future travel demands within the Greater Golden Horseshoe. The GGHM was developed to forecast peak period demand in support of the Growth Plan policies and has the capability of predicting mode shifts resulting from new public transit infrastructure. It can also be used to test network response to changes in link characteristics such as transit vehicle frequency, operating speed, station location, and parking availability.

The GGH model accounts for planned and committed road and transit projects sourced from Metrolinx Regional Transportation Plan and local transportation plans. While it is possible that additional projects will be funded over the upcoming years, this is a conservative approach.

With input from the MTO, a horizon year of 2031 was selected as the baseline for determining road and intersection requirements as part of this traffic impact study. As MTO's GGH model is to a 2041 horizon, ridership projections for 2031 were not available. Therefore the 2041 demands were carried forward on the basis that entry and exit volumes would be conservative (the resulting turning lanes and queue storage would accommodate 2031 demand) as provided in Exhibit 3-1.

Exhibit 3-1: 2041 AM Peak (2-hour) Boardings

STATION	TOTAL 2-HR BOARDINGS	2-HR PARK-AND-RIDE	2-HR WALK / TRANSIT	% PARK-AND-RIDE	% WALK / TRANSIT
Dundas	923	510	413	55%	45%
Appleby	227	207	20	91%	9%
Bronte	306	90	216	29%	71%
Trafalgar	3,095	436	2,659	14%	86%
Britannia	523	136	387	26%	74%
Derry	911	334	577	37%	63%
Mississauga	982	82	900	8%	92%
Total:	6,967	1,795	5,172	26%	74%

From the above exhibit, two hour park-and-ride boardings were equated to two hour inbound vehicle trips at an assumed factor of 10:11, or 1.1 riders per park-and-ride vehicle. Two hour inbound vehicle trips were then converted to a.m. peak hour inbound trips using a factor of 0.56, developed through review of existing travel patterns using Transportation Tomorrow Survey (TTS 2016) data. The resulting rounded a.m. peak hour inbound vehicle flow is 170 vph.

Further processing of forecasts was required to estimate a.m. outbound traffic, associated with kiss-n-ride drop off trips, and p.m. peak hour traffic. The ITE Trip Generation Manual (9th edition) provided ratios of inbound to outbound and a.m. to p.m. traffic for typical park-and-ride bus stations. Average trip generation rates for bus stations with park-and-ride lots are indicated in Exhibit 3-2. Using the ratios provided, Exhibit 3-3 lists the estimated station traffic generated give the above assumptions.

Exhibit 3-2: ITE Trip Generation Rates for Park-and-Ride Lots

LAND USE (CODE)	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		Trip Rate	Inbound / Outbound	Trip Rate	Inbound / Outbound
Park-and-ride with bus service (090)	/ parking space	0.71	79% / 21%	0.62	25% / 75%

Exhibit 3-3: Estimated Vehicle Trips Generated by Station

AM PEAK TRIPS		PM PEAK TRIPS	
Inbound	Outbound	Inbound	Outbound
171*	45	47	142

* Calculated based on forecasted 2031 a.m. park-and-ride 2 hrs boardings, at a factor 1.0 inbound vehicles per 1.1 boardings. To convert to a.m. peak hour trips, a factor of 0.56 was multiplied.

3.4.2 Trip Distribution

A map showing the origin of park-and-ride trips destined to Dundas station was extracted from the 2031 GGHM and can found in Appendix E. From this map, inbound trips were tabulated in terms of general direction of origin (i.e. north, south, east, and west) and assigned to the study area intersections as a percentage of total inbound trips. Distribution of outbound trips was assumed to be the same as inbound trips. Resulting trip assignments are illustrated in Exhibit 3-4. Site generated traffic was assigned to study area intersections and is shown in Exhibit 3-5.

Exhibit 3-4: Trip Distribution in AM and PM Peak Hours

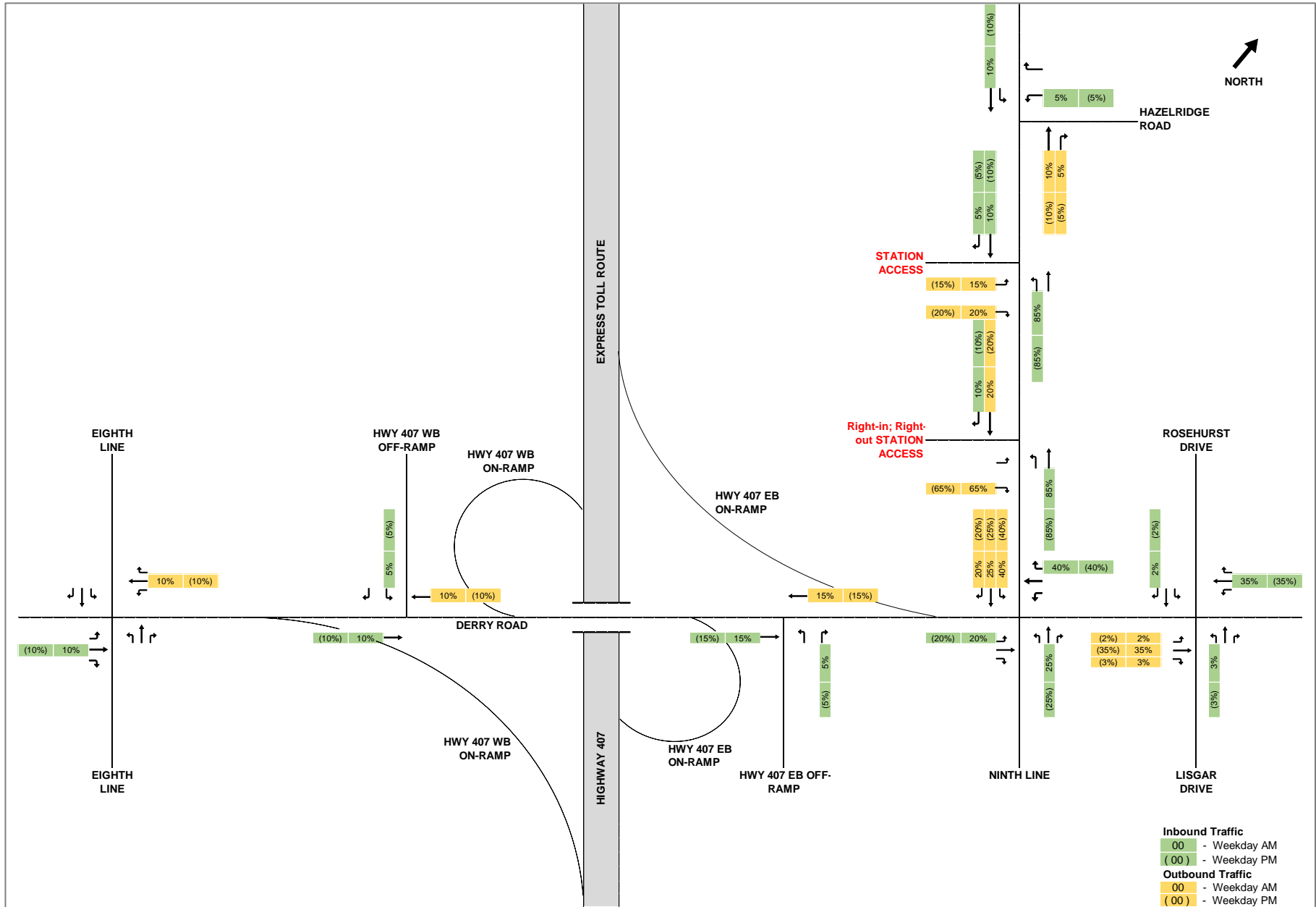
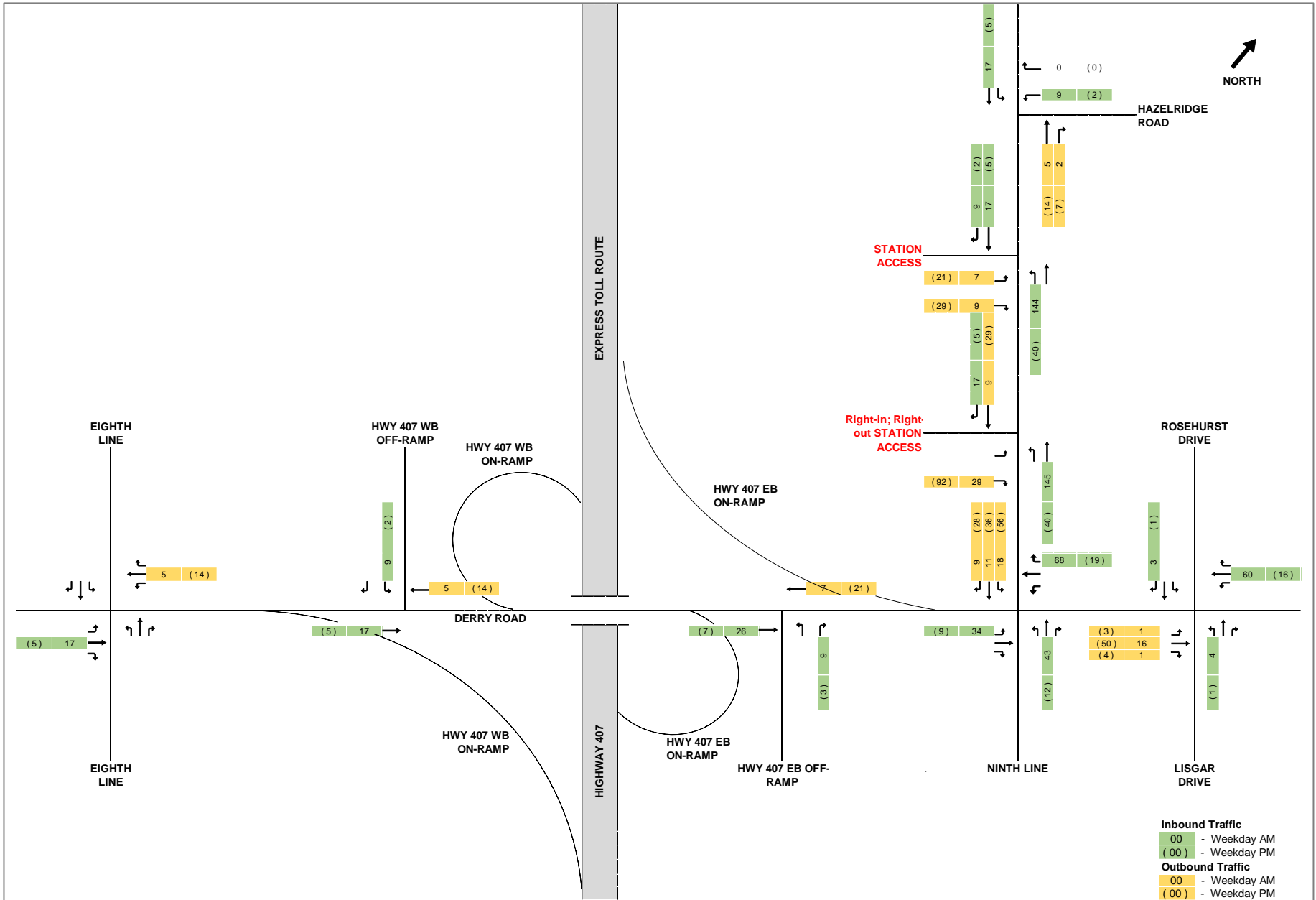


Exhibit 3-5: Site Generated Traffic in the AM Peak Hour and PM Peak Hour



3.4.3 Parking Demands

Part of the scope of the traffic study was to provide a recommended parking lot size for each station. This was developed using the ratio of ridership to parking lot sizes taken from GO transit stations. The intent of this approach is to account for typical daily utilization of the lot for a robust and nearly full transit service with low but non-zero spare capacity across the system. The following provides the approach:

- The average number of inbound vehicle trips (auto drivers) made to each of these GO stations during the a.m. peak period (defined as 6:30-9:30 am) were determined using 2016 Transportation Tomorrow Survey (TTS) data.
- Parking data for the GO transit stations was obtained from the GO Rail Station Access Plan (2016) prepared by Metrolinx. The report notes the total capacity and average utilization of each GO station parking lot, which were used to calculate average parking demands.
- A “parking rate” or ratio between demand and auto driver trips was determined. These values are indicated in the below Exhibit 3-6.

Exhibit 3-6: Parking Demand Factors for nearby GO Transit Stations

2016 TTS AM PEAK PERIOD		2016 GO STATION PARKING *			PARKING RATE (Spaces / Driver)
GO Station	Auto Drivers *	Lot Capacity **	Lot Utilization **	Demand	
Brampton	861	863	96%	828	0.962
Bramalea	1,360	2,371	86%	2,039	1.499
Malton	580	698	96%	670	1.155
Erindale	1,370	2,183	76%	1,659	1.211
Burlington	1,270	2,076	86%	1,785	1.406
Appleby	2,080	2,818	86%	2,423	1.165
Bronte	2,460	2,971	86%	2,555	1.039
Oakville	2,820	4,401	86%	3,785	1.342
Lisgar	350	715	66%	472	1.348
Milton	1,330	1,472	100%	1,472	1.107
Meadowvale	1,080	1,652	96%	1,586	1.468
Streetsville	1,650	1,541	96%	1,479	0.897
Clarkson	2,520	3,800	86%	3,268	1.159
Aldershot	870	1,640	96%	1,574	1.810
<i>Total</i>	<i>20,601</i>	<i>29,201</i>	<i>88%</i>	<i>25,597</i>	1.243

* AM peak period inbound vehicles estimated using 2016 TTS data, and rounded to the nearest 10.

** GO parking data obtained from "GO Rail Station Access Plan" (2016) and dated December 2016

This “parking factor” was then applied to the a.m. peak period inbound trips estimated at each Transitway station. Note that park-and-ride (2-hrs) forecasts (and congruently, estimated inbound vehicle trips) for the a.m. peak two hours can be converted to a.m. peak period forecasts by applying a factor of 1.370, as analysis of the TTS indicate that 73% of 3-hour a.m. peak period trips occur within the two a.m. peak hour.

The resulting estimated parking demands at each Transitway station are provided in Exhibit 3-7. Parking demands are provided for the 2041 horizon, representing the “ultimate” conditions. The recommended parking lot size for Derry Station is 520 spaces. It is noted that protection for future expansion beyond 2041, carpool spaces, and park-and-ride for other transit services are not included in the parking lot size, but may be considered in the development of the station area (property) and station layout.

Exhibit 3-7: Estimated Parking Demands for each Transitway Station

STATION	GGHM INBOUND TRIPS		PARKING LOT SIZE ***
	AM Peak 2-Hour *	AM Peak Period **	
	2041	2041	2041
Dundas	460	640	800
Appleby	190	260	320
Bronte	80	110	140
Trafalgar	400	540	680
Britannia	120	170	210
Derry	300	420	520
Mississauga	70	100	128

* Calculated based on forecasted a.m. park-and-ride boardings, at a factor 1.0 inbound vehicles per 1.1 boardings.

** Peak 2-hour trips can be converted to peak period trips at a factor of 1.370, based on GGHM outputs.

*** Parking lot size calculated by multiplying estimated a.m. peak period inbound trips by a factor of 1.243.

3.5 Background Traffic Growth

Future background traffic volumes were estimated for the study area using GGHM (discussed in Section 3.4.1) demand model supplemented with manual refinements considering local conditions. Macro models can be limited with respect to specific hourly forecasts, and the 2011 base-year model is also aging, therefore refinements included review of municipal transportation master plans (TMPs), land-use, background population and employment growth, and adjustments for local developments or changes to the road network.

The GGHM demand model growth from 2011 base to 2031 has peak direction link flow of 1265 vph to 2218 vph or 2.85% annual compound growth rate along Derry Road. The model estimated a growth of 678 in 2011 to 1074 in 2031 or a growth rate of 2.33% along Ninth Line. Model output figures are provided in Appendix E.

The City of Mississauga and Region of Peel population and employment forecasts were considered in the development of traffic growth rates. Relevant documents are listed as follows:

- Greater Toronto and Hamilton Area – “Growth Plan for the Greater Golden Horseshoe” (2017);
- City of Mississauga – “Mississauga Official Plan” (2016); “Population, Demographics & Housing” (2013); and “Moving Mississauga” (2011); and,
- Region of Peel – “Long Range Transportation Plan” (2012).

Review of the above documents showed that population growth is estimated to be 0.5% to 0.6% per year between 2011 and 2031, while trip ends from the demand model are forecasted to increase by 0.9% to 1.0% per year during that same period time.

A background review on the *Ninth Line Lands Transportation Study (2017)* by MMM Group was completed. Ninth Line study evaluated various future conditions of the Emerging Land Use Concept (dated September 18, 2016) of Ninth Line Lands, which is located on the western boundary of Mississauga. The report recommends an approximate 1% growth along Ninth Line with no widening and an approximate 2% along Britannia Road during peak hours in the busiest direction. It is noted that the growth rates used does not assume the widening of Ninth Line, since the widening is primarily associated with the development of the Emerging Land Use Scenario for future total conditions.

In summary, based on the information presented, a 2% compound growth rate was selected as a best-fit with available information, to be applied to existing traffic volumes on both Ninth Line and Derry Road. This rate was applied to all 'major' movements, which is defined as all through movements along arterial roads or turning movements between two arterial roads. This chosen rate is with the assumption that additional development traffic will need to be included, as discussed in Section 3.5.1 below.

3.5.1 Nearby Development

The *Ninth Line Lands Transportation Study (2017)* evaluates the future land use concept accounting for varying non-auto modal split scenarios (5%, 10%, and 20%) to evaluate the potential degree of success of the Highway 407 Transitway program. From this study, the Emerging Land-Use volumes 5% non-auto modal split, symbolizing worst-case scenario, was extracted and incorporated in the future background volume.

3.6 Future Model Calibration

The future Synchro models were calibrated to better reflect expected conditions accomplished by adjusting either the Lane Utilization Factor (LUF) or Lost Time Adjustments (LTA) for certain movements.

Adjustments made to the future traffic models are summarized in Exhibit 3-8.

Exhibit 3-8: Future Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Derry Road & Ninth Line	WBL	LTA	-2 seconds
		NBL	LTA	-2 seconds
		EBT	LUF	1.0
		SBT	LUF	1.0
PM Peak	Derry Road & Ninth Line	EBL	LTA	-2 seconds
		NBL	LTA	-1 seconds
		SBL	LTA	-2 seconds
		WBT	LUF	1.0

3.7 Future Background Operations

To analyze future background conditions, the existing traffic volumes were grown using the growth rates discussed in Section 3.5. Future background conditions include planned improvements discussed in Section 3.1. Exhibit 3-9 illustrates future background traffic volumes during the a.m. and p.m. peak hours.

To better capture expected future conditions, protected + permissive phasing was applied to the EBL in the a.m. peak hour and WBL in the p.m. peak hour for the intersection of Derry Road and

Ninth Line. The same phasing was also applied to the EBL movement at Derry Road & Lisgar / Rosehurst Drive intersection for the p.m. peak hour.

A summary of critical movements identified during the future background condition analysis is provided in Exhibit 3-10, with detailed output of the Synchro analysis provided in Appendix B.

Given the above and with background growth added, the study intersections are expected to operate as follows:

- Derry Road & Eighth Line is expected to continue to operate poorly. With the limited gaps available, the two approaches will not sufficiently accommodate demands. The high v/c ratios suggest that NBL movements for both peak periods will be unable to complete their movements.
- The two Highway 407 off-ramps are expected to operate well during both peak hours, operating at LOS B. With high commuting patterns, the EBT movement in the a.m. peak and the WBT movement in the p.m. peak is expected to operate as critical (v/c = 0.87, 0.94, respectively) and with long queues.
- Derry Road & Ninth Line is expected to deteriorate significantly and operate at LOS E and F during a.m. and p.m. peaks, respectively. With the developments planned for Ninth Line and future widening of both Ninth Line and Derry Road, high through and turning volumes are introduced to this intersection. During the a.m. peak hour, the already busy EBT movement is expected to reach capacity (v/c = 1.02) and 95th percentile queues spilling past the Highway 407 EB Off-Ramp. The NBL will also deteriorate and now operate past capacity (v/c = 1.21). During the p.m. peak hour, the WBT movement is expected to past capacity, with queues potentially impacting Rosehurst Drive intersection. With the heavy WBT volume, insufficient green time is allocated to the EBL movement, causing it to operate past capacity. Due to a lack of protected phasing, the SBL movement is also expected to operate past capacity. Overall, the intersection is very busy, with long delays and queues.
- Derry Road & Rosehurst Drive / Lisgar Drive is expected to deteriorate to LOS D in the a.m. peak hour and LOS C in the p.m. peak hour. Due to high through demands on the major approaches, the NB and SB movements are expected to operate with significant delays. During the a.m. peak hour, the high NBR and EBT demands causes the NBR movement to operate at capacity (v/c = 0.99). The high EBT volume will also cause its opposing WBL movement to operate at capacity (v/c = 1.06). In the p.m. peak, the WBT movement is approaching capacity, with moderate delays experienced by the NB and SB approaches and the EBL movement.
- Ninth Line & Hazelridge Road is expected to operate adequately. The minor approach will operate at LOS E and F with v/c ratios well below 1.0. This indicates acceptable operation.

Exhibit 3-9: Future Background Traffic Volumes for the AM (PM) Peak Hour

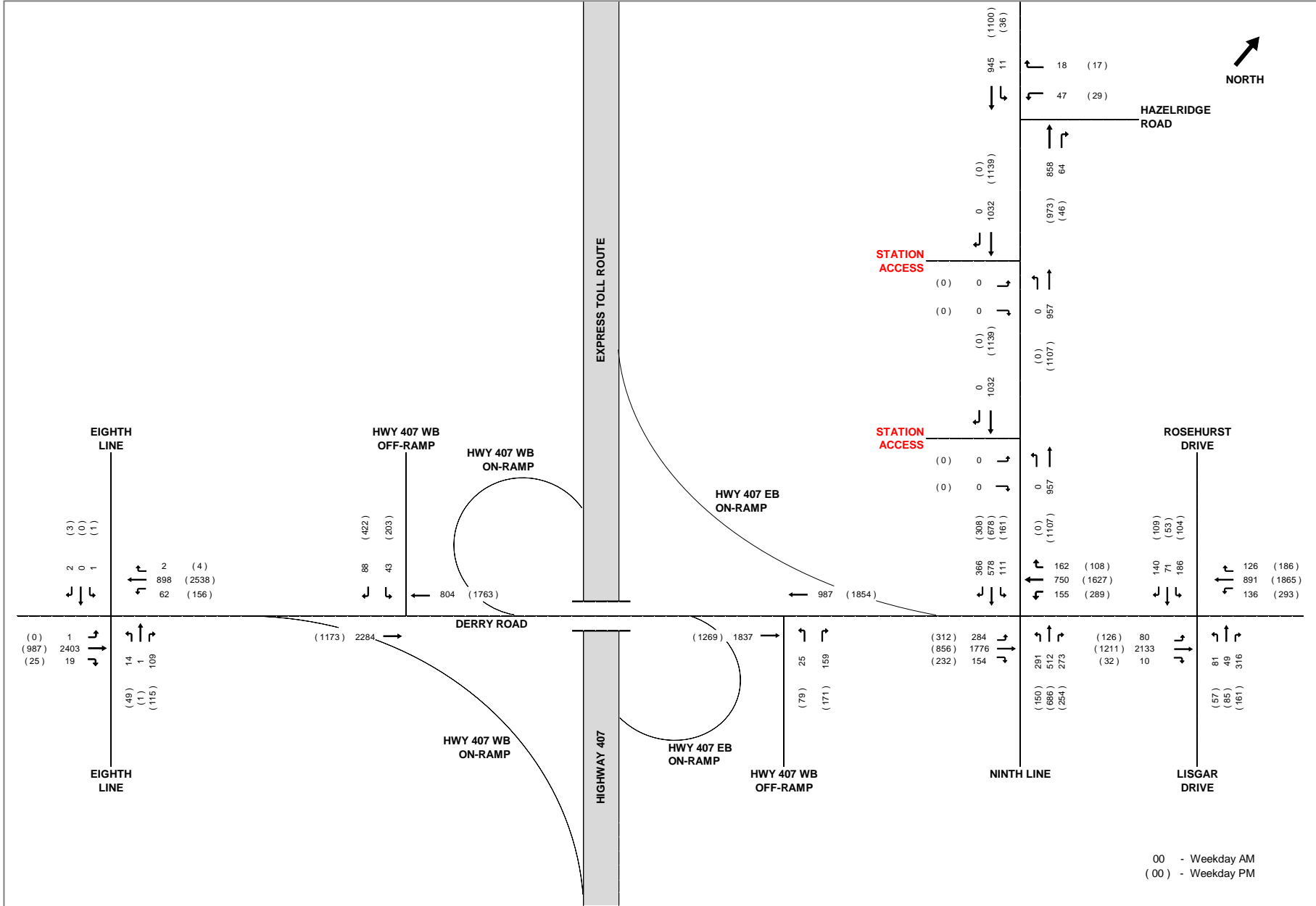


Exhibit 3-10: Synchro Analysis: Future Background Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Derry Road & Eighth Line <i>(unsignalized)</i>	-	WBL NBL NBTR SBL	E F F F	0.41 4.22 0.78 0.11	14 Err* 37 2	-	NBL NBTR SBL	F F F	3.57 0.83 1.46	Err* 41 5
Derry Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	B	EBT SBL SBR	B D D	0.87 0.21 0.07	247 9 14	C	WBT SBR	C E	0.94 0.95	235 144
Derry Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	B	NBL NBR	D D	0.06 0.70	6 49	B	NBL NBR	D D	0.21 0.59	14 41
Derry Road & Ninth Line <i>(signalized)</i>	E	EBT WBL NBL NBT NBR SBL SBT SBR	E F F D D F F E	1.02 1.06 1.21 0.53 0.48 0.86 0.99 0.46	389 95 165 97 84 76 140 60	F	EBL EBT WBL WBT NBL NBT NBR SBL SBT SBR	F D F F F D D F D D	1.26 0.85 0.95 1.16 0.90 0.58 0.18 1.17 0.67 0.36	182 207 106 390 71 123 21 115 131 57
Derry Road & Rosehurst Drive / Lisgar Drive <i>(signalized)</i>	D	EBT WBL NBL NBT NBR SBL SBT SBR	C F E E F F E D	0.98 1.06 0.36 0.16 0.99 0.85 0.23 0.10	385 83 43 28 151 108 37 20	C	EBL WBT NBL NBT NBR SBL SBT SBR	E C E E E F E E	0.79 0.90 0.38 0.38 0.11 0.72 0.25 0.08	40 338 34 46 23 63 31 19
Ninth Line & Hazelridge Road <i>(unsignalized)</i>	-	WBLTR	E	0.47	17	-	WBLTR	F	0.46	15

*Err – indicates severe congestion may occur outside of model parameters

**Traffic Operations reported are following additional calibration effort described in the report.

3.8 Future Total Operations

Future total volumes were calculated adding the station-generated traffic to the future volumes with background growth applied. The future scenarios accounts for all vehicular traffic that is estimated to year 2031 following implementation of the Transitway.

Future total volumes which includes background growth and station-generated traffic are illustrated in Exhibit 3-12.

A summary of critical movements identified during the future total condition analysis is provided in Exhibit 3-13, with detailed output of the Synchro analysis provided in Appendix C.

With the new Transitway demands added to future background conditions, the study intersections are expected to operate as follows:

- Limited station traffic is added to both the EBT and WBT movements at Derry Road & Eighth Line. Overall, the minor approaches is expected to operate with long delays and queues. Because the two approaches are marginally affected by station

demands, improvements for this intersection does not fall within the scope / responsibility of the Transitway-4 project. It is likely that Halton Region would explore improvements at the intersection tied to improvements along Derry Road.

- The two Highway 407 Off-Ramps are expected to operate with little to no change with the addition of the station demands.
- Derry Road & Ninth Line is expected to continue operating at LOS E and LOS F during both peak periods. With the added trips, several of the critical / at capacity movements are expected to deteriorate further. During the a.m. peak hour, with optimized splits, the EBT and NBL movements are expected to operate past capacity, with v/c ratios at 1.05 and 1.24, respectively. From the station, some SBL demands are added which causes it to operate close to capacity with v/c = 0.96. During the p.m. peak hour, the EBL movement will now operate well past capacity (v/c = 1.46), where vehicles may wait up to several cycles to clear the intersection. The WB approach is also experiencing severe congestion, with queues expected to impact the adjacent intersection.
- With high amounts of station traffic added to the EBT and WBT movements and minor amounts added to/from its cross road, Derry Road & Rosehurst Drive is expected to sufficiently accommodate demands. The intersection will continue operating at LOS D in the a.m. peak hour and LOS C in the p.m. peak hour with little change to overall levels-of-service. During the a.m. peak hour, the WBL movement is now operating past capacity (v/c = 1.06).
- Ninth Line & Hazelridge Road is expected to continue operating adequately with some delays experienced by the minor approach.

3.8.1 Station Access Analysis

Two accesses to the park-and-ride lot are proposed: a signalized access off Ninth Line approximately 100 m south of Hazelridge Road and a right-in/right-out access on Ninth Line approximately 150 m north of Derry Road. The below Exhibit 3-11 indicates that both accesses will operate well under the proposed configuration (as shown in Exhibit 1-2).

Exhibit 3-11: Station Access Operations Summary

ACCESS	AM PEAK					PM PEAK				
	LOS	Inbound/Outbound Movement				LOS	Inbound/Outbound Movement			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
RIRO Station Access <i>(unsignalized)</i>	-	SBR	A	0.01	0.0	-	SBR	A	0.00	0.0
		EBR	A	0.04	0.9		EBR	A	0.12	3.1
Station Access <i>(signalized - proposed)</i>	B	NBL	A	0.41	13.7	B	NBL	A	0.16	4.8
		SBR	A	0.01	2.6		SBR	A	0.00	0.9
		EBL	C	0.02	4.7		EBL	C	0.06	9.5
		EBR	B	0.03	4.1		EBR	B	0.09	6.8

From the above exhibit, both accesses are expected to operate well during both the a.m. peak and p.m. peak hour. Due to green time prioritized for N-S movements along Ninth Line, egressing traffic from the station may experience minor delays. While small delays are anticipated, the v/c for both accesses are very low and excessive queueing are not anticipated.

Exhibit 3-12: Future Total Traffic Volumes for the AM (PM) Peak Hour

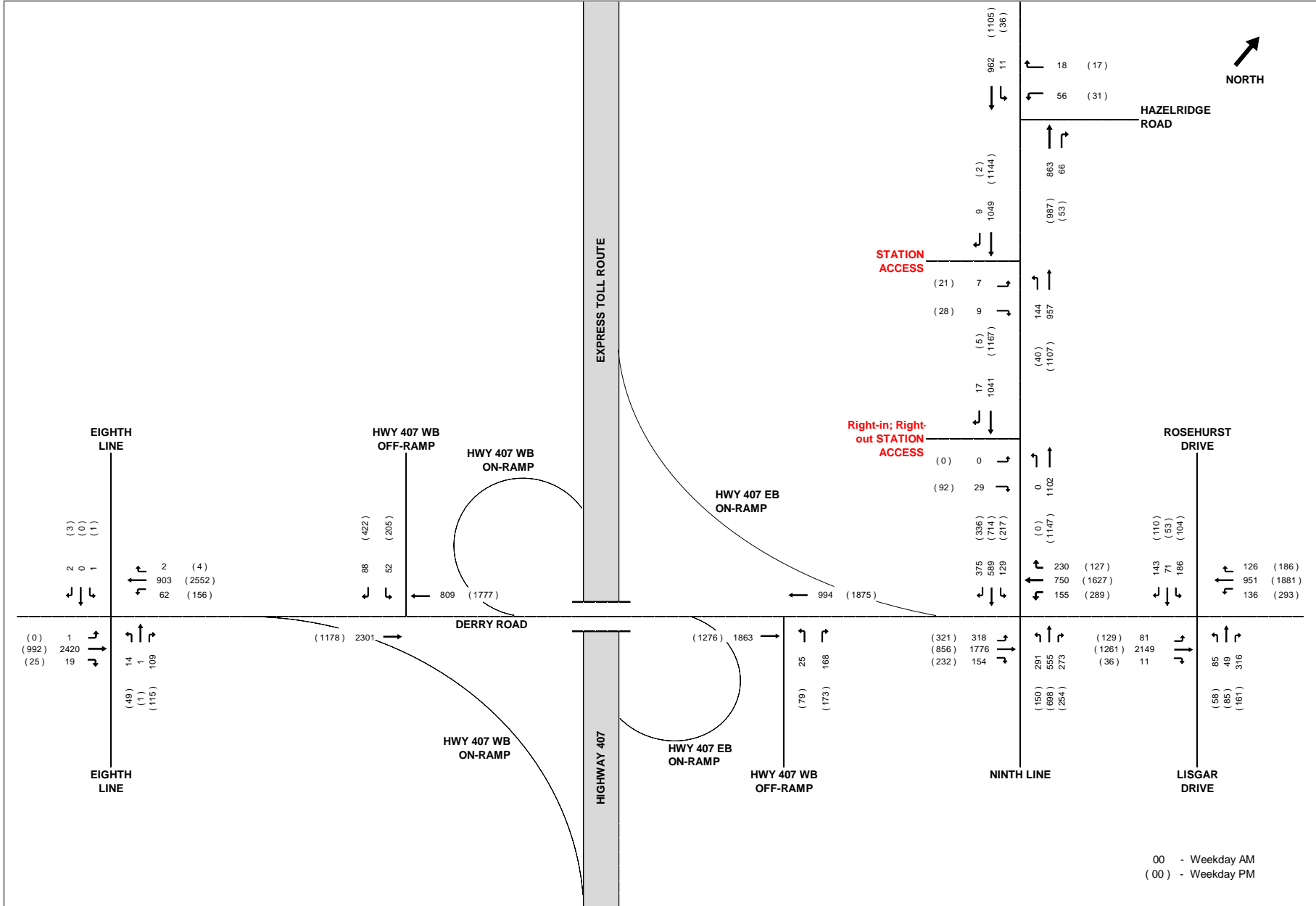


Exhibit 3-13: Synchro Analysis: Future Total Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Derry Road & Eighth Line <i>(unsignalized)</i>	-	WBL NBL WBTR SBL	E F F F	0.42 4.41 0.80 0.12	14 Err* 39 2	-	NBL NBTR SBL	F F F	3.57 0.83 1.46	Err* 41 5
Derry Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	B	EBT SBL SBR	B D D	0.88 0.25 0.07	281 10 14	C	WBT SBR	C E	0.94 0.97	235 148
Derry Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	B	NBL NBR	D D	0.06 0.73	6 52	B	NBL NBR	D D	0.20 0.60	14 42
Derry Road & Ninth Line <i>(signalized)</i>	E	EBL EBT WBL NBL NBT NBR SBL SBT SBR	E E F F D D F F E	0.89 1.05 0.99 1.24 0.56 0.45 0.96 0.92 0.47	117 399 88 166 105 79 89 134 62	F	EBL EBT WBL WBT NBL NBT SBL SBT SBR	F E F F E D F D D	1.41 0.91 1.06 1.26 0.79 0.53 1.29 0.62 0.39	196 220 119 416 57 116 151 130 66
Derry Road & Rosehurst Drive / Lisgar Drive <i>(signalized)</i>	D	EBT WBL NBL NBT NBR SBL SBT SBR	C F E E F F E E	0.99 0.98 0.39 0.17 1.00 0.88 0.24 0.10	379 79 45 28 148 110 38 20	C	EBL WBL WBT NBL NBT NBR SBL SBT SBR	E D C E E E F E E	0.80 0.79 0.91 0.38 0.38 0.11 0.72 0.25 0.08	37 75 347 35 46 23 63 31 19
Ninth Line & Hazelridge Road <i>(unsignalized)</i>	-	WBLTR	E	0.47	17	-	WBLTR	F	0.47	16

*Err – indicates severe congestion may occur outside of model parameters
 Station Access Analysis – Refer to Exhibit 3-11

4 Potential Improvement Measures

4.1 Transit

Based on the operational analysis, no special transit priority measures appear warranted for entrance into and out of the station site. The entrances operate well and buses entering and exiting the station are not expected to incur significant delay. The station layout appears to provide a reasonable and direct routing between the bus turnaround / drop-off facility and Ninth Line with limited potential for background queues to interfere.

4.2 Active Transportation

No specific active transportation measures such as pedestrian crossovers appear necessary as the proposed access configuration will provide crossing opportunity for pedestrians from the east side of Ninth Line (refer to Exhibit 1-2). The station layout should be reviewed under the future

Ninth Line Environmental Assessment to ensure active transportation connections are provided between the proposed multi-use path and the station.

4.3 Traffic

4.3.1 Derry Road & Ninth Line

The below improvement measures were analyzed in Synchro (given Future total volumes), with results presented in Exhibit 4-1.

- Dedicated EBR and WBR lanes;
- Protected + Permissive phasing for SBL movement;
- Optimized signal splits.

Exhibit 4-1: Analysis of Improvements to Derry Road and Ninth Line

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Derry Road & Ninth Line (<i>planned configuration*</i>)	1.04	EBL	E	0.89	117	1.36	EBL	F	1.41	196
		EBT	E	1.05	399		EBT	E	0.91	220
		WBL	F	0.99	88		WBL	F	1.06	119
		NBL	F	1.24	166		WBT	F	1.26	416
		NBT	D	0.56	105		NBL	E	0.79	57
		NBR	D	0.45	79		NBT	D	0.53	116
		SBL	F	0.96	89		SBL	F	1.29	151
		SBT	F	0.92	134		SBT	D	0.62	130
		SBR	E	0.47	62		SBR	D	0.39	66
Derry Road & Ninth Line (<i>with improvements</i>)	1.04	EBT	D	0.98	348	1.06	EBL	F	1.15	181
		WBL	F	1.06	95		WBL	D	0.77	75
		NBL	F	1.07	154		WBT	D	1.00	329
		NBT	E	0.69	114		NBL	F	1.09	88
		NBR	D	0.53	85		NBT	F	1.03	176
		SBL	E	0.71	50		NBR	D	0.32	46
		SBT	F	0.97	139		SBL	F	1.15	126
		SBR	E	0.45	58		SBT	E	0.91	163
								SBR	D	0.48

*refer to Future Roadway Network (Section 3.1)

The following was observed:

- Implementing dedicated right-turn lanes for both EB and WB approaches will significantly improve operations for their respective through movements (i.e. EBT, WBT). This allows for some green time to be freed up for N-S movements.
- Implementing protected + permissive phasing will better facilitate SBL demands, however added delays are experienced by opposing movements.
- Average intersection v/c significantly reduced in the p.m. peak hour.

Implementing dedicated right-turns would improve operations at this intersection, however would present major hydro conflicts to both the north and south boulevards. Further feasibility review should be considered under the design component of the Ninth Line corridor EA currently underway.

4.3.2 Derry Road & Rosehurst Drive / Lisgar Drive

The below improvement measures were analyzed in Synchro (given Future total volumes), with results presented in Exhibit 4-2.

- Dedicated WBR Lane;
- Optimized signal splits.

Exhibit 4-2: Analysis of Improvements to Derry Road and Rosehurst Drive / Lisgar Drive

INTERSECTION	AM PEAK					PM PEAK				
	Avg. v/c	Critical Movements				Avg. v/c	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Derry Road & Rosehurst Drive / Lisgar Drive (<i>existing configuration</i>)	1.0	EBT	C	0.99	379	0.88	EBL	E	0.80	37
		WBL	F	0.98	79		WBL	D	0.79	75
		NBL	E	0.39	45		WBT	C	0.91	347
		NBT	E	0.17	28		NBL	E	0.38	35
		NBR	F	1.00	148		NBT	E	0.38	46
		SBL	F	0.88	110		NBR	E	0.11	23
		SBT	E	0.24	38		SBL	F	0.72	63
		SBR	E	0.10	20		SBT	E	0.25	31
Derry Road & Rosehurst Drive / Lisgar Drive (<i>with improvements</i>)	1.0	EBT	C	0.99	379	0.81	EBL	E	0.75	48
		WBL	F	0.98	79		WBL	D	0.79	75
		NBL	E	0.39	45		NBL	E	0.37	34
		NBT	E	0.17	28		NBT	E	0.37	45
		NBR	F	1.00	148		NBR	E	0.11	22
		SBL	F	0.88	110		SBL	E	0.69	58
		SBT	E	0.24	38		SBT	E	0.24	31
		SBR	E	0.10	20		SBR	E	0.08	19

The following was observed:

- Implementing dedicated WBR lane will improve operation for the through traffic, where the WBT movement operating under the critical threshold. Some green time is also freed up for NB and SB movements.
- Average intersection v/c is reduced in the p.m. peak hour.

5 Summary and Recommendations

This report provides an analysis of traffic operations for the proposed Highway 407 Transitway station located near the intersection of Derry Road & Ninth Line in the City of Mississauga. The report also provides commentary on transit and active transportation access to the proposed station site.

The traffic analysis found that study area intersections are currently operating well though approaching capacity, with the northbound left turn at Ninth Line and Derry Road the only movement with volume to capacity greater than 1.0.

Future conditions during the a.m. and p.m. peak hours were modelled and analyzed based on a horizon year of 2031. Background growth rates were derived from MTO's travel demand model. Traffic to the proposed station was estimated based on ridership forecast (Park-and-ride demand). The study accounts for the planned widening of Derry Road from four lanes to six lanes west of Highway 407, and the widening of Ninth Line from two lanes to four lanes.

The study indicates that future 2031 background traffic conditions (with widening) will have several movements at Derry Road and Ninth Line operating above target level-of-service including westbound left, southbound left, and eastbound through in the a.m. peak hour. Overall level-of-service is F in the p.m. peak hour indicating long delays. Site traffic adds moderate volume to the intersection causing a minor further deterioration. Other study area intersections tend to operate satisfactorily in both peak hours.

As the intersection of Ninth Line and Derry Road is subject to a future EA, further improvements may be possible. A preliminary configuration for dedicated EBR and WBR lanes at the intersection was identified to help address critical movements and should be studied further in the EA. In addition, Derry Road and Rosehurst Drive / Lisgar Drive, a dedicated WBR lane was identified.

Two accesses for the station is proposed, one right-in/right-out access and one signalized intersection. The traffic model indicates that vehicles accessing and egressing is well served with no major queueing and delays anticipated.

Transit access to the station is via Ninth Line and the main proposed station entrance. A bus turnaround facility is proposed within the station.

Walking and cycling access to the station will include linkages to the planned multi-use path on Ninth Line as identified in Mississauga's long-term cycling plan. The City's plans also identify an internal multi-use path west of Ninth Line in the new development lands, providing another opportunity for linkage.

Appendix A-: Existing Conditions Synchro Output

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

AM Peak Period
09-18-2019



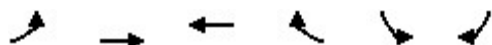
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1895	19	62	708	2	14	1	0	1	0	2
Future Volume (vph)	1	1895	19	62	708	2	14	1	0	1	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998										0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3570	0	1825	3412	0	1825	1921	0	1825	1633	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1825	3570	0	1825	3412	0	1825	1921	0	1825	1633	0
Link Speed (k/h)		80			80			60				60
Link Distance (m)		205.5			646.9			177.6				152.8
Travel Time (s)		9.2			29.1			10.7				9.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	2060	21	67	770	2	15	1	0	1	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	2081	0	67	772	0	15	1	0	1	2	0
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop				Stop

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	67.1%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	1781	610	0	33	69
Future Volume (vph)	0	1781	610	0	33	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3614	3510	0	3161	1296
Flt Permitted					0.950	
Satd. Flow (perm)	0	3614	3510	0	3161	1296
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						75
Link Speed (k/h)		80	80		60	
Link Distance (m)		128.1	128.1		224.9	
Travel Time (s)		5.8	5.8		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	4%	0%	12%	26%
Adj. Flow (vph)	0	1936	663	0	36	75
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1936	663	0	36	75
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
 3: Derry Rd W & Hwy 407 WB Off-Ramp

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		55.0	55.0		45.0	45.0
Total Split (%)		55.0%	55.0%		45.0%	45.0%
Maximum Green (s)		48.0	48.0		38.0	38.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		61.2	61.2		8.4	8.4
Actuated g/C Ratio		0.78	0.78		0.11	0.11
v/c Ratio		0.69	0.24		0.11	0.37
Control Delay		7.8	3.8		32.3	13.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		7.8	3.8		32.3	13.8
LOS		A	A		C	B
Approach Delay		7.8	3.8		19.8	
Approach LOS		A	A		B	
Queue Length 50th (m)		74.1	14.5		2.8	0.0
Queue Length 95th (m)		111.2	22.6		6.2	10.9
Internal Link Dist (m)		104.1	104.1		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		2807	2727		1533	667
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.69	0.24		0.02	0.11

Intersection Summary	
Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	78.8
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	7.3
Intersection Capacity Utilization:	67.6%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	C

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	1428	0	0	751	20	124
Future Volume (vph)	1428	0	0	751	20	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3579	0	0	3544	3372	1617
Flt Permitted					0.950	
Satd. Flow (perm)	3579	0	0	3544	3372	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						13
Link Speed (k/h)	80			80	60	
Link Distance (m)	87.7			58.0	245.2	
Travel Time (s)	3.9			2.6	14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	3%	5%	1%
Adj. Flow (vph)	1552	0	0	816	22	135
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1552	0	0	816	22	135
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	55.0			55.0	45.0	45.0
Total Split (%)	55.0%			55.0%	45.0%	45.0%
Maximum Green (s)	48.0			48.0	38.0	38.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	56.7			56.7	11.7	11.7
Actuated g/C Ratio	0.69			0.69	0.14	0.14
v/c Ratio	0.63			0.33	0.05	0.56
Control Delay	9.0			6.0	27.9	37.9
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	9.0			6.0	27.9	37.9
LOS	A			A	C	D
Approach Delay	9.0			6.0	36.5	
Approach LOS	A			A	D	
Queue Length 50th (m)	59.5			23.0	1.5	17.9
Queue Length 95th (m)	93.2			37.2	4.2	31.8
Internal Link Dist (m)	63.7			34.0	221.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2463			2439	1557	753
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.63			0.33	0.01	0.18

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	82.4
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.63
Intersection Signal Delay:	9.8
Intersection Capacity Utilization	61.0%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	B

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	1400	89	113	591	49	212	345	168	24	409	277
Future Volume (vph)	208	1400	89	113	591	49	212	345	168	24	409	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	85.0		0.0	95.0		115.0	70.0		70.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.989				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1706	3514	0	1789	3381	0	1807	1865	1585	1755	1847	1555
Flt Permitted	0.387			0.050			0.101			0.491		
Satd. Flow (perm)	695	3514	0	94	3381	0	192	1865	1585	907	1847	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			9				139			210
Link Speed (k/h)		80			60			70				70
Link Distance (m)		165.3			372.6			163.6				428.8
Travel Time (s)		7.4			22.4			8.4				22.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	3%	2%	2%	7%	4%	1%	3%	3%	4%	4%	5%
Adj. Flow (vph)	226	1522	97	123	642	53	230	375	183	26	445	301
Shared Lane Traffic (%)												
Lane Group Flow (vph)	226	1619	0	123	695	0	230	375	183	26	445	301
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6		7	4			8	

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		6			4			4		8	
Detector Phase	2	2	1		6	7		4	4	8	8	8
Switch Phase												
Minimum Initial (s)	8.0	8.0	5.0		8.0	5.0		8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	30.1	30.1	8.0		30.1	8.0		29.4	29.4	29.4	29.4	29.4
Total Split (s)	82.0	82.0	13.0		95.0	17.0		65.0	65.0	48.0	48.0	48.0
Total Split (%)	51.3%	51.3%	8.1%		59.4%	10.6%		40.6%	40.6%	30.0%	30.0%	30.0%
Maximum Green (s)	75.9	75.9	10.0		88.9	14.0		58.6	58.6	41.6	41.6	41.6
Yellow Time (s)	4.0	4.0	3.0		4.0	3.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.1	2.1	0.0		2.1	0.0		2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	-1.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	3.0		6.1	2.0		6.4	6.4	6.4	6.4	6.4
Lead/Lag	Lag	Lag	Lead			Lead			Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			Yes			Yes			
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Max	C-Max	None		None	None		None	None	None	None	None
Walk Time (s)	9.0	9.0				9.0	9.0		9.0	9.0	9.0	9.0
Flash Dont Walk (s)	15.0	15.0				15.0	14.0		14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)	0	0				0	0		0	0	0	0
Act Effct Green (s)	77.4	77.4	93.1		90.0	61.9		57.5	57.5	40.5	40.5	40.5
Actuated g/C Ratio	0.48	0.48	0.58		0.56	0.39		0.36	0.36	0.25	0.25	0.25
v/c Ratio	0.67	0.95	0.79		0.36	1.02		0.56	0.28	0.11	0.95	0.55
Control Delay	44.3	52.5	71.2		17.0	104.9		44.7	10.7	46.9	89.6	19.2
Queue Delay	0.0	43.8	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	44.3	96.3	71.2		17.0	104.9		44.7	10.7	46.9	89.6	19.2
LOS	D	F	E		B	F		D	B	D	F	B
Approach Delay	89.9					25.1		54.4		60.7		
Approach LOS	F					C		D		E		
Queue Length 50th (m)	55.2	259.7	25.9		51.3	~56.2		94.6	9.1	6.4	139.1	23.5
Queue Length 95th (m)	91.8	#313.7	#55.8		58.4	#112.7		127.7	27.0	15.0	#203.5	54.2
Internal Link Dist (m)	141.3					348.6		139.6		404.8		
Turn Bay Length (m)	80.0					85.0		95.0		115.0		70.0
Base Capacity (vph)	336	1703	160		1906	226		683	668	235	480	559
Starvation Cap Reductn	0	255	0		0	0		0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0		0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0		0	0	0	0	0
Reduced v/c Ratio	0.67	1.12	0.77		0.36	1.02		0.55	0.27	0.11	0.93	0.54

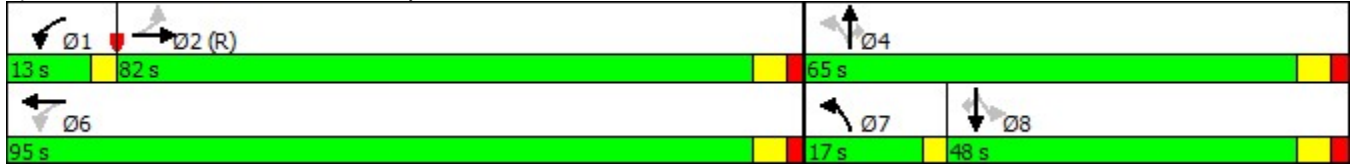
Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.02
Intersection Signal Delay:	65.4
Intersection LOS:	E
Intersection Capacity Utilization:	98.1%
ICU Level of Service:	F
Analysis Period (min):	15

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

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

Splits and Phases: 8: Ninth Line & Derry Rd W



Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	1571	10	136	614	126	81	49	316	186	71	140
Future Volume (vph)	80	1571	10	136	614	126	81	49	316	186	71	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		0.0	95.0		0.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99		0.97		0.94	0.95		0.96
Frt		0.999			0.974				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	3570	0	1706	3384	0	1825	1779	1570	1789	1795	1601
Flt Permitted	0.348			0.060			0.707			0.722		
Satd. Flow (perm)	628	3570	0	108	3384	0	1319	1779	1469	1292	1795	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			30				155			152
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.6			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	2%	20%	7%	4%	4%	0%	8%	4%	2%	7%	2%
Adj. Flow (vph)	87	1708	11	148	667	137	88	53	343	202	77	152
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	1719	0	148	804	0	88	53	343	202	77	152
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		5.0	12.0		8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	24.6	24.6		10.0	24.6		24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	93.0	93.0		16.0	109.0		51.0	51.0	51.0	51.0	51.0	51.0
Total Split (%)	58.1%	58.1%		10.0%	68.1%		31.9%	31.9%	31.9%	31.9%	31.9%	31.9%
Maximum Green (s)	87.0	87.0		13.0	103.0		44.4	44.4	44.4	44.4	44.4	44.4
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		3.0	6.0		6.6	6.6	6.6	6.6	6.6	6.6
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	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	0
Act Effct Green (s)	99.7	99.7		119.3	116.3		31.1	31.1	31.1	31.1	31.1	31.1
Actuated g/C Ratio	0.62	0.62		0.75	0.73		0.19	0.19	0.19	0.19	0.19	0.19
v/c Ratio	0.22	0.77		0.69	0.33		0.35	0.15	0.84	0.81	0.22	0.36
Control Delay	4.7	12.9		42.8	8.7		57.1	51.4	50.6	83.9	53.2	8.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.7	12.9		42.8	8.7		57.1	51.4	50.6	83.9	53.2	8.9
LOS	A	B		D	A		E	D	D	F	D	A
Approach Delay		12.5			14.0			51.9			52.0	
Approach LOS		B			B			D			D	
Queue Length 50th (m)	2.0	240.8		21.3	41.6		24.6	14.2	61.4	62.4	21.0	0.0
Queue Length 95th (m)	m8.8	m315.1		#52.2	67.6		38.2	24.6	92.0	84.5	33.1	17.4
Internal Link Dist (m)		348.6			202.4			102.9			111.9	
Turn Bay Length (m)	95.0			95.0			115.0		30.0	15.0		15.0
Base Capacity (vph)	391	2224		227	2468		366	493	519	358	498	534
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.77		0.65	0.33		0.24	0.11	0.66	0.56	0.15	0.28

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	40 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	22.7
Intersection LOS:	C

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 97.9% ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.












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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

 Ø1  Ø2 (R)	 Ø4	
16 s	93 s	51 s
 Ø6 (R)	 Ø8	
109 s	51 s	

Lanes, Volumes, Timings
12: Ninth Line & Hazelridge Rd

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	18	528	64	11	644
Future Volume (vph)	47	18	528	64	11	644
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962			0.850		
Flt Protected	0.965				0.950	
Satd. Flow (prot)	1783	0	1883	1633	1825	1883
Flt Permitted	0.965				0.950	
Satd. Flow (perm)	1783	0	1883	1633	1825	1883
Link Speed (k/h)	48		48			70
Link Distance (m)	192.2		428.8			191.5
Travel Time (s)	14.4		32.2			9.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	51	20	574	70	12	700
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	0	574	70	12	700
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.3%			ICU Level of Service A		
Analysis Period (min)	15					
Description:						

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

PM Peak Period
09-18-2019

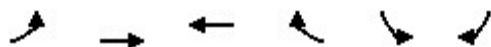
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	778	25	156	2001	4	49	1	115	1	0	3
Future Volume (vph)	0	778	25	156	2001	4	49	1	115	1	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.995						0.851			0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1921	3496	0	1772	3544	0	1789	1619	0	1825	1633	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1921	3496	0	1772	3544	0	1789	1619	0	1825	1633	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		205.5			701.1			177.6			152.9	
Travel Time (s)		9.2			31.5			10.7			9.2	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	0%	3%	3%	0%	2%	0%	1%	0%	0%	0%
Adj. Flow (vph)	0	846	27	170	2175	4	53	1	125	1	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	873	0	170	2179	0	53	126	0	1	3	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	78.2%
ICU Level of Service	D
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	883	1345	0	157	333
Future Volume (vph)	0	883	1345	0	157	333
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3476	3614	0	3437	1617
Flt Permitted					0.950	
Satd. Flow (perm)	0	3476	3614	0	3437	1617
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						17
Link Speed (k/h)		80	80		60	
Link Distance (m)		86.3	88.2		224.9	
Travel Time (s)		3.9	4.0		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	1%	0%	3%	1%
Adj. Flow (vph)	0	960	1462	0	171	362
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	960	1462	0	171	362
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
 3: Derry Rd W & Hwy 407 WB Off-Ramp

PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		55.0	55.0		45.0	45.0
Total Split (%)		55.0%	55.0%		45.0%	45.0%
Maximum Green (s)		48.0	48.0		38.0	38.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		48.5	48.5		24.1	24.1
Actuated g/C Ratio		0.56	0.56		0.28	0.28
v/c Ratio		0.49	0.72		0.18	0.79
Control Delay		13.8	18.1		23.4	39.9
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		13.8	18.1		23.4	39.9
LOS		B	B		C	D
Approach Delay		13.8	18.1		34.6	
Approach LOS		B	B		C	
Queue Length 50th (m)		46.7	86.6		10.9	52.3
Queue Length 95th (m)		82.3	148.5		17.9	81.7
Internal Link Dist (m)		62.3	64.2		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		1946	2023		1515	722
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.49	0.72		0.11	0.50

Intersection Summary	
Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	86.7
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	19.7
Intersection Capacity Utilization	74.0%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	D

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	956	0	0	1413	62	129
Future Volume (vph)	956	0	0	1413	62	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3476	0	0	3614	3471	1633
Flt Permitted					0.950	
Satd. Flow (perm)	3476	0	0	3614	3471	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						60
Link Speed (k/h)	80			80	60	
Link Distance (m)	82.5			58.1	226.2	
Travel Time (s)	3.7			2.6	13.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	1%	2%	0%
Adj. Flow (vph)	1039	0	0	1536	67	140
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1039	0	0	1536	67	140
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	55.0			55.0	45.0	45.0
Total Split (%)	55.0%			55.0%	45.0%	45.0%
Maximum Green (s)	48.0			48.0	38.0	38.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	54.1			54.1	10.0	10.0
Actuated g/C Ratio	0.69			0.69	0.13	0.13
v/c Ratio	0.43			0.61	0.15	0.54
Control Delay	6.2			8.1	29.0	25.8
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	6.2			8.1	29.0	25.8
LOS	A			A	C	C
Approach Delay	6.2			8.1	26.8	
Approach LOS	A			A	C	
Queue Length 50th (m)	28.3			51.1	4.5	10.8
Queue Length 95th (m)	47.1			83.5	9.1	25.3
Internal Link Dist (m)	58.5			34.1	202.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2408			2503	1692	827
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.43			0.61	0.04	0.17

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	78.1
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	8.8
Intersection Capacity Utilization	61.3%
Analysis Period (min)	15
Intersection LOS:	A
ICU Level of Service	B

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	228	675	177	176	1283	24	97	470	170	35	435	213
Future Volume (vph)	228	675	177	176	1283	24	97	470	170	35	435	213
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	85.0		0.0	95.0		115.0	70.0		70.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969			0.997				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3475	0	1807	3564	0	1825	1902	1633	1722	1902	1617
Flt Permitted	0.060			0.308			0.116			0.289		
Satd. Flow (perm)	113	3475	0	586	3564	0	223	1902	1633	524	1902	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			1				138			171
Link Speed (k/h)		80			60			70				70
Link Distance (m)		184.0			372.5			163.6				424.0
Travel Time (s)		8.3			22.4			8.4				21.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	1%	1%	2%	8%	0%	1%	0%	6%	1%	1%
Adj. Flow (vph)	248	734	192	191	1395	26	105	511	185	38	473	232
Shared Lane Traffic (%)												
Lane Group Flow (vph)	248	926	0	191	1421	0	105	511	185	38	473	232
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2			6		7	4				8

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019



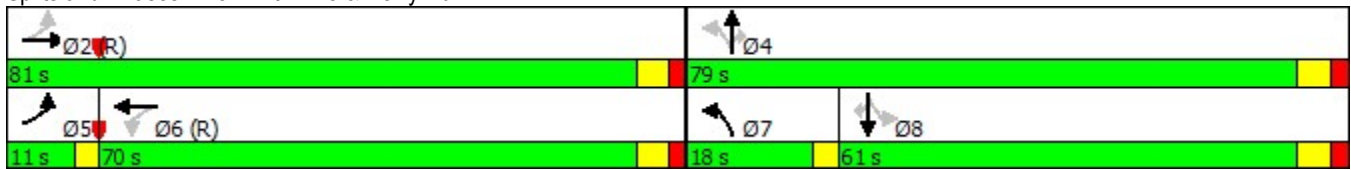
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		6	6		7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		8.0	8.0		5.0	8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	8.0	30.1		30.1	30.1		8.0	29.4	29.4	29.4	29.4	29.4
Total Split (s)	11.0	81.0		70.0	70.0		18.0	79.0	79.0	61.0	61.0	61.0
Total Split (%)	6.9%	50.6%		43.8%	43.8%		11.3%	49.4%	49.4%	38.1%	38.1%	38.1%
Maximum Green (s)	8.0	74.9		63.9	63.9		15.0	72.6	72.6	54.6	54.6	54.6
Yellow Time (s)	3.0	4.0		4.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.1		2.1	2.1		0.0	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1		6.1	6.1		3.0	6.4	6.4	6.4	6.4	6.4
Lead/Lag	Lead			Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		C-Max	C-Max		None	None	None	None	None	None
Walk Time (s)		9.0		9.0	9.0			9.0	9.0	9.0	9.0	9.0
Flash Dont Walk (s)		15.0		15.0	15.0			14.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		0		0	0			0	0	0	0	0
Act Effct Green (s)	89.8	86.7		63.9	63.9		64.2	60.8	60.8	45.8	45.8	45.8
Actuated g/C Ratio	0.56	0.54		0.40	0.40		0.40	0.38	0.38	0.29	0.29	0.29
v/c Ratio	0.92	0.49		0.82	1.00		0.50	0.71	0.26	0.25	0.87	0.40
Control Delay	80.1	24.5		61.9	64.3		36.9	47.0	9.1	45.9	70.7	13.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	80.1	24.5		61.9	64.3		36.9	47.0	9.1	45.9	70.7	13.6
LOS	F	C		E	E		D	D	A	D	E	B
Approach Delay		36.2			64.0			36.9			51.6	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	63.0	93.0		55.0	238.9		20.8	135.6	9.4	9.3	142.3	14.3
Queue Length 95th (m)	#159.3	128.0		#100.6	#289.7		30.3	157.3	23.4	19.0	174.7	35.2
Internal Link Dist (m)		160.0			348.5			139.6			400.0	
Turn Bay Length (m)	80.0			85.0			95.0		115.0	70.0		70.0
Base Capacity (vph)	271	1896		234	1423		239	863	816	178	649	664
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.49		0.82	1.00		0.44	0.59	0.23	0.21	0.73	0.35

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	49.3
Intersection LOS:	D
Intersection Capacity Utilization:	96.8%
ICU Level of Service:	F
Analysis Period (min):	15

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

Splits and Phases: 8: Ninth Line & Derry Rd W



Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

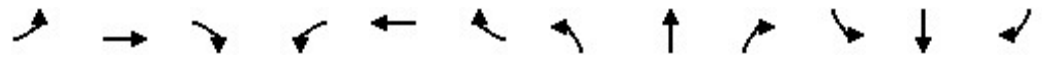
PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	833	32	293	1357	186	57	85	161	104	53	109
Future Volume (vph)	126	833	32	293	1357	186	57	85	161	104	53	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		0.0	95.0		0.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99		0.96		0.97	0.98		0.95
Frt		0.994			0.982				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3554	0	1807	3476	0	1789	1921	1601	1807	1812	1601
Flt Permitted	0.130			0.260			0.719			0.671		
Satd. Flow (perm)	248	3554	0	495	3476	0	1301	1921	1548	1252	1812	1515
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			22				175			60
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.5			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	16		5	5		16	16		8	8		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	1%	2%	2%	2%	0%	2%	1%	6%	2%
Adj. Flow (vph)	137	905	35	318	1475	202	62	92	175	113	58	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	940	0	318	1677	0	62	92	175	113	58	118
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		5.0	12.0		8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	24.6	24.6		10.0	24.6		24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	83.0	83.0		34.0	117.0		43.0	43.0	43.0	43.0	43.0	43.0
Total Split (%)	51.9%	51.9%		21.3%	73.1%		26.9%	26.9%	26.9%	26.9%	26.9%	26.9%
Maximum Green (s)	77.0	77.0		31.0	111.0		36.4	36.4	36.4	36.4	36.4	36.4
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		3.0	6.0		6.6	6.6	6.6	6.6	6.6	6.6
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	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	0
Act Effct Green (s)	109.2	109.2		128.5	125.5		21.9	21.9	21.9	21.9	21.9	21.9
Actuated g/C Ratio	0.68	0.68		0.80	0.78		0.14	0.14	0.14	0.14	0.14	0.14
v/c Ratio	0.81	0.39		0.63	0.61		0.35	0.35	0.48	0.66	0.23	0.46
Control Delay	48.2	5.9		9.9	8.5		67.6	65.8	12.2	83.8	63.2	36.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	5.9		9.9	8.5		67.6	65.8	12.2	83.8	63.2	36.9
LOS	D	A		A	A		E	E	B	F	E	D
Approach Delay		11.3			8.7			37.6			60.5	
Approach LOS		B			A			D			E	
Queue Length 50th (m)	12.2	26.5		19.2	94.3		18.4	27.3	0.0	35.1	17.0	17.1
Queue Length 95th (m)	#86.8	40.2		34.7	137.8		32.5	43.6	21.3	54.8	29.8	36.6
Internal Link Dist (m)		348.5			202.4			102.9			111.9	
Turn Bay Length (m)	95.0			95.0			115.0		30.0	15.0		15.0
Base Capacity (vph)	169	2427		651	2730		295	437	487	284	412	391
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.39		0.49	0.61		0.21	0.21	0.36	0.40	0.14	0.30

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 6 (4%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 16.1

Intersection LOS: B

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 85.8% ICU Level of Service E

Analysis Period (min) 15












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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W



Lanes, Volumes, Timings
12: Hazelridge Rd

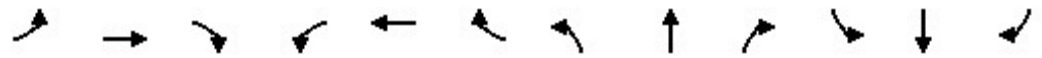
PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	29	17	635	46	36	656
Future Volume (vph)	29	17	635	46	36	656
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.951			0.850		
Flt Protected	0.969				0.950	
Satd. Flow (prot)	1770	0	1883	1633	1825	1883
Flt Permitted	0.969				0.950	
Satd. Flow (perm)	1770	0	1883	1633	1825	1883
Link Speed (k/h)	48		48			70
Link Distance (m)	201.9		424.0			275.3
Travel Time (s)	15.1		31.8			14.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	32	18	690	50	39	713
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	0	690	50	39	713
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	44.5%		ICU Level of Service A			
Analysis Period (min)	15					

Appendix B-: Future Background Conditions Synchro Output

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

AM Peak Period
09-18-2019



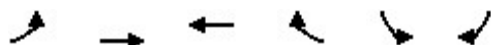
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	2403	19	62	898	2	14	1	109	1	0	2
Future Volume (vph)	1	2403	19	62	898	2	14	1	109	1	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999						0.851			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	5135	0	1825	4902	0	1825	1635	0	1825	1633	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1825	5135	0	1825	4902	0	1825	1635	0	1825	1633	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		205.5			646.9			177.6			152.8	
Travel Time (s)		9.2			29.1			10.7			9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	2612	21	67	976	2	15	1	118	1	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	2633	0	67	978	0	15	119	0	1	2	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.6%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

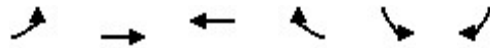
AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	2284	804	0	43	88
Future Volume (vph)	0	2284	804	0	43	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3614	3510	0	3161	1296
Flt Permitted					0.950	
Satd. Flow (perm)	0	3614	3510	0	3161	1296
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						96
Link Speed (k/h)		80	80		60	
Link Distance (m)		128.1	128.1		224.9	
Travel Time (s)		5.8	5.8		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	4%	0%	12%	26%
Adj. Flow (vph)	0	2483	874	0	47	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2483	874	0	47	96
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
 3: Derry Rd W & Hwy 407 WB Off-Ramp

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		75.0	75.0		25.0	25.0
Total Split (%)		75.0%	75.0%		25.0%	25.0%
Maximum Green (s)		68.0	68.0		18.0	18.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		79.1	79.1		8.8	8.8
Actuated g/C Ratio		0.81	0.81		0.09	0.09
v/c Ratio		0.84	0.31		0.16	0.47
Control Delay		11.9	3.5		41.7	16.5
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		11.9	3.5		41.7	16.5
LOS		B	A		D	B
Approach Delay		11.9	3.5		24.8	
Approach LOS		B	A		C	
Queue Length 50th (m)		141.1	20.7		4.4	0.0
Queue Length 95th (m)		#246.9	33.0		9.1	14.0
Internal Link Dist (m)		104.1	104.1		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		2940	2855		587	319
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.84	0.31		0.08	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	97.2
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	10.3
Intersection LOS:	B
Intersection Capacity Utilization:	81.5%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

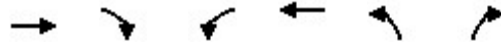
AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	1837	0	0	987	25	159
Future Volume (vph)	1837	0	0	987	25	159
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3579	0	0	3544	3372	1617
Flt Permitted					0.950	
Satd. Flow (perm)	3579	0	0	3544	3372	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						21
Link Speed (k/h)	80			80	60	
Link Distance (m)	87.7			58.0	245.2	
Travel Time (s)	3.9			2.6	14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	3%	5%	1%
Adj. Flow (vph)	1997	0	0	1073	27	173
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1997	0	0	1073	27	173
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	76.0			76.0	24.0	24.0
Total Split (%)	76.0%			76.0%	24.0%	24.0%
Maximum Green (s)	69.0			69.0	17.0	17.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	75.3			75.3	14.2	14.2
Actuated g/C Ratio	0.73			0.73	0.14	0.14
v/c Ratio	0.77			0.42	0.06	0.72
Control Delay	11.9			6.4	36.6	54.1
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	11.9			6.4	36.6	54.1
LOS	B			A	D	D
Approach Delay	11.9			6.4	51.7	
Approach LOS	B			A	D	
Queue Length 50th (m)	115.7			39.2	2.4	29.2
Queue Length 95th (m)	157.8			54.1	5.9	49.0
Internal Link Dist (m)	63.7			34.0	221.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2605			2579	554	283
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.77			0.42	0.05	0.61























Intersection Summary	
Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	103.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	12.5
Intersection Capacity Utilization	72.3%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	C

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	284	1776	154	155	750	162	291	512	273	111	578	366
Future Volume (vph)	284	1776	154	155	750	162	291	512	273	111	578	366
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	85.0		0.0	95.0		115.0	70.0		70.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	*1.00	1.00
Frt		0.988			0.973				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1706	3688	0	1789	3336	0	1807	3544	1585	1755	3694	1555
Flt Permitted	0.173			0.052			0.131			0.443		
Satd. Flow (perm)	311	3688	0	98	3336	0	249	3544	1585	818	3694	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			19				101			332
Link Speed (k/h)		80			60			70				70
Link Distance (m)		165.3			372.6			163.6				428.8
Travel Time (s)		7.4			22.4			8.4				22.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	3%	2%	2%	7%	4%	1%	3%	3%	4%	4%	5%
Adj. Flow (vph)	309	1930	167	168	815	176	316	557	297	121	628	398
Shared Lane Traffic (%)												
Lane Group Flow (vph)	309	2097	0	168	991	0	316	557	297	121	628	398
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4				8

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	8.0	30.1		8.0	30.1		8.0	29.4	29.4	29.4	29.4	29.4
Total Split (s)	34.0	95.0		11.0	72.0		20.0	54.0	54.0	34.0	34.0	34.0
Total Split (%)	21.3%	59.4%		6.9%	45.0%		12.5%	33.8%	33.8%	21.3%	21.3%	21.3%
Maximum Green (s)	31.0	88.9		8.0	65.9		17.0	47.6	47.6	27.6	27.6	27.6
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		-2.0	0.0		-2.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1		1.0	6.1		1.0	6.4	6.4	6.4	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	None		None	None	None	None	None	None
Walk Time (s)		9.0			9.0			9.0	9.0	9.0	9.0	9.0
Flash Dont Walk (s)		15.0			15.0			14.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		0			0			0	0	0	0	0
Act Effct Green (s)	103.0	88.9		90.3	75.2		53.0	47.6	47.6	27.6	27.6	27.6
Actuated g/C Ratio	0.64	0.56		0.56	0.47		0.33	0.30	0.30	0.17	0.17	0.17
v/c Ratio	0.79	1.02		1.04	0.63		1.18	0.53	0.55	0.86	0.99	0.73
Control Delay	32.9	60.3		122.6	29.1		153.5	49.0	34.7	109.1	97.3	20.5
Queue Delay	0.0	31.4		0.0	0.0		0.0	0.0	2.4	0.0	0.0	0.0
Total Delay	32.9	91.7		122.6	29.1		153.5	49.0	37.1	109.1	97.3	20.5
LOS	C	F		F	C		F	D	D	F	F	C
Approach Delay		84.2			42.7			74.2				71.9
Approach LOS		F			D			E				E
Queue Length 50th (m)	40.7	~352.0		~41.1	95.6		~102.6	78.1	52.6	37.9	101.0	18.4
Queue Length 95th (m)	74.4	#389.3		#94.5	112.8		#165.4	97.1	83.7	#76.1	#139.5	59.5
Internal Link Dist (m)		141.3			348.6			139.6				404.8
Turn Bay Length (m)	80.0			85.0			95.0		115.0	70.0		70.0
Base Capacity (vph)	470	2053		161	1578		267	1054	542	141	637	542
Starvation Cap Reductn	0	357		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	139		0	0		0	0	139	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.66	1.24		1.04	0.63		1.18	0.53	0.74	0.86	0.99	0.73

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.18
Intersection Signal Delay:	71.6
Intersection LOS:	E
Intersection Capacity Utilization:	111.8%
ICU Level of Service:	H
Analysis Period (min):	15

- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Ninth Line & Derry Rd W



Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	2133	10	136	891	126	81	49	316	186	71	140
Future Volume (vph)	80	2133	10	136	891	126	81	49	316	186	71	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		0.0	95.0		0.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99		0.97		0.94	0.95		0.96
Frt		0.999			0.981				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	3571	0	1706	3418	0	1825	1779	1570	1789	1795	1601
Flt Permitted	0.253			0.037			0.707			0.722		
Satd. Flow (perm)	459	3571	0	66	3418	0	1319	1779	1469	1292	1795	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			26				93			152
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.6			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	2%	20%	7%	4%	4%	0%	8%	4%	2%	7%	2%
Adj. Flow (vph)	87	2318	11	148	968	137	88	53	343	202	77	152
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	2329	0	148	1105	0	88	53	343	202	77	152
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		5.0	12.0		8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	24.6	24.6		10.0	24.6		24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	112.0	112.0		12.0	124.0		36.0	36.0	36.0	36.0	36.0	36.0
Total Split (%)	70.0%	70.0%		7.5%	77.5%		22.5%	22.5%	22.5%	22.5%	22.5%	22.5%
Maximum Green (s)	106.0	106.0		9.0	118.0		29.4	29.4	29.4	29.4	29.4	29.4
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		3.0	6.0		6.6	6.6	6.6	6.6	6.6	6.6
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	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	0
Act Effct Green (s)	106.0	106.0		121.0	118.0		29.4	29.4	29.4	29.4	29.4	29.4
Actuated g/C Ratio	0.66	0.66		0.76	0.74		0.18	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.29	0.98		1.04	0.44		0.36	0.16	0.99	0.85	0.23	0.38
Control Delay	6.3	31.1		127.2	8.5		62.1	56.6	93.3	93.3	57.9	10.4
Queue Delay	0.0	21.4		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.3	52.5		127.2	8.5		62.1	56.6	93.3	93.3	57.9	10.4
LOS	A	D		F	A		E	E	F	F	E	B
Approach Delay		50.8			22.5			83.6			57.7	
Approach LOS		D			C			F			E	
Queue Length 50th (m)	6.8	402.4		~35.1	63.5		24.8	14.4	84.3	63.0	21.2	0.0
Queue Length 95th (m)	m7.9	m385.0		#82.5	74.8		42.9	27.6	#150.5	#107.6	37.2	19.6
Internal Link Dist (m)		348.6			202.4			102.9			111.9	
Turn Bay Length (m)	95.0			95.0			115.0		30.0	15.0		15.0
Base Capacity (vph)	304	2366		142	2527		242	326	345	237	329	405
Starvation Cap Reductn	0	157		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.29	1.05		1.04	0.44		0.36	0.16	0.99	0.85	0.23	0.38

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 40 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.04

Intersection Signal Delay: 47.2

Intersection LOS: D

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 113.4% ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

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












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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W



Lanes, Volumes, Timings
12: Ninth Line & Hazelridge Rd

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	18	858	64	11	945
Future Volume (vph)	47	18	858	64	11	945
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.962			0.850		
Flt Protected	0.965				0.950	
Satd. Flow (prot)	1783	0	3579	1633	1825	3579
Flt Permitted	0.965				0.950	
Satd. Flow (perm)	1783	0	3579	1633	1825	3579
Link Speed (k/h)	48		48			70
Link Distance (m)	192.2		428.8			191.5
Travel Time (s)	14.4		32.2			9.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	51	20	933	70	12	1027
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	0	933	70	12	1027
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	36.5%			ICU Level of Service A		
Analysis Period (min)	15					
Description:						

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↗↗		↗	↗↗↗		↗	↗		↗	↗	
Traffic Volume (vph)	0	987	25	156	2538	4	49	1	115	1	0	3
Future Volume (vph)	0	987	25	156	2538	4	49	1	115	1	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Fr _t		0.996						0.851			0.850	
Fl _t Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1921	5027	0	1772	5092	0	1789	1619	0	1825	1633	0
Fl _t Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1921	5027	0	1772	5092	0	1789	1619	0	1825	1633	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		205.5			701.1			177.6			152.9	
Travel Time (s)		9.2			31.5			10.7			9.2	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	0%	3%	3%	0%	2%	0%	1%	0%	0%	0%
Adj. Flow (vph)	0	1073	27	170	2759	4	53	1	125	1	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1100	0	170	2763	0	53	126	0	1	3	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	71.8%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	1173	1763	0	203	422
Future Volume (vph)	0	1173	1763	0	203	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3476	3614	0	3437	1617
Flt Permitted					0.950	
Satd. Flow (perm)	0	3476	3614	0	3437	1617
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						10
Link Speed (k/h)		80	80		60	
Link Distance (m)		86.3	88.2		224.9	
Travel Time (s)		3.9	4.0		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	1%	0%	3%	1%
Adj. Flow (vph)	0	1275	1916	0	221	459
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1275	1916	0	221	459
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



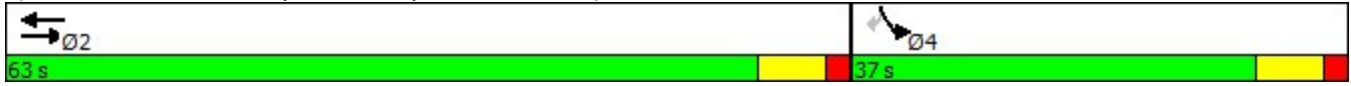
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		63.0	63.0		37.0	37.0
Total Split (%)		63.0%	63.0%		37.0%	37.0%
Maximum Green (s)		56.0	56.0		30.0	30.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		56.0	56.0		29.3	29.3
Actuated g/C Ratio		0.56	0.56		0.30	0.30
v/c Ratio		0.65	0.94		0.22	0.95
Control Delay		17.0	31.2		27.0	64.8
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		17.0	31.2		27.0	64.8
LOS		B	C		C	E
Approach Delay		17.0	31.2		52.5	
Approach LOS		B	C		D	
Queue Length 50th (m)		85.0	172.3		16.4	84.6
Queue Length 95th (m)		106.9	#235.0		25.5	#144.2
Internal Link Dist (m)		62.3	64.2		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		1960	2038		1038	495
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.94		0.21	0.93

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	99.3
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.95
Intersection Signal Delay:	30.2
Intersection LOS:	C
Intersection Capacity Utilization:	86.5%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	1269	0	0	1854	79	171
Future Volume (vph)	1269	0	0	1854	79	171
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3476	0	0	3614	3471	1633
Flt Permitted					0.950	
Satd. Flow (perm)	3476	0	0	3614	3471	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						79
Link Speed (k/h)	80			80	60	
Link Distance (m)	82.5			58.1	226.2	
Travel Time (s)	3.7			2.6	13.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	1%	2%	0%
Adj. Flow (vph)	1379	0	0	2015	86	186
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1379	0	0	2015	86	186
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	77.0			77.0	23.0	23.0
Total Split (%)	77.0%			77.0%	23.0%	23.0%
Maximum Green (s)	70.0			70.0	16.0	16.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	74.3			74.3	12.1	12.1
Actuated g/C Ratio	0.74			0.74	0.12	0.12
v/c Ratio	0.54			0.75	0.21	0.70
Control Delay	6.9			10.6	39.2	37.7
Queue Delay	0.0			0.4	0.0	0.0
Total Delay	6.9			11.0	39.2	37.7
LOS	A			B	D	D
Approach Delay	6.9			11.0	38.2	
Approach LOS	A			B	D	
Queue Length 50th (m)	50.7			101.3	7.6	19.3
Queue Length 95th (m)	76.5			152.2	14.2	40.8
Internal Link Dist (m)	58.5			34.1	202.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2572			2674	554	326
Starvation Cap Reductn	0			233	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.54			0.83	0.16	0.57

Intersection Summary























Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100.4
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.75
Intersection Signal Delay:	11.5
Intersection Capacity Utilization	69.6%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	C

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	312	856	232	289	1627	108	150	686	254	161	678	308
Future Volume (vph)	312	856	232	289	1627	108	150	686	254	161	678	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	85.0		0.0	95.0		115.0	70.0		70.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	*1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.968			0.991				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3471	0	1807	3719	0	1825	3614	1633	1722	3614	1617
Flt Permitted	0.061			0.067			0.183			0.263		
Satd. Flow (perm)	115	3471	0	127	3719	0	352	3614	1633	477	3614	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			6				269			229
Link Speed (k/h)		80			60			70			70	
Link Distance (m)		184.0			372.5			163.6			424.0	
Travel Time (s)		8.3			22.4			8.4			21.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	1%	1%	2%	8%	0%	1%	0%	6%	1%	1%
Adj. Flow (vph)	339	930	252	314	1768	117	163	746	276	175	737	335
Shared Lane Traffic (%)												
Lane Group Flow (vph)	339	1182	0	314	1885	0	163	746	276	175	737	335
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	8.0	30.1		8.0	30.1		8.0	29.4	29.4	29.4	29.4	29.4
Total Split (s)	21.0	69.0		28.0	76.0		8.0	63.0	63.0	55.0	55.0	55.0
Total Split (%)	13.1%	43.1%		17.5%	47.5%		5.0%	39.4%	39.4%	34.4%	34.4%	34.4%
Maximum Green (s)	18.0	62.9		25.0	69.9		5.0	56.6	56.6	48.6	48.6	48.6
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	-2.0	0.0		0.0	0.0		-1.0	0.0	0.0	-2.0	0.0	0.0
Total Lost Time (s)	1.0	6.1		3.0	6.1		2.0	6.4	6.4	4.4	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)		9.0			9.0			9.0	9.0	9.0	9.0	9.0
Flash Dont Walk (s)		15.0			15.0			14.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		0			0			0	0	0	0	0
Act Effct Green (s)	88.5	63.4		94.0	69.9		61.0	56.6	56.6	50.6	48.6	48.6
Actuated g/C Ratio	0.55	0.40		0.59	0.44		0.38	0.35	0.35	0.32	0.30	0.30
v/c Ratio	1.25	0.85		0.95	1.16		0.86	0.58	0.37	1.17	0.67	0.52
Control Delay	178.7	50.2		89.2	110.8		76.9	44.4	5.6	172.1	52.4	16.9
Queue Delay	0.0	1.1		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	178.7	51.3		89.2	110.8		76.9	44.4	5.6	172.1	52.4	16.9
LOS	F	D		F	F		E	D	A	F	D	B
Approach Delay		79.7			107.7			39.8			59.6	
Approach LOS		E			F			D			E	
Queue Length 50th (m)	~117.7	177.3		88.6	~349.8		35.2	101.7	1.5	~65.6	108.4	26.2
Queue Length 95th (m)	#181.7	207.3		m#106.2	#389.7		#70.8	122.6	21.1	#115.0	131.0	56.9
Internal Link Dist (m)		160.0			348.5			139.6			400.0	
Turn Bay Length (m)	80.0			85.0			95.0		115.0	70.0		70.0
Base Capacity (vph)	272	1390		337	1628		189	1278	751	150	1097	650
Starvation Cap Reductn	0	67		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.25	0.89		0.93	1.16		0.86	0.58	0.37	1.17	0.67	0.52

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.25
 Intersection Signal Delay: 78.0
 Intersection Capacity Utilization 111.0%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service H

- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ninth Line & Derry Rd W



Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	1211	32	293	1865	186	57	85	161	104	53	109
Future Volume (vph)	126	1211	32	293	1865	186	57	85	161	104	53	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		0.0	95.0		0.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99		0.96		0.97	0.98		0.95
Frt		0.996			0.986				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3562	0	1807	3500	0	1789	1921	1601	1807	1812	1601
Flt Permitted	0.038			0.138			0.719			0.666		
Satd. Flow (perm)	73	3562	0	262	3500	0	1301	1921	1548	1244	1812	1515
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			15				175			118
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.5			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	16		5	5		16	16		8	8		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	1%	2%	2%	2%	0%	2%	1%	6%	2%
Adj. Flow (vph)	137	1316	35	318	2027	202	62	92	175	113	58	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	1351	0	318	2229	0	62	92	175	113	58	118
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	12.0		5.0	12.0		8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	9.5	24.6		10.0	24.6		24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	16.2	97.7		35.0	116.5		27.3	27.3	27.3	27.3	27.3	27.3
Total Split (%)	10.1%	61.1%		21.9%	72.8%		17.1%	17.1%	17.1%	17.1%	17.1%	17.1%
Maximum Green (s)	13.2	91.7		32.0	110.5		20.7	20.7	20.7	20.7	20.7	20.7
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0		3.0	6.0		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag	Lead	Lag		Lead	Lag							
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	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	118.0	103.9		130.1	113.0		20.3	20.3	20.3	20.3	20.3	20.3
Actuated g/C Ratio	0.74	0.65		0.81	0.71		0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.79	0.58		0.78	0.90		0.38	0.38	0.50	0.72	0.25	0.40
Control Delay	65.1	8.9		30.1	25.7		71.2	68.9	13.3	91.8	66.1	14.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.1	8.9		30.1	25.7		71.2	68.9	13.3	91.8	66.1	14.0
LOS	E	A		C	C		E	E	B	F	E	B
Approach Delay		14.1			26.2			39.8				54.8
Approach LOS		B			C			D				D
Queue Length 50th (m)	28.3	54.2		35.3	286.3		18.4	27.3	0.0	35.1	16.9	0.0
Queue Length 95th (m)	m39.8	m70.1		67.8	337.8		34.2	45.8	22.6	#63.0	31.4	19.1
Internal Link Dist (m)		348.5			202.4			102.9				111.9
Turn Bay Length (m)	95.0			95.0			115.0		30.0	15.0		15.0
Base Capacity (vph)	199	2315		522	2476		168	248	352	160	234	298
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.58		0.61	0.90		0.37	0.37	0.50	0.71	0.25	0.40

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.90
Intersection Signal Delay:	25.1
Intersection LOS:	C

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 97.0% ICU Level of Service F

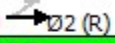
Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.












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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

 Ø1		 Ø2 (R)		 Ø4	
35 s		97.7 s		27.3 s	
 Ø5		 Ø6 (R)		 Ø8	
16.2 s		116.5 s		27.3 s	

Lanes, Volumes, Timings
12: Hazelridge Rd

PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	29	17	973	46	36	1100
Future Volume (vph)	29	17	973	46	36	1100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.951			0.850		
Flt Protected	0.969				0.950	
Satd. Flow (prot)	1770	0	3579	1633	1825	3579
Flt Permitted	0.969				0.950	
Satd. Flow (perm)	1770	0	3579	1633	1825	3579
Link Speed (k/h)	48		48			70
Link Distance (m)	201.9		424.0			275.3
Travel Time (s)	15.1		31.8			14.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	32	18	1058	50	39	1196
Shared Lane Traffic (%)						
Lane Group Flow (vph)	50	0	1058	50	39	1196
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.4%			ICU Level of Service A		
Analysis Period (min)	15					

Appendix C-: Future Total Conditions Synchro Output

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	2420	19	62	903	2	14	1	109	1	0	2
Future Volume (vph)	1	2420	19	62	903	2	14	1	109	1	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999						0.851			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	5135	0	1825	4902	0	1825	1635	0	1825	1633	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1825	5135	0	1825	4902	0	1825	1635	0	1825	1633	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		205.5			646.9			177.6			152.8	
Travel Time (s)		9.2			29.1			10.7			9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	2630	21	67	982	2	15	1	118	1	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	2651	0	67	984	0	15	119	0	1	2	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.6%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

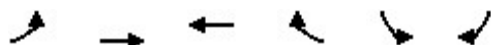
AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	2301	809	0	52	88
Future Volume (vph)	0	2301	809	0	52	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3614	3510	0	3161	1296
Flt Permitted					0.950	
Satd. Flow (perm)	0	3614	3510	0	3161	1296
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						96
Link Speed (k/h)		80	80		60	
Link Distance (m)		128.1	128.1		224.9	
Travel Time (s)		5.8	5.8		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	4%	0%	12%	26%
Adj. Flow (vph)	0	2501	879	0	57	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2501	879	0	57	96
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



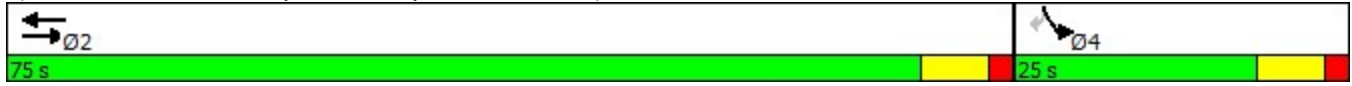
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		75.0	75.0		25.0	25.0
Total Split (%)		75.0%	75.0%		25.0%	25.0%
Maximum Green (s)		68.0	68.0		18.0	18.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		78.6	78.6		8.8	8.8
Actuated g/C Ratio		0.81	0.81		0.09	0.09
v/c Ratio		0.85	0.31		0.20	0.47
Control Delay		12.3	3.6		41.9	16.4
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.3	3.6		41.9	16.4
LOS		B	A		D	B
Approach Delay		12.3	3.6		25.9	
Approach LOS		B	A		C	
Queue Length 50th (m)		144.9	20.8		5.3	0.0
Queue Length 95th (m)		#280.7	33.3		10.4	13.9
Internal Link Dist (m)		104.1	104.1		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		2935	2851		589	319
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.85	0.31		0.10	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	96.7
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	10.7
Intersection LOS:	B
Intersection Capacity Utilization:	81.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

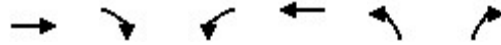
AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	1863	0	0	994	25	168
Future Volume (vph)	1863	0	0	994	25	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3579	0	0	3544	3372	1617
Flt Permitted					0.950	
Satd. Flow (perm)	3579	0	0	3544	3372	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						20
Link Speed (k/h)	80			80	60	
Link Distance (m)	87.7			58.0	245.2	
Travel Time (s)	3.9			2.6	14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	3%	5%	1%
Adj. Flow (vph)	2025	0	0	1080	27	183
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2025	0	0	1080	27	183
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	76.0			76.0	24.0	24.0
Total Split (%)	76.0%			76.0%	24.0%	24.0%
Maximum Green (s)	69.0			69.0	17.0	17.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	75.0			75.0	14.5	14.5
Actuated g/C Ratio	0.72			0.72	0.14	0.14
v/c Ratio	0.78			0.42	0.06	0.75
Control Delay	12.4			6.6	36.3	56.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	12.4			6.6	36.3	56.4
LOS	B			A	D	E
Approach Delay	12.4			6.6	53.8	
Approach LOS	B			A	D	
Queue Length 50th (m)	122.9			41.0	2.4	31.3
Queue Length 95th (m)	163.0			54.5	5.9	52.0
Internal Link Dist (m)	63.7			34.0	221.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2592			2567	554	282
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.78			0.42	0.05	0.65

Intersection Summary























Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	103.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	13.1
Intersection Capacity Utilization	73.6%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	D

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	318	1776	154	155	750	230	291	555	273	129	589	375
Future Volume (vph)	318	1776	154	155	750	230	291	555	273	129	589	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	85.0		0.0	95.0		115.0	70.0		70.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	*1.00	1.00
Frt		0.988			0.965				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1706	3688	0	1789	3314	0	1807	3544	1585	1755	3694	1555
Flt Permitted	0.125			0.057			0.132			0.424		
Satd. Flow (perm)	224	3688	0	107	3314	0	251	3544	1585	783	3694	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			30				113			334
Link Speed (k/h)		80			60			70				70
Link Distance (m)		165.3			372.6			163.6				201.4
Travel Time (s)		7.4			22.4			8.4				10.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	3%	2%	2%	7%	4%	1%	3%	3%	4%	4%	5%
Adj. Flow (vph)	346	1930	167	168	815	250	316	603	297	140	640	408
Shared Lane Traffic (%)												
Lane Group Flow (vph)	346	2097	0	168	1065	0	316	603	297	140	640	408
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4				8

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	8.0	30.1		8.0	30.1		8.0	29.4	29.4	29.4	29.4	29.4
Total Split (s)	34.0	92.6		12.0	70.6		19.0	55.4	55.4	36.4	36.4	36.4
Total Split (%)	21.3%	57.9%		7.5%	44.1%		11.9%	34.6%	34.6%	22.8%	22.8%	22.8%
Maximum Green (s)	31.0	86.5		9.0	64.5		16.0	49.0	49.0	30.0	30.0	30.0
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0		-2.0	0.0		-2.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1		1.0	6.1		1.0	6.4	6.4	6.4	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	None		None	None	None	None	None	None
Walk Time (s)		9.0			9.0			9.0	9.0	9.0	9.0	9.0
Flash Dont Walk (s)		15.0			15.0			14.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		0			0			0	0	0	0	0
Act Effct Green (s)	101.6	86.5		84.6	68.5		54.4	49.0	49.0	30.0	30.0	30.0
Actuated g/C Ratio	0.64	0.54		0.53	0.43		0.34	0.31	0.31	0.19	0.19	0.19
v/c Ratio	0.88	1.05		0.98	0.74		1.22	0.56	0.53	0.96	0.92	0.73
Control Delay	55.7	70.4		104.0	34.9		164.1	48.8	31.4	127.2	83.6	20.3
Queue Delay	0.0	21.1		0.0	0.0		0.0	0.0	2.7	0.0	0.0	0.0
Total Delay	55.7	91.5		104.0	34.9		164.1	48.8	34.2	127.2	83.6	20.3
LOS	E	F		F	C		F	D	C	F	F	C
Approach Delay		86.5			44.3			75.2				67.0
Approach LOS		F			D			E				E
Queue Length 50th (m)	71.2	~361.4		38.5	106.2		~103.6	84.7	48.4	44.7	101.3	20.5
Queue Length 95th (m)	#116.5	#398.8		#88.4	121.7		#166.3	104.7	78.9	#89.3	#134.0	61.8
Internal Link Dist (m)		141.3			348.6			139.6				177.4
Turn Bay Length (m)	80.0			85.0			95.0		115.0	70.0		70.0
Base Capacity (vph)	429	1997		172	1436		260	1085	563	146	692	562
Starvation Cap Reductn	0	334		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	142		0	0		0	0	163	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.81	1.26		0.98	0.74		1.22	0.56	0.74	0.96	0.92	0.73

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.22
Intersection Signal Delay:	71.8
Intersection LOS:	E
Intersection Capacity Utilization:	112.1%
ICU Level of Service:	H
Analysis Period (min):	15

- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Ninth Line & Derry Rd W



Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	2149	11	136	951	126	85	49	316	186	71	143
Future Volume (vph)	81	2149	11	136	951	126	85	49	316	186	71	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		0.0	95.0		0.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00			0.99		0.97		0.94	0.95		0.96
Frt		0.999			0.982				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	3571	0	1706	3423	0	1825	1779	1570	1789	1795	1601
Flt Permitted	0.236			0.037			0.707			0.722		
Satd. Flow (perm)	429	3571	0	66	3423	0	1319	1779	1469	1292	1795	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			25				102			155
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.6			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	2%	20%	7%	4%	4%	0%	8%	4%	2%	7%	2%
Adj. Flow (vph)	88	2336	12	148	1034	137	92	53	343	202	77	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	2348	0	148	1171	0	92	53	343	202	77	155
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	2	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		5.0	12.0		8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	24.6	24.6		10.0	24.6		24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	112.0	112.0		13.0	125.0		35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	70.0%	70.0%		8.1%	78.1%		21.9%	21.9%	21.9%	21.9%	21.9%	21.9%
Maximum Green (s)	106.0	106.0		10.0	119.0		28.4	28.4	28.4	28.4	28.4	28.4
Yellow Time (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		3.0	6.0		6.6	6.6	6.6	6.6	6.6	6.6
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	3.0
Recall Mode	C-Max	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)	7.0	7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0			0		0	0	0	0	0	0
Act Effct Green (s)	106.0	106.0		122.0	119.0		28.4	28.4	28.4	28.4	28.4	28.4
Actuated g/C Ratio	0.66	0.66		0.76	0.74		0.18	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.31	0.99		0.97	0.46		0.39	0.17	1.00	0.88	0.24	0.39
Control Delay	6.7	32.7		108.2	8.4		63.9	57.5	92.7	99.0	58.9	10.7
Queue Delay	0.0	20.9		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	53.6		108.2	8.4		63.9	57.5	92.7	99.0	58.9	10.7
LOS	A	D		F	A		E	E	F	F	E	B
Approach Delay		51.9			19.6			83.5				60.4
Approach LOS		D			B			F				E
Queue Length 50th (m)	7.4	405.5		32.2	67.5		26.2	14.5	81.7	63.5	21.3	0.0
Queue Length 95th (m)	m8.0	m378.5		#78.9	79.1		44.9	27.8	#148.2	#110.3	37.5	20.1
Internal Link Dist (m)		348.6			202.4			102.9				111.9
Turn Bay Length (m)	95.0			95.0			115.0		30.0	15.0		15.0
Base Capacity (vph)	284	2366		152	2552		234	315	344	229	318	399
Starvation Cap Reductn	0	144		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.31	1.06		0.97	0.46		0.39	0.17	1.00	0.88	0.24	0.39

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	40 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	46.9
Intersection LOS:	D

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 113.9% ICU Level of Service H

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

 Ø1  Ø2 (R)	 Ø4
13 s 112 s	35 s
 Ø6 (R)	 Ø8
125 s	35 s

Lanes, Volumes, Timings
10: Ninth Line & RIRO Station Access

AM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↗
Traffic Volume (vph)	0	29	0	1102	1041	17
Future Volume (vph)	0	29	0	1102	1041	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			25.0
Storage Lanes	0	1	0			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1629	0	3579	3579	1601
Flt Permitted						
Satd. Flow (perm)	0	1629	0	3579	3579	1601
Link Speed (k/h)	48			48	70	
Link Distance (m)	123.2			201.4	132.0	
Travel Time (s)	9.2			15.1	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	32	0	1198	1132	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	1198	1132	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			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	38.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
11: Ninth Line & Station Access

AM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	9	144	957	1049	9
Future Volume (vph)	7	9	144	957	1049	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	65.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.145			
Satd. Flow (perm)	1789	1601	273	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		10				6
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.3			132.0	95.4	
Travel Time (s)	9.0			6.8	4.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	10	157	1040	1140	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	10	157	1040	1140	10
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
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	16.0	67.5	51.5	51.5
Total Split (%)	25.0%	25.0%	17.8%	75.0%	57.2%	57.2%
Maximum Green (s)	18.0	18.0	11.5	63.0	47.0	47.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	18.0	18.0	63.0	63.0	47.0	47.0
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.52	0.52
v/c Ratio	0.02	0.03	0.41	0.42	0.61	0.01

Lanes, Volumes, Timings
11: Ninth Line & Station Access

AM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	29.3	16.1	7.7	6.3	16.8	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	16.1	7.7	6.3	16.8	7.6
LOS	C	B	A	A	B	A
Approach Delay	22.0			6.5	16.8	
Approach LOS	C			A	B	
Queue Length 50th (m)	1.1	0.0	7.6	34.2	68.7	0.3
Queue Length 95th (m)	4.7	4.1	13.4	44.2	88.2	2.6
Internal Link Dist (m)	101.3			108.0	71.4	
Turn Bay Length (m)				65.0	25.0	
Base Capacity (vph)	357	328	384	2505	1869	838
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03	0.41	0.42	0.61	0.01

Intersection Summary












Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	11.6
Intersection LOS:	B
Intersection Capacity Utilization	52.4%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 11: Ninth Line & Station Access
























Lanes, Volumes, Timings
12: Ninth Line & Hazelridge Rd

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	56	18	863	66	11	962
Future Volume (vph)	56	18	863	66	11	962
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.967			0.850		
Flt Protected	0.964				0.950	
Satd. Flow (prot)	1791	0	3579	1633	1825	3579
Flt Permitted	0.964				0.950	
Satd. Flow (perm)	1791	0	3579	1633	1825	3579
Link Speed (k/h)	48		48			70
Link Distance (m)	192.2		95.4			191.5
Travel Time (s)	14.4		7.2			9.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	61	20	938	72	12	1046
Shared Lane Traffic (%)						
Lane Group Flow (vph)	81	0	938	72	12	1046
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	37.5%			ICU Level of Service A		
Analysis Period (min)	15					
Description:						

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

PM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	992	25	156	2552	4	49	1	115	1	0	3
Future Volume (vph)	0	992	25	156	2552	4	49	1	115	1	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996						0.851			0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1921	5027	0	1772	5092	0	1789	1619	0	1825	1633	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1921	5027	0	1772	5092	0	1789	1619	0	1825	1633	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		205.5			701.1			177.6			152.9	
Travel Time (s)		9.2			31.5			10.7			9.2	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	0%	3%	3%	0%	2%	0%	1%	0%	0%	0%
Adj. Flow (vph)	0	1078	27	170	2774	4	53	1	125	1	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1105	0	170	2778	0	53	126	0	1	3	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	72.1%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

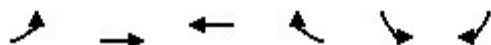
PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	1178	1777	0	205	422
Future Volume (vph)	0	1178	1777	0	205	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3476	3614	0	3437	1617
Flt Permitted					0.950	
Satd. Flow (perm)	0	3476	3614	0	3437	1617
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						10
Link Speed (k/h)		80	80		60	
Link Distance (m)		86.3	88.2		224.9	
Travel Time (s)		3.9	4.0		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	1%	0%	3%	1%
Adj. Flow (vph)	0	1280	1932	0	223	459
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1280	1932	0	223	459
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		64.0	64.0		36.0	36.0
Total Split (%)		64.0%	64.0%		36.0%	36.0%
Maximum Green (s)		57.0	57.0		29.0	29.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		57.0	57.0		29.0	29.0
Actuated g/C Ratio		0.57	0.57		0.29	0.29
v/c Ratio		0.65	0.94		0.22	0.96
Control Delay		16.6	30.5		27.7	69.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.6	30.5		27.7	69.0
LOS		B	C		C	E
Approach Delay		16.6	30.5		55.5	
Approach LOS		B	C		E	
Queue Length 50th (m)		83.4	170.5		16.9	86.0
Queue Length 95th (m)		104.7	#234.5		26.1	#147.6
Internal Link Dist (m)		62.3	64.2		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		1981	2059		996	476
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.94		0.22	0.96

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	30.3
Intersection LOS:	C
Intersection Capacity Utilization:	86.9%
ICU Level of Service:	E
Analysis Period (min):	15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	1276	0	0	1875	79	173
Future Volume (vph)	1276	0	0	1875	79	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3476	0	0	3614	3471	1633
Flt Permitted					0.950	
Satd. Flow (perm)	3476	0	0	3614	3471	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						78
Link Speed (k/h)	80			80	60	
Link Distance (m)	82.5			58.1	226.2	
Travel Time (s)	3.7			2.6	13.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	1%	2%	0%
Adj. Flow (vph)	1387	0	0	2038	86	188
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1387	0	0	2038	86	188
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	77.0			77.0	23.0	23.0
Total Split (%)	77.0%			77.0%	23.0%	23.0%
Maximum Green (s)	70.0			70.0	16.0	16.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	74.2			74.2	12.2	12.2
Actuated g/C Ratio	0.74			0.74	0.12	0.12
v/c Ratio	0.54			0.76	0.20	0.71
Control Delay	7.0			10.9	39.1	38.4
Queue Delay	0.0			0.4	0.0	0.0
Total Delay	7.0			11.4	39.1	38.4
LOS	A			B	D	D
Approach Delay	7.0			11.4	38.6	
Approach LOS	A			B	D	
Queue Length 50th (m)	51.6			104.9	7.6	19.8
Queue Length 95th (m)	77.5			156.6	14.2	41.5
Internal Link Dist (m)	58.5			34.1	202.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2568			2670	553	325
Starvation Cap Reductn	0			227	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.54			0.83	0.16	0.58

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100.4
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	11.8
Intersection Capacity Utilization	70.2%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	C

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	321	856	232	289	1627	127	150	698	254	217	714	336
Future Volume (vph)	321	856	232	289	1627	127	150	698	254	217	714	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	85.0		0.0	95.0		115.0	70.0		70.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	*1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.968			0.989				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3471	0	1807	3710	0	1825	3614	1633	1722	3614	1617
Flt Permitted	0.066			0.065			0.198			0.281		
Satd. Flow (perm)	124	3471	0	124	3710	0	380	3614	1633	509	3614	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			6				276			223
Link Speed (k/h)		80			60			70			70	
Link Distance (m)		184.0			372.5			163.6			204.9	
Travel Time (s)		8.3			22.4			8.4			10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	1%	1%	2%	8%	0%	1%	0%	6%	1%	1%
Adj. Flow (vph)	349	930	252	314	1768	138	163	759	276	236	776	365
Shared Lane Traffic (%)												
Lane Group Flow (vph)	349	1182	0	314	1906	0	163	759	276	236	776	365
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6		7	4			8	

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		7	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0		5.0	8.0		5.0	8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	8.0	30.1		8.0	30.1		8.0	29.4	29.4	29.4	29.4	29.4
Total Split (s)	19.0	65.0		25.0	71.0		8.0	70.0	70.0	62.0	62.0	62.0
Total Split (%)	11.9%	40.6%		15.6%	44.4%		5.0%	43.8%	43.8%	38.8%	38.8%	38.8%
Maximum Green (s)	16.0	58.9		22.0	64.9		5.0	63.6	63.6	55.6	55.6	55.6
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.1		0.0	2.1		0.0	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	-2.0	0.0		0.0	0.0		-1.0	0.0	0.0	-2.0	0.0	0.0
Total Lost Time (s)	1.0	6.1		3.0	6.1		2.0	6.4	6.4	4.4	6.4	6.4
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)		9.0			9.0			9.0	9.0	9.0	9.0	9.0
Flash Dont Walk (s)		15.0			15.0			14.0	14.0	14.0	14.0	14.0
Pedestrian Calls (#/hr)		0			0			0	0	0	0	0
Act Effct Green (s)	82.0	58.9		87.0	64.9		68.0	63.6	63.6	57.6	55.6	55.6
Actuated g/C Ratio	0.51	0.37		0.54	0.41		0.42	0.40	0.40	0.36	0.35	0.35
v/c Ratio	1.40	0.91		1.05	1.26		0.76	0.53	0.34	1.29	0.62	0.52
Control Delay	237.8	58.8		114.4	158.1		55.8	38.4	4.3	205.8	46.0	18.0
Queue Delay	0.0	0.4		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	237.8	59.1		114.4	158.1		55.8	38.4	4.3	205.8	46.0	18.0
LOS	F	E		F	F		E	D	A	F	D	B
Approach Delay		99.9			151.9			32.9			66.0	
Approach LOS		F			F			C			E	
Queue Length 50th (m)	~131.4	185.3		~94.3	~377.1		32.5	96.5	0.0	~95.1	108.1	34.5
Queue Length 95th (m)	#196.1	#220.2		m#119.2	#416.4		#57.2	116.3	18.0	#150.5	129.8	66.0
Internal Link Dist (m)		160.0			348.5			139.6			180.9	
Turn Bay Length (m)	80.0			85.0			95.0		115.0	70.0		70.0
Base Capacity (vph)	250	1292		298	1508		215	1436	815	183	1255	707
Starvation Cap Reductn	0	10		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.40	0.92		1.05	1.26		0.76	0.53	0.34	1.29	0.62	0.52

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.40
Intersection Signal Delay:	98.1
Intersection LOS:	F
Intersection Capacity Utilization:	115.5%
ICU Level of Service:	H
Analysis Period (min):	15

- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ninth Line & Derry Rd W



Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	1261	36	293	1881	186	58	85	161	104	53	110
Future Volume (vph)	129	1261	36	293	1881	186	58	85	161	104	53	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		0.0	95.0		0.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			0.99		0.96		0.97	0.98		0.95
Frt		0.996			0.987				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3562	0	1807	3504	0	1789	1921	1601	1807	1812	1601
Flt Permitted	0.039			0.122			0.719			0.666		
Satd. Flow (perm)	75	3562	0	232	3504	0	1301	1921	1548	1244	1812	1515
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			15				175			120
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.5			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	16		5	5		16	16		8	8		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	1%	2%	2%	2%	0%	2%	1%	6%	2%
Adj. Flow (vph)	140	1371	39	318	2045	202	63	92	175	113	58	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	1410	0	318	2247	0	63	92	175	113	58	120
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6			4		4	8		8
Detector Phase	5	2		1	6		4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	12.0		5.0	12.0		8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	9.5	24.6		10.0	24.6		24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	16.4	96.7		36.0	116.3		27.3	27.3	27.3	27.3	27.3	27.3
Total Split (%)	10.3%	60.4%		22.5%	72.7%		17.1%	17.1%	17.1%	17.1%	17.1%	17.1%
Maximum Green (s)	13.4	90.7		33.0	110.3		20.7	20.7	20.7	20.7	20.7	20.7
Yellow Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0		2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0		3.0	6.0		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag	Lead	Lag		Lead	Lag							
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	C-Max		None	C-Max		None	None	None	None	None	None
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	116.3	102.0		130.1	112.8		20.3	20.3	20.3	20.3	20.3	20.3
Actuated g/C Ratio	0.73	0.64		0.81	0.70		0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.79	0.62		0.78	0.91		0.38	0.38	0.50	0.72	0.25	0.40
Control Delay	62.0	10.1		34.7	26.5		71.4	68.9	13.3	91.8	66.1	13.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	10.1		34.7	26.5		71.4	68.9	13.3	91.8	66.1	13.9
LOS	E	B		C	C		E	E	B	F	E	B
Approach Delay		14.8			27.5			39.9				54.6
Approach LOS		B			C			D				D
Queue Length 50th (m)	28.6	66.0		43.3	295.1		18.7	27.3	0.0	35.1	16.9	0.0
Queue Length 95th (m)	m37.3	m76.7		75.0	346.5		34.8	45.8	22.6	#63.0	31.4	19.2
Internal Link Dist (m)		348.5			202.4			102.9				111.9
Turn Bay Length (m)	95.0			95.0			115.0		30.0	15.0		15.0
Base Capacity (vph)	202	2271		513	2474		168	248	352	160	234	300
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.62		0.62	0.91		0.38	0.37	0.50	0.71	0.25	0.40

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 25.9
 Intersection LOS: C

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 97.4% ICU Level of Service F




Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

 Ø1 36 s		 Ø2 (R) 96.7 s		 Ø4 27.3 s	
 Ø5 16.4 s		 Ø6 (R) 116.3 s		 Ø8 27.3 s	

Lanes, Volumes, Timings
10: RIRO Station Access

PM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	92	0	1147	1167	5
Future Volume (vph)	0	92	0	1147	1167	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			25.0
Storage Lanes	0	1	0			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1629	0	3579	3579	1601
Flt Permitted						
Satd. Flow (perm)	0	1629	0	3579	3579	1601
Link Speed (k/h)	48			48	70	
Link Distance (m)	110.4			204.9	119.0	
Travel Time (s)	8.3			15.4	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	100	0	1247	1268	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	100	0	1247	1268	5
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			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	44.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
11: Station Access

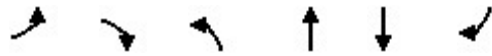
PM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	28	40	1107	1144	2
Future Volume (vph)	21	28	40	1107	1144	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	65.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.140			
Satd. Flow (perm)	1789	1601	264	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		30				1
Link Speed (k/h)	50			70	70	
Link Distance (m)	115.8			119.0	100.1	
Travel Time (s)	8.3			6.1	5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	30	43	1203	1243	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	30	43	1203	1243	2
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
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	10.0	67.0	57.0	57.0
Total Split (%)	25.6%	25.6%	11.1%	74.4%	63.3%	63.3%
Maximum Green (s)	18.5	18.5	5.5	62.5	52.5	52.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	18.5	18.5	62.5	62.5	52.5	52.5
Actuated g/C Ratio	0.21	0.21	0.69	0.69	0.58	0.58
v/c Ratio	0.06	0.09	0.16	0.48	0.60	0.00

Lanes, Volumes, Timings
11: Station Access

PM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	29.4	11.5	5.6	7.1	13.5	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	11.5	5.6	7.1	13.5	7.0
LOS	C	B	A	A	B	A
Approach Delay	19.3			7.1	13.5	
Approach LOS	B			A	B	
Queue Length 50th (m)	3.2	0.0	2.0	43.3	66.7	0.1
Queue Length 95th (m)	9.5	6.8	4.8	55.4	85.4	0.9
Internal Link Dist (m)	91.8			95.0	76.1	
Turn Bay Length (m)			65.0			25.0
Base Capacity (vph)	367	352	276	2485	2087	934
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.09	0.16	0.48	0.60	0.00

Intersection Summary














Area Type:	Other
Cycle Length:	90
Actuated Cycle Length:	90
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.60
Intersection Signal Delay:	10.4
Intersection LOS:	B
Intersection Capacity Utilization	44.9%
ICU Level of Service	A
Analysis Period (min)	15

Splits and Phases: 11: Station Access



Lanes, Volumes, Timings
12: Hazelridge Rd

PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	31	17	987	53	36	1105
Future Volume (vph)	31	17	987	53	36	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.953			0.850		
Flt Protected	0.968				0.950	
Satd. Flow (prot)	1772	0	3579	1633	1825	3579
Flt Permitted	0.968				0.950	
Satd. Flow (perm)	1772	0	3579	1633	1825	3579
Link Speed (k/h)	48		48			70
Link Distance (m)	201.9		100.1			275.3
Travel Time (s)	15.1		7.5			14.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	34	18	1073	58	39	1201
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	1073	58	39	1201
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.5%			ICU Level of Service A		
Analysis Period (min)	15					

Appendix D-: Future Improvement Conditions Synchro Output

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	2420	19	62	903	2	14	1	109	1	0	2
Future Volume (vph)	1	2420	19	62	903	2	14	1	109	1	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999						0.851			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	5135	0	1825	4902	0	1825	1635	0	1825	1633	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1825	5135	0	1825	4902	0	1825	1635	0	1825	1633	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		205.5			646.9			177.6			152.8	
Travel Time (s)		9.2			29.1			10.7			9.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	5%	0%	7%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	1	2630	21	67	982	2	15	1	118	1	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	2651	0	67	984	0	15	119	0	1	2	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	65.6%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

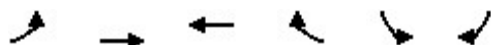
AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	2301	809	0	52	88
Future Volume (vph)	0	2301	809	0	52	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3614	3510	0	3161	1296
Flt Permitted					0.950	
Satd. Flow (perm)	0	3614	3510	0	3161	1296
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						96
Link Speed (k/h)		80	80		60	
Link Distance (m)		128.1	128.1		224.9	
Travel Time (s)		5.8	5.8		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	1%	4%	0%	12%	26%
Adj. Flow (vph)	0	2501	879	0	57	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2501	879	0	57	96
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		75.0	75.0		25.0	25.0
Total Split (%)		75.0%	75.0%		25.0%	25.0%
Maximum Green (s)		68.0	68.0		18.0	18.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		78.6	78.6		8.8	8.8
Actuated g/C Ratio		0.81	0.81		0.09	0.09
v/c Ratio		0.85	0.31		0.20	0.47
Control Delay		12.3	3.6		41.9	16.4
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		12.3	3.6		41.9	16.4
LOS		B	A		D	B
Approach Delay		12.3	3.6		25.9	
Approach LOS		B	A		C	
Queue Length 50th (m)		144.9	20.8		5.3	0.0
Queue Length 95th (m)		#280.7	33.3		10.4	13.9
Internal Link Dist (m)		104.1	104.1		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		2935	2851		589	319
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.85	0.31		0.10	0.30

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	96.7
Natural Cycle:	95
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.85
Intersection Signal Delay:	10.7
Intersection LOS:	B
Intersection Capacity Utilization:	81.9%
ICU Level of Service:	D
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

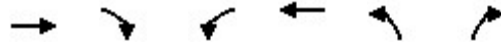
Queue shown is maximum after two cycles.

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

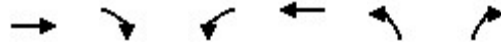
AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	1863	0	0	994	25	168
Future Volume (vph)	1863	0	0	994	25	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3579	0	0	3544	3372	1617
Flt Permitted					0.950	
Satd. Flow (perm)	3579	0	0	3544	3372	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						20
Link Speed (k/h)	80			80	60	
Link Distance (m)	87.7			58.0	245.2	
Travel Time (s)	3.9			2.6	14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	0%	0%	3%	5%	1%
Adj. Flow (vph)	2025	0	0	1080	27	183
Shared Lane Traffic (%)						
Lane Group Flow (vph)	2025	0	0	1080	27	183
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	76.0			76.0	24.0	24.0
Total Split (%)	76.0%			76.0%	24.0%	24.0%
Maximum Green (s)	69.0			69.0	17.0	17.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	75.0			75.0	14.5	14.5
Actuated g/C Ratio	0.72			0.72	0.14	0.14
v/c Ratio	0.78			0.42	0.06	0.75
Control Delay	12.4			6.6	36.3	56.4
Queue Delay	0.0			0.0	0.0	0.0
Total Delay	12.4			6.6	36.3	56.4
LOS	B			A	D	E
Approach Delay	12.4			6.6	53.8	
Approach LOS	B			A	D	
Queue Length 50th (m)	122.9			41.0	2.4	31.3
Queue Length 95th (m)	163.0			54.5	5.9	52.0
Internal Link Dist (m)	63.7			34.0	221.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2592			2567	554	282
Starvation Cap Reductn	0			0	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.78			0.42	0.05	0.65

Intersection Summary

























Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	103.5
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	13.1
Intersection Capacity Utilization	73.6%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	D

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	318	1776	154	155	750	230	291	555	273	129	589	375
Future Volume (vph)	318	1776	154	155	750	230	291	555	273	129	589	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		50.0	85.0		50.0	95.0		115.0	70.0		70.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	*1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1706	3730	1601	1789	3411	1570	1807	3544	1585	1755	3694	1555
Flt Permitted	0.227			0.055			0.127			0.300		
Satd. Flow (perm)	408	3730	1601	104	3411	1570	242	3544	1585	554	3694	1555
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			85			160			116			345
Link Speed (k/h)		80			60			70			70	
Link Distance (m)		165.3			372.6			163.6			201.4	
Travel Time (s)		7.4			22.4			8.4			10.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	7%	3%	2%	2%	7%	4%	1%	3%	3%	4%	4%	5%
Adj. Flow (vph)	346	1930	167	168	815	250	316	603	297	140	640	408
Shared Lane Traffic (%)												
Lane Group Flow (vph)	346	1930	167	168	815	250	316	603	297	140	640	408
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	8.0	30.1	30.1	8.0	30.1	30.1	8.0	29.4	29.4	8.0	29.4	29.4
Total Split (s)	35.0	91.0	91.0	11.0	67.0	67.0	23.0	46.0	46.0	12.0	35.0	35.0
Total Split (%)	21.9%	56.9%	56.9%	6.9%	41.9%	41.9%	14.4%	28.8%	28.8%	7.5%	21.9%	21.9%
Maximum Green (s)	32.0	84.9	84.9	8.0	60.9	60.9	20.0	39.6	39.6	9.0	28.6	28.6
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.1	2.1	0.0	2.1	2.1	0.0	2.4	2.4	0.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	-2.0	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.1	6.1	1.0	6.1	6.1	1.0	6.4	6.4	3.0	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)		9.0	9.0		9.0	9.0		9.0	9.0		9.0	9.0
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	99.0	84.9	84.9	85.4	70.3	70.3	57.0	39.6	39.6	41.0	28.6	28.6
Actuated g/C Ratio	0.62	0.53	0.53	0.53	0.44	0.44	0.36	0.25	0.25	0.26	0.18	0.18
v/c Ratio	0.80	0.98	0.19	1.05	0.54	0.32	1.05	0.69	0.62	0.67	0.97	0.73
Control Delay	30.3	51.6	9.9	124.1	30.8	9.4	109.3	59.3	38.2	57.6	92.8	19.2
Queue Delay	0.0	41.7	0.0	0.0	0.0	0.0	0.0	0.0	1.5	71.4	0.0	0.0
Total Delay	30.3	93.3	9.9	124.1	30.8	9.4	109.3	59.3	39.7	129.0	92.8	19.2
LOS	C	F	A	F	C	A	F	E	D	F	F	B
Approach Delay		78.7			39.2			67.5			71.8	
Approach LOS		E			D			E			E	
Queue Length 50th (m)	50.5	291.8	12.6	~40.6	82.1	12.4	~91.2	92.3	52.0	31.8	102.5	17.4
Queue Length 95th (m)	75.8	#348.0	25.6	#94.7	98.6	29.9	#153.9	114.0	85.1	49.6	#139.3	58.1
Internal Link Dist (m)		141.3			348.6			139.6			177.4	
Turn Bay Length (m)	80.0		50.0	85.0		50.0	95.0		115.0	70.0		70.0
Base Capacity (vph)	512	1979	889	160	1499	779	301	877	479	209	660	561
Starvation Cap Reductn	0	370	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	112	0	0	0	0	0	0	68	98	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	1.20	0.19	1.05	0.54	0.32	1.05	0.69	0.72	1.26	0.97	0.73

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.05
Intersection Signal Delay:	67.1
Intersection LOS:	E
Intersection Capacity Utilization:	107.2%
ICU Level of Service:	G
Analysis Period (min):	15

- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Ninth Line & Derry Rd W

↙ Ø1	↘ Ø2 (R)	↙ Ø3	↕ Ø4
11 s	91 s	12 s	46 s
↙ Ø5	↙ Ø6	↙ Ø7	↘ Ø8
35 s	67 s	23 s	35 s

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
 09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	81	2149	11	136	951	126	85	49	316	186	71	143
Future Volume (vph)	81	2149	11	136	951	126	85	49	316	186	71	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		50.0	95.0		50.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.99	1.00				0.94	0.97		0.94	0.95		0.96
Frt		0.999				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1738	3571	0	1706	3510	1570	1825	1779	1570	1789	1795	1601
Flt Permitted	0.277			0.037			0.707			0.722		
Satd. Flow (perm)	502	3571	0	66	3510	1477	1319	1779	1469	1292	1795	1532
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				137			102			155
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.6			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	9		4	4		9	12		20	20		12
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	2%	20%	7%	4%	4%	0%	8%	4%	2%	7%	2%
Adj. Flow (vph)	88	2336	12	148	1034	137	92	53	343	202	77	155
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	2348	0	148	1034	137	92	53	343	202	77	155
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		1	6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	2	2		1	6	6	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	12.0	12.0		5.0	12.0	12.0	8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	24.6	24.6		10.0	24.6	24.6	24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	112.0	112.0		13.0	125.0	125.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Split (%)	70.0%	70.0%		8.1%	78.1%	78.1%	21.9%	21.9%	21.9%	21.9%	21.9%	21.9%
Maximum Green (s)	106.0	106.0		10.0	119.0	119.0	28.4	28.4	28.4	28.4	28.4	28.4
Yellow Time (s)	4.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		0.0	2.0	2.0	2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		3.0	6.0	6.0	6.6	6.6	6.6	6.6	6.6	6.6
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	3.0	3.0
Recall Mode	C-Max	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	106.0	106.0		122.0	119.0	119.0	28.4	28.4	28.4	28.4	28.4	28.4
Actuated g/C Ratio	0.66	0.66		0.76	0.74	0.74	0.18	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.27	0.99		0.97	0.40	0.12	0.39	0.17	1.00	0.88	0.24	0.39
Control Delay	5.8	34.5		108.2	8.0	1.0	63.9	57.5	92.7	99.0	58.9	10.7
Queue Delay	0.0	25.4		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.8	60.0		108.2	8.0	1.0	63.9	57.5	92.7	99.0	58.9	10.7
LOS	A	E		F	A	A	E	E	F	F	E	B
Approach Delay		58.0			18.5			83.5			60.4	
Approach LOS		E			B			F			E	
Queue Length 50th (m)	6.2	398.5		32.2	57.0	0.0	26.2	14.5	81.7	63.5	21.3	0.0
Queue Length 95th (m)	m8.8	m#431.8		#78.9	67.1	5.3	44.9	27.8	#148.2	#110.3	37.5	20.1
Internal Link Dist (m)		348.6			202.4			102.9			111.9	
Turn Bay Length (m)	95.0			95.0		50.0	115.0		30.0	15.0		15.0
Base Capacity (vph)	332	2366		152	2610	1133	234	315	344	229	318	399
Starvation Cap Reductn	0	167		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	1.07		0.97	0.40	0.12	0.39	0.17	1.00	0.88	0.24	0.39

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 40 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.00
 Intersection Signal Delay: 49.7
 Intersection LOS: D

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

AM Peak Period
 09-18-2019

Intersection Capacity Utilization 113.9% ICU Level of Service H


Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

 Ø1  Ø2 (R)	 Ø4
13 s	35 s
 Ø6 (R)	 Ø8
125 s	35 s

Lanes, Volumes, Timings
10: Ninth Line & RIRO Station Access

AM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑↑	↑↑	↗
Traffic Volume (vph)	0	29	0	1102	1041	17
Future Volume (vph)	0	29	0	1102	1041	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			25.0
Storage Lanes	0	1	0			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1629	0	3579	3579	1601
Flt Permitted						
Satd. Flow (perm)	0	1629	0	3579	3579	1601
Link Speed (k/h)	48			48	70	
Link Distance (m)	123.2			201.4	132.0	
Travel Time (s)	9.2			15.1	6.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	32	0	1198	1132	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	32	0	1198	1132	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			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	38.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
11: Ninth Line & Station Access

AM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	7	9	144	957	1049	9
Future Volume (vph)	7	9	144	957	1049	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	65.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.145			
Satd. Flow (perm)	1789	1601	273	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		10				6
Link Speed (k/h)	50			70	70	
Link Distance (m)	125.3			132.0	95.4	
Travel Time (s)	9.0			6.8	4.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	10	157	1040	1140	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	10	157	1040	1140	10
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
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	16.0	67.5	51.5	51.5
Total Split (%)	25.0%	25.0%	17.8%	75.0%	57.2%	57.2%
Maximum Green (s)	18.0	18.0	11.5	63.0	47.0	47.0
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	18.0	18.0	63.0	63.0	47.0	47.0
Actuated g/C Ratio	0.20	0.20	0.70	0.70	0.52	0.52
v/c Ratio	0.02	0.03	0.41	0.42	0.61	0.01

Lanes, Volumes, Timings
11: Ninth Line & Station Access

AM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	29.3	16.1	7.7	6.3	16.8	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.3	16.1	7.7	6.3	16.8	7.6
LOS	C	B	A	A	B	A
Approach Delay	22.0			6.5	16.8	
Approach LOS	C			A	B	
Queue Length 50th (m)	1.1	0.0	7.6	34.2	68.7	0.3
Queue Length 95th (m)	4.7	4.1	13.4	44.2	88.2	2.6
Internal Link Dist (m)	101.3			108.0	71.4	
Turn Bay Length (m)				65.0	25.0	
Base Capacity (vph)	357	328	384	2505	1869	838
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.03	0.41	0.42	0.61	0.01

Intersection Summary












Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 11.6
 Intersection LOS: B
 Intersection Capacity Utilization 52.4%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 11: Ninth Line & Station Access



Lanes, Volumes, Timings
12: Ninth Line & Hazelridge Rd

AM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	56	18	863	66	11	962
Future Volume (vph)	56	18	863	66	11	962
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.967			0.850		
Flt Protected	0.964				0.950	
Satd. Flow (prot)	1791	0	3579	1633	1825	3579
Flt Permitted	0.964				0.950	
Satd. Flow (perm)	1791	0	3579	1633	1825	3579
Link Speed (k/h)	48		48			70
Link Distance (m)	192.2		95.4			191.5
Travel Time (s)	14.4		7.2			9.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	61	20	938	72	12	1046
Shared Lane Traffic (%)						
Lane Group Flow (vph)	81	0	938	72	12	1046
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	37.5%			ICU Level of Service A		
Analysis Period (min)	15					
Description:						

Lanes, Volumes, Timings
1: Eighth Line & Derry Rd W

PM Peak Period
09-18-2019



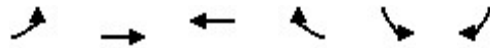
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	992	25	156	2552	4	49	1	115	1	0	3
Future Volume (vph)	0	992	25	156	2552	4	49	1	115	1	0	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	140.0		0.0	35.0		0.0	35.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.996						0.851			0.850	
Flt Protected				0.950			0.950			0.950		
Satd. Flow (prot)	1921	5027	0	1772	5092	0	1789	1619	0	1825	1633	0
Flt Permitted				0.950			0.950			0.950		
Satd. Flow (perm)	1921	5027	0	1772	5092	0	1789	1619	0	1825	1633	0
Link Speed (k/h)		80			80			60			60	
Link Distance (m)		205.5			701.1			177.6			152.9	
Travel Time (s)		9.2			31.5			10.7			9.2	
Confl. Peds. (#/hr)			1	1								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	4%	0%	3%	3%	0%	2%	0%	1%	0%	0%	0%
Adj. Flow (vph)	0	1078	27	170	2774	4	53	1	125	1	0	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1105	0	170	2778	0	53	126	0	1	3	0
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	72.1%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

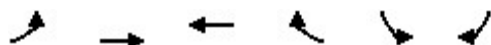
PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	↑
Traffic Volume (vph)	0	1178	1777	0	205	422
Future Volume (vph)	0	1178	1777	0	205	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0	0.0	130.0
Storage Lanes	0			0	2	1
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3476	3614	0	3437	1617
Flt Permitted					0.950	
Satd. Flow (perm)	0	3476	3614	0	3437	1617
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						10
Link Speed (k/h)		80	80		60	
Link Distance (m)		86.3	88.2		224.9	
Travel Time (s)		3.9	4.0		13.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	1%	0%	3%	1%
Adj. Flow (vph)	0	1280	1932	0	223	459
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1280	1932	0	223	459
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		0.0	0.0		7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors		2	2		1	1
Detector Template		Thru	Thru		Left	Right
Leading Detector (m)		30.5	30.5		6.1	6.1
Trailing Detector (m)		0.0	0.0		0.0	0.0
Detector 1 Position(m)		0.0	0.0		0.0	0.0
Detector 1 Size(m)		1.8	1.8		6.1	6.1
Detector 1 Type		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0		0.0	0.0
Detector 1 Queue (s)		0.0	0.0		0.0	0.0
Detector 1 Delay (s)		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		NA	NA		Prot	Perm
Protected Phases		2	2		4	

Lanes, Volumes, Timings
3: Derry Rd W & Hwy 407 WB Off-Ramp

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases						4
Detector Phase		2	2		4	4
Switch Phase						
Minimum Initial (s)		50.0	50.0		8.0	8.0
Minimum Split (s)		57.0	57.0		25.0	25.0
Total Split (s)		64.0	64.0		36.0	36.0
Total Split (%)		64.0%	64.0%		36.0%	36.0%
Maximum Green (s)		57.0	57.0		29.0	29.0
Yellow Time (s)		5.0	5.0		5.0	5.0
All-Red Time (s)		2.0	2.0		2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0
Total Lost Time (s)		7.0	7.0		7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		4.5	4.5		3.5	3.5
Recall Mode		Max	Max		None	None
Walk Time (s)		0.0	0.0		0.0	0.0
Flash Dont Walk (s)		7.0	7.0		7.0	7.0
Pedestrian Calls (#/hr)		0	0		0	0
Act Effct Green (s)		57.0	57.0		29.0	29.0
Actuated g/C Ratio		0.57	0.57		0.29	0.29
v/c Ratio		0.65	0.94		0.22	0.96
Control Delay		16.6	30.5		27.7	69.0
Queue Delay		0.0	0.0		0.0	0.0
Total Delay		16.6	30.5		27.7	69.0
LOS		B	C		C	E
Approach Delay		16.6	30.5		55.5	
Approach LOS		B	C		E	
Queue Length 50th (m)		83.4	170.5		16.9	86.0
Queue Length 95th (m)		104.7	#234.5		26.1	#147.6
Internal Link Dist (m)		62.3	64.2		200.9	
Turn Bay Length (m)						130.0
Base Capacity (vph)		1981	2059		996	476
Starvation Cap Reductn		0	0		0	0
Spillback Cap Reductn		0	0		0	0
Storage Cap Reductn		0	0		0	0
Reduced v/c Ratio		0.65	0.94		0.22	0.96

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Natural Cycle:	85
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	30.3
Intersection LOS:	C
Intersection Capacity Utilization:	86.9%
ICU Level of Service:	E
Analysis Period (min):	15
# 95th percentile volume exceeds capacity, queue may be longer.	

Queue shown is maximum after two cycles.

Splits and Phases: 3: Derry Rd W & Hwy 407 WB Off-Ramp



Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↘↘	↗
Traffic Volume (vph)	1276	0	0	1875	79	173
Future Volume (vph)	1276	0	0	1875	79	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	0.0		0.0	130.0
Storage Lanes		0	0		2	1
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	3476	0	0	3614	3471	1633
Flt Permitted					0.950	
Satd. Flow (perm)	3476	0	0	3614	3471	1633
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)						78
Link Speed (k/h)	80			80	60	
Link Distance (m)	82.5			58.1	226.2	
Travel Time (s)	3.7			2.6	13.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	0%	0%	1%	2%	0%
Adj. Flow (vph)	1387	0	0	2038	86	188
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1387	0	0	2038	86	188
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Number of Detectors	2			2	1	1
Detector Template	Thru			Thru	Left	Right
Leading Detector (m)	30.5			30.5	6.1	6.1
Trailing Detector (m)	0.0			0.0	0.0	0.0
Detector 1 Position(m)	0.0			0.0	0.0	0.0
Detector 1 Size(m)	1.8			1.8	6.1	6.1
Detector 1 Type	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0			0.0	0.0	0.0
Detector 1 Queue (s)	0.0			0.0	0.0	0.0
Detector 1 Delay (s)	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	NA			NA	Prot	Perm
Protected Phases	2			2	4	

Lanes, Volumes, Timings
6: Hwy 407 EB Off-Ramp & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Permitted Phases						4
Detector Phase	2			2	4	4
Switch Phase						
Minimum Initial (s)	50.0			50.0	8.0	8.0
Minimum Split (s)	57.0			57.0	15.0	15.0
Total Split (s)	77.0			77.0	23.0	23.0
Total Split (%)	77.0%			77.0%	23.0%	23.0%
Maximum Green (s)	70.0			70.0	16.0	16.0
Yellow Time (s)	5.0			5.0	5.0	5.0
All-Red Time (s)	2.0			2.0	2.0	2.0
Lost Time Adjust (s)	0.0			0.0	0.0	0.0
Total Lost Time (s)	7.0			7.0	7.0	7.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Recall Mode	Max			Max	None	None
Walk Time (s)	0.0			0.0	0.0	0.0
Flash Dont Walk (s)	7.0			7.0	7.0	7.0
Pedestrian Calls (#/hr)	0			0	0	0
Act Effct Green (s)	74.2			74.2	12.2	12.2
Actuated g/C Ratio	0.74			0.74	0.12	0.12
v/c Ratio	0.54			0.76	0.20	0.71
Control Delay	7.0			10.9	39.1	38.4
Queue Delay	0.0			0.4	0.0	0.0
Total Delay	7.0			11.4	39.1	38.4
LOS	A			B	D	D
Approach Delay	7.0			11.4	38.6	
Approach LOS	A			B	D	
Queue Length 50th (m)	51.6			104.9	7.6	19.8
Queue Length 95th (m)	77.5			156.6	14.2	41.5
Internal Link Dist (m)	58.5			34.1	202.2	
Turn Bay Length (m)						130.0
Base Capacity (vph)	2568			2670	553	325
Starvation Cap Reductn	0			227	0	0
Spillback Cap Reductn	0			0	0	0
Storage Cap Reductn	0			0	0	0
Reduced v/c Ratio	0.54			0.83	0.16	0.58

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100.4
Natural Cycle:	75
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	11.8
Intersection Capacity Utilization	70.2%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	C

Splits and Phases: 6: Hwy 407 EB Off-Ramp & Derry Rd W



Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	321	856	232	289	1627	127	150	698	254	217	714	336
Future Volume (vph)	321	856	232	289	1627	127	150	698	254	217	714	336
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		50.0	85.0		50.0	95.0		115.0	70.0		70.0
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	*1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3579	1617	1807	3767	1512	1825	3614	1633	1722	3614	1617
Flt Permitted	0.051			0.211			0.119			0.112		
Satd. Flow (perm)	96	3579	1617	401	3767	1512	229	3614	1633	203	3614	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			154			85			215			238
Link Speed (k/h)		80			60			70			70	
Link Distance (m)		184.0			372.5			163.6			204.9	
Travel Time (s)		8.3			22.4			8.4			10.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	1%	1%	2%	8%	0%	1%	0%	6%	1%	1%
Adj. Flow (vph)	349	930	252	314	1768	138	163	759	276	236	776	365
Shared Lane Traffic (%)												
Lane Group Flow (vph)	349	930	252	314	1768	138	163	759	276	236	776	365
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)		3.7			3.7			3.7			3.7	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	0	1	2	0	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	0.0	6.1	30.5	0.0	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	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	0.0
Detector 1 Size(m)	6.1	1.8	0.0	6.1	1.8	0.0	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3		8

Lanes, Volumes, Timings
8: Ninth Line & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0	5.0	5.0	5.0
Minimum Split (s)	8.0	30.1	30.1	8.0	30.1	30.1	8.0	29.4	29.4	8.0	29.4	29.4
Total Split (s)	24.0	75.0	75.0	30.0	81.0	81.0	11.0	39.0	39.0	16.0	44.0	44.0
Total Split (%)	15.0%	46.9%	46.9%	18.8%	50.6%	50.6%	6.9%	24.4%	24.4%	10.0%	27.5%	27.5%
Maximum Green (s)	21.0	68.9	68.9	27.0	74.9	74.9	8.0	32.6	32.6	13.0	37.6	37.6
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.1	2.1	0.0	2.1	2.1	0.0	2.4	2.4	0.0	2.4	2.4
Lost Time Adjust (s)	-2.0	0.0	0.0	0.0	0.0	0.0	-1.0	0.0	0.0	-2.0	0.0	0.0
Total Lost Time (s)	1.0	6.1	6.1	3.0	6.1	6.1	2.0	6.4	6.4	1.0	6.4	6.4
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		9.0	9.0		9.0	9.0		9.0	9.0		9.0	9.0
Flash Dont Walk (s)		15.0	15.0		15.0	15.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	102.1	76.6	76.6	96.7	74.9	74.9	46.0	32.6	32.6	54.0	37.6	37.6
Actuated g/C Ratio	0.64	0.48	0.48	0.60	0.47	0.47	0.29	0.20	0.20	0.34	0.24	0.24
v/c Ratio	1.15	0.54	0.30	0.76	1.00	0.18	1.05	1.03	0.55	1.12	0.91	0.65
Control Delay	143.3	31.6	11.1	35.5	49.8	9.4	128.3	102.3	18.1	138.4	75.4	24.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	143.3	31.6	11.1	35.5	49.8	9.4	128.3	102.3	18.1	138.4	75.4	24.4
LOS	F	C	B	D	D	A	F	F	B	F	E	C
Approach Delay		53.7			45.3			86.4			72.7	
Approach LOS		D			D			F			E	
Queue Length 50th (m)	~113.2	106.8	16.9	46.4	~234.1	4.2	~40.8	~135.5	16.3	~69.5	127.8	36.5
Queue Length 95th (m)	#180.7	140.6	39.3	m74.5	#328.5	m13.3	#87.7	#176.4	46.0	#125.6	#162.7	73.3
Internal Link Dist (m)		160.0			348.5			139.6			180.9	
Turn Bay Length (m)	80.0		50.0	85.0		50.0	95.0		115.0	70.0		70.0
Base Capacity (vph)	304	1713	854	492	1763	753	155	736	503	210	849	562
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.54	0.30	0.64	1.00	0.18	1.05	1.03	0.55	1.12	0.91	0.65

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.15
Intersection Signal Delay:	61.1
Intersection LOS:	E
Intersection Capacity Utilization:	111.2%
ICU Level of Service:	H
Analysis Period (min):	15

- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Ninth Line & Derry Rd W

↙ Ø1	↘ Ø2 (R)	↙ Ø3	↑ Ø4
30 s	75 s	16 s	39 s
↙ Ø5	↘ Ø6 (R)	↙ Ø7	↓ Ø8
24 s	81 s	11 s	44 s

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	1261	36	293	1881	186	58	85	161	104	53	110
Future Volume (vph)	129	1261	36	293	1881	186	58	85	161	104	53	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	95.0		50.0	95.0		50.0	115.0		30.0	15.0		15.0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00				0.91	0.96		0.97	0.98		0.95
Frt		0.996				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3562	0	1807	3579	1601	1789	1921	1601	1807	1812	1601
Flt Permitted	0.045			0.122			0.719			0.668		
Satd. Flow (perm)	86	3562	0	232	3579	1457	1301	1921	1548	1247	1812	1515
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				99			175			120
Link Speed (k/h)		60			60			50				50
Link Distance (m)		372.5			226.4			126.9				135.9
Travel Time (s)		22.4			13.6			9.1				9.8
Confl. Peds. (#/hr)	16		5	5		16	16		8	8		16
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	0%	1%	2%	2%	2%	0%	2%	1%	6%	2%
Adj. Flow (vph)	140	1371	39	318	2045	202	63	92	175	113	58	120
Shared Lane Traffic (%)												
Lane Group Flow (vph)	140	1410	0	318	2045	202	63	92	175	113	58	120
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	0	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	0.0	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	0.0	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
09-18-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			8	
Permitted Phases	2			6		6	4		4	8		8
Detector Phase	5	2		1	6	6	4	4	4	8	8	8
Switch Phase												
Minimum Initial (s)	5.0	12.0		5.0	12.0	12.0	8.0	8.0	8.0	20.0	20.0	20.0
Minimum Split (s)	9.5	24.6		10.0	24.6	24.6	24.6	24.6	24.6	26.6	26.6	26.6
Total Split (s)	17.0	98.0		33.0	114.0	114.0	29.0	29.0	29.0	29.0	29.0	29.0
Total Split (%)	10.6%	61.3%		20.6%	71.3%	71.3%	18.1%	18.1%	18.1%	18.1%	18.1%	18.1%
Maximum Green (s)	14.0	92.0		30.0	108.0	108.0	22.4	22.4	22.4	22.4	22.4	22.4
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	2.6	2.6	2.6	2.6	2.6	2.6
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0		3.0	6.0	6.0	6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag	Lead	Lag		Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max		None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0	0	0	0	0	0	0	0
Act Effct Green (s)	116.5	102.0		129.4	111.9	111.9	21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.73	0.64		0.81	0.70	0.70	0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.75	0.62		0.80	0.82	0.19	0.37	0.37	0.49	0.69	0.24	0.40
Control Delay	61.7	13.4		36.5	21.0	4.9	70.0	67.7	12.9	88.8	65.0	13.5
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	61.7	13.4		36.5	21.0	4.9	70.0	67.7	12.9	88.8	65.0	13.5
LOS	E	B		D	C	A	E	E	B	F	E	B
Approach Delay		17.8			21.7			39.1			53.0	
Approach LOS		B			C			D			D	
Queue Length 50th (m)	28.3	70.5		43.2	224.3	9.9	18.7	27.3	0.0	35.2	17.0	0.0
Queue Length 95th (m)	m48.3	m84.3		77.2	278.0	20.5	34.4	45.2	22.2	#57.5	31.0	18.9
Internal Link Dist (m)		348.5			202.4			102.9			111.9	
Turn Bay Length (m)	95.0			95.0		50.0	115.0		30.0	15.0		15.0
Base Capacity (vph)	216	2272		482	2503	1049	182	268	367	174	253	315
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.62		0.66	0.82	0.19	0.35	0.34	0.48	0.65	0.23	0.38

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 23.5
 Intersection LOS: C

Lanes, Volumes, Timings
 9: Lisgar Dr/Rosehurst Dr & Derry Rd W

PM Peak Period
 09-18-2019

Intersection Capacity Utilization 91.3% ICU Level of Service F

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 9: Lisgar Dr/Rosehurst Dr & Derry Rd W



Lanes, Volumes, Timings
10: RIRO Station Access

PM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	92	0	1147	1167	5
Future Volume (vph)	0	92	0	1147	1167	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	0.0			25.0
Storage Lanes	0	1	0			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.865				0.850
Flt Protected						
Satd. Flow (prot)	0	1629	0	3579	3579	1601
Flt Permitted						
Satd. Flow (perm)	0	1629	0	3579	3579	1601
Link Speed (k/h)	48			48	70	
Link Distance (m)	110.4			204.9	119.0	
Travel Time (s)	8.3			15.4	6.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	100	0	1247	1268	5
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	100	0	1247	1268	5
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			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	44.6%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
11: Station Access

PM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	28	40	1107	1144	2
Future Volume (vph)	21	28	40	1107	1144	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	65.0			25.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1789	1601	1789	3579	3579	1601
Flt Permitted	0.950		0.140			
Satd. Flow (perm)	1789	1601	264	3579	3579	1601
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		30				1
Link Speed (k/h)	50			70	70	
Link Distance (m)	115.8			119.0	100.1	
Travel Time (s)	8.3			6.1	5.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	30	43	1203	1243	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	30	43	1203	1243	2
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
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Minimum Split (s)	22.5	22.5	9.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	10.0	67.0	57.0	57.0
Total Split (%)	25.6%	25.6%	11.1%	74.4%	63.3%	63.3%
Maximum Green (s)	18.5	18.5	5.5	62.5	52.5	52.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	18.5	18.5	62.5	62.5	52.5	52.5
Actuated g/C Ratio	0.21	0.21	0.69	0.69	0.58	0.58
v/c Ratio	0.06	0.09	0.16	0.48	0.60	0.00

Lanes, Volumes, Timings
11: Station Access

PM Peak Period
09-18-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Control Delay	29.4	11.5	5.6	7.1	13.5	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.4	11.5	5.6	7.1	13.5	7.0
LOS	C	B	A	A	B	A
Approach Delay	19.3			7.1	13.5	
Approach LOS	B			A	B	
Queue Length 50th (m)	3.2	0.0	2.0	43.3	66.7	0.1
Queue Length 95th (m)	9.5	6.8	4.8	55.4	85.4	0.9
Internal Link Dist (m)	91.8			95.0	76.1	
Turn Bay Length (m)			65.0			25.0
Base Capacity (vph)	367	352	276	2485	2087	934
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.09	0.16	0.48	0.60	0.00

Intersection Summary












Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 10.4
 Intersection LOS: B
 Intersection Capacity Utilization 44.9%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 11: Station Access

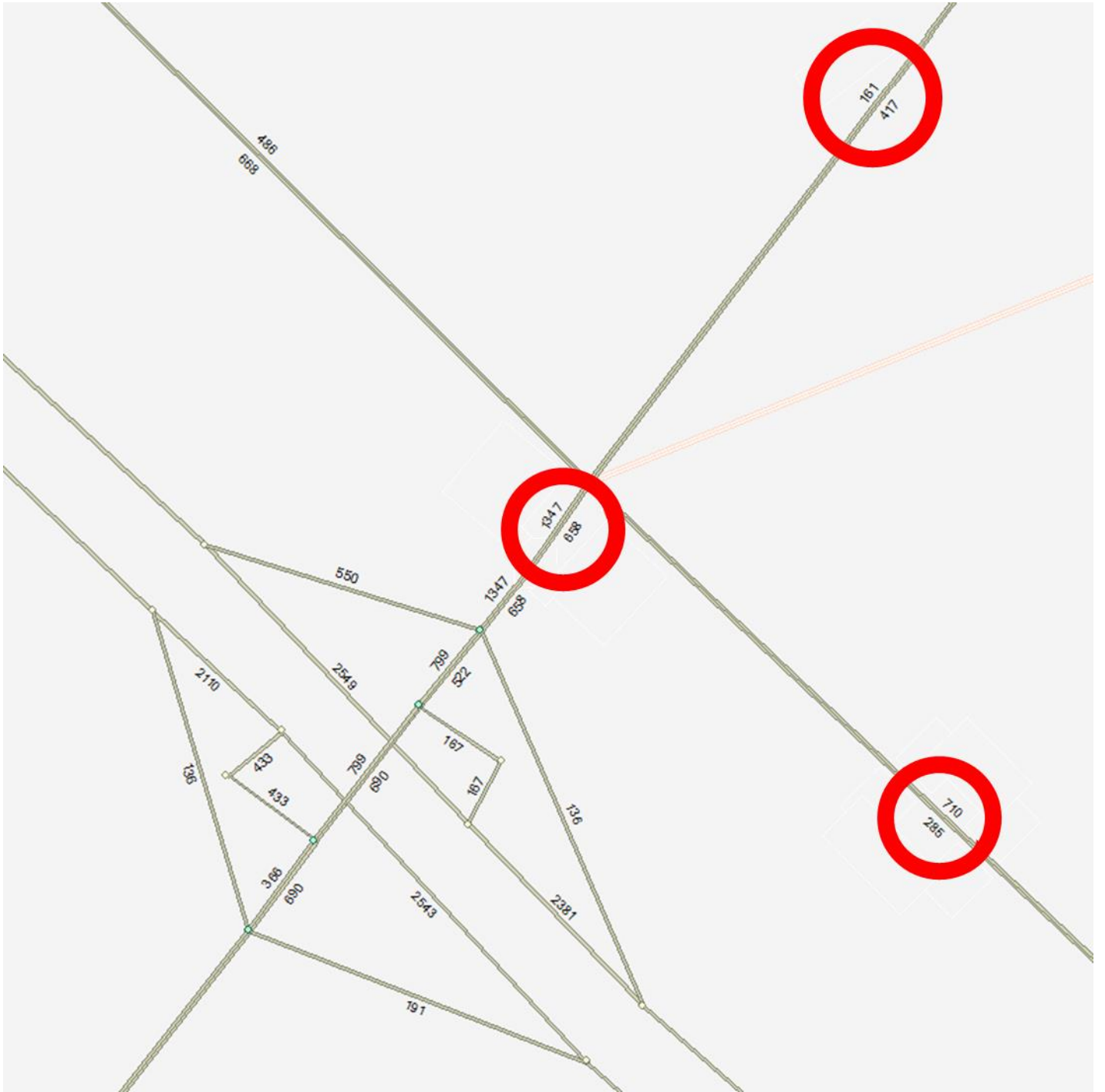


Lanes, Volumes, Timings
12: Hazelridge Rd

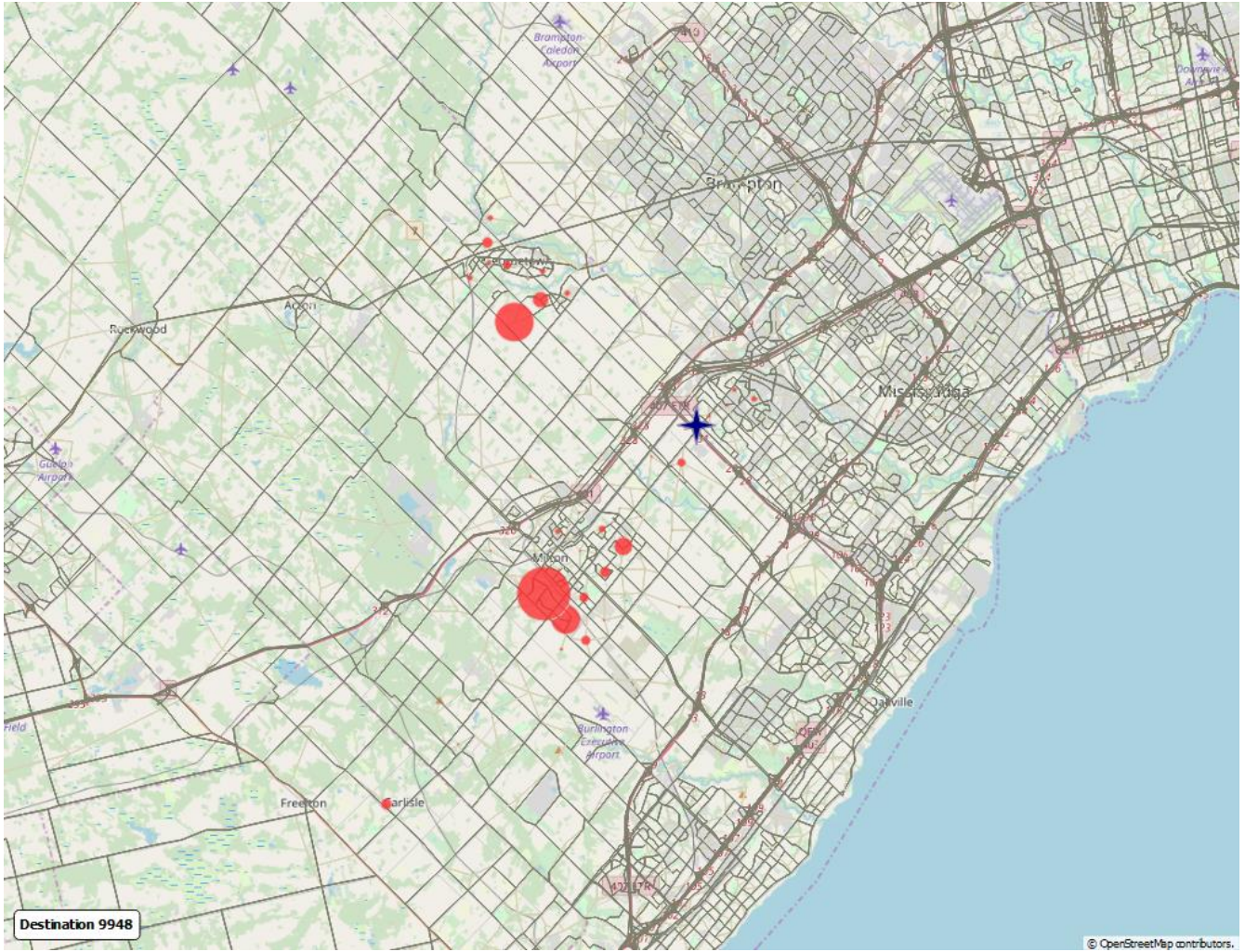
PM Peak Period
09-18-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	31	17	987	53	36	1105
Future Volume (vph)	31	17	987	53	36	1105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	40.0	
Storage Lanes	1	0		1	1	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frt	0.953			0.850		
Flt Protected	0.968				0.950	
Satd. Flow (prot)	1772	0	3579	1633	1825	3579
Flt Permitted	0.968				0.950	
Satd. Flow (perm)	1772	0	3579	1633	1825	3579
Link Speed (k/h)	48		48			70
Link Distance (m)	201.9		100.1			275.3
Travel Time (s)	15.1		7.5			14.2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	0%	2%
Adj. Flow (vph)	34	18	1073	58	39	1201
Shared Lane Traffic (%)						
Lane Group Flow (vph)	52	0	1073	58	39	1201
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
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		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.5%			ICU Level of Service A		
Analysis Period (min)	15					

Appendix E-: EMME Output









Final Report

Mississauga Station Traffic Impact Study

Highway 407 Transitway-4



Prepared for Ministry of Transportation, Ontario
by IBI Group
November 15, 2019

Document Control Page

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1 Introduction

This report is a traffic impact study for the proposed 407 Transitway Station located near the interchange of Highway 407 and Mississauga Road in the City of Brampton, Ontario. This report was prepared as part of the Environmental Assessment of the 407 Transitway, Brant Street to West of Hurontario Street.

The purpose of this report is to provide an assessment of traffic, transit, walking and cycling access to the proposed station. The assessment includes operations analysis and review of local road network configuration to identify needs and opportunities for transportation-related changes and coordination to accommodate the station

1.1 Transitway Overview

The Highway 407 Transitway is a rapid transit facility planned within the Greater Toronto and Hamilton Area (GTHA). The Transitway will be fully grade-separated with an exclusive right-of-way and will run parallel along the Highway 407 corridor. This Transitway project supports the Province's Growth Plan by meeting increased travel demands through alternative transportation modes, providing increased mobility for a wide variety of users, and supporting transit-oriented development and associated land uses. The Transitway is initially designed to support busway service (BRT) with provisions for future conversion to light-rail transit (LRT) technology.

The section under the current EA spans approximately 43 kilometres from Brant Street in Burlington to west of Hurontario Street (west of proposed Hurontario Station) in Mississauga. This section of the Transitway provides opportunities to connect numerous Urban Growth Centres (e.g. Hamilton, Oakville, Milton and Mississauga City Centres) as well as to a number of higher order transit systems, supporting development within both the Region of Halton and Peel.

1.2 Study Area

The proposed station is located west of Mississauga Road just north of the Highway 407 and Mississauga Road interchange as shown in Exhibit 1-1. The location was developed through consultation with the City of Brampton and accommodates the Transitway alignment north of the Highway 407. The study area includes the following intersections:

- Mississauga Road & Steeles Avenue West (*signalized*);
- Mississauga Road & Edgeware Road (*signalized*);
- Mississauga Road & Hereford Street / Hallstone Road (*signalized*);
- Mississauga Road & Highway 407 WB Off-Ramp (*signalized*);
- Mississauga Road & Highway 407 EB Off-Ramp (*signalized*); and
- Mississauga Road & Meadowvale Boulevard (*signalized*).

From aerial view, it has been identified that there is deficient parking supply for the nearby office complex that may lead to added parking demand at the Transitway station. On-street parking will need to be relocated upon the opening of the station.

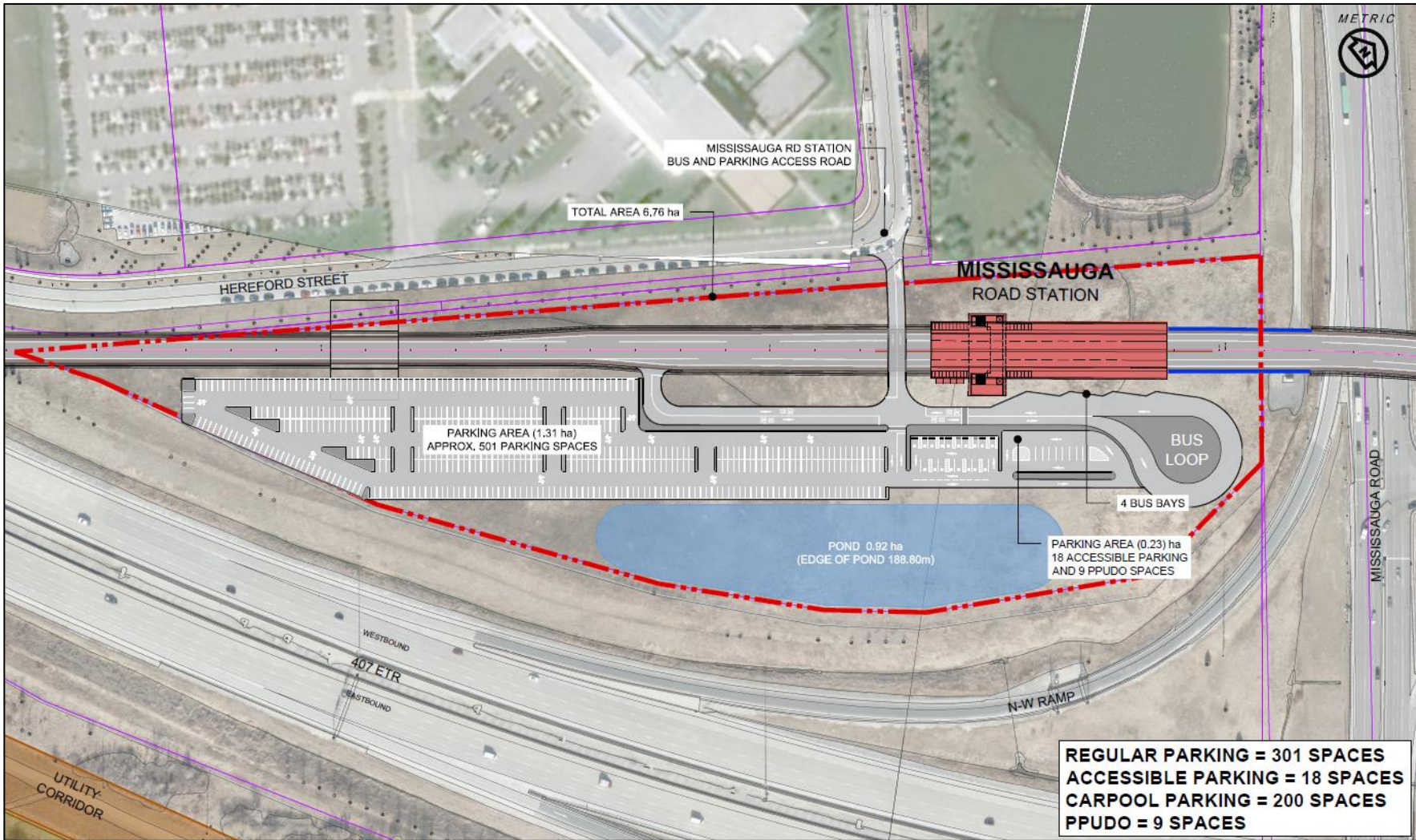
1.3 Station Plan

The proposed station layout is provided in Exhibit 1-2. The site plan illustrates that the station connects directly to the bend at Hereford Street, a municipal road off Mississauga Road. Further commentary on station layout and internal circulation is provided in Section 4 of this report.

Exhibit 1-1: Study Area



Exhibit 1-2: Proposed Station Layout



2 Existing Conditions

This section documents the existing road network, facilities, and weekday peak hour operations at the studied intersections.

2.1 Road Network

Mississauga Road is a major north-south regional arterial road within the Region of Peel. It becomes a regional road from the intersection of Turner Valley Road & Erin Mills Parkway and ends in the Town of Caledon. Within the study area, Mississauga Road has six lanes and a posted speed limit of 60 km/h.

Highway 407 is a tolled 400-series highway with an eight lane cross section. It connects the City of Burlington to the City of Pickering. 400-series highways have a speed limit of 100 km/h. A full interchange is located at Highway 407 and Mississauga Road.

Steeles Avenue West is an east-west arterial road that connects the Town of Milton to Scarborough, Toronto. Within the study area, it is under the jurisdiction of Region of Peel, has four lanes and a posted speed limit of 80 km/h.

Edgeware Road is an east-west four lane collector road within the City of Brampton with a speed limit of 50 km/h. The road provides access to industrial properties and office buildings.

Hereford Street is a collector road within the City of Brampton. Within the study area, Hereford Street has four lanes and a speed limit of 50 km/h. The street provides access to industrial properties and office buildings. Hereford Street continues as Hallstone Road east of Mississauga Road.

Hallstone Road is a two lane east-west collector road within the City of Brampton. The road provides access to residential properties and a golf course. Hallstone Road has a speed limit of 50 km/h.

Meadowvale Boulevard is a four lane east-west collector road within the City of Mississauga. The road primarily provides access to industrial and office buildings. A sports park is located on Meadowvale Boulevard west of Mississauga Road, and residential properties and a school to the east. Meadowvale Boulevard has a posted speed limit of 60 km/h.

2.2 Transit Network

Brampton Transit (BT) operates routes within the study area. The following services are currently in operation:

- **BT Route 51 (Hereford)** originates from Brampton Gateway Terminal and operates northbound on Mississauga Road only between Derry Road and Hereford Street with 20 minute headways during peak hours.
- **BT Route 58 (Financial)** operates southbound on Mississauga Road only between Edgeware Road and Derry Road West. This route operates on weekday peak hours only with 40 minute headways.
- **BT Route 60 (Mississauga Road)** originates from Mount Pleasant GO and operates along Mississauga Road with approximately 30 minute headways during peak hours.

Exhibit 2-1 illustrates the BT routes within the study area.

Exhibit 2-1: BT Routes within Study Area



Source: BT System Map (2019)

2.3 Active Transportation

The only active transportation facilities that exist are sidewalks that run the length of Hereford Street. The area is zoned as industrial and commercial, therefore the limited facilities are appropriate.

2.4 Traffic Conditions

2.4.1 Traffic Counts & Signal Timing Data

Traffic count data and signal timing information was collected from Region of Peel, Ministry of Transportation of Ontario and 407 ETR. All turning movement counts modelled for the purposes of this study were conducted recently (within the past five years) and so should reflect current traffic patterns within the study area. Exhibit 2-2 provides a summary of dates on which this information was collected/recorded.

Exhibit 2-2: Traffic Count and Signal Timing Data

INTERSECTION	CONTROL TYPE	DATE OF TMC	DATE OF SIGNAL DATA
Mississauga Road & Steeles Avenue West	Signalized	2016-10-06	2018-11-21
Mississauga Road & Edgeware Road	Signalized	2017-05-31	2016-12-06
Mississauga Road & Hereford Street / Hallstone Road	Signalized	2017-04-19	2016-12-06
Mississauga Road & Highway 407 WB Off-Ramp	Signalized	2018-11-29	2016-12-06
Mississauga Road & Highway 407 EB Off-Ramp	Signalized	2018-11-29	2016-12-06
Mississauga Road & Meadowvale Boulevard	Signalized	2018-04-11	2018-10-12
Mississauga Road & Derry Road West	Signalized	2018-02-27	2018-10-12

2.4.2 Analysis Approach

Traffic analysis was conducted using Synchro (version 9) software and follows Highway Capacity Manual (HCM 2000) methodologies of intersection operation analysis. Critical movements were defined as follows.

For signalized intersections,

- V/C ratios for overall intersection operations, through movements or shared through/turning movements equal 0.80 or above;
- V/C ratios for exclusive movements equal 0.85 or above; or,
- Queues for an individual movement are projected to exceed available turning lane storage.

For unsignalized intersections,

- Level-of-service, based on average delay per vehicle or on individual movements is “LOS D” or greater; or
- The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

Level-of-service (LOS) is a measure of performance based on control delay, defined as follows in Exhibit 2-3.

Exhibit 2-3: Intersection LOS Reference

LEVEL OF SERVICE (LOS)	CONTROL DELAY PER VEHICLE (SEC)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The Synchro traffic models were calibrated to better represent measured field conditions. This was accomplished by adjusting the lane utilization factor and via lost time adjustment. The “lane utilization factor” (LUF) was altered when calibrating through movements. This parameter is used to dictate the distribution of traffic across the available lanes, with a value of 1.0 representing a uniform distribution across all lanes. During non-congested periods, there is often more traffic distributed amongst the right-most lanes as compared to the left-most lanes. However, in over-saturated conditions, the distribution of traffic is typically more evenly split, as drivers quickly fill any available gap in traffic.

In existing models, the LUF was adjusted to a value of 1.0 for all through movements initially identified as having a v/c greater than 1.0. These adjustments were then carried forward to their respective movements to the future models (for the same peak period). Additionally, because the above-mentioned driver behaviour is quite predictable, this adjustment was also made to any new critical through movements (having a v/c ratio > 1.0) identified in the future models.

The “lost time adjustment” (LTA) was also altered in order to calibrate left-turn movements. Adjusting this parameter to negative value effectively increases the clearance time available for left-turning traffic to clear the intersection during the amber and/or all-red signal phases.

During oversaturated conditions where left-turn queues are excessively long and/or there are limited gap available in the opposing traffic to make the left-turn (under permissive phasing), drivers are typically more aggressive and willing to turn during the amber/all-red phases.

In existing models, the LTA was changed for all left-turn movements identified as being well over capacity – defined as having a v/c greater than 1.2 – since these turning volumes were explicitly measured in the field. Values were assigned based on the initial v/c ratio for that movement:

- If the v/c ratio was between 1.2 and 1.5, the LTA was set to ‘-1’; and,
- If the v/c ratio exceeded 1.5, the LTA was set to ‘-2’.

Subsequently, all adjustments made to the LTA in the existing models were carried forward to the respective movements in the future models (for the same peak periods). However, because this driving behaviour is believed to be less predictable, no additional LTA changes were made to “new critical left-turn movements (having a v/c ratio > 1.2) identified in the future model, which did not exist previously in the existing models.

2.4.3 Synchro Model Calibration

The existing traffic models were calibrated to better reflect measured field conditions accomplished by adjusting the lane utilization factor (LUF) and/or lost time adjustment (LTA) for certain movements.

The adjustments made to existing models are outlined in Exhibit 2-4.

Exhibit 2-4: Existing Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Mississauga Road & Steeles Avenue	EBL	LTA	-2.0 seconds
		EBT	LUF	1.0
		WBL	LTA	-2.0 seconds
	Mississauga Road & Hereford Street / Hallstone Road	SBT	LUF	1.0
PM Peak	Mississauga Road & Steeles Avenue	EBL	LTA	-2.0 seconds
		WBL	LTA	-1.0 seconds
		NBT	LUF	1.0
	Mississauga Road & Hereford Street / Hallstone Road	NBT	LUF	1.0
	Mississauga Road & Hwy 407 WB Off-Ramp	WBR	LTA	-2.0 seconds

2.5 Traffic Operations

Analysis was conducted for weekday a.m. and p.m. peak hours for the existing conditions. An annual compound growth rate of 1.0% was applied to all count volumes obtained in years prior to 2019 in order to bring all counts to a consistent base year. Existing conditions traffic volumes are shown in Exhibit 2-5.

A summary of the Synchro analysis including delay, v/c, 95th percentile queue lengths and LOS indicators are shown in Exhibit 2-6, with detailed Synchro reports provided in Appendix A.

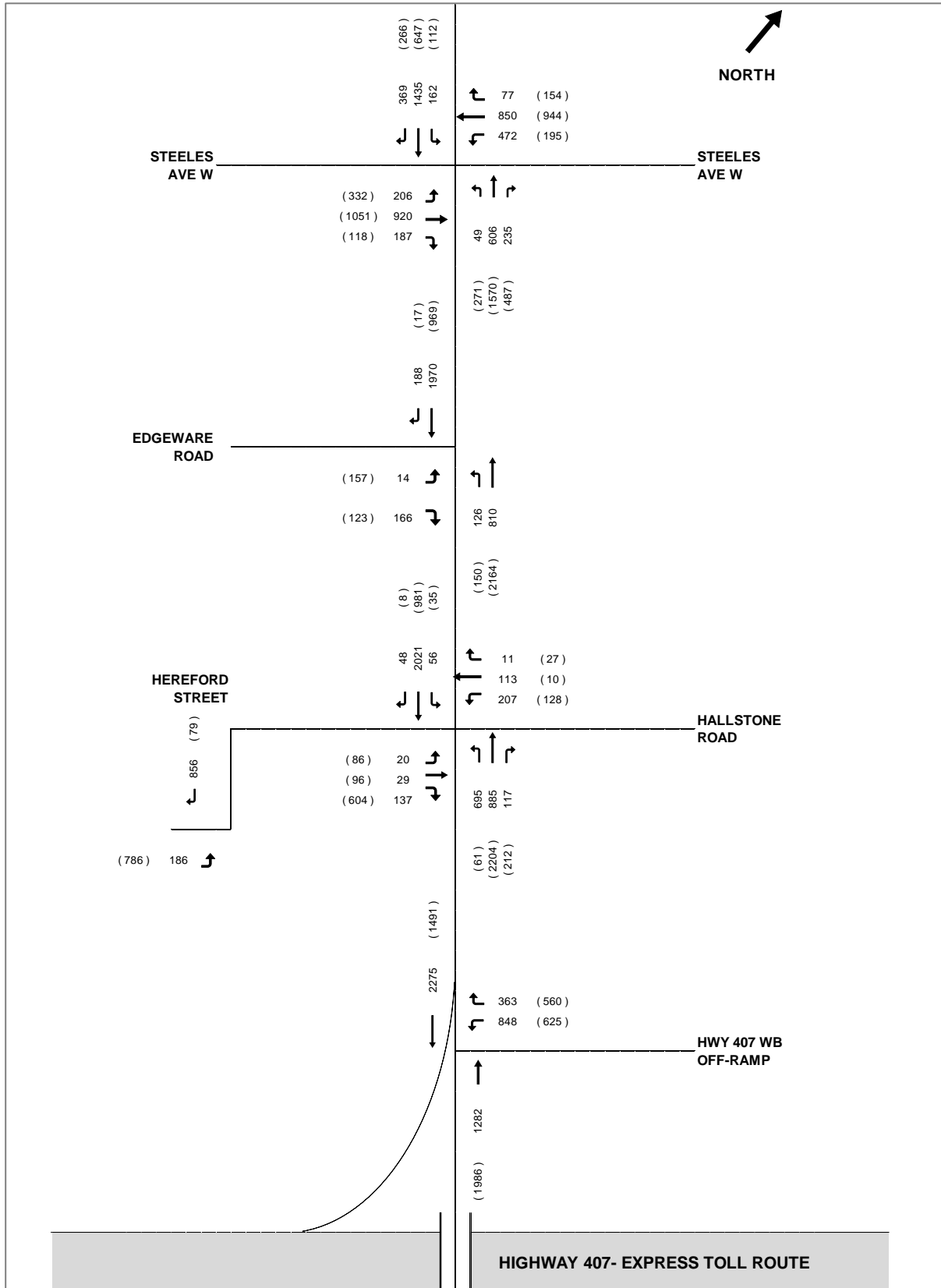
The study intersections are currently operating as follows:

- Mississauga Road & Steeles Avenue W is expected to operate with severe congestion at LOS F in the a.m. peak hour and LOS E in the p.m. peak hour. In the a.m. peak, the protected EBL and WBL movements are operating overcapacity with

$v/c = 1.53$ and 1.39 respectively. This is due to green time prioritized for the high through demands, particularly for the EBT, WBT, and SBT movements. In the p.m. peak hour, left-turn movements EBL, WBL, and NBL are operating overcapacity with $v/c = 1.50$, 1.36 , and 1.03 respectively.

- Mississauga Road & Edgeware Road is expected to operate well at LOS B during both peak hours. There are no movements that are overcapacity. Movements EBL, EBR, and NBL are expected to operate at LOS E in the a.m. peak hour due to green time for the mainline volume (N-S through volume).
- Mississauga Road & Hereford Street / Hallstone Road is expected to operate satisfactorily at LOS D during both peak hours. In the a.m. peak hour, SBT is expected reach capacity with $v/c = 1.02$, due to its high peak demands. In the p.m. peak hour, movements EBR and NBT are expected to be at capacity with $v/c = 0.99$ and 1.08 , respectively, also due to their high peak demands.
- Mississauga Road & Highway 407 WB Off-Ramp is expected to operate at LOS C in the a.m. peak hour but at LOS F in the p.m. peak hour. In the morning peak, the WBL movement is operating at capacity with $v/c = 0.99$ due to insufficient green time. In the p.m. peak, both movements WBL and WBR are expected to deteriorate significantly with increased demands for all approaches.
- Mississauga Road & Highway 407 EB Off-Ramp is expected to operate well at LOS B in the a.m. peak hour and LOS A in the p.m. peak hour. During the a.m. peak hour, the EBR is expected to operate with some delay.
- Mississauga Road & Meadowvale Boulevard is operating well, all movements are performing with sufficient reserve capacity, indicating the intersection is well served.

Exhibit 2-5: Existing Traffic Volumes in the AM (PM) Peak Hour



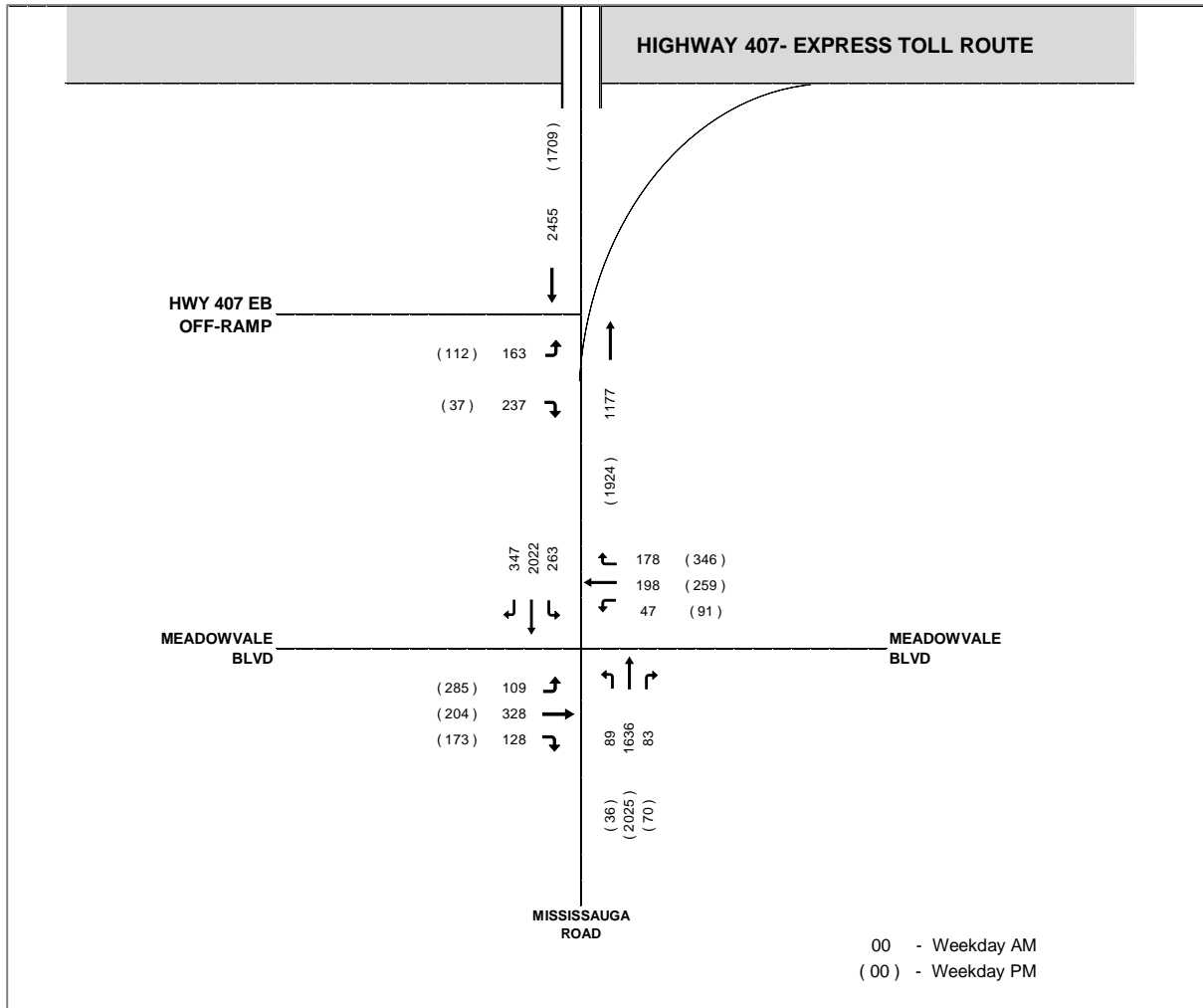


Exhibit 2-6: Synchro Analysis: Existing Conditions for AM (PM) Peak Hour

INTERSECTION	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmnt	LOS	V/C	95% Queue		Mvmnt	LOS	V/C	95% Queue
Mississauga Road & Steeles Avenue West <i>(signalized)</i>	F	EBL	F	1.53	158	E	EBL	F	1.50	222
		EBT	E	0.96	195		EBT	E	0.91	213
		EBR	D	0.24	38		WBL	F	1.36	142
		WBL	F	1.39	292		WBT	E	0.88	191
		WBT	D	0.69	151		WBR	D	0.10	16
		NBL	D	0.50	19		NBL	F	1.03	126
		NBT	D	0.50	82		NBT	E	0.96	218
		NBR	D	0.20	29		NBR	E	0.76	162
		SBL	D	0.55	54		SBL	D	0.63	43
		SBT	E	0.94	213		SBT	D	0.42	76
Mississauga Road & Edgeware Road <i>(signalized)</i>	B	EBL	E	0.13	11	B	EBL	D	0.67	54
		EBR	E	0.46	36		EBR	D	0.10	16
		NBL	E	0.61	44					
Mississauga Road & Hereford Street/Hallstone Road <i>(signalized)</i>	D	EBL	E	0.15	12	D	EBR	E	0.99	158
		EBT	E	0.12	10		NBL	D	0.31	8
		EBR	E	0.10	21		NBT	E	1.08	158
		WBL	E	0.84	81					
		WBT	E	0.46	52					
		WBR	D	0.01	-					
		NBL	D	0.78	134					
		SBT	D	1.02	229					
Mississauga Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	C	WBL	E	0.99	176	F	WBL	F	1.13	113
		WBR	E	0.82	143		WBR	F	1.98	249
Mississauga Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	B	EBL	D	0.28	31	A	EBL	D	0.39	20
		EBR	E	0.83	96		EBR	D	0.15	13
Mississauga Road & Meadowvale Boulevard <i>(signalized)</i>	C	EBL	E	0.63	50	D	EBL	D	0.78	93
		EBT	E	0.62	70		EBT	D	0.20	33
		EBR	E	0.10	19		EBR	D	0.16	22
		WBL	E	0.56	30		WBL	E	0.49	44
		WBT	E	0.61	47		WBT	E	0.46	53
		WBR	E	0.12	23		WBR	E	0.82	98
		NBL	E	0.45	18		NBL	D	0.31	7
		SBL	E	0.71	60		NBT	E	0.87	292
							SBL	E	0.50	28

4 Future Conditions

This section documents the future traffic conditions with considerations to background traffic growth and traffic expected to be generated from the Transitway station.

4.1 Future Roadway Network

The future horizon year of 2031 has a couple of confirmed changes in the road network within the study area according to the *Peel Region Budget Document (2019)*. Steeles Avenue is planned to be widened from four to six lanes from Chinguacousy Road to Mississauga Road in year 2021 and from Mississauga Road to Winston Churchill Boulevard in year 2023. As per the Peel Region budget document and *Steeles Avenue from Chinguacousy / Mavis Road to Winston Churchill Boulevard Environmental Study Report (2014)* completed by AMEC, the study corridor is planned to undergo the following geometric changes (in addition to the six travel lanes) and are assumed for the current study: Mississauga Road & Steeles Avenue dual WBL lanes, dual SBL lanes, and dual NBL lanes.

4.2 Transit

The Region of Peel has selected the Highway 407 & Mississauga Road interchange as a location for a potential Major Transit Station Area (MTSA) in their study titled *Shaping Growth in Peel*. The surrounding area around the station in an 800 metre radius is planned to undergo intensification to develop high density, multi-purpose, transit supported neighbourhoods. The Transitway station would be the focal point of the MTSA.

4.3 Active Transportation

In their *Sustainable Transportation Strategy*, the Region of Peel has identified Mississauga Road south of Highway 407 as a future pedestrian corridor. Additional improvements to the Highway 407 Interchange at Mississauga Road are planned to further accommodate active transportation modes along the planned corridor. The City of Brampton has also outlined a proposed off road trail along the south side of the Highway 407 connecting to the proposed pedestrian corridor on Mississauga Road. The station layout should be review to accommodate connections to the future active transportation network.

4.4 Station Traffic

4.4.1 Station Trip Generation

In consultation with Ministry of Transportation, Ontario, it was determined that the adjacent Transitway station (i.e. Winston Churchill Station) will no longer be carried forward. Therefore, to offset its park-and-ride demand, a build out case was considered for the Mississauga Station. As shown in the latest station layout (refer to Exhibit 1-2), the maximum parking supply is 606 spaces. The build out case was used in estimating trips generated to and from the station.

Trip generation rates were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual – 10th edition. Specifically, Land Use Code 90 (Park-and-ride with bus service) was considered the best fit for the station as it would include both passenger and transit vehicles. The trip generation average rate for a.m. and p.m. peak hours are summarized in Exhibit 4-1. Applying the parking supply to the rates,

Exhibit 4-2 lists the estimated station traffic generated given the full build out condition of the station.

Exhibit 4-1: ITE Trip Generation Rates for Park-and-Ride Lots

LAND USE (CODE)	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		Trip Rate	Inbound / Outbound	Trip Rate	Inbound / Outbound
Park-and-ride with bus service (090)	/ parking space	0.71	79% / 21%	0.62	25% / 75%

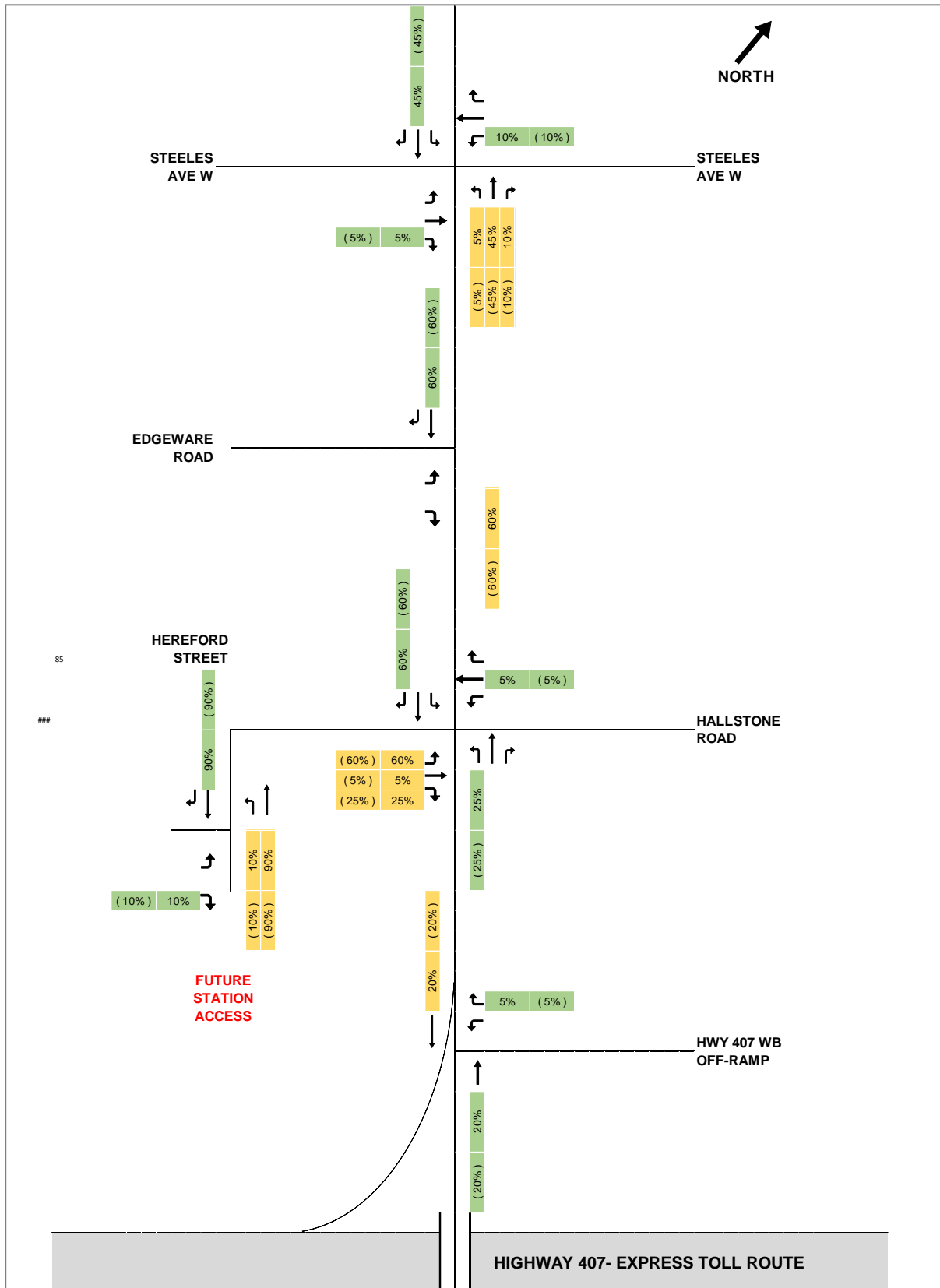
Exhibit 4-2: Estimated Vehicle Trips Generated by Station

AM PEAK TRIPS		PM PEAK TRIPS	
Inbound	Outbound	Inbound	Outbound
340	91	94	282

4.4.2 Trip Distribution

A map showing the origin of park-and-ride trips destined to Mississauga station was extracted from the 2031 GGHM and can found attached in Appendix E. Using this map, inbound trips were tabulated in terms of general direction of origin (i.e. north, south, east, and west) and assigned to the study area intersections as a percentage of total inbound trips. Distribution of outbound trips was assumed to be the same as inbound trips. Resulting trip assignments are illustrated in Exhibit 4-9. Site generated traffic was assigned to study area intersections and is indicated in Exhibit 4-10.

Exhibit 4-3: Trip Distribution in AM and PM Peak Hours



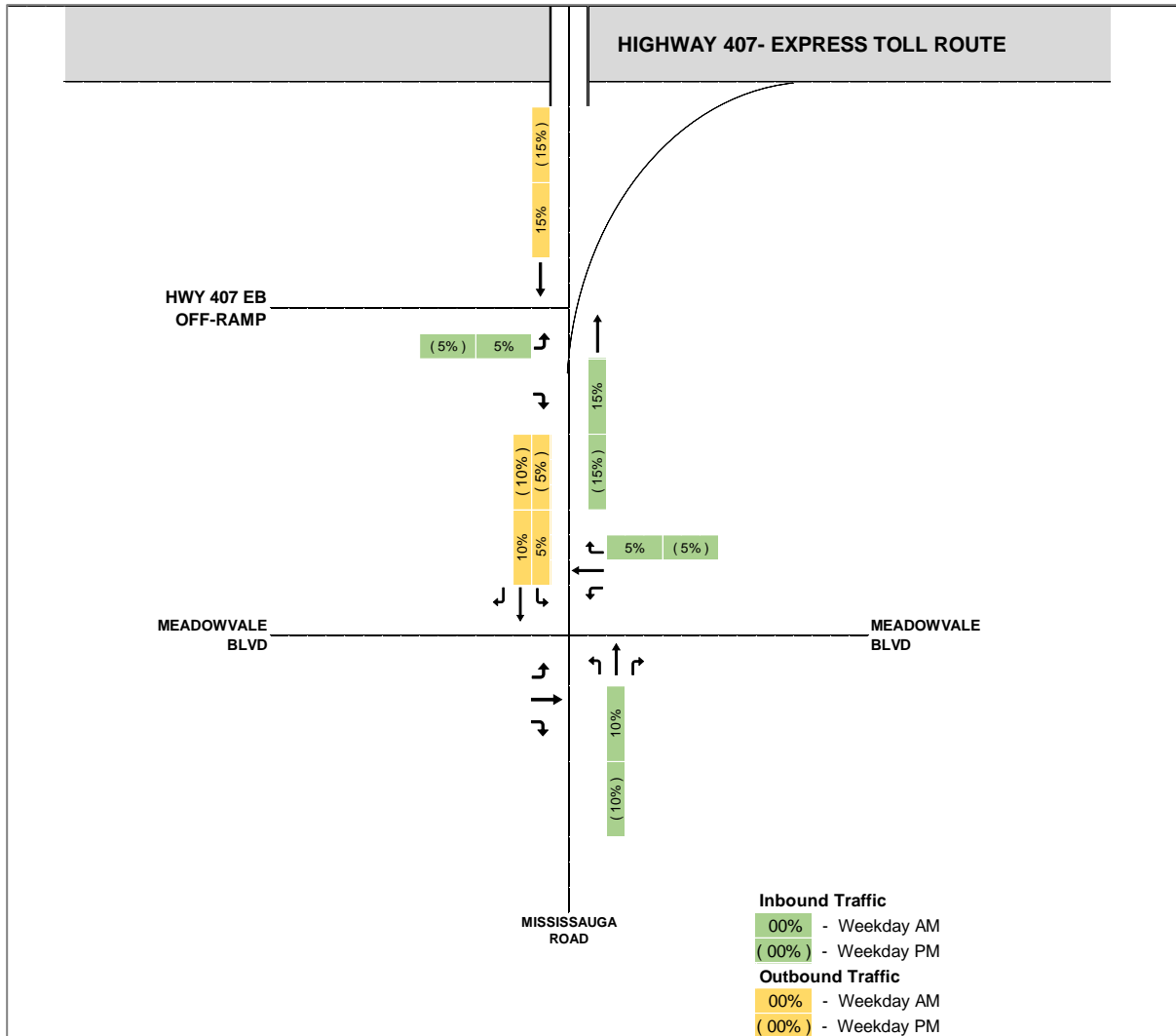
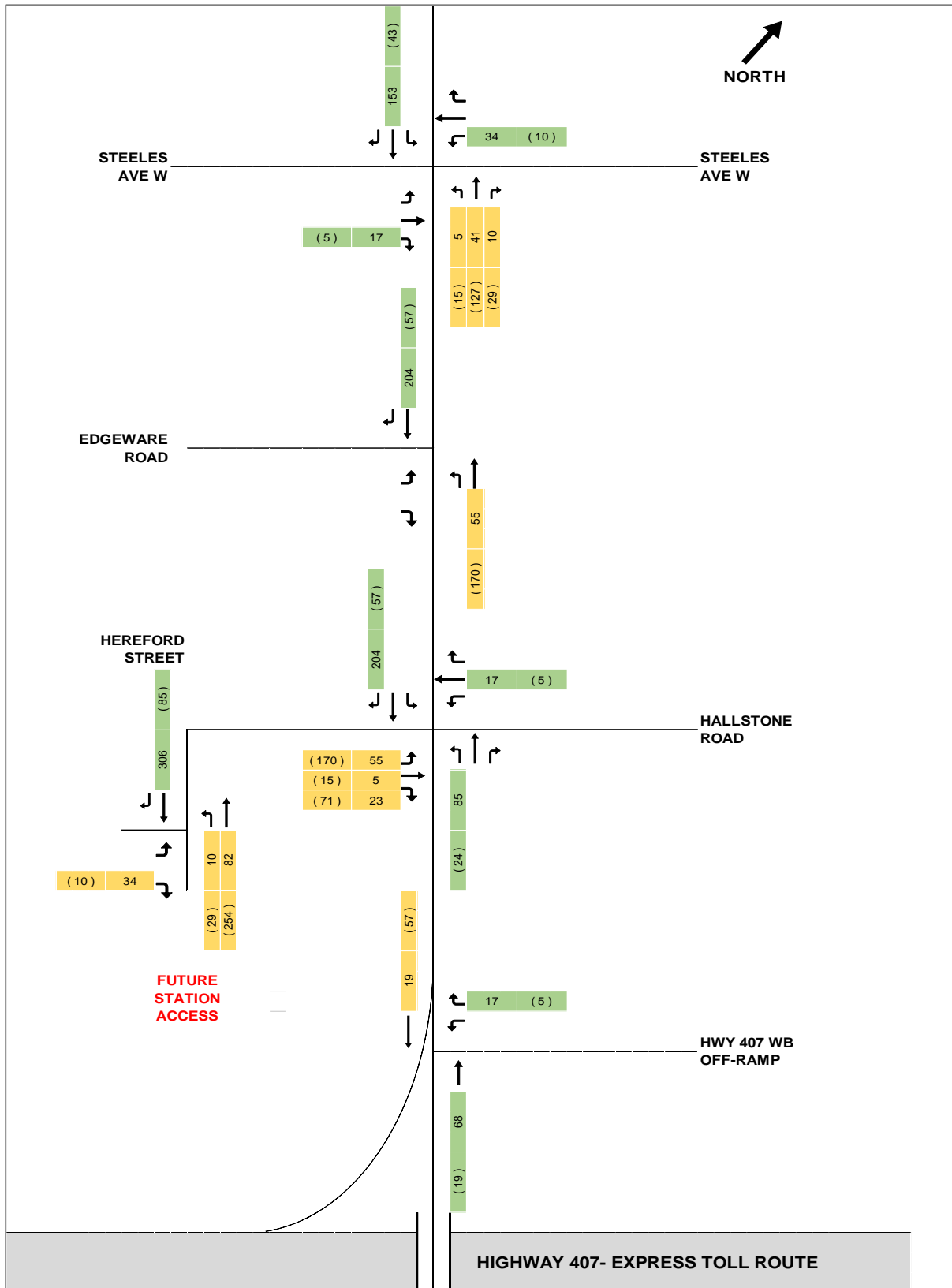
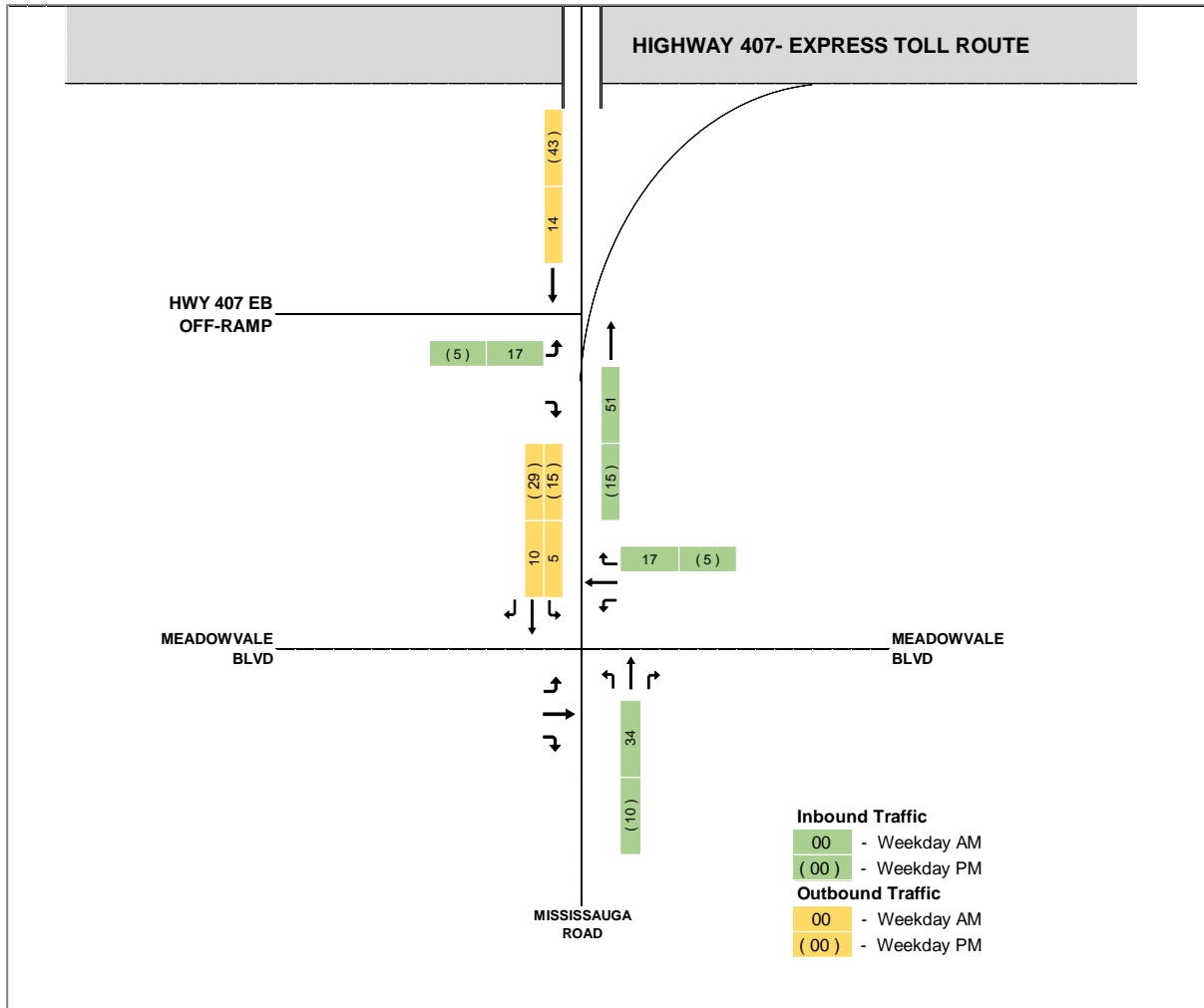


Exhibit 4-4: Site Generated Traffic in AM Peak Hour and PM Peak Hour





4.5 Background Traffic Growth

Future background traffic volumes were estimated for the study area using GGHM (discussed in Section 4.4) demand model supplemented with manual refinements considering local conditions. Macro models can be limited with respect to specific hourly forecasts, and the 2011 base-year model is also aging, therefore refinements included review of municipal transportation master plans (TMPs), land-use, background population and employment growth, and adjustments for local developments or changes to the road network.

The GGHM demand model growth from 2011 base to 2031 has peak direction link flow of 1280 vph to 1946 vph or 2.1% annual compound growth rate along Mississauga Road. Model output figures are provided in Appendix E.

The City of Mississauga and Region of Peel population and employment forecasts were considered in the development of traffic growth rates. Relevant documents are listed as follows:

- Greater Toronto and Hamilton Area – “Growth Plan for the Greater Golden Horseshoe” (2017);
- City of Mississauga – “Mississauga Official Plan” (2016); “Population, Demographics & Housing” (2013); and “Moving Mississauga” (2011); and,
- Region of Peel – “Long Range Transportation Plan” (2012).

Review of the above documents showed that population growth is estimated to be 0.5% to 0.6% per year between 2011 and 2031, while trip ends from the demand model are forecasted to increase by 0.9% to 1.0% per year during that same period time.

In the vicinity of the station, local developments are limited to offices north of the station and industrial zoning to the west. No major commercial or retail centres are planned. Therefore, the above growth rates appear suitable and no major developments need be added.

In summary, based on the information presented, it was concluded that a conservative annual compound growth of 1% will be applied to Mississauga Road. This rate was applied to all ‘major’ movements, which is defined as all through movements along arterial roads or turning movements between two arterial roads.

4.6 Future Model Calibration

The future Synchro models were calibrated to better reflect expected conditions accomplished by adjusting either the Lane Utilization Factor (LUF) or Lost Time Adjustments (LTA) for certain movements.

Adjustments made to the future traffic models are summarized in Exhibit 4-5.

Exhibit 4-5: Future Model Calibration Adjustments

Peak Period	Intersection	Movement	Adjusted Parameter	Adjusted Value
AM Peak	Mississauga Road & Hereford Street/Hallstone Road	SBT	LUF	1.0
PM Peak	Mississauga Road & Steeles Avenue	NBT	LUF	1.0
	Mississauga Road & Hereford Street/Hallstone Road	NBT	LUF	1.0
	Mississauga Road & Hwy 407 WB Off-Ramp	WBL	LTA	-1.0
		WBR	LTA	-2.0

4.7 Future Background Operations

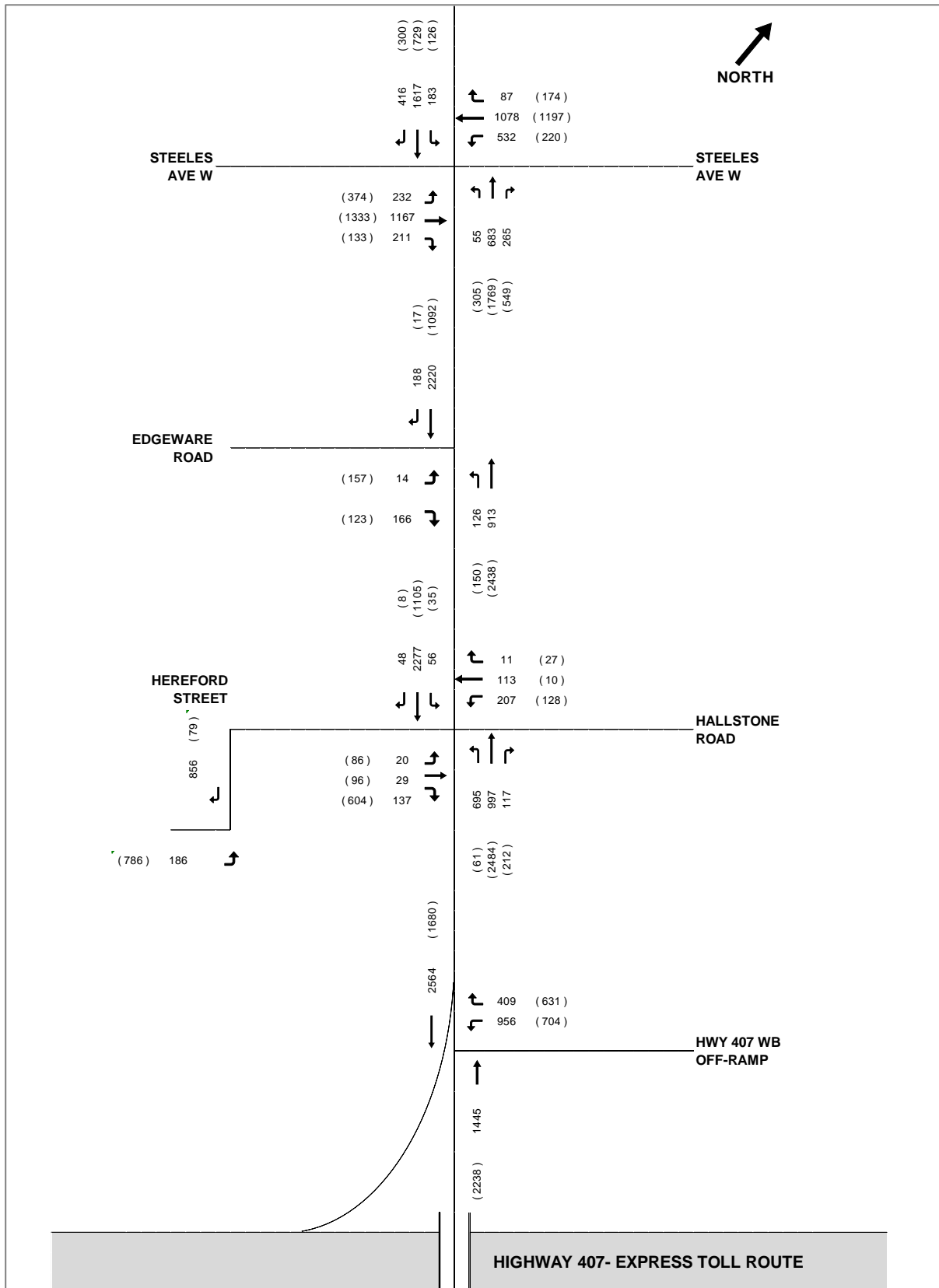
To analyze future background conditions, the existing traffic volumes were grown using the growth rates discussed in Section 3.5. Future background conditions include planned improvements discussed in Section 3.1. Exhibit 4-6 illustrates future background traffic volumes during the a.m. and p.m. peak hours.

A summary of critical movements identified during the future background condition analysis is provided in Exhibit 4-7, with detailed output of the Synchro analysis provided in Appendix B.

With the background growth added, the study intersections are expected to operate as follows:

- Steeles Avenue is expected to be widened from 4 lanes to 6 lanes. Additional improvements are planned for the intersection of Mississauga Road and Steeles Avenue which were incorporated into the Synchro Model. Under these improvements the intersection is expected to improve to LOS E in the a.m. peak period. The p.m. peak period LOS remains at E. There are high demands on all approaches which compete for available green time, but all movements are expected to operate at or below capacity during the two peak periods.
- Mississauga Road and Edgeware Road is expected to continue operating well at LOS B for both a.m. and p.m. peak hours.
- Mississauga Road and Hereford Street / Hallstone Road is expected to continue performing well in the a.m. peak hour. The WBL movement is operating at capacity due to the high N-S through demand. In the p.m. peak the performance is expected to deteriorate to LOS E, the EBL is expected to be operating at overcapacity ($v/c = 1.20$), while the NBT is expected to be operating at capacity ($v/c = 1.09$) again because of the high N-S through movement.
- The Highway 407 WB Off-Ramp is expected to operate at LOS D, deteriorating slightly during the a.m. peak with the SBT and WBL nearing capacity (v/c of 0.95 and 0.96). However the p.m. peak is expected to improve from LOS F to D, with the WBR and NBT movements operating at capacity ($v/c = 1.09$ & 1.01).
- The Highway 407 EB Off-Ramp is expected to continue operating well.
- Mississauga Road and Meadowvale Boulevard is expected to remain LOS C during the morning peak period. In the p.m. peak period, the intersection LOS is expected to remain at LOS D with all movements expected to operate at acceptable levels of service ($v/c < 1$).

Exhibit 4-6: Future Background Traffic Volumes for the AM (PM) Peak Hour



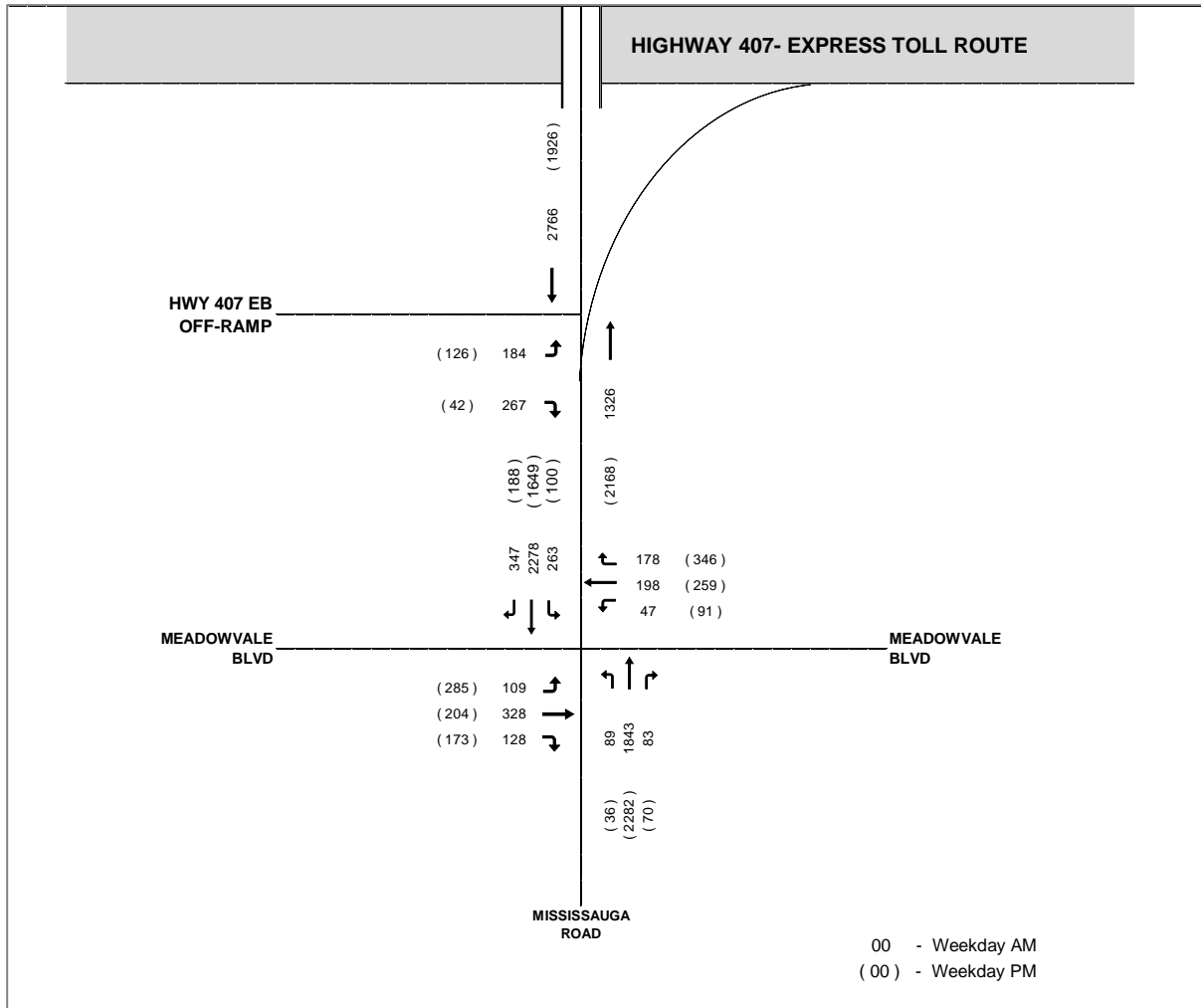


Exhibit 4-7: Synchro Analysis: Future Background Conditions for AM (PM) Peak Hour

Intersection	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmt	LOS	V/C Ratio	95% Queue (m)		Mvmt	LOS	V/C Ratio	95% Queue (m)
Mississauga Road & Steeles Avenue West (<i>signalized</i>)	E	EBL	F	0.91	128	E	EBL	F	1.03	205
		EBT	E	0.83	144		EBT	D	0.77	167
		EBR	D	0.36	59		WBL	E	0.69	53
		WBL	F	0.91	125		WBT	E	0.95	179
		WBT	E	0.85	150		WBR	D	0.20	34
		WBR	D	0.07	12		NBL	F	0.87	78
		NBL	F	0.69	22		NBT	F	1.02	241
		NBT	D	0.48	85		NBR	E	0.86	195
		NBR	D	0.22	30		SBL	F	0.95	45
		SBL	E	0.69	46		SBT	D	0.62	98
		SBT	E	0.93	218		SBR	D	0.22	26
SBR	D	0.49	79							
Mississauga Road & Edgeware Road (<i>signalized</i>)	B	EBL	E	0.15	11	B	EBL	D	0.68	55
		EBR	E	0.27	28		EBR	D	0.10	16
		NBL	E	0.70	49					
Mississauga Road & Hereford Street/Hallstone Road (<i>signalized</i>)	D	EBL	E	0.18	13	E	EBR	F	1.20	197
		EBT	E	0.14	10		NBL	D	0.32	13
		EBR	E	0.10	22		NBT	E	1.09	223
		WBL	F	1.04	111					
		WBT	E	0.56	60					
		WBR	D	0.01	-					
		NBL	E	0.95	144					
SBT	C	0.95	124							
Mississauga Road & Highway 407 WB Off-Ramp (<i>signalized</i>)	D	WBL	E	0.95	186	D	WBR	F	1.09	219
		WBR	E	0.84	164		NBT	D	1.01	212
		SBT	D	0.96	286					
Mississauga Road & Highway 407 EB Off-Ramp (<i>signalized</i>)	C	EBL	D	0.29	35	A	EBL	D	0.42	22
		EBR	E	0.88	118		EBR	D	0.17	14
		SBT	B	0.86	251					
Mississauga Road & Meadowvale Boulevard (<i>signalized</i>)	C	EBL	E	0.63	50	D	EBL	D	0.78	93
		EBT	E	0.62	70		EBT	D	0.20	33
		EBR	E	0.10	19		EBR	D	0.17	22
		WBL	E	0.56	30		WBL	E	0.49	44
		WBT	E	0.61	47		WBT	E	0.46	53
		WBR	E	0.12	23		WBR	E	0.82	98
		NBL	E	0.45	25		NBL	E	0.31	7
		SBL	E	0.71	60		NBT	E	0.98	369
					SBL	E	0.50	28		

4.8 Future Total Operations

Future total volumes were calculated adding the station-generated traffic to the future volumes with background growth applied. The future scenarios accounts for all vehicular traffic that is estimated to year 2031 following implementation of the Transitway.

Future total volumes which includes background growth and station-generated traffic are illustrated in Exhibit 4-9.

A summary of critical movements identified during the future total condition analysis is provided in Exhibit 4-10, with detailed output of the Synchro analysis provided in Appendix C.

With the new Transitway demands added to future background growth conditions, the study intersections are expected to operate as follows:

- Mississauga Road & Steeles Avenue continues to operate poorly. Station demand does not drastically deteriorate the intersection's operation. However, some demands are added to already congested movements. In the morning peak period, none of the movements are expected to be overcapacity. During the p.m. peak period, the EBL and NBT movements continue to operate at capacity / past capacity, with expected long delays and queues. Given the high growth rates used along the Steeles Avenue for its future widening, it is expected that some green time may be available for N-S volumes on Mississauga Road. Therefore, no improvement measures are necessary.
- Mississauga Road & Edgeware Road is expected to continue performing well with the addition of the station demands.
- Mississauga Road & Hereford Street / Hallstone Road is expected to maintain LOS in the a.m. peak period but deteriorate to LOS F in the p.m. peak period. With majority of traffic oriented to the north, both the SBR and EBL movements during both peak periods are expected to sufficiently accommodate the demands. With station traffic leaving in the p.m. peak hour, the EBR deteriorates to LOS F with v/c of 1.30, indicating severe congestion and high delay. Improvements should be considered for this particular movement to minimize impact.
- Both Highway 407 Off-Ramps are expected to maintain LOS in both a.m. and p.m. peak periods, Transitway demand is not expected to significantly impact performance at these intersections.
- Mississauga Road & Meadowvale Boulevard is expected to maintain LOS in both a.m. and p.m. peak periods, the performance of the intersection is marginally impacted by station demand.

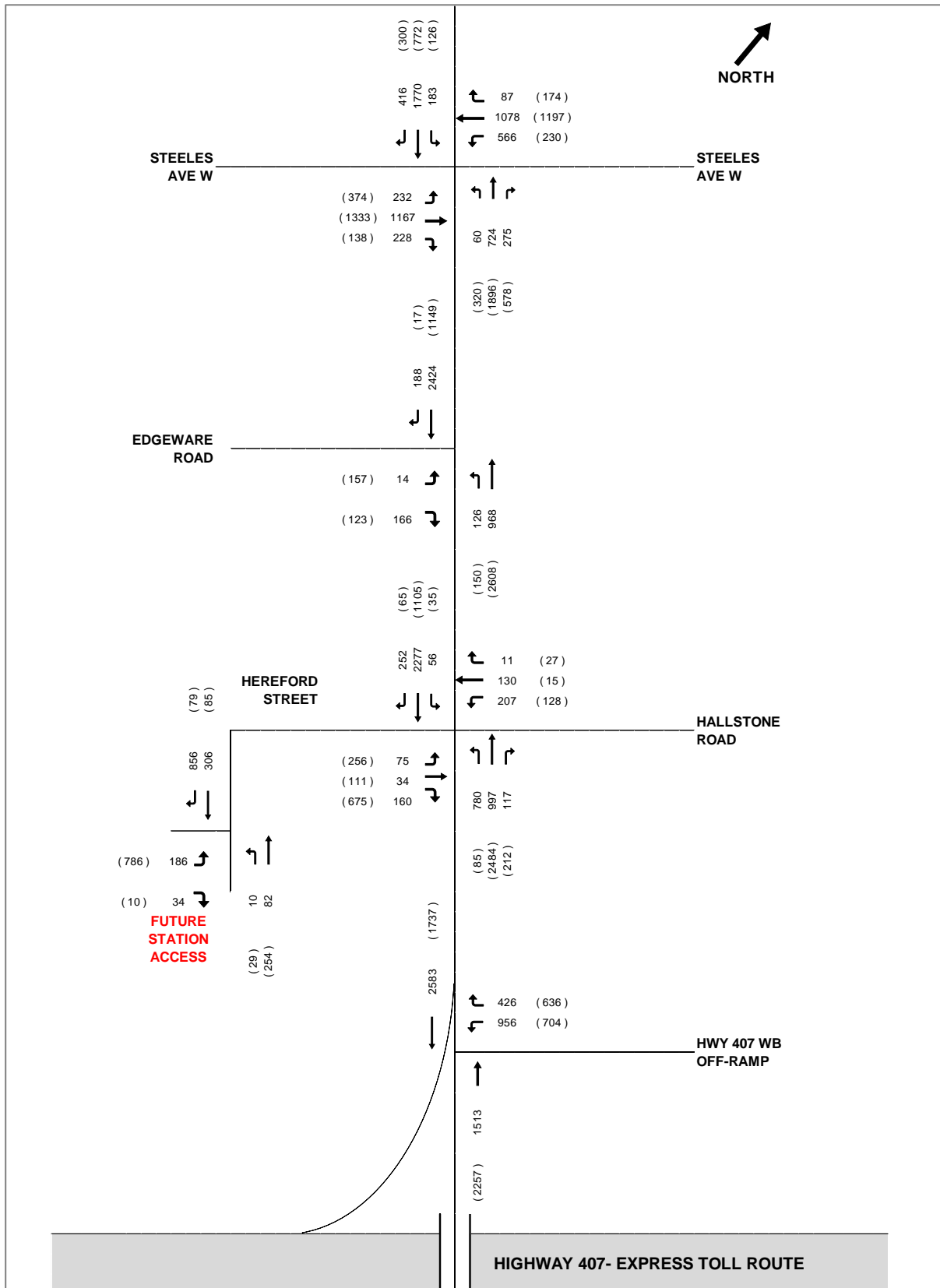
4.8.1 Station Access Analysis

One station access to the park-and-ride is proposed, a signalized access off Hereford Street. The below Exhibit 4-8 indicates that the single access will operate well in the a.m. peak period under the proposed configuration (as shown in Exhibit 1-2). However, in the p.m. peak period the intersection is expected to operate with some congestion due to the high EBL demands. It should be noted that the EBL volumes was calculated from the Hereford Street eastbound approach, where counts at the station access was not made available. From aerial view, it was noted that there are other routes (such as Ironbridge Road) in the area that contribute to the demand at Hereford Street. With the above, the EBL movement for the station access is still expected to operate below capacity (v/c = 0.92) at LOS C, indicating satisfactory operation.

Exhibit 4-8: Synchro Analysis Summary of Hereford Street & Station Access

Intersection	Intersection LOS	Critical Movement			
		Movement	LOS	V/C Ratio	95% Queue (m)
Mississauga Road & Hereford Street/Hallstone Road (<i>signalized</i>)	AM PEAK				
	B	EBL	B	0.41	35
		NBT	A	0.07	7
		SBT	B	0.74	82
	PM PEAK				
	C	EBL	C	0.92	153
NBT		B	0.35	31	
SBT		B	0.16	15	

Exhibit 4-9: Future Total Traffic Volumes for the AM (PM) Peak Hour



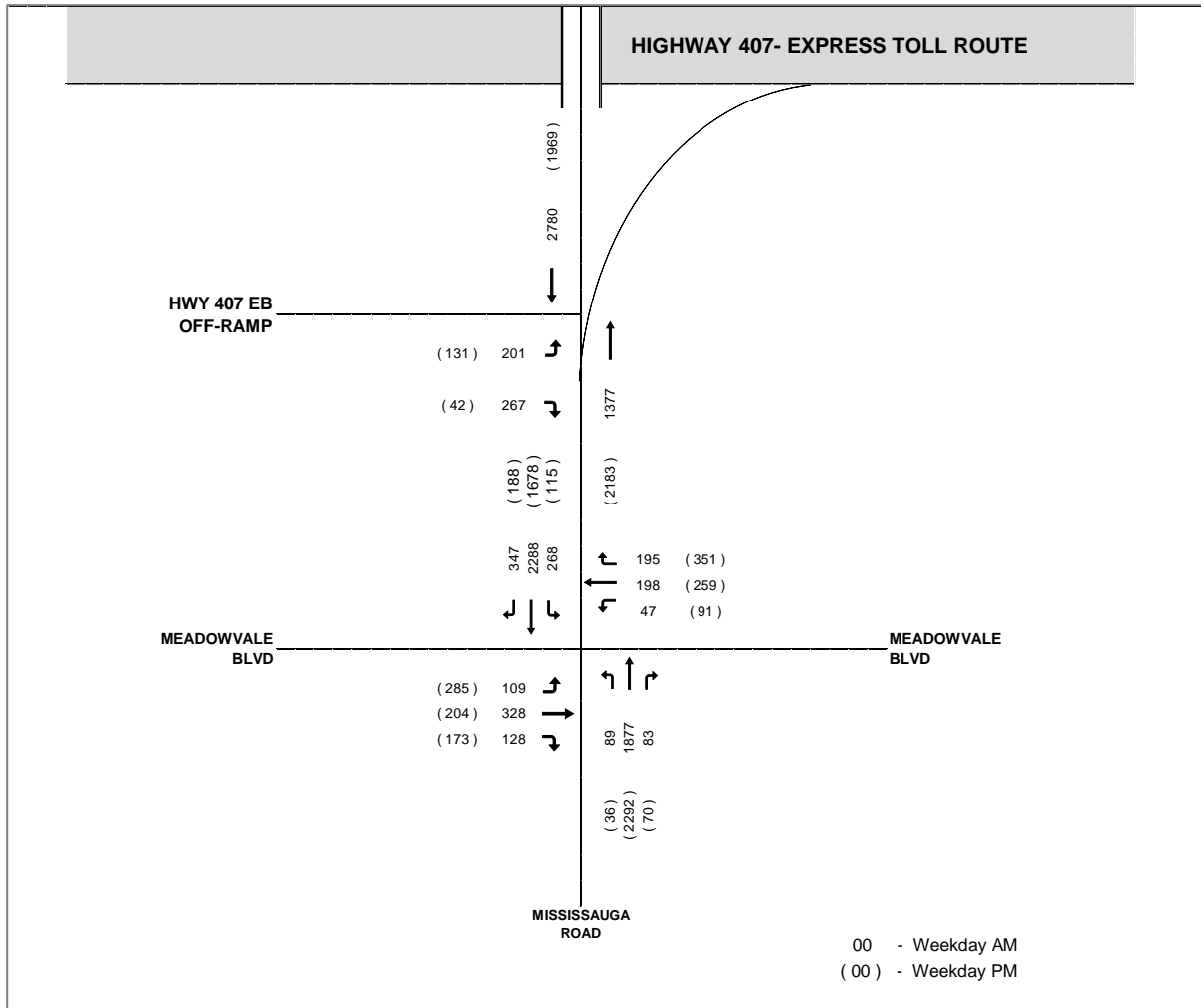


Exhibit 4-10: Synchro Analysis: Future Total Conditions for AM (PM) Peak Hour

Intersection	AM PEAK					PM PEAK				
	LOS	Critical Movements				LOS	Critical Movements			
		Mvmt	LOS	V/C Ratio	95% Queue (m)		Mvmt	LOS	V/C Ratio	95% Queue (m)
Mississauga Road & Steeles Avenue West <i>(signalized)</i>	E	EBL	F	0.98	137	E	EBL	F	1.09	212
		EBT	E	0.86	145		EBT	D	0.76	163
		EBR	D	0.42	67		WBL	F	0.83	63
		WBL	F	0.99	141		WBT	E	0.93	175
		WBT	E	0.86	149		WBR	D	0.20	33
		WBR	D	0.07	12		NBL	F	0.87	81
		NBL	F	0.75	24		NBT	F	1.08	267
		NBT	D	0.49	88		NBR	E	0.95	232
		NBR	D	0.24	33		SBL	F	0.95	45
		SBL	E	0.69	46		SBT	D	0.65	104
		SBT	E	0.98	256		SBR	D	0.22	26
		SBR	D	0.49	83					
		Mississauga Road & Edgeware Road <i>(signalized)</i>	B	EBL	E		0.15	11	B	EBL
EBR	E			0.22	26	EBR	D	0.10		16
NBL	E			0.70	50					
Mississauga Road & Hereford Street/Hallstone Road <i>(signalized)</i>	D	EBL	E	0.59	36	F	EBR	F	1.30	230
		EBT	E	0.18	11		WBL	D	0.63	31
		EBR	E	0.11	24		WBT	D	0.08	8
		WBL	F	1.17	116		WBR	D	0.02	-
		WBT	F	0.86	77		NBL	D	0.45	17
		WBR	E	0.01	-		NBT	F	1.14	227
		NBL	F	1.00	166					
SBT	C	0.95	178							
Mississauga Road & Highway 407 WB Off-Ramp <i>(signalized)</i>	D	WBL	E	0.97	189	D	WBR	F	1.09	220
		WBR	E	0.89	180		NBT	D	1.03	216
		SBT	D	0.96	284					
Mississauga Road & Highway 407 EB Off-Ramp <i>(signalized)</i>	C	EBL	D	0.32	38	A	EBL	D	0.43	22
		EBR	E	0.88	118		EBR	D	0.18	15
		SBT	B	0.86	254					
Mississauga Road & Meadowvale Boulevard <i>(signalized)</i>	C	EBL	E	0.68	50	D	EBL	F	0.95	128
		EBT	E	0.64	71		EBT	D	0.22	39
		EBR	E	0.26	33		EBR	D	0.26	43
		WBL	E	0.56	30		WBL	E	0.43	47
		WBT	E	0.62	47		WBT	E	0.41	56
		WBR	E	0.30	35		WBR	F	0.94	155
		NBL	E	0.45	25		NBL	E	0.33	13
		SBL	E	0.71	61		NBT	D	0.90	282
				SBL	F	0.71	35			

5 Potential Improvement Measures

5.1 Transit

No special transit priority measures are warranted for the station access, no significant delays are expected to occur. The station layout provides a reasonable routing between the bus drop-off facility and the station access with limited potential for background queues to interfere.

5.2 Active Transportation

Station layout should be reviewed to ensure active transportation access is provided to the proposed pedestrian corridor at the Highway 407 interchange at Mississauga Road. This would allow access to the local active transportation network, which includes the proposed off road trail running along the south side of the Highway 407.

5.3 Traffic

Given the future total operations and consideration of planned future road widening of Steeles Avenue, no additional road improvements were identified for the study area. Signal phasing changes were explored at Mississauga Road & Hereford Street / Hallstone Road and are as follows.

5.3.1 Mississauga Road & Hereford Street / Hallstone Road

The below improvement measure were analyzed in Synchro (using future total volumes) the results are presented in Exhibit 4-1.

- Overlap phase (+ permissive) during p.m. peak period; and
- Optimized signal timings for both peak periods.

Exhibit 5-1: Analysis of Improvements to Mississauga Road and Hereford St / Hallstone Rd

Intersection	AM Peak					PM Peak				
	Avg. v/c	Critical Movement				Avg. v/c	Critical Movement			
		Mvmt	LOS	V/C Ratio	95% Queue (m)		Mvmt	LOS	V/C Ratio	95% Queue (m)
Hereford Street / Hallstone Road <i>(planned configuration)</i>	1.02	EBL	E	0.59	36	1.17	EBR	F	1.30	230
		EBT	E	0.18	11		WBL	D	0.63	31
		EBR	E	0.11	24		WBT	D	0.08	8
		WBL	F	1.17	116		WBR	D	0.02	-
		WBT	F	0.86	77		NBL	D	0.45	17
		WBR	E	0.01	-		NBT	F	1.14	227
		NBL	F	1.00	166					
		SBT	C	0.95	178					
Hereford Street / Hallstone Road <i>(with improvements)</i>	1.01	EBL	E	0.67	36	0.98	EBL	D	0.84	76
		EBT	E	0.23	11		EBT	D	0.28	21
		EBR	D	0.27	37		EBR	D	0.96	204
		WBL	F	1.05	118		WBL	D	0.69	39
		WBT	E	0.77	77		WBT	D	0.17	9
		WBR	E	0.01	-		WBR	D	0.02	-
		NBL	F	0.99	166		SBT	D	0.91	96
		SBT	D	0.97	177					

The following was observed:

- During the a.m. peak period, the overlap phase for the EBR movement allows for more gap for its opposing WBL and WBT movements, thereby improving operation.
- In the p.m. peak period, the overlap phase improves operation for the EBR movement and frees up additional green time for N-S volumes. With the optimization of traffic signal, the NBT movement is no longer considered critical and where the EBR movement operating below capacity.
- Average intersection v/c is reduced slightly in the a.m. peak hour and significantly in the p.m. peak hour.

6 Summary and Recommendations

This report provides an analysis of traffic operations for the proposed Highway 407 Transitway station located off the intersection of Mississauga Road and Hereford Street, adjacent to the Highway 407. The report also includes commentary on transit and active transportation access to the proposed station.

Existing conditions during the a.m. and p.m. peak hours were modelled and analyzed in the base year of 2019. The analysis found that existing conditions has the intersection of Mississauga Road and Steeles Avenue operating poorly in both peak periods and the Highway 407 WB Off-Ramp operating poorly during the p.m. peak period.

Future conditions during both peak periods were modelled and analyzed based on the horizon year of 2031. Forecasting was completed using the background growth rates informed by MTO's travel demand model. Inbound and outbound station traffic to the proposed station was estimated based a maximum build out scenario of 606 parking spaces. The study accounts for the planned widening of Steeles Avenue from four lanes to six lanes.

The study indicated that under future 2031 background traffic conditions Steeles Avenue operates with moderate congestion even with the road widening. The intersection of Mississauga Road and Hereford Street/ Hallstone is expected to deteriorate in the a.m. peak due to the heavy northbound left turns and southbound through volumes, and in the p.m. peak the eastbound right turns and northbound through movements are expected to operate at / over capacity. The Highway 407 WB Off-Ramp is also expected to continue operating poorly for the ramp volumes. Recommended improvements include adding an eastbound right permissive-overlap phase at Mississauga Road and Hereford Street/Hallstone Road and signal optimization throughout the study area.

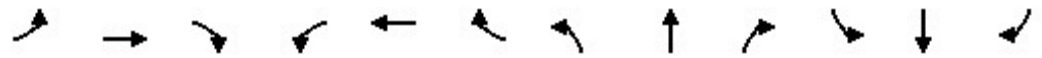
The proposed station access will be located at a new signalized intersection at the bend of Hereford Street. The station access is expected to perform well, with no significant delays or queuing expected with the exception of the EBL movement during the p.m. peak. Despite the higher than anticipated EBL volumes, the movement is expected to operate satisfactory at LOS C with some residual capacity. Therefore, the proposed configuration is considered appropriate in accommodating Hereford Street and station demands. Transit access to the station is via the station access, a bus turnaround facility is proposed within the station.

Walking and cycling access to the station will include linkages to the pedestrian corridor starting at the Highway 407 interchange at Mississauga Road. This will connect with the local active transportation network, which includes the proposed off road trail running along the south side of Highway 407.

Appendix A-: Existing Conditions Synchro Output

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

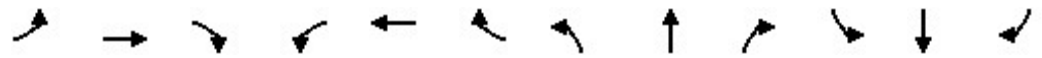
AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	206	920	187	472	850	77	49	606	235	162	1435	369
Future Volume (vph)	206	920	187	472	850	77	49	606	235	162	1435	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	145.0		75.0	155.0		155.0	105.0		50.0	135.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1534	3625	1541	1772	3349	1445	1437	4812	1555	1722	5043	1512
Fl _t Permitted	0.950			0.950			0.091			0.276		
Satd. Flow (perm)	1532	3625	1515	1770	3349	1423	138	4812	1529	499	5043	1492
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			140			104			238			258
Link Speed (k/h)		80			80			60				60
Link Distance (m)		233.4			222.1			602.4				215.3
Travel Time (s)		10.5			10.0			36.1				12.9
Confl. Peds. (#/hr)	3		4	4		3	1		4	4		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	6%	3%	9%	13%	27%	9%	5%	6%	4%	8%
Adj. Flow (vph)	224	1000	203	513	924	84	53	659	255	176	1560	401
Shared Lane Traffic (%)												
Lane Group Flow (vph)	224	1000	203	513	924	84	53	659	255	176	1560	401
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	13.0	50.2	50.2	13.0	50.5	50.5	8.0	45.3	45.3	8.0	45.3	45.3
Total Split (s)	17.0	54.0	54.0	35.0	72.0	72.0	13.0	46.0	46.0	25.0	58.0	58.0
Total Split (%)	10.6%	33.8%	33.8%	21.9%	45.0%	45.0%	8.1%	28.8%	28.8%	15.6%	36.3%	36.3%
Maximum Green (s)	12.0	46.8	46.8	30.0	64.8	64.8	10.0	38.7	38.7	22.0	50.7	50.7
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	0.0	3.3	3.3	0.0	3.3	3.3
Lost Time Adjust (s)	-2.0	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.2	7.2	3.0	7.2	7.2	3.0	7.3	7.3	3.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		35.0	35.0		35.0	35.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	15.3	46.8	46.8	33.3	64.8	64.8	56.5	43.3	43.3	66.7	52.4	52.4
Actuated g/C Ratio	0.10	0.29	0.29	0.21	0.40	0.40	0.35	0.27	0.27	0.42	0.33	0.33
v/c Ratio	1.53	0.94	0.37	1.39	0.68	0.13	0.44	0.51	0.43	0.53	0.94	0.61
Control Delay	314.5	72.0	16.5	237.3	42.3	3.1	40.4	51.2	9.4	36.3	64.6	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	314.5	72.0	16.5	237.3	42.3	3.1	40.4	51.2	9.4	36.3	64.6	19.8
LOS	F	E	B	F	D	A	D	D	A	D	E	B
Approach Delay		102.2			105.9			39.6			53.9	
Approach LOS		F			F			D			D	
Queue Length 50th (m)	~103.4	156.3	14.9	~221.3	126.4	0.0	10.0	64.5	4.0	35.6	179.9	38.0
Queue Length 95th (m)	#158.1	#195.0	37.6	#292.4	150.5	7.0	19.3	81.8	28.6	53.6	#212.8	75.0
Internal Link Dist (m)		209.4			198.1			578.4			191.3	
Turn Bay Length (m)	145.0		75.0	155.0		155.0	105.0		50.0	135.0		90.0
Base Capacity (vph)	146	1060	542	368	1356	638	130	1302	587	376	1652	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.53	0.94	0.37	1.39	0.68	0.13	0.41	0.51	0.43	0.47	0.94	0.61

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 49 (31%), Referenced to phase 2:EBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.53
 Intersection Signal Delay: 76.1
 Intersection LOS: E

Lanes, Volumes, Timings
 1: Steeles Ave W & Mississauga Rd

AM Peak Period
 09-27-2019

Intersection Capacity Utilization 112.8% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Steeles Ave W & Mississauga Rd



Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	166	126	810	1970	188
Future Volume (vph)	14	166	126	810	1970	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	160.0			55.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1415	1498	1659	4812	5043	1617
Flt Permitted	0.950		0.058			
Satd. Flow (perm)	1415	1498	101	4812	5043	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		133				140
Link Speed (k/h)	50			60	60	
Link Distance (m)	158.7			310.3	602.4	
Travel Time (s)	11.4			18.6	36.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	29%	9%	10%	9%	4%	1%
Adj. Flow (vph)	15	180	137	880	2141	204
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	180	137	880	2141	204
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)	4.9			4.9	4.9	
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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	12.0	12.0	12.0
Minimum Split (s)	15.5	15.5	11.0	25.2	25.2	25.2
Total Split (s)	35.0	35.0	14.0	105.0	91.0	91.0
Total Split (%)	25.0%	25.0%	10.0%	75.0%	65.0%	65.0%
Maximum Green (s)	27.5	27.5	11.0	98.8	84.8	84.8
Yellow Time (s)	4.0	4.0	3.0	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	3.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Walk Time (s)				8.0	8.0	8.0
Flash Dont Walk (s)				11.0	11.0	11.0
Pedestrian Calls (#/hr)				0	0	0
Act Effct Green (s)	11.8	11.8	117.7	114.5	98.7	98.7
Actuated g/C Ratio	0.08	0.08	0.84	0.82	0.70	0.70
v/c Ratio	0.13	0.73	0.61	0.22	0.60	0.17
Control Delay	58.9	35.2	61.7	1.5	12.5	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.9	35.2	61.7	1.5	12.5	3.4
LOS	E	D	E	A	B	A
Approach Delay	37.0			9.6	11.7	
Approach LOS	D			A	B	
Queue Length 50th (m)	4.0	12.7	20.5	6.1	96.1	4.7
Queue Length 95th (m)	10.5	36.2	44.4	6.7	154.1	16.9
Internal Link Dist (m)	134.7			286.3	578.4	
Turn Bay Length (m)			160.0			55.0
Base Capacity (vph)	277	401	236	3935	3556	1181
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.45	0.58	0.22	0.60	0.17

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	72 (51%), Referenced to phase 2:SBT and 6:NBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	12.5
Intersection LOS:	B
Intersection Capacity Utilization:	66.5%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Mississauga Rd & Edgeware Rd



Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	29	137	207	113	11	695	885	117	56	2021	48
Future Volume (vph)	20	29	137	207	113	11	695	885	117	56	2021	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	*1.00	1.00
Frt			0.850				0.850			0.850		0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3544	1570	1772	1902	1633	3506	4683	1585	1738	5489	1601
Flt Permitted	0.678			0.572			0.950			0.285		
Satd. Flow (perm)	1303	3544	1570	1067	1902	1633	3506	4683	1585	521	5489	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			114			127			147
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		401.1			259.0			279.0			310.3	
Travel Time (s)		28.9			18.6			16.7			18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	4%	3%	1%	0%	1%	12%	3%	5%	5%	2%
Adj. Flow (vph)	22	32	149	225	123	12	755	962	127	61	2197	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	32	149	225	123	12	755	962	127	61	2197	52
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	15.9	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	9.0	29.0	29.0	16.0	36.0	36.0	32.0	86.0	86.0	9.0	63.0	63.0
Total Split (%)	6.4%	20.7%	20.7%	11.4%	25.7%	25.7%	22.9%	61.4%	61.4%	6.4%	45.0%	45.0%
Maximum Green (s)	6.0	21.1	21.1	13.0	28.1	28.1	27.0	79.4	79.4	6.0	56.4	56.4
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	3.9	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	7.9	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	20.1	9.3	9.3	30.2	19.9	19.9	38.8	92.1	92.1	66.8	56.4	56.4
Actuated g/C Ratio	0.14	0.07	0.07	0.22	0.14	0.14	0.28	0.66	0.66	0.48	0.40	0.40
v/c Ratio	0.11	0.14	0.61	0.76	0.45	0.04	0.78	0.31	0.12	0.20	0.99	0.07
Control Delay	44.2	61.9	20.1	67.1	61.9	0.2	47.4	14.2	3.8	7.1	47.5	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.2	61.9	20.1	67.1	61.9	0.2	47.4	14.2	3.8	7.1	47.5	0.1
LOS	D	E	C	E	E	A	D	B	A	A	D	A
Approach Delay		29.3			63.1			27.1			45.4	
Approach LOS		C			E			C			D	
Queue Length 50th (m)	4.9	4.5	0.0	57.2	33.0	0.0	103.9	52.4	3.4	3.8	200.7	0.0
Queue Length 95th (m)	12.0	9.7	20.7	80.9	52.0	0.0	#133.9	69.6	m7.9	m6.5	#228.8	m0.0
Internal Link Dist (m)		377.1			235.0			255.0			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	210	534	363	295	381	418	970	3079	1086	308	2211	732
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.06	0.41	0.76	0.32	0.03	0.78	0.31	0.12	0.20	0.99	0.07

Intersection Summary

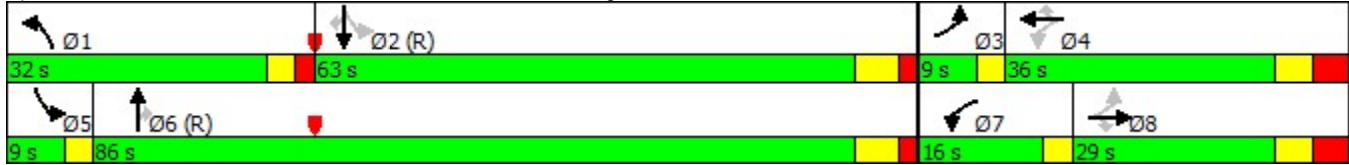
Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	84 (60%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.99
Intersection Signal Delay:	38.9
Intersection LOS:	D
Intersection Capacity Utilization:	93.3%
ICU Level of Service:	F
Analysis Period (min):	15

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
 09-27-2019
















- * User Entered Value
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd



Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
09-27-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	848	363	1282	0	0	2275
Future Volume (vph)	848	363	1282	0	0	2275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	110.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1570	4995	0	0	5043
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1570	4995	0	0	5043
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		55				
Link Speed (k/h)	60		60			60
Link Distance (m)	333.6		152.0			97.3
Travel Time (s)	20.0		9.1			5.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	4%	5%	0%	0%	4%
Adj. Flow (vph)	922	395	1393	0	0	2473
Shared Lane Traffic (%)						
Lane Group Flow (vph)	922	395	1393	0	0	2473
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.4		0.0			0.0
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	4		2			2

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
09-27-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		4				
Detector Phase	4	4	2			2
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0			12.0
Minimum Split (s)	15.5	15.5	30.7			30.7
Total Split (s)	46.0	46.0	94.0			94.0
Total Split (%)	32.9%	32.9%	67.1%			67.1%
Maximum Green (s)	38.6	38.6	87.4			87.4
Yellow Time (s)	4.0	4.0	4.6			4.6
All-Red Time (s)	3.4	3.4	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	7.4	7.4	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Walk Time (s)			8.0			8.0
Flash Dont Walk (s)			15.0			15.0
Pedestrian Calls (#/hr)			0			0
Act Effct Green (s)	38.6	38.6	87.4			87.4
Actuated g/C Ratio	0.28	0.28	0.62			0.62
v/c Ratio	0.99	0.84	0.45			0.79
Control Delay	78.0	57.5	11.9			8.1
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	78.0	57.5	11.9			8.1
LOS	E	E	B			A
Approach Delay	71.8		11.9			8.1
Approach LOS	E		B			A
Queue Length 50th (m)	131.7	90.6	52.7			240.4
Queue Length 95th (m)	#175.6	#142.8	58.2			m243.4
Internal Link Dist (m)	309.6		128.0			73.3
Turn Bay Length (m)		110.0				
Base Capacity (vph)	929	472	3118			3148
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.99	0.84	0.45			0.79

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	109 (78%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.99
Intersection Signal Delay:	25.3
Intersection LOS:	C
Intersection Capacity Utilization:	79.8%
ICU Level of Service:	D
Analysis Period (min):	15

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
09-27-2019

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Mississauga Rd & 407 WB Off Ramp



Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	163	237	0	1177	2455	0
Future Volume (vph)	163	237	0	1177	2455	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	20.0		20.0			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1617	0	4948	5043	0
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1617	0	4948	5043	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		4				
Link Speed (k/h)	60			60	60	
Link Distance (m)	316.3			93.8	141.6	
Travel Time (s)	19.0			5.6	8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	0%	6%	4%	0%
Adj. Flow (vph)	177	258	0	1279	2668	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	177	258	0	1279	2668	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	8.0	8.0		12.0	12.0	
Minimum Split (s)	15.5	15.5		30.7	30.7	
Total Split (s)	40.0	40.0		100.0	100.0	
Total Split (%)	28.6%	28.6%		71.4%	71.4%	
Maximum Green (s)	32.5	32.5		93.3	93.3	
Yellow Time (s)	4.0	4.0		4.6	4.6	
All-Red Time (s)	3.5	3.5		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.5	7.5		6.7	6.7	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)				8.0	8.0	
Flash Dont Walk (s)				16.0	16.0	
Pedestrian Calls (#/hr)				0	0	
Act Effct Green (s)	26.5	26.5		99.3	99.3	
Actuated g/C Ratio	0.19	0.19		0.71	0.71	
v/c Ratio	0.28	0.84		0.36	0.75	
Control Delay	48.5	76.0		8.8	16.1	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	48.5	76.0		8.8	16.1	
LOS	D	E		A	B	
Approach Delay	64.8			8.8	16.1	
Approach LOS	E			A	B	
Queue Length 50th (m)	21.7	68.1		47.2	233.6	
Queue Length 95th (m)	30.9	95.6		62.6	m246.9	
Internal Link Dist (m)	292.3			69.8	117.6	
Turn Bay Length (m)		100.0				
Base Capacity (vph)	782	378		3510	3577	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.23	0.68		0.36	0.75	

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	136 (97%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	65
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.84
Intersection Signal Delay:	18.8
Intersection LOS:	B
Intersection Capacity Utilization:	73.9%
ICU Level of Service:	D
Analysis Period (min):	15

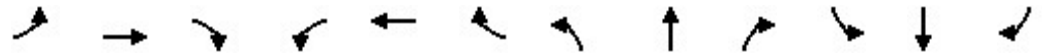
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: 407 EB Off Ramp & Mississauga Rd



Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	328	128	47	198	178	89	1636	83	263	2022	347
Future Volume (vph)	109	328	128	47	198	178	89	1636	83	263	2022	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor	0.99		0.97	0.99		0.98			0.98	1.00		
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1690	3380	1408	1587	3411	1601	3404	5092	1526	3541	5092	1617
Fl _t Permitted	0.471			0.538			0.950			0.950		
Satd. Flow (perm)	833	3380	1372	891	3411	1570	3404	5092	1498	3537	5092	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			139			193			123			377
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		230.5			214.1			348.6			277.6	
Travel Time (s)		13.8			12.8			20.9			16.7	
Confl. Peds. (#/hr)	5		9	9		5			3	3		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	16%	15%	7%	2%	4%	3%	7%	0%	3%	1%
Adj. Flow (vph)	118	357	139	51	215	193	97	1778	90	286	2198	377
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	357	139	51	215	193	97	1778	90	286	2198	377
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8			4		1	6		5	2	
Permitted Phases	8		8	4		4			6			2
Detector Phase	3	8	8	4	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	12.0	12.0	8.0	12.0	12.0
Minimum Split (s)	8.0	39.0	39.0	39.0	39.0	39.0	13.0	28.6	28.6	13.0	28.6	28.6
Total Split (s)	11.0	59.0	59.0	48.0	48.0	48.0	18.0	75.0	75.0	26.0	83.0	83.0
Total Split (%)	6.9%	36.9%	36.9%	30.0%	30.0%	30.0%	11.3%	46.9%	46.9%	16.3%	51.9%	51.9%
Maximum Green (s)	8.0	51.0	51.0	40.0	40.0	40.0	13.0	68.4	68.4	21.0	76.4	76.4
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0	8.0	8.0	8.0	8.0	5.0	6.6	6.6	5.0	6.6	6.6
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		12.0	12.0	12.0	12.0	12.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		19.0	19.0	19.0	19.0	19.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	0
Act Effct Green (s)	32.5	27.5	27.5	16.5	16.5	16.5	10.1	94.8	94.8	18.2	102.8	102.8
Actuated g/C Ratio	0.20	0.17	0.17	0.10	0.10	0.10	0.06	0.59	0.59	0.11	0.64	0.64
v/c Ratio	0.56	0.62	0.40	0.56	0.61	0.58	0.45	0.59	0.10	0.71	0.67	0.32
Control Delay	64.8	65.7	11.0	89.7	75.7	14.8	68.5	10.6	0.1	78.3	20.0	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.8	65.7	11.0	89.7	75.7	14.8	68.5	10.6	0.1	78.3	20.0	2.0
LOS	E	E	B	F	E	B	E	B	A	E	C	A
Approach Delay		53.2			51.7			12.9			23.5	
Approach LOS		D			D			B			C	
Queue Length 50th (m)	32.8	56.5	0.0	15.8	35.3	0.0	16.4	43.6	0.0	45.9	149.6	0.0
Queue Length 95th (m)	49.8	69.8	18.5	29.7	47.1	23.1	m18.6	60.7	m0.0	60.1	197.6	13.5
Internal Link Dist (m)		206.5			190.1			324.6			253.6	
Turn Bay Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Base Capacity (vph)	211	1077	532	222	852	537	276	3015	937	472	3272	1173
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.33	0.26	0.23	0.25	0.36	0.35	0.59	0.10	0.61	0.67	0.32

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	53 (33%), Referenced to phase 2:SBT and 6:NBT, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	25.3
Intersection LOS:	C

Lanes, Volumes, Timings
 10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
 09-27-2019































Intersection Capacity Utilization 88.8% ICU Level of Service E
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 10: Meadowvale Blvd & Mississauga Rd



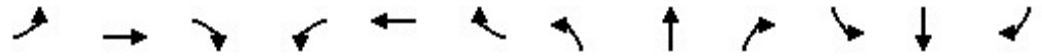
Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 			  			  	
Traffic Volume (vph)	332	1051	118	195	944	154	271	1570	487	112	647	266
Future Volume (vph)	332	1051	118	195	944	154	271	1570	487	112	647	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	145.0		75.0	155.0		155.0	105.0		50.0	135.0		90.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	*1.00	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00		0.98	1.00		0.99	1.00		0.98			0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	3318	1526	1789	3476	1633	1706	5706	1617	1706	4995	1484
Fl _t Permitted	0.950			0.950			0.324			0.076		
Satd. Flow (perm)	1754	3318	1501	1788	3476	1612	581	5706	1585	136	4995	1465
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104			167			224			233
Link Speed (k/h)		80			80			60				60
Link Distance (m)		233.5			222.0			602.3				215.4
Travel Time (s)		10.5			10.0			36.1				12.9
Confl. Peds. (#/hr)	1		4	4		1	1		6	6		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	10%	7%	2%	5%	0%	7%	1%	1%	7%	5%	10%
Adj. Flow (vph)	361	1142	128	212	1026	167	295	1707	529	122	703	289
Shared Lane Traffic (%)												
Lane Group Flow (vph)	361	1142	128	212	1026	167	295	1707	529	122	703	289
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)		3.7			3.7			3.7				3.7
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	13.0	50.2	50.2	13.0	50.5	50.5	8.0	45.3	45.3	8.0	45.3	45.3
Total Split (s)	25.0	68.0	68.0	18.0	61.0	61.0	13.0	54.0	54.0	20.0	61.0	61.0
Total Split (%)	15.6%	42.5%	42.5%	11.3%	38.1%	38.1%	8.1%	33.8%	33.8%	12.5%	38.1%	38.1%
Maximum Green (s)	20.0	60.8	60.8	13.0	53.8	53.8	10.0	46.7	46.7	17.0	53.7	53.7
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	0.0	3.3	3.3	0.0	3.3	3.3
Lost Time Adjust (s)	-2.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.2	7.2	4.0	7.2	7.2	3.0	7.3	7.3	3.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		35.0	35.0		35.0	35.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	22.0	60.8	60.8	14.0	53.8	53.8	64.0	49.7	49.7	70.2	53.7	53.7
Actuated g/C Ratio	0.14	0.38	0.38	0.09	0.34	0.34	0.40	0.31	0.31	0.44	0.34	0.34
v/c Ratio	1.50	0.91	0.20	1.36	0.88	0.26	0.98	0.96	0.82	0.62	0.42	0.45
Control Delay	288.7	58.1	9.3	248.0	59.8	5.9	84.8	67.9	40.4	45.6	42.0	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	288.7	58.1	9.3	248.0	59.8	5.9	84.8	67.9	40.4	45.6	42.0	11.1
LOS	F	E	A	F	E	A	F	E	D	D	D	B
Approach Delay		105.3			81.8			64.1			34.4	
Approach LOS		F			F			E			C	
Queue Length 50th (m)	~158.4	180.3	4.8	~88.1	162.0	0.0	62.6	179.5	96.9	23.0	63.4	12.3
Queue Length 95th (m)	#222.3	#213.0	18.8	#141.5	190.8	16.4	#125.8	#218.1	#161.6	43.3	75.9	38.1
Internal Link Dist (m)		209.5			198.0			578.3			191.4	
Turn Bay Length (m)	145.0		75.0	155.0		155.0	105.0		50.0	135.0		90.0
Base Capacity (vph)	241	1260	634	156	1168	652	302	1773	647	227	1676	646
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.50	0.91	0.20	1.36	0.88	0.26	0.98	0.96	0.82	0.54	0.42	0.45

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	111 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.50
Intersection Signal Delay:	72.9
Intersection LOS:	E

Lanes, Volumes, Timings
 1: Steeles Ave W & Mississauga Rd

PM Peak Period
 Existing Conditions Calibrated 2019

Intersection Capacity Utilization 109.8% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

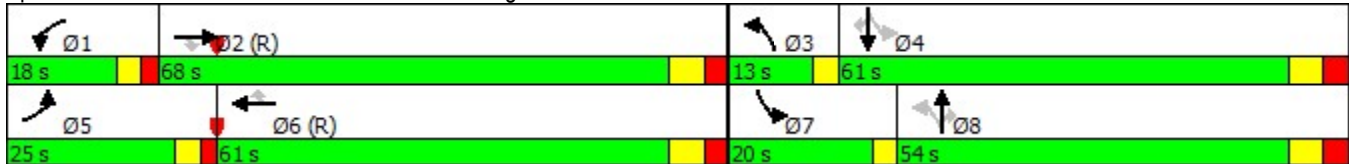
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Steeles Ave W & Mississauga Rd



Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	157	123	150	2164	969	17
Future Volume (vph)	157	123	150	2164	969	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	160.0			55.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor			1.00			0.97
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1807	1396	1738	5043	4902	1458
Flt Permitted	0.950		0.231			
Satd. Flow (perm)	1807	1396	422	5043	4902	1421
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		134				18
Link Speed (k/h)	50			60	60	
Link Distance (m)	158.7			310.3	602.3	
Travel Time (s)	11.4			18.6	36.1	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	17%	5%	4%	7%	12%
Adj. Flow (vph)	171	134	163	2352	1053	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	171	134	163	2352	1053	18
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)	4.9			4.9	4.9	
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
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	

Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	12.0	12.0	12.0
Minimum Split (s)	15.5	15.5	11.0	25.2	25.2	25.2
Total Split (s)	30.0	30.0	14.0	80.0	66.0	66.0
Total Split (%)	27.3%	27.3%	12.7%	72.7%	60.0%	60.0%
Maximum Green (s)	22.5	22.5	11.0	73.8	59.8	59.8
Yellow Time (s)	4.0	4.0	3.0	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	3.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Walk Time (s)				8.0	8.0	8.0
Flash Dont Walk (s)				11.0	11.0	11.0
Pedestrian Calls (#/hr)				0	0	0
Act Effct Green (s)	15.6	15.6	83.9	80.7	68.8	68.8
Actuated g/C Ratio	0.14	0.14	0.76	0.73	0.63	0.63
v/c Ratio	0.67	0.43	0.38	0.64	0.34	0.02
Control Delay	56.9	11.2	6.6	8.8	10.8	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.9	11.2	6.6	8.8	10.8	4.5
LOS	E	B	A	A	B	A
Approach Delay	36.8			8.7	10.7	
Approach LOS	D			A	B	
Queue Length 50th (m)	35.2	0.0	7.7	79.9	35.9	0.0
Queue Length 95th (m)	54.2	15.8	16.3	113.8	54.1	3.2
Internal Link Dist (m)	134.7			286.3	578.3	
Turn Bay Length (m)			160.0			55.0
Base Capacity (vph)	369	392	453	3698	3065	895
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.34	0.36	0.64	0.34	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	42 (38%), Referenced to phase 2:SBT and 6:NBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.67
Intersection Signal Delay:	11.4
Intersection LOS:	B

Lanes, Volumes, Timings
 2: Mississauga Rd & Edgeware Rd

PM Peak Period
 Existing Conditions Calibrated 2019

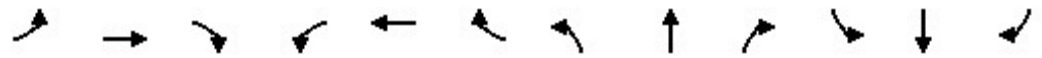
Intersection Capacity Utilization 61.9% ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 2: Mississauga Rd & Edgeware Rd



Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	96	604	128	10	27	61	2204	212	35	981	8
Future Volume (vph)	86	96	604	128	10	27	61	2204	212	35	981	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	*1.00	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00		0.99	1.00		0.99	1.00					0.99
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3650	1633	1789	1921	1633	3219	5595	1617	1772	4995	1633
Flt Permitted	0.668			0.686			0.950			0.116		
Satd. Flow (perm)	1281	3650	1611	1291	1921	1610	3217	5595	1617	216	4995	1611
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			301			159			130			173
Link Speed (k/h)		50			50			60				60
Link Distance (m)		401.0			259.0			260.2				310.3
Travel Time (s)		28.9			18.6			15.6				18.6
Confl. Peds. (#/hr)	2		1	1		2	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	10%	3%	1%	3%	5%	0%
Adj. Flow (vph)	93	104	657	139	11	29	66	2396	230	38	1066	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	104	657	139	11	29	66	2396	230	38	1066	9
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)		3.7			3.7			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	15.9	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	9.0	33.0	33.0	12.0	36.0	36.0	17.0	46.0	46.0	9.0	38.0	38.0
Total Split (%)	9.0%	33.0%	33.0%	12.0%	36.0%	36.0%	17.0%	46.0%	46.0%	9.0%	38.0%	38.0%
Maximum Green (s)	6.0	25.1	25.1	9.0	28.1	28.1	12.0	39.4	39.4	6.0	31.4	31.4
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	3.9	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	7.9	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	37.4	25.3	25.3	35.4	25.9	25.9	8.3	43.0	43.0	46.1	37.7	37.7
Actuated g/C Ratio	0.37	0.25	0.25	0.35	0.26	0.26	0.08	0.43	0.43	0.46	0.38	0.38
v/c Ratio	0.17	0.11	1.04	0.28	0.02	0.05	0.25	1.00	0.30	0.20	0.57	0.01
Control Delay	18.8	29.3	68.2	23.8	26.5	0.2	50.8	32.0	4.1	14.7	26.9	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	29.3	68.2	23.8	26.5	0.2	50.8	32.0	4.1	14.7	26.9	0.0
LOS	B	C	E	C	C	A	D	C	A	B	C	A
Approach Delay		58.1			20.1			30.0			26.3	
Approach LOS		E			C			C			C	
Queue Length 50th (m)	10.8	8.2	~91.4	16.5	1.5	0.0	6.2	~177.3	3.7	3.5	61.4	0.0
Queue Length 95th (m)	20.5	14.8	#158.4	29.0	5.7	0.0	m8.4 m#157.6	m10.0	8.3	77.1	77.1	0.0
Internal Link Dist (m)		377.0			235.0			236.2			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	550	923	631	502	574	592	386	2405	769	192	1883	715
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.11	1.04	0.28	0.02	0.05	0.17	1.00	0.30	0.20	0.57	0.01

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 45 (45%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 33.8
 Intersection LOS: C

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
 Existing Conditions Calibrated 2019

Intersection Capacity Utilization 80.9% ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.











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

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd



Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
Existing Conditions Calibrated 2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	625	560	1986	0	0	1491
Future Volume (vph)	625	560	1986	0	0	1491
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	110.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3404	1541	5092	0	0	5043
Flt Permitted	0.950					
Satd. Flow (perm)	3404	1541	5092	0	0	5043
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		15				
Link Speed (k/h)	60		60			60
Link Distance (m)	296.7		104.8			116.1
Travel Time (s)	17.8		6.3			7.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	3%	0%	0%	4%
Adj. Flow (vph)	679	609	2159	0	0	1621
Shared Lane Traffic (%)						
Lane Group Flow (vph)	679	609	2159	0	0	1621
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.4		0.0			0.0
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	4		2			6

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		4				
Detector Phase	4	4	2			6
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0			12.0
Minimum Split (s)	15.4	15.4	29.6			29.6
Total Split (s)	25.0	25.0	75.0			75.0
Total Split (%)	25.0%	25.0%	75.0%			75.0%
Maximum Green (s)	17.6	17.6	68.4			68.4
Yellow Time (s)	4.0	4.0	4.6			4.6
All-Red Time (s)	3.4	3.4	2.0			2.0
Lost Time Adjust (s)	0.0	-2.0	0.0			0.0
Total Lost Time (s)	7.4	5.4	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Walk Time (s)			8.0			8.0
Flash Dont Walk (s)			15.0			15.0
Pedestrian Calls (#/hr)			0			0
Act Effct Green (s)	17.6	19.6	68.4			68.4
Actuated g/C Ratio	0.18	0.20	0.68			0.68
v/c Ratio	1.13	1.94	0.62			0.47
Control Delay	118.1	459.4	10.5			4.4
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	118.1	459.4	10.5			4.4
LOS	F	F	B			A
Approach Delay	279.5		10.5			4.4
Approach LOS	F		B			A
Queue Length 50th (m)	~79.3	~183.2	93.8			23.3
Queue Length 95th (m)	#113.4	#249.0	114.3			m25.5
Internal Link Dist (m)	272.7		80.8			92.1
Turn Bay Length (m)		110.0				
Base Capacity (vph)	599	314	3482			3449
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	1.13	1.94	0.62			0.47

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	20 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.94
Intersection Signal Delay:	76.9
Intersection LOS:	E
Intersection Capacity Utilization:	83.0%
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
 5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
 Existing Conditions Calibrated 2019

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Mississauga Rd & 407 WB Off Ramp



Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↑↑↑	↑↑↑	
Traffic Volume (vph)	112	37	0	1924	1709	0
Future Volume (vph)	112	37	0	1924	1709	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	20.0		20.0			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1555	0	5092	4995	0
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1555	0	5092	4995	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		21				
Link Speed (k/h)	60			60	60	
Link Distance (m)	313.7			70.5	159.3	
Travel Time (s)	18.8			4.2	9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	0%	3%	5%	0%
Adj. Flow (vph)	122	40	0	2091	1858	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	122	40	0	2091	1858	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019






Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0		12.0	12.0	
Minimum Split (s)	15.5	15.5		30.7	30.7	
Total Split (s)	29.0	29.0		71.0	71.0	
Total Split (%)	29.0%	29.0%		71.0%	71.0%	
Maximum Green (s)	21.5	21.5		64.3	64.3	
Yellow Time (s)	4.0	4.0		4.6	4.6	
All-Red Time (s)	3.5	3.5		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.5	7.5		6.7	6.7	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)				8.0	8.0	
Flash Dont Walk (s)				16.0	16.0	
Pedestrian Calls (#/hr)				0	0	
Act Effct Green (s)	9.3	9.3		76.5	76.5	
Actuated g/C Ratio	0.09	0.09		0.76	0.76	
v/c Ratio	0.39	0.25		0.54	0.49	
Control Delay	46.1	28.4		5.4	1.9	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	46.1	28.4		5.4	1.9	
LOS	D	C		A	A	
Approach Delay	41.7			5.4	1.9	
Approach LOS	D			A	A	
Queue Length 50th (m)	11.7	3.5		47.1	11.1	
Queue Length 95th (m)	19.8	13.0		63.4	m12.1	
Internal Link Dist (m)	289.7			46.5	135.3	
Turn Bay Length (m)		100.0				
Base Capacity (vph)	724	350		3895	3821	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.17	0.11		0.54	0.49	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	92 (92%), 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:	5.2
Intersection Capacity Utilization:	55.7%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	B

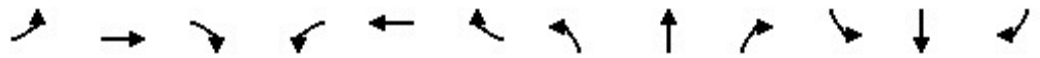
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: 407 EB Off Ramp & Mississauga Rd

 Ø2 (R)	 Ø4
71 s	29 s
 Ø6 (R)	
71 s	

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	285	204	173	91	259	346	36	2025	70	100	1463	188
Future Volume (vph)	285	204	173	91	259	346	36	2025	70	100	1463	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor			0.98	0.99			1.00		0.99	1.00		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3476	1541	1825	3476	1617	2975	5142	1617	3506	5092	1601
Flt Permitted	0.451			0.613			0.950			0.950		
Satd. Flow (perm)	849	3476	1503	1167	3476	1617	2971	5142	1594	3505	5092	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			161			177			89			204
Link Speed (k/h)		60			60			60				60
Link Distance (m)		230.5			214.2			348.6				277.6
Travel Time (s)		13.8			12.9			20.9				16.7
Confl. Peds. (#/hr)			8	8			4		1	1		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	6%	0%	5%	1%	19%	2%	1%	1%	3%	2%
Adj. Flow (vph)	310	222	188	99	282	376	39	2201	76	109	1590	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	310	222	188	99	282	376	39	2201	76	109	1590	204
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)		3.7			3.7			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
Existing Conditions Calibrated 2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8			4		1	6		5	2	
Permitted Phases	8		8	4		4			6			2
Detector Phase	3	8	8	4	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	12.0	12.0	8.0	12.0	12.0
Minimum Split (s)	8.0	39.0	39.0	39.0	39.0	39.0	13.0	28.6	28.6	13.0	28.6	28.6
Total Split (s)	24.0	72.0	72.0	48.0	48.0	48.0	16.0	72.0	72.0	16.0	72.0	72.0
Total Split (%)	15.0%	45.0%	45.0%	30.0%	30.0%	30.0%	10.0%	45.0%	45.0%	10.0%	45.0%	45.0%
Maximum Green (s)	21.0	64.0	64.0	40.0	40.0	40.0	11.0	65.4	65.4	11.0	65.4	65.4
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0	8.0	8.0	8.0	8.0	5.0	6.6	6.6	5.0	6.6	6.6
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		12.0	12.0	12.0	12.0	12.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		19.0	19.0	19.0	19.0	19.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	0
Act Effct Green (s)	57.0	52.0	52.0	28.0	28.0	28.0	8.4	78.4	78.4	10.0	82.7	82.7
Actuated g/C Ratio	0.36	0.32	0.32	0.18	0.18	0.18	0.05	0.49	0.49	0.06	0.52	0.52
v/c Ratio	0.73	0.20	0.32	0.49	0.46	0.88	0.25	0.87	0.09	0.50	0.60	0.22
Control Delay	49.8	37.9	8.3	65.2	60.2	54.1	54.5	65.8	21.4	80.4	30.6	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	37.9	8.3	65.2	60.2	54.1	54.5	65.8	21.4	80.4	30.6	3.9
LOS	D	D	A	E	E	D	D	E	C	F	C	A
Approach Delay		35.3			57.8			64.1			30.6	
Approach LOS		D			E			E			C	
Queue Length 50th (m)	76.3	26.7	5.9	28.6	42.7	65.7	6.5	269.1	9.1	17.5	132.8	0.0
Queue Length 95th (m)	93.1	33.3	21.8	44.3	52.7	97.9	m7.0 m#293.5	m10.8	27.9	173.6	15.5	
Internal Link Dist (m)		206.5			190.2			324.6			253.6	
Turn Bay Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Base Capacity (vph)	425	1390	697	291	869	537	204	2520	826	243	2630	908
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.16	0.27	0.34	0.32	0.70	0.19	0.87	0.09	0.45	0.60	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 53 (33%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 48.4
 Intersection LOS: D

Lanes, Volumes, Timings
 10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
 Existing Conditions Calibrated 2019

Intersection Capacity Utilization 91.8% ICU Level of Service F








Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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





































Splits and Phases: 10: Meadowvale Blvd & Mississauga Rd

 Ø1	 Ø2 (R)	 Ø3	 Ø4
16 s	72 s	24 s	48 s
 Ø5	 Ø6 (R)	 Ø8	
16 s	72 s	72 s	

Appendix B-: Future Background Conditions Synchro Output

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

AM Peak Period
09-27-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		  	  		 	  		 	  	
Traffic Volume (vph)	232	1167	211	532	1078	87	55	683	265	183	1617	416
Future Volume (vph)	232	1167	211	532	1078	87	55	683	265	183	1617	416
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1534	5437	1541	3437	4812	1445	2788	4812	1555	3340	5043	1512
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1533	5437	1515	3435	4812	1423	2788	4812	1529	3334	5043	1492
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104			104			262			290
Link Speed (k/h)		80			80			60				60
Link Distance (m)		233.4			222.1			602.4				215.3
Travel Time (s)		10.5			10.0			36.1				12.9
Confl. Peds. (#/hr)	3		4	4		3	1		4	4		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	6%	3%	9%	13%	27%	9%	5%	6%	4%	8%
Adj. Flow (vph)	252	1268	229	578	1172	95	60	742	288	199	1758	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	1268	229	578	1172	95	60	742	288	199	1758	452
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	13.0	50.2	50.2	13.0	50.5	50.5	8.0	45.3	45.3	8.0	45.3	45.3
Total Split (s)	33.0	52.0	52.0	33.0	52.0	52.0	8.0	57.0	57.0	18.0	67.0	67.0
Total Split (%)	20.6%	32.5%	32.5%	20.6%	32.5%	32.5%	5.0%	35.6%	35.6%	11.3%	41.9%	41.9%
Maximum Green (s)	28.0	44.8	44.8	28.0	44.8	44.8	5.0	49.7	49.7	15.0	59.7	59.7
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	0.0	3.3	3.3	0.0	3.3	3.3
Lost Time Adjust (s)	-2.0	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.2	7.2	3.0	7.2	7.2	3.0	7.3	7.3	3.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		35.0	35.0		35.0	35.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	29.1	45.1	45.1	29.7	45.7	45.7	5.0	50.9	50.9	13.8	59.7	59.7
Actuated g/C Ratio	0.18	0.28	0.28	0.19	0.29	0.29	0.03	0.32	0.32	0.09	0.37	0.37
v/c Ratio	0.90	0.83	0.46	0.91	0.85	0.20	0.69	0.48	0.43	0.69	0.93	0.61
Control Delay	97.4	59.4	28.4	82.5	61.3	6.8	112.3	45.5	8.4	84.0	58.4	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	97.4	59.4	28.4	82.5	61.3	6.8	112.3	45.5	8.4	84.0	58.4	17.5
LOS	F	E	C	F	E	A	F	D	A	F	E	B
Approach Delay		60.8			65.2			39.4			52.9	
Approach LOS		E			E			D			D	
Queue Length 50th (m)	78.9	127.1	32.4	93.7	130.8	0.0	9.9	70.6	5.8	32.0	196.7	41.0
Queue Length 95th (m)	#128.0	143.7	58.7	#124.5	149.6	12.0	#21.9	84.5	29.5	45.8	218.0	78.6
Internal Link Dist (m)		209.4			198.1			578.4			191.3	
Turn Bay Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Base Capacity (vph)	287	1533	502	644	1373	480	87	1531	665	313	1881	738
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.83	0.46	0.90	0.85	0.20	0.69	0.48	0.43	0.64	0.93	0.61

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	49 (31%), Referenced to phase 2:EBT, Start of Green
Natural Cycle:	140
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	56.0
Intersection LOS:	E

Lanes, Volumes, Timings
 1: Steeles Ave W & Mississauga Rd

AM Peak Period
 09-27-2019

Intersection Capacity Utilization 105.2% ICU Level of Service G

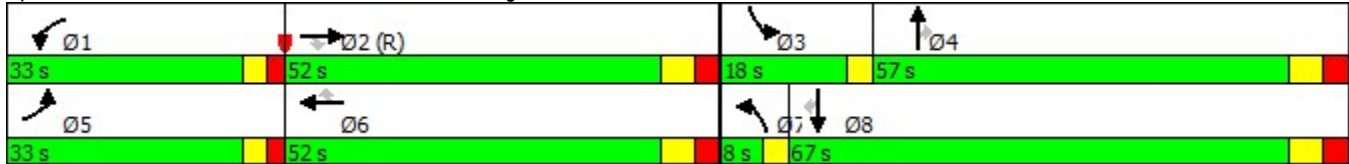
Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Steeles Ave W & Mississauga Rd



Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	166	126	913	2220	188
Future Volume (vph)	14	166	126	913	2220	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	160.0			55.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1415	1498	1659	4812	5043	1617
Flt Permitted	0.950		0.040			
Satd. Flow (perm)	1415	1498	70	4812	5043	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		162				134
Link Speed (k/h)	50			60	60	
Link Distance (m)	158.7			310.3	602.4	
Travel Time (s)	11.4			18.6	36.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	29%	9%	10%	9%	4%	1%
Adj. Flow (vph)	15	180	137	992	2413	204
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	180	137	992	2413	204
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			7.4	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	12.0	12.0	12.0
Minimum Split (s)	15.5	15.5	11.0	25.2	25.2	25.2
Total Split (s)	27.0	27.0	18.0	113.0	95.0	95.0
Total Split (%)	19.3%	19.3%	12.9%	80.7%	67.9%	67.9%
Maximum Green (s)	19.5	19.5	15.0	106.8	88.8	88.8
Yellow Time (s)	4.0	4.0	3.0	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	3.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Walk Time (s)				8.0	8.0	8.0
Flash Dont Walk (s)				11.0	11.0	11.0
Pedestrian Calls (#/hr)				0	0	0
Act Effct Green (s)	10.2	10.2	119.3	116.1	100.8	100.8
Actuated g/C Ratio	0.07	0.07	0.85	0.83	0.72	0.72
v/c Ratio	0.15	0.69	0.69	0.25	0.66	0.17
Control Delay	62.0	26.2	73.6	1.7	12.6	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	26.2	73.6	1.7	12.6	3.2
LOS	E	C	E	A	B	A
Approach Delay	29.0			10.4	11.9	
Approach LOS	C			B	B	
Queue Length 50th (m)	4.0	4.9	26.8	8.8	108.9	4.7
Queue Length 95th (m)	10.8	28.0	49.1	10.2	179.1	16.6
Internal Link Dist (m)	134.7			286.3	578.4	
Turn Bay Length (m)			160.0			55.0
Base Capacity (vph)	197	348	237	3989	3629	1201
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.52	0.58	0.25	0.66	0.17

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	72 (51%), Referenced to phase 2:SBT and 6:NBTL, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.69
Intersection Signal Delay:	12.3
Intersection LOS:	B
Intersection Capacity Utilization:	71.3%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Mississauga Rd & Edgeware Rd



Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	29	137	207	113	11	695	997	117	56	2277	48
Future Volume (vph)	20	29	137	207	113	11	695	997	117	56	2277	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	*1.00	1.00
Frt			0.850				0.850			0.850		0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3544	1570	1772	1902	1633	3506	4683	1585	1738	5489	1601
Flt Permitted	0.678			0.556			0.950			0.251		
Satd. Flow (perm)	1303	3544	1570	1037	1902	1633	3506	4683	1585	459	5489	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			114			127			147
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		401.1			259.0			279.0			310.3	
Travel Time (s)		28.9			18.6			16.7			18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	4%	3%	1%	0%	1%	12%	3%	5%	5%	2%
Adj. Flow (vph)	22	32	149	225	123	12	755	1084	127	61	2475	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	32	149	225	123	12	755	1084	127	61	2475	52
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	15.9	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	8.0	16.0	16.0	13.0	21.0	21.0	37.0	103.0	103.0	8.0	74.0	74.0
Total Split (%)	5.7%	11.4%	11.4%	9.3%	15.0%	15.0%	26.4%	73.6%	73.6%	5.7%	52.9%	52.9%
Maximum Green (s)	5.0	8.1	8.1	10.0	13.1	13.1	32.0	96.4	96.4	5.0	67.4	67.4
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	3.9	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	7.9	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	18.0	8.1	8.1	26.0	16.3	16.3	31.7	98.0	98.0	76.4	67.8	67.8
Actuated g/C Ratio	0.13	0.06	0.06	0.19	0.12	0.12	0.23	0.70	0.70	0.55	0.48	0.48
v/c Ratio	0.12	0.16	0.65	0.92	0.56	0.04	0.95	0.33	0.11	0.21	0.93	0.06
Control Delay	48.9	64.7	22.9	94.4	70.1	0.3	75.5	8.7	1.3	5.4	29.8	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.9	64.7	22.9	94.4	70.1	0.3	75.5	8.7	1.3	5.4	29.8	0.1
LOS	D	E	C	F	E	A	E	A	A	A	C	A
Approach Delay		32.3			82.9			33.9			28.7	
Approach LOS		C			F			C			C	
Queue Length 50th (m)	5.1	4.5	0.0	58.8	33.6	0.0	106.8	41.0	0.0	3.2	211.8	0.0
Queue Length 95th (m)	12.9	10.1	21.7	#110.6	#60.3	0.0	#143.7	48.2	6.0	m4.7	123.5	m0.0
Internal Link Dist (m)		377.1			235.0			255.0			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	186	205	231	245	220	290	801	3278	1147	296	2656	850
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.16	0.65	0.92	0.56	0.04	0.94	0.33	0.11	0.21	0.93	0.06

Intersection Summary

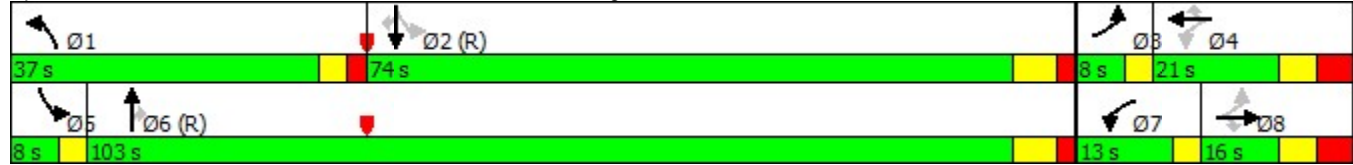
Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	84 (60%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.95
Intersection Signal Delay:	34.6
Intersection LOS:	C
Intersection Capacity Utilization:	98.2%
ICU Level of Service:	F
Analysis Period (min):	15

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
 09-27-2019







- * User Entered Value
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd


















Lanes, Volumes, Timings
4: SB Hwy 407 WB On-Ramp

AM Peak Period
09-27-2019

						
Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑	↗		
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			80.0	0.0	0.0
Storage Lanes	0			1	0	0
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	5142	5142	1883	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	5142	1883	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		97.3	279.0		405.7	
Travel Time (s)		5.8	16.7		30.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.4	7.4		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		Free	Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
09-27-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	956	409	1445	0	0	2564
Future Volume (vph)	956	409	1445	0	0	2564
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	110.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1570	4995	0	0	5043
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1570	4995	0	0	5043
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		27				
Link Speed (k/h)	60		60			60
Link Distance (m)	333.6		152.0			97.3
Travel Time (s)	20.0		9.1			5.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	4%	5%	0%	0%	4%
Adj. Flow (vph)	1039	445	1571	0	0	2787
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1039	445	1571	0	0	2787
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.4		0.0			0.0
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	4		2			2

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
09-27-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		4				
Detector Phase	4	4	2			2
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0			12.0
Minimum Split (s)	15.5	15.5	30.7			30.7
Total Split (s)	53.0	53.0	87.0			87.0
Total Split (%)	37.9%	37.9%	62.1%			62.1%
Maximum Green (s)	45.6	45.6	80.4			80.4
Yellow Time (s)	4.0	4.0	4.6			4.6
All-Red Time (s)	3.4	3.4	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	7.4	7.4	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Walk Time (s)			8.0			8.0
Flash Dont Walk (s)			15.0			15.0
Pedestrian Calls (#/hr)			0			0
Act Effct Green (s)	45.2	45.2	80.8			80.8
Actuated g/C Ratio	0.32	0.32	0.58			0.58
v/c Ratio	0.96	0.85	0.54			0.96
Control Delay	64.9	57.6	19.2			37.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	64.9	57.6	19.2			37.6
LOS	E	E	B			D
Approach Delay	62.7		19.2			37.6
Approach LOS	E		B			D
Queue Length 50th (m)	144.5	108.4	95.0			258.5
Queue Length 95th (m)	#185.9	#163.9	107.9			#285.8
Internal Link Dist (m)	309.6		128.0			73.3
Turn Bay Length (m)		110.0				
Base Capacity (vph)	1098	529	2884			2912
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.95	0.84	0.54			0.96

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	109 (78%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	39.0
Intersection LOS:	D
Intersection Capacity Utilization:	88.5%
ICU Level of Service:	E
Analysis Period (min):	15

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

Splits and Phases: 5: Mississauga Rd & 407 WB Off Ramp



Lanes, Volumes, Timings
 6: Mississauga Rd & NB Hwy 407 WB On-Ramp

AM Peak Period
 09-27-2019

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑			↑↑↑		
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	0	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	0	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	81.8			152.0	285.1	
Travel Time (s)	4.9			9.1	21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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)		14	24		24	14
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	88.5%
Analysis Period (min)	15
	ICU Level of Service E

Lanes, Volumes, Timings
7: SB Hwy 407 EB On-Ramp & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑			
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	5142	5142	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	5142	0	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		141.6	81.8		276.8	
Travel Time (s)		8.5	4.9		20.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	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		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	184	267	0	1326	2766	0
Future Volume (vph)	184	267	0	1326	2766	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	20.0		20.0			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1617	0	4948	5043	0
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1617	0	4948	5043	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		2				
Link Speed (k/h)	60			60	60	
Link Distance (m)	316.3			93.8	141.6	
Travel Time (s)	19.0			5.6	8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	0%	6%	4%	0%
Adj. Flow (vph)	200	290	0	1441	3007	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	200	290	0	1441	3007	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	8.0	8.0		12.0	12.0	
Minimum Split (s)	15.5	15.5		30.7	30.7	
Total Split (s)	39.0	39.0		101.0	101.0	
Total Split (%)	27.9%	27.9%		72.1%	72.1%	
Maximum Green (s)	31.5	31.5		94.3	94.3	
Yellow Time (s)	4.0	4.0		4.6	4.6	
All-Red Time (s)	3.5	3.5		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.5	7.5		6.7	6.7	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)				8.0	8.0	
Flash Dont Walk (s)				16.0	16.0	
Pedestrian Calls (#/hr)				0	0	
Act Effct Green (s)	28.4	28.4		97.4	97.4	
Actuated g/C Ratio	0.20	0.20		0.70	0.70	
v/c Ratio	0.29	0.88		0.42	0.86	
Control Delay	47.7	80.2		9.9	20.0	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	47.7	80.2		9.9	20.0	
LOS	D	F		A	C	
Approach Delay	67.0			9.9	20.0	
Approach LOS	E			A	C	
Queue Length 50th (m)	23.8	76.5		61.2	224.2	
Queue Length 95th (m)	34.8	#118.3		71.3	251.1	
Internal Link Dist (m)	292.3			69.8	117.6	
Turn Bay Length (m)		100.0				
Base Capacity (vph)	758	365		3441	3507	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.26	0.79		0.42	0.86	

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	136 (97%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	21.7
Intersection LOS:	C
Intersection Capacity Utilization:	60.7%
ICU Level of Service:	B
Analysis Period (min):	15

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

Splits and Phases: 8: 407 EB Off Ramp & Mississauga Rd



Lanes, Volumes, Timings
 9: NB Hwy 407 EB On-Ramp

AM Peak Period
 09-27-2019

























	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗		↑↑↑		
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		85.0	0.0		0.0	0.0
Storage Lanes		1	0		0	0
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	1883	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	1883	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	254.5			93.8	439.8	
Travel Time (s)	15.3			5.6	33.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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)		14	24		24	14
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
09-27-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	328	128	47	198	178	89	1843	83	263	2278	347
Future Volume (vph)	109	328	128	47	198	178	89	1843	83	263	2278	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor	0.99		0.97	0.99		0.98			0.98	1.00		
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1690	3380	1408	1587	3411	1601	3404	5092	1526	3541	5092	1617
Fl _t Permitted	0.471			0.538			0.950			0.950		
Satd. Flow (perm)	833	3380	1372	891	3411	1570	3404	5092	1498	3538	5092	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			139			193			123			377
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		230.5			214.1			174.3			277.6	
Travel Time (s)		13.8			12.8			10.5			16.7	
Confl. Peds. (#/hr)	5		9	9		5			3	3		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	16%	15%	7%	2%	4%	3%	7%	0%	3%	1%
Adj. Flow (vph)	118	357	139	51	215	193	97	2003	90	286	2476	377
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	357	139	51	215	193	97	2003	90	286	2476	377
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
09-27-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8			4		1	6		5	2	
Permitted Phases	8		8	4		4			6			2
Detector Phase	3	8	8	4	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	12.0	12.0	8.0	12.0	12.0
Minimum Split (s)	8.0	39.0	39.0	39.0	39.0	39.0	13.0	28.6	28.6	13.0	28.6	28.6
Total Split (s)	11.0	59.0	59.0	48.0	48.0	48.0	18.0	75.0	75.0	26.0	83.0	83.0
Total Split (%)	6.9%	36.9%	36.9%	30.0%	30.0%	30.0%	11.3%	46.9%	46.9%	16.3%	51.9%	51.9%
Maximum Green (s)	8.0	51.0	51.0	40.0	40.0	40.0	13.0	68.4	68.4	21.0	76.4	76.4
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0	8.0	8.0	8.0	8.0	5.0	6.6	6.6	5.0	6.6	6.6
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		12.0	12.0	12.0	12.0	12.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		19.0	19.0	19.0	19.0	19.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	0
Act Effct Green (s)	32.5	27.5	27.5	16.5	16.5	16.5	10.1	94.8	94.8	18.2	102.8	102.8
Actuated g/C Ratio	0.20	0.17	0.17	0.10	0.10	0.10	0.06	0.59	0.59	0.11	0.64	0.64
v/c Ratio	0.56	0.62	0.40	0.56	0.61	0.58	0.45	0.66	0.10	0.71	0.76	0.32
Control Delay	64.8	65.7	11.0	89.7	75.7	14.8	78.7	24.3	1.2	78.3	22.7	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.8	65.7	11.0	89.7	75.7	14.8	78.7	24.3	1.2	78.3	22.7	2.0
LOS	E	E	B	F	E	B	E	C	A	E	C	A
Approach Delay		53.2			51.7			25.8			25.3	
Approach LOS		D			D			C			C	
Queue Length 50th (m)	32.8	56.5	0.0	15.8	35.3	0.0	15.6	148.9	0.0	45.9	186.5	0.0
Queue Length 95th (m)	49.8	69.8	18.5	29.7	47.1	23.1	25.3	197.6	3.8	60.1	244.3	13.5
Internal Link Dist (m)		206.5			190.1			150.3			253.6	
Turn Bay Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Base Capacity (vph)	211	1077	532	222	852	537	276	3015	937	472	3272	1173
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.33	0.26	0.23	0.25	0.36	0.35	0.66	0.10	0.61	0.76	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 53 (33%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 30.0
 Intersection LOS: C

Lanes, Volumes, Timings
 10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
 09-27-2019

Intersection Capacity Utilization 93.8% ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 10: Meadowvale Blvd & Mississauga Rd



Lanes, Volumes, Timings
50: Mississauga Rd

AM Peak Period
09-27-2019




































Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	90.0		45.0	105.0		70.0
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Flt Permitted												
Satd. Flow (perm)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Link Speed (k/h)		50			48			60			60	
Link Distance (m)		128.1			116.5			277.6			254.5	
Travel Time (s)		9.2			8.7			16.7			15.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
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)		0.0			0.0			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

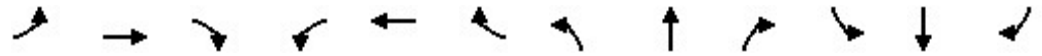
Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

PM Peak Period
Future Background 2031 PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		  	  		 	  		  	  	
Traffic Volume (vph)	374	1333	133	220	1197	174	305	1769	549	126	729	300
Future Volume (vph)	374	1333	133	220	1197	174	305	1769	549	126	729	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	*1.00	1.00	0.97	0.91	1.00
Ped Bike Factor	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	4768	1526	3471	4995	1633	3309	5706	1617	3309	4995	1484
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1755	4768	1501	3469	4995	1612	3308	5706	1585	3307	4995	1465
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104			138			224			326
Link Speed (k/h)		80			80			60				60
Link Distance (m)		233.5			222.0			602.3				215.4
Travel Time (s)		10.5			10.0			36.1				12.9
Confl. Peds. (#/hr)	1		4	4		1	1		6	6		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	10%	7%	2%	5%	0%	7%	1%	1%	7%	5%	10%
Adj. Flow (vph)	407	1449	145	239	1301	189	332	1923	597	137	792	326
Shared Lane Traffic (%)												
Lane Group Flow (vph)	407	1449	145	239	1301	189	332	1923	597	137	792	326
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	13.0	50.2	50.2	13.0	50.5	50.5	8.0	45.3	45.3	8.0	45.3	45.3
Total Split (s)	39.0	69.0	69.0	21.0	51.0	51.0	22.0	60.0	60.0	10.0	48.0	48.0
Total Split (%)	24.4%	43.1%	43.1%	13.1%	31.9%	31.9%	13.8%	37.5%	37.5%	6.3%	30.0%	30.0%
Maximum Green (s)	34.0	61.8	61.8	16.0	43.8	43.8	19.0	52.7	52.7	7.0	40.7	40.7
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	0.0	3.3	3.3	0.0	3.3	3.3
Lost Time Adjust (s)	-2.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.2	7.2	4.0	7.2	7.2	3.0	7.3	7.3	3.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		35.0	35.0		35.0	35.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	36.0	62.9	62.9	15.9	43.8	43.8	18.5	52.7	52.7	7.0	41.2	41.2
Actuated g/C Ratio	0.22	0.39	0.39	0.10	0.27	0.27	0.12	0.33	0.33	0.04	0.26	0.26
v/c Ratio	1.03	0.77	0.22	0.69	0.95	0.35	0.87	1.02	0.89	0.95	0.62	0.53
Control Delay	113.0	46.0	11.3	80.7	72.0	15.6	91.7	79.0	47.7	137.1	55.0	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	113.0	46.0	11.3	80.7	72.0	15.6	91.7	79.0	47.7	137.1	55.0	7.8
LOS	F	D	B	F	E	B	F	E	D	F	D	A
Approach Delay		57.1			67.0			73.9			51.7	
Approach LOS		E			E			E			D	
Queue Length 50th (m)	~138.1	148.4	8.2	38.2	149.9	12.3	54.2	~215.9	123.5	22.8	82.4	0.0
Queue Length 95th (m)	#204.6	167.1	23.7	53.2	#178.6	33.6	#78.2	#241.4	#195.2	#45.0	97.6	25.8
Internal Link Dist (m)		209.5			198.0			578.3			191.4	
Turn Bay Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Base Capacity (vph)	394	1874	653	368	1367	541	392	1879	672	144	1285	618
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.77	0.22	0.65	0.95	0.35	0.85	1.02	0.89	0.95	0.62	0.53

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 111 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 64.5
 Intersection LOS: E

Lanes, Volumes, Timings
 1: Steeles Ave W & Mississauga Rd

PM Peak Period
 Future Background 2031 PM

Intersection Capacity Utilization 113.6% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Steeles Ave W & Mississauga Rd



Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	157	123	150	2438	1092	17
Future Volume (vph)	157	123	150	2438	1092	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	160.0			55.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor			1.00			0.97
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1807	1396	1738	5043	4902	1458
Flt Permitted	0.950		0.195			
Satd. Flow (perm)	1807	1396	357	5043	4902	1421
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		134				18
Link Speed (k/h)	50			60	60	
Link Distance (m)	158.7			310.3	602.3	
Travel Time (s)	11.4			18.6	36.1	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	17%	5%	4%	7%	12%
Adj. Flow (vph)	171	134	163	2650	1187	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	171	134	163	2650	1187	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			7.4	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	

Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	12.0	12.0	12.0
Minimum Split (s)	15.5	15.5	11.0	25.2	25.2	25.2
Total Split (s)	28.0	28.0	13.0	82.0	69.0	69.0
Total Split (%)	25.5%	25.5%	11.8%	74.5%	62.7%	62.7%
Maximum Green (s)	20.5	20.5	10.0	75.8	62.8	62.8
Yellow Time (s)	4.0	4.0	3.0	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	3.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Walk Time (s)				8.0	8.0	8.0
Flash Dont Walk (s)				11.0	11.0	11.0
Pedestrian Calls (#/hr)				0	0	0
Act Effct Green (s)	15.4	15.4	84.1	80.9	69.2	69.2
Actuated g/C Ratio	0.14	0.14	0.76	0.74	0.63	0.63
v/c Ratio	0.68	0.43	0.43	0.71	0.39	0.02
Control Delay	57.8	11.3	7.4	10.1	11.0	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.8	11.3	7.4	10.1	11.0	4.2
LOS	E	B	A	B	B	A
Approach Delay	37.4			9.9	10.9	
Approach LOS	D			A	B	
Queue Length 50th (m)	35.3	0.0	7.7	100.9	41.8	0.0
Queue Length 95th (m)	54.7	16.0	15.8	139.9	60.0	3.0
Internal Link Dist (m)	134.7			286.3	578.3	
Turn Bay Length (m)			160.0			55.0
Base Capacity (vph)	336	369	398	3707	3083	900
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.36	0.41	0.71	0.39	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	42 (38%), Referenced to phase 2:SBT and 6:NBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	12.1
Intersection LOS:	B

Lanes, Volumes, Timings
 2: Mississauga Rd & Edgeware Rd

PM Peak Period
 Future Background 2031 PM

Intersection Capacity Utilization 67.2% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 2: Mississauga Rd & Edgeware Rd



Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	96	604	128	10	27	61	2484	212	35	1105	8
Future Volume (vph)	86	96	604	128	10	27	61	2484	212	35	1105	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	*1.00	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00		0.99	1.00		0.99	1.00					0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3650	1633	1789	1921	1633	3219	5595	1617	1772	4995	1633
Fl _t Permitted	0.659			0.686			0.950			0.103		
Satd. Flow (perm)	1264	3650	1611	1291	1921	1610	3218	5595	1617	192	4995	1611
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180			105			125			119
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		401.0			259.0			260.2			310.3	
Travel Time (s)		28.9			18.6			15.6			18.6	
Confl. Peds. (#/hr)	2		1	1		2	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	10%	3%	1%	3%	5%	0%
Adj. Flow (vph)	93	104	657	139	11	29	66	2700	230	38	1201	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	104	657	139	11	29	66	2700	230	38	1201	9
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	15.9	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	8.0	33.0	33.0	8.0	33.0	33.0	13.0	51.0	51.0	8.0	46.0	46.0
Total Split (%)	8.0%	33.0%	33.0%	8.0%	33.0%	33.0%	13.0%	51.0%	51.0%	8.0%	46.0%	46.0%
Maximum Green (s)	5.0	25.1	25.1	5.0	25.1	25.1	8.0	44.4	44.4	5.0	39.4	39.4
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	3.9	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	7.9	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	35.6	25.1	25.1	29.6	23.3	23.3	8.0	47.6	47.6	49.6	42.0	42.0
Actuated g/C Ratio	0.36	0.25	0.25	0.30	0.23	0.23	0.08	0.48	0.48	0.50	0.42	0.42
v/c Ratio	0.18	0.11	1.22	0.34	0.02	0.06	0.26	1.01	0.28	0.22	0.57	0.01
Control Delay	21.6	29.3	140.4	28.4	28.7	0.3	46.0	48.5	8.7	13.4	24.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.6	29.3	140.4	28.4	28.7	0.3	46.0	48.5	8.7	13.4	24.2	0.0
LOS	C	C	F	C	C	A	D	D	A	B	C	A
Approach Delay		113.9			23.8			45.4			23.7	
Approach LOS		F			C			D			C	
Queue Length 50th (m)	11.6	8.2	~129.6	17.8	1.6	0.0	6.3	~197.1	11.8	3.1	66.7	0.0
Queue Length 95th (m)	22.0	14.8	#196.7	31.3	5.9	0.0	12.7	#223.0	26.8	7.5	81.2	0.0
Internal Link Dist (m)		377.0			235.0			236.2			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	515	916	539	406	513	506	257	2663	835	174	2098	745
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.18	0.11	1.22	0.34	0.02	0.06	0.26	1.01	0.28	0.22	0.57	0.01

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 45 (45%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.22
 Intersection Signal Delay: 50.6
 Intersection LOS: D

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
 Future Background 2031 PM

Intersection Capacity Utilization 81.4% ICU Level of Service D

Analysis Period (min) 15

* User Entered Value

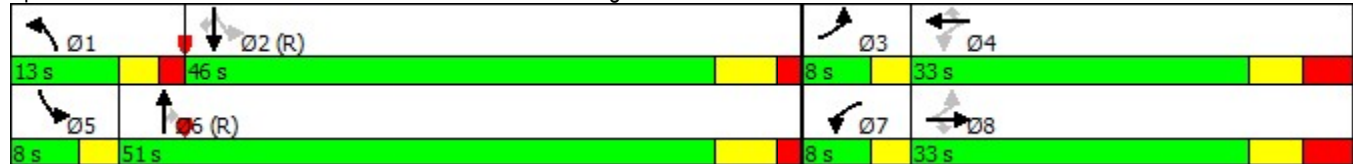
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.







Queue shown is maximum after two cycles.

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd


















Lanes, Volumes, Timings
4: SB Hwy 407 WB On-Ramp

PM Peak Period
Future Background 2031 PM

						
Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑	↗		
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			80.0	0.0	0.0
Storage Lanes	0			1	0	0
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	5142	5142	1883	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	5142	1883	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		116.1	260.2		427.9	
Travel Time (s)		7.0	15.6		32.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.4	7.4		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		Free	Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
Future Background 2031 PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	704	631	2238	0	0	1680
Future Volume (vph)	704	631	2238	0	0	1680
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	110.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3404	1541	5092	0	0	5043
Flt Permitted	0.950					
Satd. Flow (perm)	3404	1541	5092	0	0	5043
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		1				
Link Speed (k/h)	60		60			60
Link Distance (m)	296.7		104.8			116.1
Travel Time (s)	17.8		6.3			7.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	3%	0%	0%	4%
Adj. Flow (vph)	765	686	2433	0	0	1826
Shared Lane Traffic (%)						
Lane Group Flow (vph)	765	686	2433	0	0	1826
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.4		0.0			0.0
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	4		2			6

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
Future Background 2031 PM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		4				
Detector Phase	4	4	2			6
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0			12.0
Minimum Split (s)	15.4	15.4	29.6			29.6
Total Split (s)	46.2	46.2	53.8			53.8
Total Split (%)	46.2%	46.2%	53.8%			53.8%
Maximum Green (s)	38.8	38.8	47.2			47.2
Yellow Time (s)	4.0	4.0	4.6			4.6
All-Red Time (s)	3.4	3.4	2.0			2.0
Lost Time Adjust (s)	-1.0	-2.0	0.0			0.0
Total Lost Time (s)	6.4	5.4	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Walk Time (s)			8.0			8.0
Flash Dont Walk (s)			15.0			15.0
Pedestrian Calls (#/hr)			0			0
Act Effct Green (s)	39.8	40.8	47.2			47.2
Actuated g/C Ratio	0.40	0.41	0.47			0.47
v/c Ratio	0.56	1.09	1.01			0.77
Control Delay	25.4	93.2	48.5			24.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	25.4	93.2	48.5			24.6
LOS	C	F	D			C
Approach Delay	57.4		48.5			24.6
Approach LOS	E		D			C
Queue Length 50th (m)	58.2	~151.0	~172.8			103.5
Queue Length 95th (m)	75.9	#219.2	#211.8			122.2
Internal Link Dist (m)	272.7		80.8			92.1
Turn Bay Length (m)		110.0				
Base Capacity (vph)	1354	629	2403			2380
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.56	1.09	1.01			0.77

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	20 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	100
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.09
Intersection Signal Delay:	43.1
Intersection LOS:	D
Intersection Capacity Utilization:	88.2%
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
 5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
 Future Background 2031 PM

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 5: Mississauga Rd & 407 WB Off Ramp

 Ø2 (R)	 Ø4
53.8 s	46.2 s
 Ø6 (R)	
53.8 s	

Lanes, Volumes, Timings
 6: Mississauga Rd & NB Hwy 407 WB On-Ramp

PM Peak Period
 Future Background 2031 PM

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑			↑↑↑		
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	0	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	0	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	111.3			104.8	312.1	
Travel Time (s)	6.7			6.3	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	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)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	88.2%
Analysis Period (min)	15
	ICU Level of Service E

Lanes, Volumes, Timings
 7: SB Hwy 407 EB On-Ramp & Mississauga Rd

PM Peak Period
 Future Background 2031 PM



Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑			
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	5142	5142	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	5142	0	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		159.3	111.3		313.5	
Travel Time (s)		9.6	6.7		23.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	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		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7% ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	126	42	0	2168	1926	0
Future Volume (vph)	126	42	0	2168	1926	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	20.0		20.0			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1555	0	5092	4995	0
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1555	0	5092	4995	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		23				
Link Speed (k/h)	60			60	60	
Link Distance (m)	313.7			70.5	159.3	
Travel Time (s)	18.8			4.2	9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	0%	3%	5%	0%
Adj. Flow (vph)	137	46	0	2357	2093	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	137	46	0	2357	2093	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0		12.0	12.0	
Minimum Split (s)	15.5	15.5		30.7	30.7	
Total Split (s)	20.0	20.0		80.0	80.0	
Total Split (%)	20.0%	20.0%		80.0%	80.0%	
Maximum Green (s)	12.5	12.5		73.3	73.3	
Yellow Time (s)	4.0	4.0		4.6	4.6	
All-Red Time (s)	3.5	3.5		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.5	7.5		6.7	6.7	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)				8.0	8.0	
Flash Dont Walk (s)				16.0	16.0	
Pedestrian Calls (#/hr)				0	0	
Act Effct Green (s)	9.6	9.6		76.2	76.2	
Actuated g/C Ratio	0.10	0.10		0.76	0.76	
v/c Ratio	0.42	0.27		0.61	0.55	
Control Delay	46.3	28.9		6.3	5.7	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	46.3	28.9		6.3	5.7	
LOS	D	C		A	A	
Approach Delay	41.9			6.3	5.7	
Approach LOS	D			A	A	
Queue Length 50th (m)	13.1	4.2		59.8	49.1	
Queue Length 95th (m)	21.8	14.4		80.0	66.1	
Internal Link Dist (m)	289.7			46.5	135.3	
Turn Bay Length (m)		100.0				
Base Capacity (vph)	421	214		3878	3804	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.33	0.21		0.61	0.55	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	92 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	55
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	7.4
Intersection LOS:	A
Intersection Capacity Utilization:	60.4%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 8: 407 EB Off Ramp & Mississauga Rd

 Ø2 (R)	 Ø4
80 s	20 s
 Ø6 (R)	
80 s	

































Lanes, Volumes, Timings
9: NB Hwy 407 EB On-Ramp

PM Peak Period
Future Background 2031 PM

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗		↑↑↑		
Traffic Volume (vph)	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		80.0	0.0		0.0	0.0
Storage Lanes		1	0		0	0
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	1883	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	1883	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	277.6			70.5	458.1	
Travel Time (s)	16.7			4.2	34.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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)		14	24		24	14
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	0.0%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
Future Background 2031 PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		 	  	
Traffic Volume (vph)	285	204	173	91	259	346	36	2282	70	100	1649	188
Future Volume (vph)	285	204	173	91	259	346	36	2282	70	100	1649	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor			0.98	0.99			1.00		0.99	1.00		0.98
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3476	1541	1825	3476	1617	2975	5142	1617	3506	5092	1601
Flt Permitted	0.451			0.613			0.950			0.950		
Satd. Flow (perm)	849	3476	1503	1167	3476	1617	2972	5142	1594	3505	5092	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			159			177			89			204
Link Speed (k/h)		60			60			60				60
Link Distance (m)		230.5			214.2			174.3				277.6
Travel Time (s)		13.8			12.9			10.5				16.7
Confl. Peds. (#/hr)			8	8			4		1	1		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	6%	0%	5%	1%	19%	2%	1%	1%	3%	2%
Adj. Flow (vph)	310	222	188	99	282	376	39	2480	76	109	1792	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	310	222	188	99	282	376	39	2480	76	109	1792	204
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)		3.7			3.7			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
Future Background 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8			4		1	6		5	2	
Permitted Phases	8		8	4		4			6			2
Detector Phase	3	8	8	4	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	12.0	12.0	8.0	12.0	12.0
Minimum Split (s)	8.0	39.0	39.0	39.0	39.0	39.0	13.0	28.6	28.6	13.0	28.6	28.6
Total Split (s)	24.0	72.0	72.0	48.0	48.0	48.0	16.0	72.0	72.0	16.0	72.0	72.0
Total Split (%)	15.0%	45.0%	45.0%	30.0%	30.0%	30.0%	10.0%	45.0%	45.0%	10.0%	45.0%	45.0%
Maximum Green (s)	21.0	64.0	64.0	40.0	40.0	40.0	11.0	65.4	65.4	11.0	65.4	65.4
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0	8.0	8.0	8.0	8.0	5.0	6.6	6.6	5.0	6.6	6.6
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		12.0	12.0	12.0	12.0	12.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		19.0	19.0	19.0	19.0	19.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	0
Act Effct Green (s)	57.0	52.0	52.0	28.0	28.0	28.0	8.4	78.4	78.4	10.0	82.7	82.7
Actuated g/C Ratio	0.36	0.32	0.32	0.18	0.18	0.18	0.05	0.49	0.49	0.06	0.52	0.52
v/c Ratio	0.73	0.20	0.32	0.49	0.46	0.88	0.25	0.98	0.09	0.50	0.68	0.22
Control Delay	49.8	37.9	8.5	65.2	60.2	54.1	76.7	54.2	3.8	80.4	32.9	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	37.9	8.5	65.2	60.2	54.1	76.7	54.2	3.8	80.4	32.9	3.9
LOS	D	D	A	E	E	D	E	D	A	F	C	A
Approach Delay		35.3			57.8			53.1			32.5	
Approach LOS		D			E			D			C	
Queue Length 50th (m)	76.3	26.7	6.3	28.6	42.7	65.7	6.2	283.9	0.0	17.5	159.0	0.0
Queue Length 95th (m)	93.1	33.3	22.3	44.3	52.7	97.9	12.7	#369.5	7.9	27.9	205.8	15.5
Internal Link Dist (m)		206.5			190.2			150.3			253.6	
Turn Bay Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Base Capacity (vph)	425	1390	696	291	869	537	204	2520	826	243	2630	908
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.16	0.27	0.34	0.32	0.70	0.19	0.98	0.09	0.45	0.68	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 53 (33%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 44.6
 Intersection LOS: D

Lanes, Volumes, Timings
 10: Meadowvale Blvd & Mississauga Rd

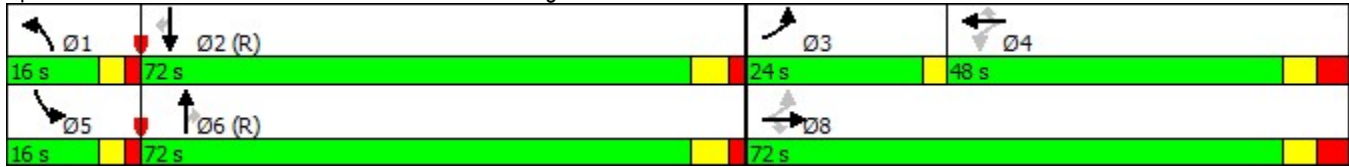
PM Peak Period
 Future Background 2031 PM

Intersection Capacity Utilization 96.8% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 10: Meadowvale Blvd & Mississauga Rd



Lanes, Volumes, Timings
50: Mississauga Rd

PM Peak Period
Future Background 2031 PM

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	90.0		45.0	105.0		70.0
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Flt Permitted												
Satd. Flow (perm)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Link Speed (k/h)		50			48			60			60	
Link Distance (m)		172.2			145.0			277.6			277.6	
Travel Time (s)		12.4			10.9			16.7			16.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
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)		0.0			0.0			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	





































Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Appendix C-: Future Total Conditions Synchro Output

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

AM Peak Period
10-08-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		  	  		 	  		  	  	
Traffic Volume (vph)	232	1167	228	566	1078	87	60	724	275	183	1770	416
Future Volume (vph)	232	1167	228	566	1078	87	60	724	275	183	1770	416
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	*1.00	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor	1.00		0.98	1.00		0.98	1.00		0.98	1.00		0.99
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1534	5437	1541	3437	4812	1445	2788	4812	1555	3340	5043	1512
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1533	5437	1515	3435	4812	1423	2788	4812	1529	3335	5043	1492
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104			104			262			271
Link Speed (k/h)		80			80			60				60
Link Distance (m)		233.4			222.1			602.4				215.3
Travel Time (s)		10.5			10.0			36.1				12.9
Confl. Peds. (#/hr)	3		4	4		3	1		4	4		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	19%	6%	6%	3%	9%	13%	27%	9%	5%	6%	4%	8%
Adj. Flow (vph)	252	1268	248	615	1172	95	65	787	299	199	1924	452
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	1268	248	615	1172	95	65	787	299	199	1924	452
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2			6			4			8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	13.0	50.2	50.2	13.0	50.5	50.5	8.0	45.3	45.3	8.0	45.3	45.3
Total Split (s)	30.0	50.7	50.7	32.0	52.7	52.7	8.0	59.3	59.3	18.0	69.3	69.3
Total Split (%)	18.8%	31.7%	31.7%	20.0%	32.9%	32.9%	5.0%	37.1%	37.1%	11.3%	43.3%	43.3%
Maximum Green (s)	25.0	43.5	43.5	27.0	45.5	45.5	5.0	52.0	52.0	15.0	62.0	62.0
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	0.0	3.3	3.3	0.0	3.3	3.3
Lost Time Adjust (s)	-2.0	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.2	7.2	3.0	7.2	7.2	3.0	7.3	7.3	3.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	None	None	None	None
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		35.0	35.0		35.0	35.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	27.0	43.5	43.5	29.0	45.5	45.5	5.0	53.2	53.2	13.8	62.0	62.0
Actuated g/C Ratio	0.17	0.27	0.27	0.18	0.28	0.28	0.03	0.33	0.33	0.09	0.39	0.39
v/c Ratio	0.98	0.86	0.51	0.99	0.86	0.20	0.75	0.49	0.44	0.69	0.98	0.61
Control Delay	115.1	62.2	31.9	97.7	61.5	6.7	119.7	44.1	8.9	84.0	65.2	18.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.1	62.2	31.9	97.7	61.5	6.7	119.7	44.1	8.9	84.0	65.2	18.5
LOS	F	E	C	F	E	A	F	D	A	F	E	B
Approach Delay		65.5			70.6			39.2			58.4	
Approach LOS		E			E			D			E	
Queue Length 50th (m)	80.8	128.6	38.6	101.9	130.0	0.0	10.7	74.0	8.2	32.0	221.4	45.5
Queue Length 95th (m)	#137.4	145.4	67.1	#141.4	148.6	11.9	#24.2	87.9	32.9	45.8	#256.3	82.9
Internal Link Dist (m)		209.4			198.1			578.4			191.3	
Turn Bay Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Base Capacity (vph)	258	1478	487	622	1368	479	87	1601	683	313	1954	744
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.86	0.51	0.99	0.86	0.20	0.75	0.49	0.44	0.64	0.98	0.61

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	49 (31%), Referenced to phase 2:EBT, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.99
Intersection Signal Delay:	60.2
Intersection LOS:	E

Lanes, Volumes, Timings
 1: Steeles Ave W & Mississauga Rd

AM Peak Period
 10-08-2019

Intersection Capacity Utilization 109.1% ICU Level of Service H

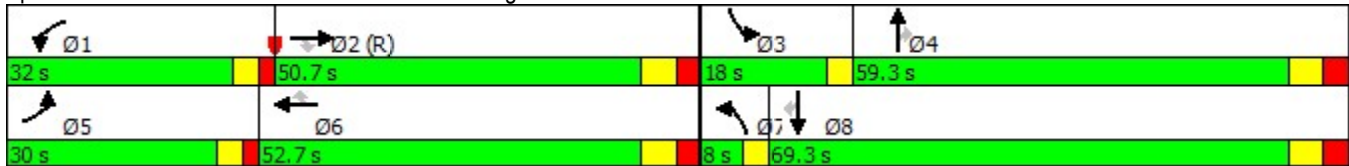
Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Steeles Ave W & Mississauga Rd



Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	166	126	968	2424	188
Future Volume (vph)	14	166	126	968	2424	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	160.0			55.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1415	1498	1659	4812	5043	1617
Flt Permitted	0.950		0.038			
Satd. Flow (perm)	1415	1498	66	4812	5043	1617
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		169				122
Link Speed (k/h)	50			60	60	
Link Distance (m)	158.7			310.3	602.4	
Travel Time (s)	11.4			18.6	36.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	29%	9%	10%	9%	4%	1%
Adj. Flow (vph)	15	180	137	1052	2635	204
Shared Lane Traffic (%)						
Lane Group Flow (vph)	15	180	137	1052	2635	204
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			7.4	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	

Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	12.0	12.0	12.0
Minimum Split (s)	15.5	15.5	11.0	25.2	25.2	25.2
Total Split (s)	26.0	26.0	19.0	114.0	95.0	95.0
Total Split (%)	18.6%	18.6%	13.6%	81.4%	67.9%	67.9%
Maximum Green (s)	18.5	18.5	16.0	107.8	88.8	88.8
Yellow Time (s)	4.0	4.0	3.0	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	3.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Walk Time (s)				8.0	8.0	8.0
Flash Dont Walk (s)				11.0	11.0	11.0
Pedestrian Calls (#/hr)				0	0	0
Act Effct Green (s)	10.0	10.0	119.5	116.3	101.0	101.0
Actuated g/C Ratio	0.07	0.07	0.85	0.83	0.72	0.72
v/c Ratio	0.15	0.68	0.70	0.26	0.72	0.17
Control Delay	62.6	24.1	72.0	1.9	13.9	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.6	24.1	72.0	1.9	13.9	3.5
LOS	E	C	E	A	B	A
Approach Delay	27.0			9.9	13.2	
Approach LOS	C			A	B	
Queue Length 50th (m)	4.0	3.0	26.8	12.0	129.4	5.5
Queue Length 95th (m)	10.8	25.9	49.7	11.9	210.9	17.9
Internal Link Dist (m)	134.7			286.3	578.4	
Turn Bay Length (m)			160.0			55.0
Base Capacity (vph)	186	344	244	3998	3638	1200
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.52	0.56	0.26	0.72	0.17

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	72 (51%), Referenced to phase 2:SBT and 6:NBTL, Start of Green
Natural Cycle:	75
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.72
Intersection Signal Delay:	12.9
Intersection LOS:	B
Intersection Capacity Utilization:	75.2%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 2: Mississauga Rd & Edgeware Rd



Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	34	160	207	130	11	780	997	117	56	2277	252
Future Volume (vph)	75	34	160	207	130	11	780	997	117	56	2277	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	*1.00	1.00
Frt			0.850				0.850			0.850		0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3544	1570	1772	1902	1633	3506	4683	1585	1738	5489	1601
Flt Permitted	0.667			0.534			0.950			0.251		
Satd. Flow (perm)	1281	3544	1570	996	1902	1633	3506	4683	1585	459	5489	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			174			114			127			152
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		302.7			259.0			279.0			310.3	
Travel Time (s)		21.8			18.6			16.7			18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	4%	3%	1%	0%	1%	12%	3%	5%	5%	2%
Adj. Flow (vph)	82	37	174	225	141	12	848	1084	127	61	2475	274
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	37	174	225	141	12	848	1084	127	61	2475	274
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	15.9	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	8.0	16.0	16.0	12.0	20.0	20.0	39.0	104.0	104.0	8.0	73.0	73.0
Total Split (%)	5.7%	11.4%	11.4%	8.6%	14.3%	14.3%	27.9%	74.3%	74.3%	5.7%	52.1%	52.1%
Maximum Green (s)	5.0	8.1	8.1	9.0	12.1	12.1	34.0	97.4	97.4	5.0	66.4	66.4
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	3.9	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	7.9	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	18.0	8.1	8.1	25.0	12.1	12.1	34.0	99.0	99.0	75.0	66.4	66.4
Actuated g/C Ratio	0.13	0.06	0.06	0.18	0.09	0.09	0.24	0.71	0.71	0.54	0.47	0.47
v/c Ratio	0.45	0.18	0.69	0.99	0.86	0.05	1.00	0.33	0.11	0.21	0.95	0.33
Control Delay	59.7	65.1	23.1	112.8	103.8	0.4	82.1	8.6	1.5	5.7	32.9	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.7	65.1	23.1	112.8	103.8	0.4	82.1	8.6	1.5	5.7	32.9	5.3
LOS	E	E	C	F	F	A	F	A	A	A	C	A
Approach Delay		38.6			105.9			38.4			29.6	
Approach LOS		D			F			D			C	
Queue Length 50th (m)	19.8	5.2	0.0	59.3	39.2	0.0	121.9	40.6	0.2	3.3	215.0	6.4
Queue Length 95th (m)	35.5	11.3	#23.9	#115.6	#76.9	0.0	#165.5	48.1	6.2	m5.6	178.3	19.1
Internal Link Dist (m)		278.7			235.0			255.0			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	184	205	254	227	164	245	851	3312	1158	291	2603	839
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.18	0.69	0.99	0.86	0.05	1.00	0.33	0.11	0.21	0.95	0.33

Intersection Summary

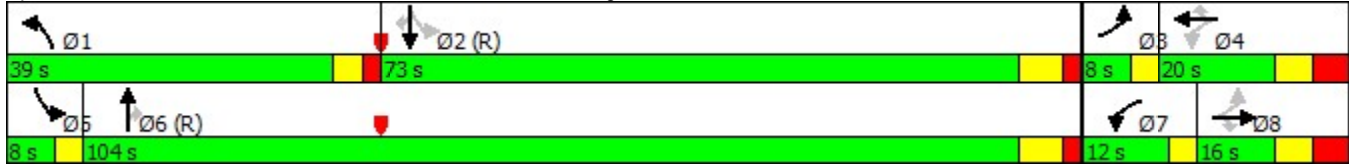
Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	84 (60%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
Natural Cycle:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	38.6
Intersection LOS:	D
Intersection Capacity Utilization:	104.0%
ICU Level of Service:	G
Analysis Period (min):	15

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
 10-08-2019

- * User Entered Value
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd



Lanes, Volumes, Timings
4: SB Hwy 407 WB On-Ramp

AM Peak Period
10-08-2019


















Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑	↗		
Traffic Volume (vph)	0	85	19	5	0	0
Future Volume (vph)	0	85	19	5	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			80.0	0.0	0.0
Storage Lanes	0			1	0	0
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		
Flt Protected						
Satd. Flow (prot)	0	5142	5142	1601	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	5142	1601	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		97.3	279.0		405.7	
Travel Time (s)		5.8	16.7		30.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	92	21	5	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	92	21	5	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.4	7.4		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		Free	Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
10-08-2019

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	956	426	1513	0	0	2583
Future Volume (vph)	956	426	1513	0	0	2583
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	110.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1570	4995	0	0	5043
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1570	4995	0	0	5043
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		23				
Link Speed (k/h)	60		60			60
Link Distance (m)	333.6		152.0			97.3
Travel Time (s)	20.0		9.1			5.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	4%	5%	0%	0%	4%
Adj. Flow (vph)	1039	463	1645	0	0	2808
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1039	463	1645	0	0	2808
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.4		0.0			0.0
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	4		2			2

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
10-08-2019



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		4				
Detector Phase	4	4	2			2
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0			12.0
Minimum Split (s)	15.5	15.5	30.7			30.7
Total Split (s)	52.0	52.0	88.0			88.0
Total Split (%)	37.1%	37.1%	62.9%			62.9%
Maximum Green (s)	44.6	44.6	81.4			81.4
Yellow Time (s)	4.0	4.0	4.6			4.6
All-Red Time (s)	3.4	3.4	2.0			2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	7.4	7.4	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Walk Time (s)			8.0			8.0
Flash Dont Walk (s)			15.0			15.0
Pedestrian Calls (#/hr)			0			0
Act Effct Green (s)	44.6	44.6	81.4			81.4
Actuated g/C Ratio	0.32	0.32	0.58			0.58
v/c Ratio	0.97	0.90	0.57			0.96
Control Delay	67.5	64.9	19.2			37.3
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	67.5	64.9	19.2			37.3
LOS	E	E	B			D
Approach Delay	66.7		19.2			37.3
Approach LOS	E		B			D
Queue Length 50th (m)	146.1	117.4	98.4			257.8
Queue Length 95th (m)	#189.4	#179.8	111.3			283.5
Internal Link Dist (m)	309.6		128.0			73.3
Turn Bay Length (m)		110.0				
Base Capacity (vph)	1074	515	2904			2932
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.97	0.90	0.57			0.96

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	109 (78%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.97
Intersection Signal Delay:	39.7
Intersection LOS:	D
Intersection Capacity Utilization:	88.8%
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

AM Peak Period
10-08-2019

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

Splits and Phases: 5: Mississauga Rd & 407 WB Off Ramp



Lanes, Volumes, Timings
6: Mississauga Rd & NB Hwy 407 WB On-Ramp

AM Peak Period
10-08-2019

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑			↑↑↑		
Traffic Volume (vph)	68	0	0	19	0	0
Future Volume (vph)	68	0	0	19	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	0	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	0	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	81.8			152.0	285.1	
Travel Time (s)	4.9			9.1	21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	74	0	0	21	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	0	0	21	0	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)		14	24		24	14
Sign Control	Free			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	88.8%			ICU Level of Service E		
Analysis Period (min)	15					

Lanes, Volumes, Timings
 7: SB Hwy 407 EB On-Ramp & Mississauga Rd

AM Peak Period
 10-08-2019



Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑			
Traffic Volume (vph)	0	68	14	5	0	0
Future Volume (vph)	0	68	14	5	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt			0.962			
Flt Protected						
Satd. Flow (prot)	0	5142	4946	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	4946	0	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		141.6	81.8		276.8	
Travel Time (s)		8.5	4.9		20.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	74	15	5	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	74	20	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	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		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	62.5%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	201	267	0	1377	2780	0
Future Volume (vph)	201	267	0	1377	2780	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	20.0		20.0			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1617	0	4948	5043	0
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1617	0	4948	5043	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		2				
Link Speed (k/h)	60			60	60	
Link Distance (m)	316.3			93.8	141.6	
Travel Time (s)	19.0			5.6	8.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	1%	0%	6%	4%	0%
Adj. Flow (vph)	218	290	0	1497	3022	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	218	290	0	1497	3022	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	2	

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	2	
Switch Phase						
Minimum Initial (s)	8.0	8.0		12.0	12.0	
Minimum Split (s)	15.5	15.5		30.7	30.7	
Total Split (s)	39.0	39.0		101.0	101.0	
Total Split (%)	27.9%	27.9%		72.1%	72.1%	
Maximum Green (s)	31.5	31.5		94.3	94.3	
Yellow Time (s)	4.0	4.0		4.6	4.6	
All-Red Time (s)	3.5	3.5		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.5	7.5		6.7	6.7	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)				8.0	8.0	
Flash Dont Walk (s)				16.0	16.0	
Pedestrian Calls (#/hr)				0	0	
Act Effct Green (s)	28.4	28.4		97.4	97.4	
Actuated g/C Ratio	0.20	0.20		0.70	0.70	
v/c Ratio	0.32	0.88		0.44	0.86	
Control Delay	48.2	80.2		10.1	20.3	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	48.2	80.2		10.1	20.3	
LOS	D	F		B	C	
Approach Delay	66.5			10.1	20.3	
Approach LOS	E			B	C	
Queue Length 50th (m)	26.1	76.5		64.6	227.2	
Queue Length 95th (m)	37.6	#118.3		75.3	254.0	
Internal Link Dist (m)	292.3			69.8	117.6	
Turn Bay Length (m)		100.0				
Base Capacity (vph)	758	365		3441	3507	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.29	0.79		0.44	0.86	

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	136 (97%), Referenced to phase 2:NBSB, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.88
Intersection Signal Delay:	21.9
Intersection LOS:	C
Intersection Capacity Utilization:	61.6%
ICU Level of Service:	B
Analysis Period (min):	15

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

Splits and Phases: 8: 407 EB Off Ramp & Mississauga Rd



Lanes, Volumes, Timings
 9: NB Hwy 407 EB On-Ramp

AM Peak Period
 10-08-2019

























	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗		↑↑↑		
Traffic Volume (vph)	51	0	0	14	0	0
Future Volume (vph)	51	0	0	14	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		85.0	0.0		0.0	0.0
Storage Lanes		1	0		0	0
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	1883	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	1883	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	254.5			93.8	439.8	
Travel Time (s)	15.3			5.6	33.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	0	0	15	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	55	0	0	15	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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)		14	24		24	14
Sign Control	Free			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
10-08-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	109	328	128	47	198	195	89	1877	83	268	2288	347
Future Volume (vph)	109	328	128	47	198	195	89	1877	83	268	2288	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor	0.99		0.97	0.99		0.98			0.98	1.00		
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1690	3380	1408	1587	3411	1601	3404	5092	1526	3541	5092	1617
Fl _t Permitted	0.470			0.538			0.950			0.950		
Satd. Flow (perm)	832	3380	1372	891	3411	1570	3404	5092	1498	3538	5092	1617
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			95			183			123			342
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		230.5			214.1			174.3			277.6	
Travel Time (s)		13.8			12.8			10.5			16.7	
Confl. Peds. (#/hr)	5		9	9		5			3	3		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	8%	16%	15%	7%	2%	4%	3%	7%	0%	3%	1%
Adj. Flow (vph)	118	357	139	51	215	212	97	2040	90	291	2487	377
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	357	139	51	215	212	97	2040	90	291	2487	377
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8			4		1	6		5	2	
Permitted Phases	8		8	4		4			6			2
Detector Phase	3	8	8	4	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	12.0	12.0	8.0	12.0	12.0
Minimum Split (s)	8.0	39.0	39.0	39.0	39.0	39.0	13.0	28.6	28.6	13.0	28.6	28.6
Total Split (s)	10.0	49.0	49.0	39.0	39.0	39.0	13.0	87.0	87.0	24.0	98.0	98.0
Total Split (%)	6.3%	30.6%	30.6%	24.4%	24.4%	24.4%	8.1%	54.4%	54.4%	15.0%	61.3%	61.3%
Maximum Green (s)	7.0	41.0	41.0	31.0	31.0	31.0	8.0	80.4	80.4	19.0	91.4	91.4
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0	8.0	8.0	8.0	8.0	5.0	6.6	6.6	5.0	6.6	6.6
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		12.0	12.0	12.0	12.0	12.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		19.0	19.0	19.0	19.0	19.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	0
Act Effct Green (s)	31.4	26.4	26.4	16.4	16.4	16.4	10.1	95.6	95.6	18.4	103.9	103.9
Actuated g/C Ratio	0.20	0.16	0.16	0.10	0.10	0.10	0.06	0.60	0.60	0.12	0.65	0.65
v/c Ratio	0.59	0.64	0.46	0.56	0.62	0.65	0.45	0.67	0.10	0.72	0.75	0.32
Control Delay	67.9	67.4	25.1	90.3	75.9	22.8	78.7	24.0	1.2	78.3	22.0	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.9	67.4	25.1	90.3	75.9	22.8	78.7	24.0	1.2	78.3	22.0	2.7
LOS	E	E	C	F	E	C	E	C	A	E	C	A
Approach Delay		57.9			53.9			25.5			24.9	
Approach LOS		E			D			C			C	
Queue Length 50th (m)	33.1	57.0	12.4	15.8	35.3	8.7	15.6	151.0	0.0	46.8	183.9	3.7
Queue Length 95th (m)	50.3	70.5	32.6	29.8	47.2	34.6	25.3	200.5	3.7	61.0	241.4	18.3
Internal Link Dist (m)		206.5			190.1			150.3			253.6	
Turn Bay Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Base Capacity (vph)	200	866	422	172	660	451	215	3043	945	443	3306	1169
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.41	0.33	0.30	0.33	0.47	0.45	0.67	0.10	0.66	0.75	0.32

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 53 (33%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 30.3
 Intersection LOS: C

Lanes, Volumes, Timings
 10: Meadowvale Blvd & Mississauga Rd

AM Peak Period
 10-08-2019

Intersection Capacity Utilization 94.0% ICU Level of Service F
 Analysis Period (min) 15

Splits and Phases: 10: Meadowvale Blvd & Mississauga Rd



Lanes, Volumes, Timings
32: Station Access & Hereford St

AM Peak Period
10-08-2019



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	186	23	6	54	203	586
Future Volume (vph)	186	23	6	54	203	586
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	0.985				0.900	
Flt Protected	0.957			0.995		
Satd. Flow (prot)	1775	0	0	1874	1695	0
Flt Permitted	0.957			0.935		
Satd. Flow (perm)	1775	0	0	1761	1695	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	11				383	
Link Speed (k/h)	50			50	50	
Link Distance (m)	264.1			82.0	110.6	
Travel Time (s)	19.0			5.9	8.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	25	7	59	221	637
Shared Lane Traffic (%)						
Lane Group Flow (vph)	227	0	0	66	858	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			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
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Minimum Split (s)	22.5		22.5	22.5	22.5	
Total Split (s)	22.6		37.4	37.4	37.4	
Total Split (%)	37.7%		62.3%	62.3%	62.3%	
Maximum Green (s)	18.1		32.9	32.9	32.9	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	4.5			4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	18.1			32.9	32.9	
Actuated g/C Ratio	0.30			0.55	0.55	
v/c Ratio	0.42			0.07	0.78	
Control Delay	18.8			6.6	12.0	
Queue Delay	0.0			0.0	0.0	
Total Delay	18.8			6.6	12.0	

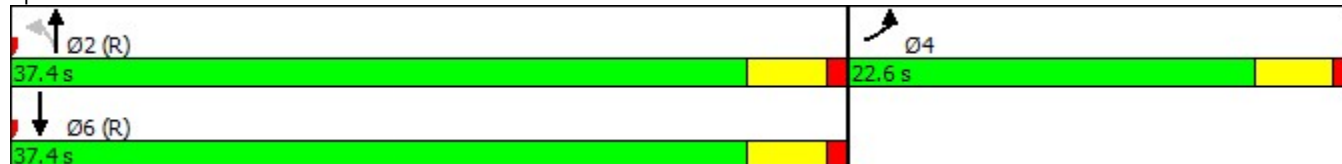


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	B			A	B	
Approach Delay	18.8			6.6	12.0	
Approach LOS	B			A	B	
Queue Length 50th (m)	18.6			3.1	33.1	
Queue Length 95th (m)	35.1			7.4	#81.8	
Internal Link Dist (m)	240.1			58.0	86.6	
Turn Bay Length (m)						
Base Capacity (vph)	543			965	1102	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.42			0.07	0.78	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 13.0
 Intersection LOS: B
 Intersection Capacity Utilization 65.9%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 32: Station Access & Hereford St



Lanes, Volumes, Timings
50: Mississauga Rd

AM Peak Period
10-08-2019




































Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	90.0		45.0	105.0		70.0
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Flt Permitted												
Satd. Flow (perm)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Link Speed (k/h)		50			48			60			60	
Link Distance (m)		128.1			116.5			277.6			254.5	
Travel Time (s)		9.2			8.7			16.7			15.3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
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)		0.0			0.0			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

PM Peak Period
Future Total 2031 PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  		  	  		 	  		  	  	
Traffic Volume (vph)	374	1333	138	230	1197	174	320	1896	578	126	772	300
Future Volume (vph)	374	1333	138	230	1197	174	320	1896	578	126	772	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Storage Lanes	1		1	2		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	*1.00	1.00	0.97	0.91	1.00
Ped Bike Factor	1.00		0.98	1.00		0.99	1.00		0.98	1.00		0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	4768	1526	3471	4995	1633	3309	5706	1617	3309	4995	1484
Fl _t Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1755	4768	1501	3469	4995	1612	3308	5706	1585	3308	4995	1465
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			104			138			187			326
Link Speed (k/h)		80			80			60				60
Link Distance (m)		233.5			222.0			602.3				215.4
Travel Time (s)		10.5			10.0			36.1				12.9
Confl. Peds. (#/hr)	1		4	4		1	1		6	6		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	10%	7%	2%	5%	0%	7%	1%	1%	7%	5%	10%
Adj. Flow (vph)	407	1449	150	250	1301	189	348	2061	628	137	839	326
Shared Lane Traffic (%)												
Lane Group Flow (vph)	407	1449	150	250	1301	189	348	2061	628	137	839	326
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)		7.4			7.4			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
1: Steeles Ave W & Mississauga Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6			8			4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	5.0	8.0	8.0
Minimum Split (s)	13.0	50.2	50.2	13.0	50.5	50.5	8.0	45.3	45.3	8.0	45.3	45.3
Total Split (s)	37.0	71.0	71.0	18.0	52.0	52.0	23.0	61.0	61.0	10.0	48.0	48.0
Total Split (%)	23.1%	44.4%	44.4%	11.3%	32.5%	32.5%	14.4%	38.1%	38.1%	6.3%	30.0%	30.0%
Maximum Green (s)	32.0	63.8	63.8	13.0	44.8	44.8	20.0	53.7	53.7	7.0	40.7	40.7
Yellow Time (s)	3.0	4.2	4.2	3.0	4.2	4.2	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	3.0	3.0	2.0	3.0	3.0	0.0	3.3	3.3	0.0	3.3	3.3
Lost Time Adjust (s)	-2.0	0.0	0.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.2	7.2	4.0	7.2	7.2	3.0	7.3	7.3	3.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	None	None
Walk Time (s)		8.0	8.0		8.0	8.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		35.0	35.0		35.0	35.0		30.0	30.0		30.0	30.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	34.0	63.8	63.8	14.0	44.8	44.8	19.4	53.7	53.7	7.0	41.3	41.3
Actuated g/C Ratio	0.21	0.40	0.40	0.09	0.28	0.28	0.12	0.34	0.34	0.04	0.26	0.26
v/c Ratio	1.09	0.76	0.23	0.83	0.93	0.34	0.87	1.08	0.96	0.95	0.65	0.53
Control Delay	130.9	44.8	11.4	93.5	68.4	15.3	90.1	94.1	62.2	137.1	55.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	130.9	44.8	11.4	93.5	68.4	15.3	90.1	94.1	62.2	137.1	55.9	7.8
LOS	F	D	B	F	E	B	F	F	E	F	E	A
Approach Delay		59.8			66.2			87.1			52.4	
Approach LOS		E			E			F			D	
Queue Length 50th (m)	~145.3	145.1	9.0	41.0	148.5	12.2	56.7	~242.3	150.7	22.8	88.3	0.0
Queue Length 95th (m)	#211.8	163.4	24.6	#62.5	#174.9	33.2	#80.8	#267.1	#231.5	#45.0	104.0	25.8
Internal Link Dist (m)		209.5			198.0			578.3			191.4	
Turn Bay Length (m)	75.0		60.0	80.0		80.0	105.0		50.0	80.0		80.0
Base Capacity (vph)	372	1902	661	303	1398	550	413	1915	656	144	1288	619
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.76	0.23	0.83	0.93	0.34	0.84	1.08	0.96	0.95	0.65	0.53

Intersection Summary

Area Type:	Other
Cycle Length:	160
Actuated Cycle Length:	160
Offset:	111 (69%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.09
Intersection Signal Delay:	70.2
Intersection LOS:	E

Lanes, Volumes, Timings
 1: Steeles Ave W & Mississauga Rd

PM Peak Period
 Future Total 2031 PM

Intersection Capacity Utilization 116.1% ICU Level of Service H

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Steeles Ave W & Mississauga Rd



Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	157	123	150	2608	1149	17
Future Volume (vph)	157	123	150	2608	1149	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	160.0			55.0
Storage Lanes	1	1	1			1
Taper Length (m)	20.0		20.0			
Lane Util. Factor	1.00	1.00	1.00	0.91	0.91	1.00
Ped Bike Factor			1.00			0.97
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1807	1396	1738	5043	4902	1458
Flt Permitted	0.950		0.181			
Satd. Flow (perm)	1807	1396	331	5043	4902	1421
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		134				18
Link Speed (k/h)	50			60	60	
Link Distance (m)	158.7			310.3	602.3	
Travel Time (s)	11.4			18.6	36.1	
Confl. Peds. (#/hr)			2			2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	17%	5%	4%	7%	12%
Adj. Flow (vph)	171	134	163	2835	1249	18
Shared Lane Traffic (%)						
Lane Group Flow (vph)	171	134	163	2835	1249	18
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			7.4	7.4	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	6.1	6.1	6.1	30.5	30.5	6.1
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)	6.1	6.1	6.1	1.8	1.8	6.1
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)				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	

Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Perm	Perm	pm+pt	NA	NA	Perm
Protected Phases			1	6	2	
Permitted Phases	8	8	6			2
Detector Phase	8	8	1	6	2	2
Switch Phase						
Minimum Initial (s)	8.0	8.0	8.0	12.0	12.0	12.0
Minimum Split (s)	15.5	15.5	11.0	25.2	25.2	25.2
Total Split (s)	26.0	26.0	13.0	84.0	71.0	71.0
Total Split (%)	23.6%	23.6%	11.8%	76.4%	64.5%	64.5%
Maximum Green (s)	18.5	18.5	10.0	77.8	64.8	64.8
Yellow Time (s)	4.0	4.0	3.0	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	3.0	6.2	6.2	6.2
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	C-Max	C-Max	C-Max
Walk Time (s)				8.0	8.0	8.0
Flash Dont Walk (s)				11.0	11.0	11.0
Pedestrian Calls (#/hr)				0	0	0
Act Effct Green (s)	15.0	15.0	84.5	81.3	69.6	69.6
Actuated g/C Ratio	0.14	0.14	0.77	0.74	0.63	0.63
v/c Ratio	0.69	0.44	0.45	0.76	0.40	0.02
Control Delay	59.7	11.7	7.6	10.8	10.9	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.7	11.7	7.6	10.8	10.9	4.0
LOS	E	B	A	B	B	A
Approach Delay	38.7			10.6	10.8	
Approach LOS	D			B	B	
Queue Length 50th (m)	35.3	0.0	7.7	116.7	44.7	0.0
Queue Length 95th (m)	56.1	16.3	14.5	150.5	60.9	2.9
Internal Link Dist (m)	134.7			286.3	578.3	
Turn Bay Length (m)			160.0			55.0
Base Capacity (vph)	303	346	382	3725	3100	905
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.39	0.43	0.76	0.40	0.02

Intersection Summary

Area Type:	Other
Cycle Length:	110
Actuated Cycle Length:	110
Offset:	42 (38%), Referenced to phase 2:SBT and 6:NBTL, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.76
Intersection Signal Delay:	12.6
Intersection LOS:	B

Lanes, Volumes, Timings
2: Mississauga Rd & Edgeware Rd

PM Peak Period
Future Total 2031 PM

Intersection Capacity Utilization 70.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 2: Mississauga Rd & Edgeware Rd



Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	111	675	128	15	27	85	2484	212	35	1105	65
Future Volume (vph)	256	111	675	128	15	27	85	2484	212	35	1105	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	*1.00	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00		0.99	1.00		0.98	1.00					0.99
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3650	1633	1789	1921	1633	3219	5595	1617	1772	4995	1633
Flt Permitted	0.579			0.675			0.950			0.109		
Satd. Flow (perm)	1110	3650	1612	1270	1921	1608	3218	5595	1617	203	4995	1611
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			172			137			152			152
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		299.9			259.0			260.2			310.3	
Travel Time (s)		21.6			18.6			15.6			18.6	
Confl. Peds. (#/hr)	2		1	1		2	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	10%	3%	1%	3%	5%	0%
Adj. Flow (vph)	278	121	734	139	16	29	92	2700	230	38	1201	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	121	734	139	16	29	92	2700	230	38	1201	71
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	8	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	15.9	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	17.0	34.0	34.0	8.0	25.0	25.0	13.0	50.0	50.0	8.0	45.0	45.0
Total Split (%)	17.0%	34.0%	34.0%	8.0%	25.0%	25.0%	13.0%	50.0%	50.0%	8.0%	45.0%	45.0%
Maximum Green (s)	14.0	26.1	26.1	5.0	17.1	17.1	8.0	43.4	43.4	5.0	38.4	38.4
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	3.9	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	7.9	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	39.0	26.1	26.1	18.2	13.5	13.5	8.0	46.6	46.6	48.6	41.0	41.0
Actuated g/C Ratio	0.39	0.26	0.26	0.18	0.14	0.14	0.08	0.47	0.47	0.49	0.41	0.41
v/c Ratio	0.46	0.13	1.34	0.54	0.06	0.09	0.36	1.04	0.28	0.22	0.59	0.09
Control Delay	25.0	28.7	191.3	37.4	35.7	0.5	47.8	55.6	7.3	13.7	25.1	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	28.7	191.3	37.4	35.7	0.5	47.8	55.6	7.3	13.7	25.1	0.2
LOS	C	C	F	D	D	A	D	E	A	B	C	A
Approach Delay		133.1			31.4			51.7			23.4	
Approach LOS		F			C			D			C	
Queue Length 50th (m)	38.1	9.4	~161.3	17.5	2.6	0.0	8.8	~200.8	8.8	3.2	67.9	0.0
Queue Length 95th (m)	59.3	16.5	#230.4	30.6	8.3	0.0	16.5	#226.8	23.3	7.7	82.7	0.0
Internal Link Dist (m)		275.9			235.0			236.2			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	604	952	547	256	328	388	257	2607	834	176	2048	750
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.13	1.34	0.54	0.05	0.07	0.36	1.04	0.28	0.22	0.59	0.09

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	45 (45%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
Natural Cycle:	150
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.34
Intersection Signal Delay:	60.8
Intersection LOS:	E

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
 Future Total 2031 PM

Intersection Capacity Utilization 85.8% ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.







Queue shown is maximum after two cycles.

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd



Lanes, Volumes, Timings
4: SB Hwy 407 WB On-Ramp

PM Peak Period
Future Total 2031 PM
















						
Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑	↗		
Traffic Volume (vph)	0	24	57	15	0	0
Future Volume (vph)	0	24	57	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			80.0	0.0	0.0
Storage Lanes	0			1	0	0
Taper Length (m)	20.0				20.0	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		
Flt Protected						
Satd. Flow (prot)	0	5142	5142	1601	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	5142	1601	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		116.1	260.2		427.9	
Travel Time (s)		7.0	15.6		32.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	26	62	16	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	26	62	16	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		7.4	7.4		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		Free	Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
Future Total 2031 PM

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	 		  			  
Traffic Volume (vph)	704	636	2257	0	0	1737
Future Volume (vph)	704	636	2257	0	0	1737
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	110.0		0.0	0.0	
Storage Lanes	2	1		0	0	
Taper Length (m)	20.0				20.0	
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.91
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3404	1541	5092	0	0	5043
Flt Permitted	0.950					
Satd. Flow (perm)	3404	1541	5092	0	0	5043
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		1				
Link Speed (k/h)	60		60			60
Link Distance (m)	296.7		104.8			116.1
Travel Time (s)	17.8		6.3			7.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	3%	0%	0%	4%
Adj. Flow (vph)	765	691	2453	0	0	1888
Shared Lane Traffic (%)						
Lane Group Flow (vph)	765	691	2453	0	0	1888
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	7.4		0.0			0.0
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1	1	2			2
Detector Template	Left	Right	Thru			Thru
Leading Detector (m)	6.1	6.1	30.5			30.5
Trailing Detector (m)	0.0	0.0	0.0			0.0
Detector 1 Position(m)	0.0	0.0	0.0			0.0
Detector 1 Size(m)	6.1	6.1	1.8			1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex			Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0			0.0
Detector 1 Queue (s)	0.0	0.0	0.0			0.0
Detector 1 Delay (s)	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	NA			NA
Protected Phases	4		2			6

Lanes, Volumes, Timings
5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
Future Total 2031 PM



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Permitted Phases		4				
Detector Phase	4	4	2			6
Switch Phase						
Minimum Initial (s)	8.0	8.0	12.0			12.0
Minimum Split (s)	15.4	15.4	29.6			29.6
Total Split (s)	46.4	46.4	53.6			53.6
Total Split (%)	46.4%	46.4%	53.6%			53.6%
Maximum Green (s)	39.0	39.0	47.0			47.0
Yellow Time (s)	4.0	4.0	4.6			4.6
All-Red Time (s)	3.4	3.4	2.0			2.0
Lost Time Adjust (s)	-1.0	-2.0	0.0			0.0
Total Lost Time (s)	6.4	5.4	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Recall Mode	None	None	C-Max			C-Max
Walk Time (s)			8.0			8.0
Flash Dont Walk (s)			15.0			15.0
Pedestrian Calls (#/hr)			0			0
Act Effct Green (s)	40.0	41.0	47.0			47.0
Actuated g/C Ratio	0.40	0.41	0.47			0.47
v/c Ratio	0.56	1.09	1.03			0.80
Control Delay	25.2	93.9	52.2			26.0
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	25.2	93.9	52.2			26.0
LOS	C	F	D			C
Approach Delay	57.8		52.2			26.0
Approach LOS	E		D			C
Queue Length 50th (m)	57.9	~152.4	~186.6			110.9
Queue Length 95th (m)	75.6	#220.3	#215.6			m129.7
Internal Link Dist (m)	272.7		80.8			92.1
Turn Bay Length (m)		110.0				
Base Capacity (vph)	1361	632	2393			2370
Starvation Cap Reductn	0	0	0			0
Spillback Cap Reductn	0	0	0			0
Storage Cap Reductn	0	0	0			0
Reduced v/c Ratio	0.56	1.09	1.03			0.80

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	20 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.09
Intersection Signal Delay:	45.1
Intersection LOS:	D
Intersection Capacity Utilization:	89.6%
ICU Level of Service:	E
Analysis Period (min):	15

Lanes, Volumes, Timings
 5: Mississauga Rd & 407 WB Off Ramp

PM Peak Period
 Future Total 2031 PM

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Mississauga Rd & 407 WB Off Ramp

 Ø2 (R)	 Ø4
53.6 s	46.4 s
 Ø6 (R)	
53.6 s	

Lanes, Volumes, Timings
 6: Mississauga Rd & NB Hwy 407 WB On-Ramp

PM Peak Period
 Future Total 2031 PM

	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑			↑↑↑		
Traffic Volume (vph)	19	0	0	57	0	0
Future Volume (vph)	19	0	0	57	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	0	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	0	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	111.3			104.8	312.1	
Travel Time (s)	6.7			6.3	23.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	0	0	62	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	0	0	62	0	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)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	89.6%
Analysis Period (min)	15
	ICU Level of Service E

Lanes, Volumes, Timings
 7: SB Hwy 407 EB On-Ramp & Mississauga Rd

PM Peak Period
 Future Total 2031 PM



Lane Group	NBL	NBT	SBT	SBR	NEL	NER
Lane Configurations		↑↑↑	↑↑↑			
Traffic Volume (vph)	0	19	43	15	0	0
Future Volume (vph)	0	19	43	15	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt			0.962			
Flt Protected						
Satd. Flow (prot)	0	5142	4946	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	5142	4946	0	0	0
Link Speed (k/h)		60	60		48	
Link Distance (m)		159.3	111.3		313.5	
Travel Time (s)		9.6	6.7		23.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	21	47	16	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	21	63	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	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		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	60.7%
Analysis Period (min)	15
	ICU Level of Service B

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔↔	↗		↑↑↑	↑↑↑	
Traffic Volume (vph)	131	42	0	2183	1969	0
Future Volume (vph)	131	42	0	2183	1969	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	100.0	0.0			0.0
Storage Lanes	2	1	0			0
Taper Length (m)	20.0		20.0			
Lane Util. Factor	0.97	1.00	1.00	0.91	0.91	1.00
Frt		0.850				
Flt Protected	0.950					
Satd. Flow (prot)	3372	1555	0	5092	4995	0
Flt Permitted	0.950					
Satd. Flow (perm)	3372	1555	0	5092	4995	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		21				
Link Speed (k/h)	60			60	60	
Link Distance (m)	313.7			70.5	159.3	
Travel Time (s)	18.8			4.2	9.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	5%	0%	3%	5%	0%
Adj. Flow (vph)	142	46	0	2373	2140	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	142	46	0	2373	2140	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	7.4			0.0	0.0	
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	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Number of Detectors	1	1		2	2	
Detector Template	Left	Right		Thru	Thru	
Leading Detector (m)	6.1	6.1		30.5	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	6.1		1.8	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	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		NA	NA	
Protected Phases	4			2	6	

Lanes, Volumes, Timings
8: 407 EB Off Ramp & Mississauga Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases		4				
Detector Phase	4	4		2	6	
Switch Phase						
Minimum Initial (s)	8.0	8.0		12.0	12.0	
Minimum Split (s)	15.5	15.5		30.7	30.7	
Total Split (s)	20.0	20.0		80.0	80.0	
Total Split (%)	20.0%	20.0%		80.0%	80.0%	
Maximum Green (s)	12.5	12.5		73.3	73.3	
Yellow Time (s)	4.0	4.0		4.6	4.6	
All-Red Time (s)	3.5	3.5		2.1	2.1	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.5	7.5		6.7	6.7	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Recall Mode	None	None		C-Max	C-Max	
Walk Time (s)				8.0	8.0	
Flash Dont Walk (s)				16.0	16.0	
Pedestrian Calls (#/hr)				0	0	
Act Effct Green (s)	9.7	9.7		76.1	76.1	
Actuated g/C Ratio	0.10	0.10		0.76	0.76	
v/c Ratio	0.43	0.27		0.61	0.56	
Control Delay	46.4	30.3		6.4	5.9	
Queue Delay	0.0	0.0		0.0	0.0	
Total Delay	46.4	30.3		6.4	5.9	
LOS	D	C		A	A	
Approach Delay	42.4			6.4	5.9	
Approach LOS	D			A	A	
Queue Length 50th (m)	13.6	4.5		60.8	51.7	
Queue Length 95th (m)	22.4	14.8		81.9	69.9	
Internal Link Dist (m)	289.7			46.5	135.3	
Turn Bay Length (m)		100.0				
Base Capacity (vph)	421	212		3873	3799	
Starvation Cap Reductn	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	0.34	0.22		0.61	0.56	

Intersection Summary

Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	100
Offset:	92 (92%), Referenced to phase 2:NBT and 6:SBT, Start of Green
Natural Cycle:	55
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	7.6
Intersection LOS:	A
Intersection Capacity Utilization:	60.7%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 8: 407 EB Off Ramp & Mississauga Rd

 Ø2 (R)	 Ø4
80 s	20 s
 Ø6 (R)	
80 s	

Lanes, Volumes, Timings
 9: NB Hwy 407 EB On-Ramp

PM Peak Period
 Future Total 2031 PM

































	↑	↗	↘	↓	↙	↖
Lane Group	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations	↑↑↑	↗		↑↑↑		
Traffic Volume (vph)	15	0	0	43	0	0
Future Volume (vph)	15	0	0	43	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		80.0	0.0		0.0	0.0
Storage Lanes		1	0		0	0
Taper Length (m)			20.0		20.0	
Lane Util. Factor	0.91	1.00	1.00	0.91	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	5142	1883	0	5142	0	0
Flt Permitted						
Satd. Flow (perm)	5142	1883	0	5142	0	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	277.6			70.5	458.1	
Travel Time (s)	16.7			4.2	34.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	0	0	47	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	0	0	47	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	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)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	6.7%
	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
Future Total 2031 PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 		 	  		 	  	
Traffic Volume (vph)	285	204	173	91	259	351	36	2292	70	115	1678	188
Future Volume (vph)	285	204	173	91	259	351	36	2292	70	115	1678	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Ped Bike Factor			0.98	0.99			1.00		0.99	1.00		0.98
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	3476	1541	1825	3476	1617	2975	5142	1617	3506	5092	1601
Fl _t Permitted	0.469			0.613			0.950			0.950		
Satd. Flow (perm)	883	3476	1503	1167	3476	1617	2972	5142	1594	3505	5092	1568
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			103			101			89			204
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		230.5			214.2			174.3			277.6	
Travel Time (s)		13.8			12.9			10.5			16.7	
Confl. Peds. (#/hr)			8	8			4		1	1		4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	6%	0%	5%	1%	19%	2%	1%	1%	3%	2%
Adj. Flow (vph)	310	222	188	99	282	382	39	2491	76	125	1824	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	310	222	188	99	282	382	39	2491	76	125	1824	204
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8			4		1	6		5	2	
Permitted Phases	8		8	4		4			6			2
Detector Phase	3	8	8	4	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	8.0	8.0	8.0	8.0	12.0	12.0	8.0	12.0	12.0
Minimum Split (s)	8.0	39.0	39.0	39.0	39.0	39.0	13.0	28.6	28.6	13.0	28.6	28.6
Total Split (s)	15.0	56.0	56.0	41.0	41.0	41.0	13.0	91.0	91.0	13.0	91.0	91.0
Total Split (%)	9.4%	35.0%	35.0%	25.6%	25.6%	25.6%	8.1%	56.9%	56.9%	8.1%	56.9%	56.9%
Maximum Green (s)	12.0	48.0	48.0	33.0	33.0	33.0	8.0	84.4	84.4	8.0	84.4	84.4
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	8.0	8.0	8.0	8.0	8.0	5.0	6.6	6.6	5.0	6.6	6.6
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		12.0	12.0	12.0	12.0	12.0		8.0	8.0		8.0	8.0
Flash Dont Walk (s)		19.0	19.0	19.0	19.0	19.0		14.0	14.0		14.0	14.0
Pedestrian Calls (#/hr)		0	0	0	0	0		0	0		0	0
Act Effct Green (s)	51.6	46.6	46.6	31.6	31.6	31.6	8.0	85.8	85.8	8.0	88.4	88.4
Actuated g/C Ratio	0.32	0.29	0.29	0.20	0.20	0.20	0.05	0.54	0.54	0.05	0.55	0.55
v/c Ratio	0.88	0.22	0.37	0.43	0.41	0.95	0.26	0.90	0.08	0.71	0.65	0.21
Control Delay	73.0	43.2	21.5	62.3	57.7	80.8	77.9	39.4	2.5	96.3	27.2	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	43.2	21.5	62.3	57.7	80.8	77.9	39.4	2.5	96.3	27.2	2.8
LOS	E	D	C	E	E	F	E	D	A	F	C	A
Approach Delay		50.4			69.9			38.9			28.9	
Approach LOS		D			E			D			C	
Queue Length 50th (m)	80.0	27.9	20.3	27.7	41.3	92.3	6.2	260.1	0.0	20.6	152.9	0.0
Queue Length 95th (m)	#127.7	39.2	42.7	47.1	56.0	#154.8	12.8	281.5	6.2	#35.1	168.9	12.4
Internal Link Dist (m)		206.5			190.2			150.3			253.6	
Turn Bay Length (m)	120.0		90.0	100.0		95.0	80.0		235.0	130.0		165.0
Base Capacity (vph)	352	1042	523	240	716	413	148	2756	895	176	2813	957
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.21	0.36	0.41	0.39	0.92	0.26	0.90	0.08	0.71	0.65	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 53 (33%), Referenced to phase 2:SBT and 6:NBT, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 40.6
 Intersection LOS: D

Lanes, Volumes, Timings
 10: Meadowvale Blvd & Mississauga Rd

PM Peak Period
 Future Total 2031 PM

Intersection Capacity Utilization 97.3% ICU Level of Service F

Analysis Period (min) 15

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

Splits and Phases: 10: Meadowvale Blvd & Mississauga Rd



Lanes, Volumes, Timings
12: Station Access & Hereford St

PM Peak Period
Future Total 2031 PM



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	786	7	19	169	56	79
Future Volume (vph)	786	7	19	169	56	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.999				0.921	
Fl _t Protected	0.953			0.995		
Satd. Flow (prot)	1793	0	0	1874	1735	0
Fl _t Permitted	0.953			0.965		
Satd. Flow (perm)	1793	0	0	1818	1735	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	1				86	
Link Speed (k/h)	50			50	50	
Link Distance (m)	214.7			88.2	107.7	
Travel Time (s)	15.5			6.4	7.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	854	8	21	184	61	86
Shared Lane Traffic (%)						
Lane Group Flow (vph)	862	0	0	205	147	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			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
Turn Type	Prot		Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases			2			
Minimum Split (s)	22.5		22.5	22.5	22.5	
Total Split (s)	36.0		24.0	24.0	24.0	
Total Split (%)	60.0%		40.0%	40.0%	40.0%	
Maximum Green (s)	31.5		19.5	19.5	19.5	
Yellow Time (s)	3.5		3.5	3.5	3.5	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0			0.0	0.0	
Total Lost Time (s)	4.5			4.5	4.5	
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0		7.0	7.0	7.0	
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	
Pedestrian Calls (#/hr)	0		0	0	0	
Act Effct Green (s)	31.5			19.5	19.5	
Actuated g/C Ratio	0.52			0.32	0.32	
v/c Ratio	0.92			0.35	0.24	
Control Delay	30.6			17.5	8.3	
Queue Delay	0.0			0.0	0.0	
Total Delay	30.6			17.5	8.3	

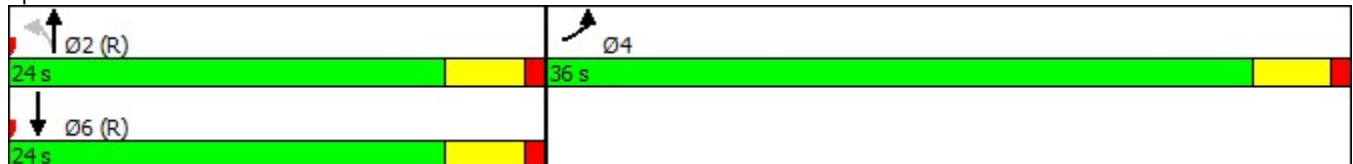


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
LOS	C			B	A	
Approach Delay	30.6			17.5	8.3	
Approach LOS	C			B	A	
Queue Length 50th (m)	78.8			16.9	4.6	
Queue Length 95th (m)	#153.1			31.4	15.1	
Internal Link Dist (m)	190.7			64.2	83.7	
Turn Bay Length (m)						
Base Capacity (vph)	941			590	621	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.92			0.35	0.24	

Intersection Summary





















Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Pretimed
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 25.7
 Intersection LOS: C
 Intersection Capacity Utilization 73.0%
 ICU Level of Service C
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 12: Station Access & Hereford St



Lanes, Volumes, Timings
50: Mississauga Rd

PM Peak Period
Future Total 2031 PM

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Future Volume (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	90.0		45.0	105.0		70.0
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frt												
Flt Protected												
Satd. Flow (prot)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Flt Permitted												
Satd. Flow (perm)	0	1883	0	0	0	1883	1883	5142	1883	1883	5142	1883
Link Speed (k/h)		50			48			60			60	
Link Distance (m)		172.2			145.0			277.6			277.6	
Travel Time (s)		12.4			10.9			16.7			16.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	0	0	0	0
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)		0.0			0.0			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Free			Free	































Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	0.0%
ICU Level of Service	A
Analysis Period (min)	15

Appendix D-: Future Improvement Conditions Synchro Output

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
10-08-2019

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 					 	  			  	
Traffic Volume (vph)	75	34	160	207	130	11	780	997	117	56	2277	252
Future Volume (vph)	75	34	160	207	130	11	780	997	117	56	2277	252
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	*1.00	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3544	1570	1772	1902	1633	3506	4683	1585	1738	5489	1601
Flt Permitted	0.667			0.498			0.950			0.251		
Satd. Flow (perm)	1281	3544	1570	929	1902	1633	3506	4683	1585	459	5489	1601
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			75			114			127			152
Link Speed (k/h)		50			50			60			60	
Link Distance (m)		302.7			259.0			279.0			310.3	
Travel Time (s)		21.8			18.6			16.7			18.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	4%	3%	1%	0%	1%	12%	3%	5%	5%	2%
Adj. Flow (vph)	82	37	174	225	141	12	848	1084	127	61	2475	274
Shared Lane Traffic (%)												
Lane Group Flow (vph)	82	37	174	225	141	12	848	1084	127	61	2475	274
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)		3.7			3.7			7.4			7.4	
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8	1	7	4		1	6		5	2	

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
10-08-2019



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	1	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	13.0	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	8.0	15.9	39.0	12.0	19.9	19.9	39.0	104.1	104.1	8.0	73.1	73.1
Total Split (%)	5.7%	11.4%	27.9%	8.6%	14.2%	14.2%	27.9%	74.4%	74.4%	5.7%	52.2%	52.2%
Maximum Green (s)	5.0	8.0	34.0	9.0	12.0	12.0	34.0	97.5	97.5	5.0	66.5	66.5
Yellow Time (s)	3.0	4.0	3.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	2.0	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	5.0	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	15.3	8.0	46.8	24.8	11.9	11.9	34.1	99.2	99.2	75.2	66.5	66.5
Actuated g/C Ratio	0.11	0.06	0.33	0.18	0.08	0.08	0.24	0.71	0.71	0.54	0.48	0.48
v/c Ratio	0.52	0.18	0.30	0.95	0.87	0.05	1.00	0.33	0.11	0.21	0.95	0.33
Control Delay	64.5	65.2	19.7	101.7	105.8	0.4	81.7	8.5	1.5	5.6	32.7	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.5	65.2	19.7	101.7	105.8	0.4	81.7	8.5	1.5	5.6	32.7	5.3
LOS	E	E	B	F	F	A	F	A	A	A	C	A
Approach Delay		38.0			100.0			38.2			29.4	
Approach LOS		D			F			D			C	
Queue Length 50th (m)	19.8	5.2	18.8	~61.2	39.2	0.0	121.9	40.5	0.2	3.3	214.7	6.4
Queue Length 95th (m)	35.5	11.3	37.3	#117.9	#77.3	0.0	#165.5	47.9	6.2	m5.5	176.8	19.0
Internal Link Dist (m)		278.7			235.0			255.0			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	159	202	574	237	163	244	852	3317	1159	292	2607	840
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.18	0.30	0.95	0.87	0.05	1.00	0.33	0.11	0.21	0.95	0.33

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	84 (60%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
Natural Cycle:	120
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.00
Intersection Signal Delay:	38.0
Intersection LOS:	D
Intersection Capacity Utilization:	104.0%
ICU Level of Service:	G
Analysis Period (min):	15

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

AM Peak Period
 10-08-2019

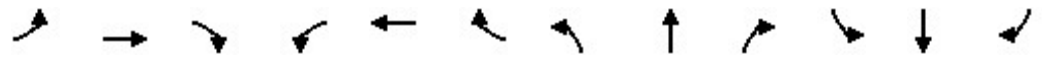
- * User Entered Value
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd

Ø1 39 s		Ø2 (R) 73.1 s		Ø3 8 s		Ø4 19.9 s	
Ø5 8 s		Ø6 (R) 104.1 s		Ø7 12 s		Ø8 15.9 s	

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Future IMPRV 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	111	675	128	15	27	85	2484	212	35	1105	65
Future Volume (vph)	256	111	675	128	15	27	85	2484	212	35	1105	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Storage Lanes	1		1	1		1	2		1	1		1
Taper Length (m)	20.0			20.0			20.0			20.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.97	*1.00	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00		0.99	1.00		0.98	1.00					0.99
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	3650	1633	1789	1921	1633	3219	5595	1617	1772	4995	1633
Fl _t Permitted	0.513			0.833			0.950			0.151		
Satd. Flow (perm)	982	3650	1612	1566	1921	1601	3218	5595	1617	282	4995	1611
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			81			159			168			173
Link Speed (k/h)		50			50			60				60
Link Distance (m)		299.9			259.0			260.2				310.3
Travel Time (s)		21.6			18.6			15.6				18.6
Confl. Peds. (#/hr)	2		1	1		2	1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	10%	3%	1%	3%	5%	0%
Adj. Flow (vph)	278	121	734	139	16	29	92	2700	230	38	1201	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	121	734	139	16	29	92	2700	230	38	1201	71
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)		3.7			3.7			7.4				7.4
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	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	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	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	0.0
Detector 1 Size(m)	6.1	1.8	6.1	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	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	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	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	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												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0

Lanes, Volumes, Timings
3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
Future IMPRV 2031 PM



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8	1	7	4		1	6		5	2	
Permitted Phases	8		8	4		4			6	2		2
Detector Phase	3	8	1	7	4	4	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	5.0	8.0	8.0	5.0	8.0	8.0	8.0	12.0	12.0	5.0	12.0	12.0
Minimum Split (s)	8.0	15.9	13.0	8.0	15.9	15.9	13.0	31.6	31.6	8.0	31.6	31.6
Total Split (s)	11.0	16.9	37.0	10.0	15.9	15.9	37.0	65.1	65.1	8.0	36.1	36.1
Total Split (%)	11.0%	16.9%	37.0%	10.0%	15.9%	15.9%	37.0%	65.1%	65.1%	8.0%	36.1%	36.1%
Maximum Green (s)	8.0	9.0	32.0	7.0	8.0	8.0	32.0	58.5	58.5	5.0	29.5	29.5
Yellow Time (s)	3.0	4.0	3.0	3.0	4.0	4.0	3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	0.0	3.9	2.0	0.0	3.9	3.9	2.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	7.9	5.0	3.0	7.9	7.9	5.0	6.6	6.6	3.0	6.6	6.6
Lead/Lag	Lead	Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)								8.0	8.0		8.0	8.0
Flash Dont Walk (s)								17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)								0	0		0	0
Act Effct Green (s)	22.3	8.6	43.7	14.7	8.0	8.0	32.2	62.1	62.1	38.6	29.7	29.7
Actuated g/C Ratio	0.22	0.09	0.44	0.15	0.08	0.08	0.32	0.62	0.62	0.39	0.30	0.30
v/c Ratio	0.83	0.39	0.97	0.57	0.10	0.11	0.09	0.78	0.22	0.20	0.81	0.12
Control Delay	58.8	46.9	51.1	45.0	44.5	0.8	24.1	16.6	3.4	13.7	37.7	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.8	46.9	51.1	45.0	44.5	0.8	24.1	16.6	3.4	13.7	37.7	0.4
LOS	E	D	D	D	D	A	C	B	A	B	D	A
Approach Delay		52.6			37.9			15.8			35.0	
Approach LOS		D			D			B			C	
Queue Length 50th (m)	48.5	11.8	111.3	22.3	2.9	0.0	6.3	130.6	4.8	2.2	78.9	0.0
Queue Length 95th (m)	#76.3	20.7	#203.8	39.1	9.3	0.0	11.9	149.7	14.6	5.2	95.9	0.0
Internal Link Dist (m)		275.9			235.0			236.2			286.3	
Turn Bay Length (m)	90.0		30.0	80.0		45.0	95.0		50.0	120.0		105.0
Base Capacity (vph)	336	328	756	246	153	274	1036	3474	1067	187	1485	600
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.37	0.97	0.57	0.10	0.11	0.09	0.78	0.22	0.20	0.81	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 45 (45%), Referenced to phase 2:SBTL and 6:NBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 28.4
 Intersection LOS: C

Lanes, Volumes, Timings
 3: Hereford St/Hallstone Rd & Mississauga Rd

PM Peak Period
 Future IMPRV 2031 PM

Intersection Capacity Utilization 84.3% ICU Level of Service E

Analysis Period (min) 15

* User Entered Value

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Hereford St/Hallstone Rd & Mississauga Rd

Ø1 37 s		Ø2 (R) 36.1 s		Ø3 11 s		Ø4 15.9 s	
Ø5 8 s		Ø6 (R) 65.1 s		Ø7 10 s		Ø8 16.9 s	

Appendix E-: EMME Output

