3064 Trafalgar Road, Oakville, ON – OPA

Transportation Impact, Parking and TDM Study

Paradigm Transportation Solutions Limited

2024-04
220140

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Project Summary

3064 Trafalgar Road, Oakville, ON – OPA Transportation Impact, Parking and TDM Study

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Disclaimer

Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to undertake a Transportation Impact and Parking Study for a proposed residential development at 3064 Trafalgar Road in Oakville, Ontario.

The development program consists of constructing a new apartment complex with two 33-storey towers containing 782 residential units. A single right-in/right-out driveway to Trafalgar Road is proposed

The study includes an analysis of existing traffic conditions, a description of the proposed development, traffic forecasts, parking demand analysis, recommendations to improve future traffic conditions and justification for the proposed on-site parking demand.

Conclusions

Transportation Impact Study

This study evaluated the impacts of constructing 782 residential units in two 33-storey buildings on a parcel of land bounded by Trafalgar Road north of Dundas Street East. Access to the site is proposed via one right-in/right-out driveway to Trafalgar Road. The proposed development is projected to generate approximately 211 new vehicle trips during the weekday AM peak hour and 250 new vehicle trips during the weekday PM peak hour.

Detailed traffic analysis was conducted for each of the study area intersections under Base conditions and 2034 Background and Total conditions.

The new traffic forecast to be added by full-build out of the development to the study area roadways results in relatively small impacts at the various study intersections. The analysis has further determined that the proposed driveway to Trafalgar Road will operate at LOS B during the weekday peak periods under the 2034 Total conditions.

With the proposed development having access through a single right in/out driveway to Trafalgar Road, it is suggested that a southbound right turn taper be constructed to allow right-turning traffic to safely slow down before turning without interfering with traffic on Trafalgar Road.

It is acknowledged that deficiencies currently exist at the Trafalgar Road and Dundas Street East intersection that can be expected to persist with anticipated traffic growth, independent of the development.

A variety of roadway improvements are planned within the study area to address the existing and long-term impacts of traffic growth, including the widening of Trafalgar Road and the implementation of High Occupancy Vehicle (HOV) lanes on Trafalgar Road and Dundas Street. It is understood that these improvements will provide some relief to operational issues, however, capacity constraints will persist for the overall transportation network.

Due to the high levels of congestion occurring and the expected long-term transit network anticipated to be developed (BRT along Trafalgar Road and Dundas Street), further remedial measures to improve intersection capacity are not likely to be implemented. Instead, future improvements to the transportation network are expected to focus on public transit infrastructure.

By focusing on shifting commuter travel to public transit, intersection operations are expected to maintain the status quo (capacity condition during peak hours) or to possibly improve if fewer vehicles transverse the intersections during the peak hours of a typical weekday.

Parking Study

The proposed site provides for a total of 948 parking spaces: equating to a parking rate of 1.15 parking spaces per unit (resident and visitor).

In contrast to generic minimum parking requirements, The Town of Oakville's Zoning By-law 2009-189 provides maximum limits to restrict the total number of spaces that can be constructed rather than establish a minimum number that must be provided. The parking requirement under Zoning By-Law 2009-189 stipulates a maximum parking supply of 1,134 spaces: equating to a parking rate of 1.45 spaces per unit (resident and visitor). The proposed parking supply of 948 parking spaces satisfies the Zoning requirements as the maximum supply is not exceeded.

With restrictive maximum limits on the number of parking spaces, and to provide further support that the proposed supply of 1.15 spaces per unit will not result in a shortfall of parking, projected peak parking demand for the site has been estimated based on compiled parking surveys as well as industry standard rates contained within the ITE Parking Generation. Based on these methodologies, forecast parking demand for the proposed development is projected to be 774 parking spaces.

With the proposed HOV lanes, future BRT and multi-use trails on both Trafalgar Road and Dundas Street East, the development has the potential to be transit supportive and promote active transportation. It will also introduce the residential population of the development to maximize the benefits of the site's location to a comprehensive and integrated transit system (Oakville Transit and GO Transit). As the development promotes the use of other modes of transportation through a limited number of on-site vehicle parking, the development has a significant role in setting an example for residents to consider non-automotive travel if they chose.

Overall, the forecasted demand provides a statistically valid justification that the proposed parking supply of 948 spaces is sufficient for the intended use.

Recommendations

- The Town of Oakville recognizes the conclusions drawn above
- The Town of Oakville supports the proposed parking supply of 1.15 spaces per unit
- A southbound right turn taper be provided along Trafalgar Road at the proposed driveway
- Consider unbundling parking, where parking spaces are provided at a separate cost to residents; and
- Provision of secure, visible bicycle parking area with a bicycle repair area.

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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to undertake a Transportation Impact and Parking Study for a proposed residential development at 3064 Trafalgar Road in Oakville, Ontario.

The subject site is located on the west side of Trafalgar Road, approximately 200 metres north of Dundas Street East, as shown in **Figure 1.1**. The proposed development is to consist of two 33-storey residential towers with a total of 782 units.

Previous approved versions of the site plan and traffic studies consisted of two 30-storey towers with 722 units.

Pre-study consultation was undertaken with Town of Oakville via email in February 2024. **Appendix A** contains the pre-study correspondence and the comments received from the Town.

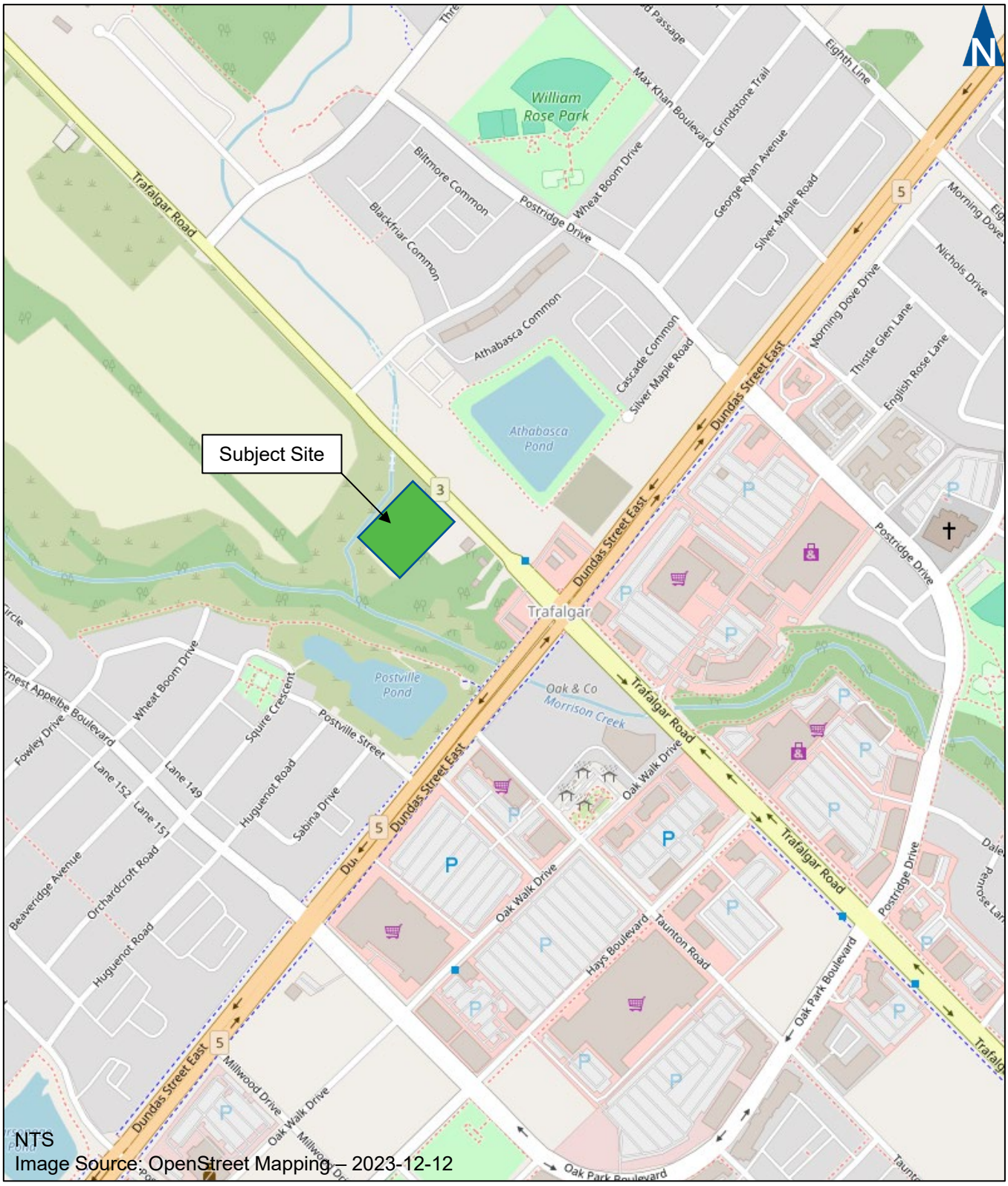
1.2 Purpose and Scope

This study determines the impacts of the additional traffic generated by the expansion of the surrounding road network and the remedial measures necessary to accommodate future traffic satisfactorily. The scope of this study includes:

- Assessments of the current traffic and site conditions within the study area;
- Estimates of background traffic growth;
- Estimates of the additional traffic generated by the planned expansion;
- Analyses of the impact(s) of the future traffic on the surrounding road network for the 2034 horizon year;
- Recommendations necessary to mitigate the site-generated traffic satisfactorily; and
- An estimate of the parking demand generated by expanding and establishing the number of on-site parking spaces should be provided to support the demand.

The study has been completed using Halton Region Transportation Impact Study Guidelines[1].

[1] Halton Region, *Transportation Impact Study Guidelines,* (Halton Region, January 2015).



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Study Area

Figure 1.1

220140

1.3 Study Area Intersections

The intersections that have been identified for assessment in this study and approved by Halton Region staff are as follows:

- Dundas Street East (Regional Road 5) and Trafalgar Road (Regional Road 3) (signalized)
- The future intersection of Trafalgar Road (Regional Road 3) and Wheat Boom Drive (signalized); and
- The proposed right-in/right-out site driveway with Trafalgar Road (Regional Road 3 (unsignalized).

2 Existing Conditions

This section documents current traffic conditions, operational deficiencies, and constraints experienced by the public travelling at the intersections within the study area. The operational deficiencies and limitations identified at this stage will be fundamental to defining the required remedial measures.

2.1 Roadway Characteristics

The main roadways near the subject site considered in assessing the traffic impacts of the development include:

- **Trafalgar Road (Regional Road 3)** – is a major north-south undivided arterial roadway from Lakeshore Road East to the north of the northern Halton Region boundary. The study area has a four-lane urban cross-section with auxiliary turning lanes at its signalized intersection with Dundas Street East. The posted speed limit is 60 kilometres per hour.
- **Dundas Street East (Regional Road 5)** – is a major east-west arterial roadway than runs across the width of Halton Region. In the study area it has a six-lane urban cross-section with auxiliary tuning lanes at its signalized intersection with Trafalgar Road. There is a raised centre median along Dundas Street which restricts the number of left-turns along the roadway. The posted speed limit is 60 kilometers per hour west of Trafalgar Road and 70 kilometres per hour east of Trafalgar Road.
- **Wheat Boom Drive** is an east-west minor collector road with a two-lane cross-section. A statutory speed limit of 50 km/h is assumed. Sidewalks are provided on both sides of the road. The roadway is proposed to be extended westerly across Trafalgar Road creating a four-legged intersection to accommodate future development within North Oakville.

Figure 2.1 illustrates the existing lane configurations and traffic control.

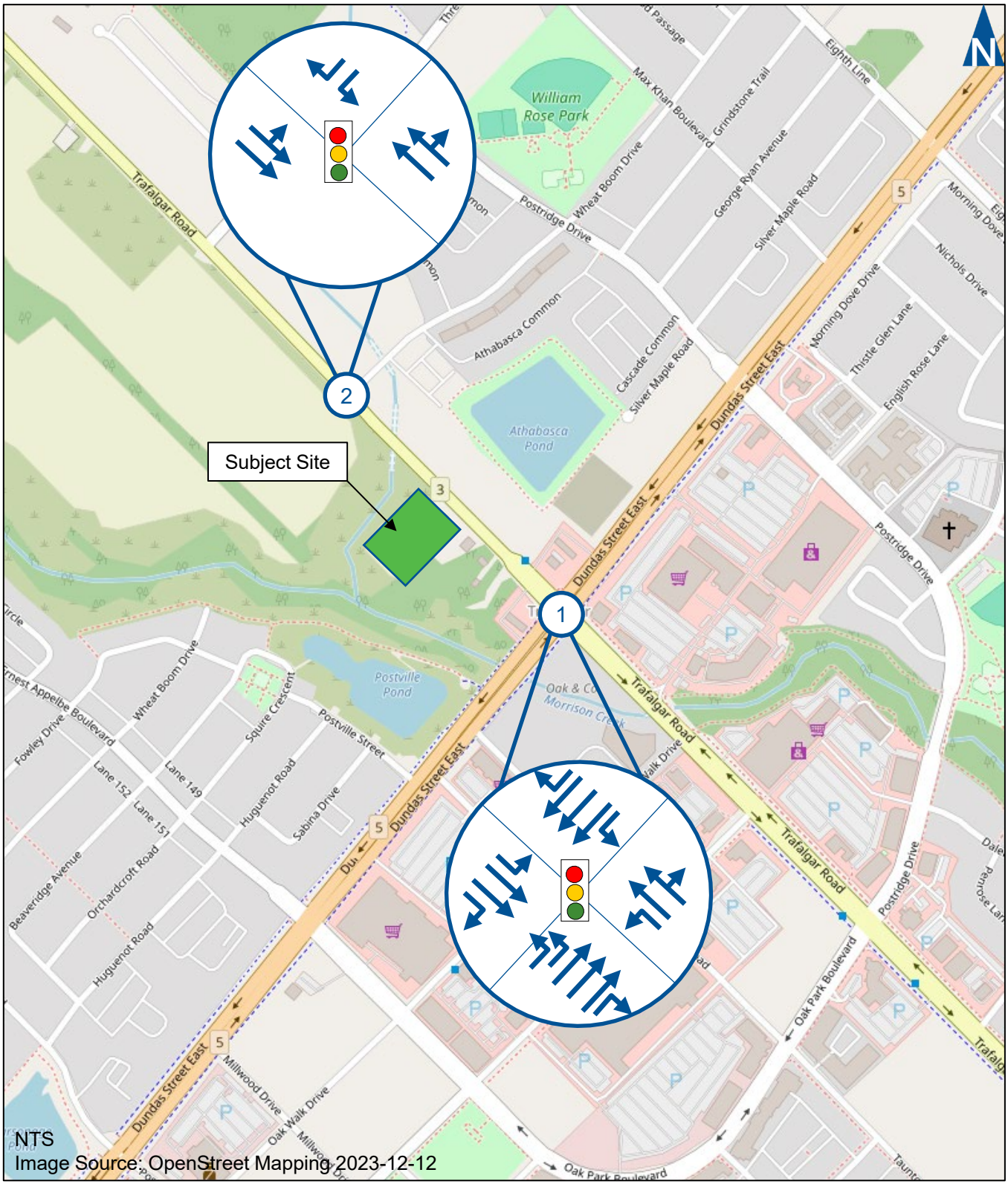

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Image Source: OpenStreet Mapping 2023-12-12

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Existing (2024) Lane Configuration & Traffic Control

Figure 2.1

2.2 Transit Service

2.2.1 Local Transit

Oakville Transit operates five separate transit routes utilize the Uptown Core Transit Terminal at Oak Walk Drive and Taunton Road (the southwest quadrant of the Dundas Street East and Trafalgar Road intersection). Transit stops are also at the Dundas Street East and Trafalgar Road intersection. The Uptown Core Transit Terminal is approximately 750 metres (9-minute walk) from the subject site. **Figure 2.2** illustrates the existing transit network.

- **Route 1 (Trafalgar)** travels from the Oakville GO Station to the Trafalgar Dundas/Highway 407 Carpool lot via Trafalgar Road and Dundas Street West. Service runs weekdays from early morning to late night with headways in the order of 60 minutes. Weekend and holiday service run from early morning to late nights with headway in the order of 60 minutes.
- **Route 5 and 5A (Dundas)** travels from the Oakville GO Station to the Dundas/Highway 407 Carpool lot via Trafalgar Road and Dundas Street West. Service runs weekdays from early morning to late night with headways in the order of 30 minutes. Weekend and holiday service run from early morning to late nights with headway in the order of 30 minutes on Saturday and 60 minutes on Sunday and holidays.
- **Route 19 (River Oaks)** travels from the Oakville GO Station to the Uptown Core Transit Terminal via McCraney Street, River Oaks Boulevard, River Glen Boulevard and Glenashton Drive. Service runs weekday from early morning to late evening with headways in the order of 15 to 30 minutes. Weekend and holiday service run from early morning to late evening with headways in the order of 30 minutes.
- **Route 20 (Northridge)** travels from the Oakville GO Station to the Uptown Core Transit Terminal via Eight Line and North Ridge Trail. Weekday service runs from early morning to late evening with headway in the order of 15 to 30 minutes. Weekend and holiday service run from early morning to late evening with headways in the order of 30 to 60 minutes.
- **Route 24 (South Common)** travels from the Oakville GO Station to the South Common Centre Transit Terminal via Trafalgar Road, Uptown Core Transit Terminal and Dundas Street East. Weekday service runs from early morning to late evening with headways in the order of 15 to 30 minutes. Weekend and holiday service run from early morning to early evening with headways in the order of 30 minutes.

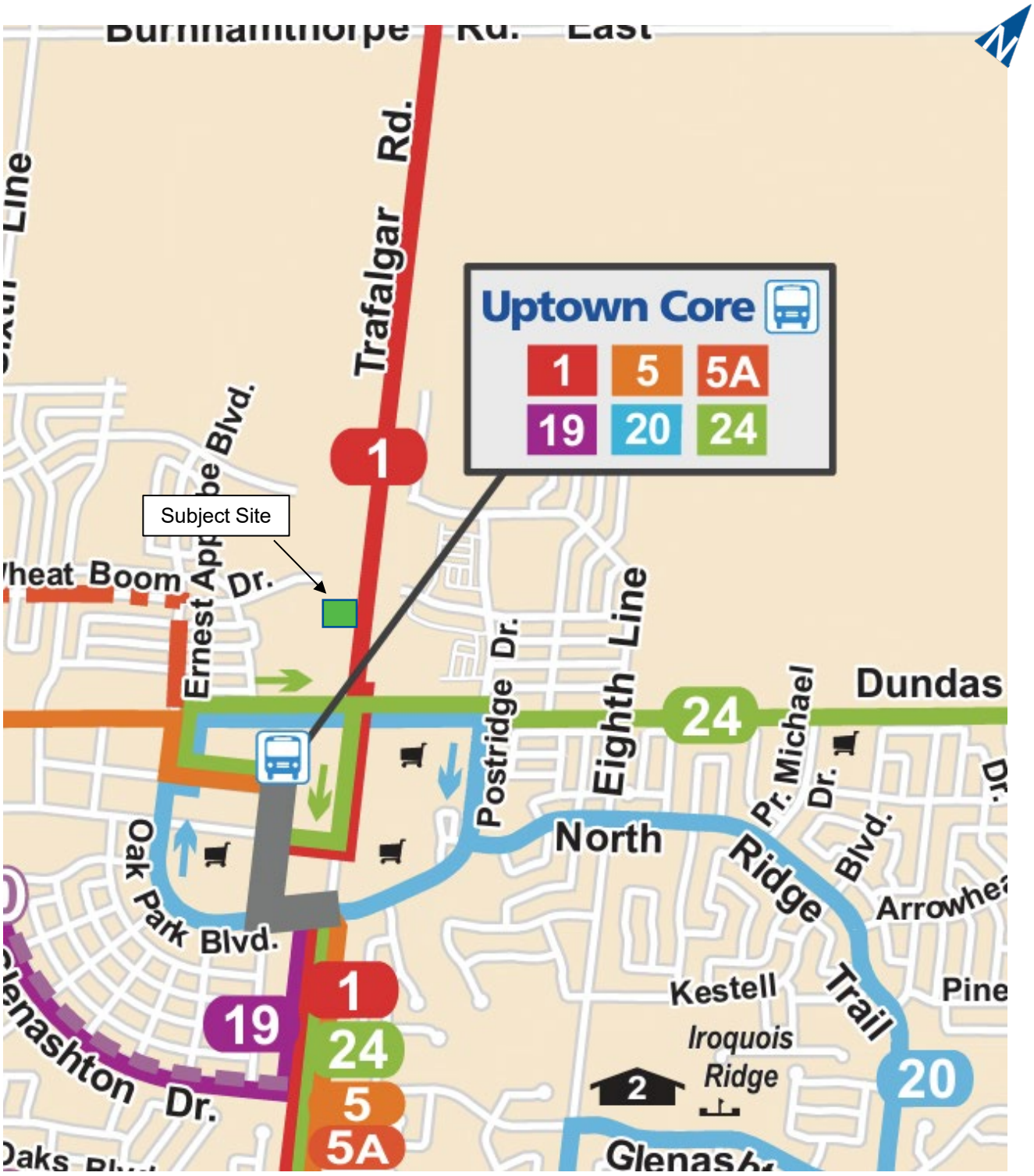

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Image Source: Oakville Transit System Map, September 5, 2021

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Existing (2021) Transit Network

Figure 2.2

2.2.2 Regional Transit

GO Transit operates two routes along Trafalgar Road, with stops north of the Dundas Street intersection.

- **Route 20 (Milton/Oakville)** provides north-south service along Trafalgar Road from the Milton GO Station to the Oakville GO Station. Weekday service runs from early morning to early evening with headway in the order of 60 minutes. There is no weekend or holiday service.
- **Route 46 (407 West)** provides service from Oakville GO Station to York University via Trafalgar Road and Highway 407. Weekday service is provided in the AM and PM peak hours with headways of 30 minutes. There is no weekend or holiday service.

2.2.3 Rapid Transit (Future)

Metrolinx, which is the Provincial Crown agency that manages and integrates road and public transport in the Golder Horseshoe region, has identified two regional rapid transit corridors[2] along Dundas Street (from Brant Street to Kipling Station) and Trafalgar Road from Midtown Oakville to Highway 401 in their 15-year plan.

Bus Rapid Transit has been confirmed for the Dundas Street corridor[3]. However, as with any BRT, implementation is an iterative process. The roadway has already undergone reconstruction to increase the number of lanes and through that process, BRT type bus stop cut-outs where constructed. However, there is no timing on when BRT will be implemented. Trafalgar Road has long been identified as a future BRT corridor and it is currently under construction from Leighland Avenue to north of Hays Boulevard by the Region. In conjunction with this construction, BRT type far side bus stop infrastructure is being added[4].

Provision of long-term rapid transit along Trafalgar Road and Dundas Street would improve service through the study area and would promote multi-modal travel within the area.

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[2] Metrolinx, *The Big Move, Transforming Transportation in the Greater Toronto and Hamilton Area,* (Metrolinx, 2008).

[3] Metrolinx - Dundas BRT

[4] Town of Oakville Transit Priority Projects, Town of Oakville, Report - November 23,2021

2.3 Pedestrian and Cycling Environment

2.3.1 Pedestrian

South of Dundas Street, Trafalgar Road has a sidewalk on the east side of the roadway. No sidewalks are provided on either side of Trafalgar Road north of Dundas Street East. The Trafalgar Road Class Environmental Assessment Study[5] has indicated that multi-use paths will be installed on Trafalgar Road north of Dundas Street East by the 2020 horizon year when Trafalgar Road is reconstructed.

There is an asphalt multi-use path along the southside of Dundas Street East within the study area. No pedestrian facilities on the north side of the roadway are provided.

Pedestrian signal heads with push buttons and crosswalk markings are provided at the signalized intersection of Dundas Street East and Trafalgar Road.

The subject site is noted to score a Walk Score[6] of 54 and is considered “Somewhat Walkable,” which means that some errands can be accomplished by walking. Walk Score is an online tool that assigns a numerical walkability score between 0 and 100. Walk Score ranks communities nationwide based on how many businesses, parks, theatres, schools, and other common destinations are within walking distance

2.3.2 Cycling

No on-street cycling lanes are noted along the roadways within the study area. Any access-controlled roadways do not restrict travel by bicycle to/from the subject site. Cyclists are permitted to ride on the roadways within the study area.

There is an existing asphalt multi-use path along the south side of Dundas Street East. As noted previously, a multi-use path along Trafalgar Road north of Dundas Street is proposed during the reconstruction of Trafalgar Road as indicated in the Environmental Study Report.

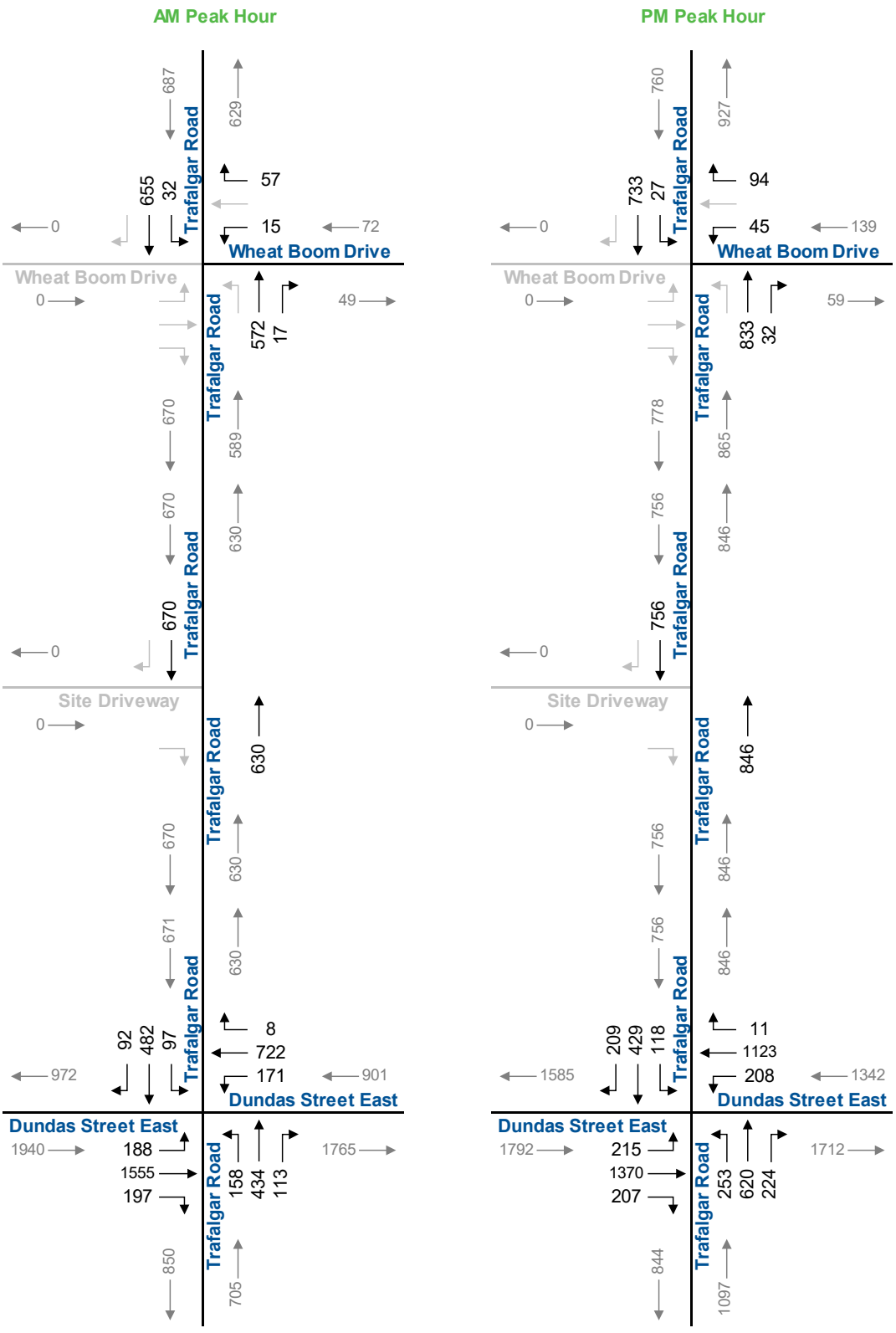
[5] AECOM, *Environment Study Report, Trafalgar Road (Regional Road 3) Improvements Class Environmental Assessment Study from Cornwall Road to Highway 407,* (AECOM: Town of Oakville, April 2016).
[6] https://www.walkscore.com/score/3064-trafalgar-rd-oakville-on-canada.

.4 Traffic Volumes

Turning movement counts (TMC) are used to quantify the movement of vehicles through the area to assess intersection operation. Existing traffic data at an intersection or road section forms the foundation for analysis. The counts are usually taken during peak periods at an intersection to complete the level of service analysis. **Appendix B** contains the traffic data utilized in this report.

TMC data from 2022 have been used for analysis purposes. Counts completed before 2024 have been adjusted to provide reasonable traffic volumes for the baseline horizon (24), using a growth rate of 2% per annum. **Figure 2.3** illustrates weekday AM and PM peak hour traffic volumes at the study area intersections.

Appendix B contains the turning movement count data and traffic signal timing plan.



Existing (2024)Traffic Volumes

Figure 2.3

2.5 Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the average delay experienced by drivers at intersections. It is based on the delay related to the number of vehicles desiring to make a movement, compared to the estimated capacity for that movement.

The capacity is based on several criteria including but not limited to, vehicle headways, intersection geometry, vehicle composition, opposing traffic flows, and for signalized intersections, signal timing. Capacity is evaluated in terms of the ratio of demand flow to capacity with a at capacity condition represented by a volume-to-capacity ratio of 1.00 (i.e., volume demand equals capacity).

Table 2.1 summarizes the level of service criteria for signalized and stop controlled intersections. The highest possible rating is LOS A, under which the average delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections, 50 seconds at unsignalized intersections or when the v/c ratio is greater than 1.00, the movement is classed as LOS F and remedial measures are usually implemented if feasible. LOS E is generally used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on capacity and safety considerations. It is also recognized that the guidelines for determining when improvements are necessary can vary in different municipalities.

TABLE 2.1: VEHICLE LEVEL OF SERVICE DEFINITIONS

LOS	Signalized Intersections Average Total Delay (sec/veh)	Unsignalized Intersections Average Total Delay (sec/veh)
A	<= 10	<= 10
B	>10 & <= 20	>10 & <= 15
C	>20 & <= 35	>15 & <= 25
D	>35 & <= 55	>25 & <= 35
E	>55 & <= 80	>35 & <= 50
F	>80	>50

The operations of the study area intersections were evaluated under existing traffic volumes using Synchro 9 and HCM 2000 procedures.

The intersection analysis considered the following measures of performance:

- The LOS for each turning movement. LOS is based on the average control delay per vehicle
- The volume-to-capacity ratio for each intersection; and
- 95th percentile queue length (m).

The Halton Region TIS Guidelines identify the following thresholds for critical movements at intersections:

- Volume to capacity ratios for overall intersection operations, through movements or shared through/turning movements that operate at 0.85 or greater for signalized intersections
- Volume to capacity ratios for exclusive turning movements that operate at 0.95 or greater for signalized intersections
- Level of service based on average delay per vehicle or individual movement is LOS D or greater for unsignalized intersections; and
- Estimated 95th percentile queue lengths exceed available turning lane storage at signalized and unsignalized intersections.

Table 2.2 summarizes the analysis results for the existing weekday AM and PM peak-hour intersection operations. The results of the analyses indicate that the study area intersections are currently operating at acceptable levels of service during the AM and PM peak hours with the following critical movements:

- Trafalgar Road and Dundas Street:
  - The westbound left-turn movement is operating at LOS F and v/c ratio of 0.97 during the AM peak hour; and
  - The eastbound through movement is operating with LOS E and v/c ratio greater than 1.0 during the AM peak hour and LOS E and v/c ratio of 0.94 during the PM peak hour.

Appendix C contains the detailed Synchro output.

TABLE 2.2: EXISTING INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																	
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Trafalgar Road & Dundas Street East	TCS	LOS	E	E	C	**E**	F	D	C	**D**	C	C	>	**C**	C	D	C	**D**	**D**
			Delay	56	75	31	**69**	93	41	34	**51**	27	35	>	**33**	29	38	35	**36**	**54**
			V/C	0.48	1.04	0.20		0.97	0.55	0.01		0.46	0.49	>		0.32	0.48	0.07		**0.77**
			Q	40	210	28		82	80	0		42	81	>		27	78	0		
			Ex	85		85		160		70		120		>		50		50		
			Avail.	45		57		78		70		78		>		23		50		
	Trafalgar Road & Wheat Bloom Drive	TCS	LOS					D		D	**D**		A	>	**A**	<	A		**A**	**A**
			Delay					39		39	**39**		7	>	**7**	<	8		**7.7**	**9**
			V/C					0.04		0.04			0.26	>		<	0.34			**0.27**
			Q					10		12			36	>		<	45			
			Ex											>		<				
			Avail.											>		<				
PM Peak Hour	Trafalgar Road & Dundas Street East	TCS	LOS	E	E	C	**D**	D	D	C	**D**	D	D	>	**D**	D	D	C	**D**	**D**
			Delay	60	56	34	**54**	52	46	31	**47**	40	50	>	**48**	39	37	33	**36**	**48**
			V/C	0.56	0.94	0.19		0.78	0.79	0.01		0.71	0.84	>		0.56	0.42	0.14		**0.86**
			Q	45	175	27		81	130	0		70	145	>		36	69	19		
			Ex	85		85		160		70		120		>		50		50		
			Avail.	40		58		79		70		50		>		14		31		
	Trafalgar Road & Wheat Bloom Drive	TCS	LOS					D		D	**D**		A	>	**A**	<	A		**A**	**A**
			Delay					45		44	**44**		4	>	**4**	<	4		**4**	**7**
			V/C					0.29		0.06			0.34	>		<	0.33			**0.33**
			Q					22		16			33	>		<	29			
			Ex											>		<				
			Avail.											>		<				

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control

< - Shared Left-turn
> - Shared Right-turn

3 Development Concept

3.1 Development Description

The 0.82-hectare site is comprised of a residential development with a total of 782 units in two 33-storey towers. Tower A will have 385 units, and Tower B will have 397 units.

Vehicular access is provided by one right-in/right-out driveway to Trafalgar Road. A total of 948 parking spaces are being provided.

Figure 3.1 illustrates the site concept plan.

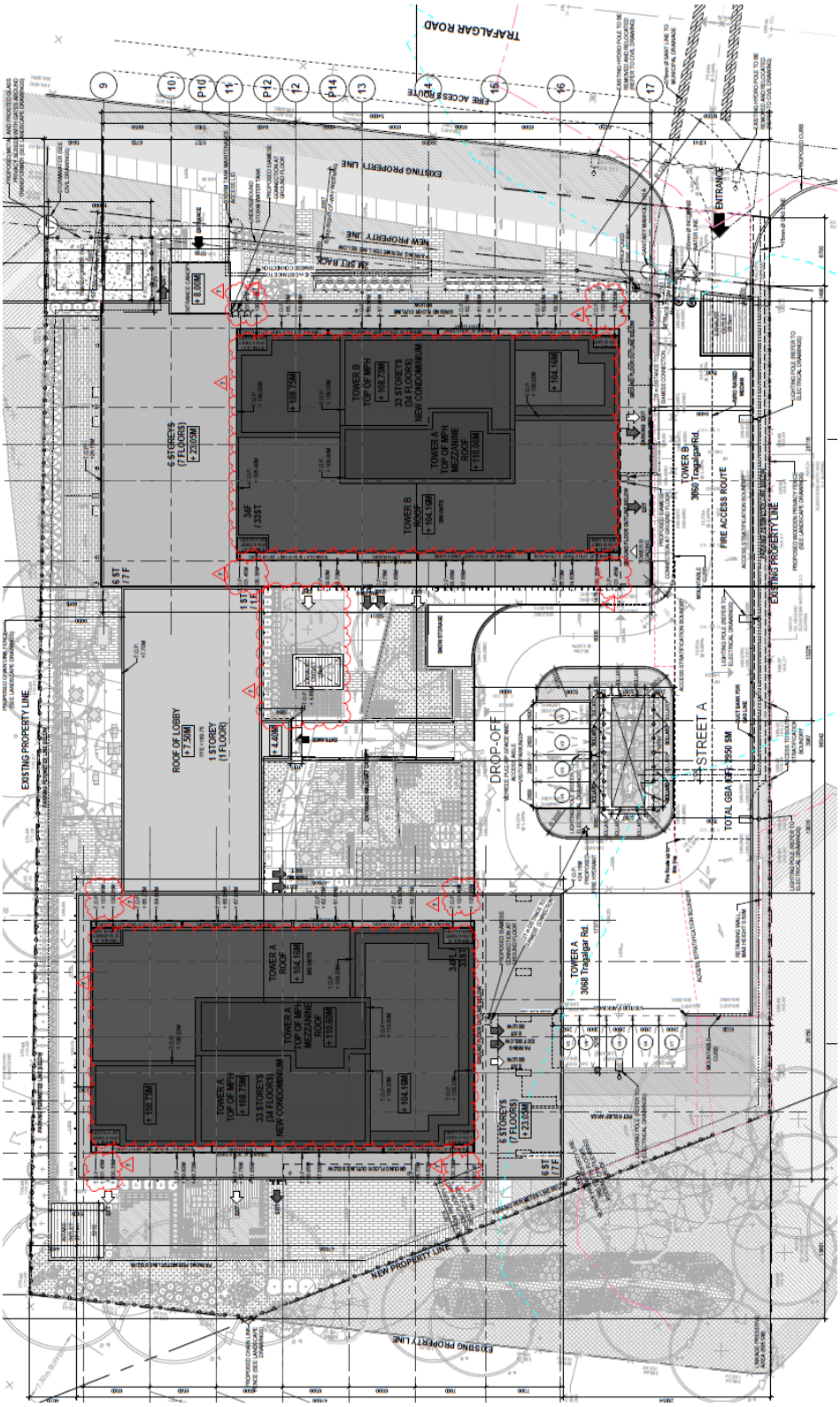
3.1.1 Mutually Shared Access

Upon build-out of the subject site, the proposed access and internal site driveway will be situated immediately adjacent to the southern property line of the site, as it will most likely be constructed before the development of the neighbouring property fronting the south limit of the site.

The site access location allows future mutual access to the neighbouring site to the south. This proposed ultimate condition is considered desirable from an operational and road user safety standpoint for the following reasons:

- This design will permit the neighbouring southern property to have access situated as far north as possible, given the neighbouring site's comparatively proximity to the major signalized intersection of Trafalgar Road at Dundas Street East
- Combining the accesses will minimize the number of accesses in the immediate area, thus minimizing the number of potential turning movements within a relatively close distance; and
- Eliminates the potential for access spacing concerns between the two properties[7].

[7] GHD, *Access Review Letter, Proposed Residential Development, 3064 Trafalgar Road, Oakville, Ontario,* (GHD, June 15, 2018).



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Concept Plan

Figure 3.1

3.2 Site-Generated Traffic

The Institute of Transportation Engineers (ITE) Trip Generation[8] methods predict the site trip generation. Land Use Code 222 (Multifamily Housing [High-Rise]) was used to estimate the site's trip generation.

Table 3.1 summarizes the estimated trip generation of the subject site. The average rates were used as the coefficient of determination is considered low for both the AM and PM peak hours. It is estimated to generate approximately 211 AM and 250 PM peak-hour trips. The modal split has been removed from the site trip generation calculation as the ITE Trip Generation Manual 11th Edition rates include updated surveys completed in the 2010s at high-rise developments, indicating a reduced rate for these developments. A plausible reason is that newer high-rises are incorporating transportation demand management (TDM), reducing a development's dependency on vehicle trips.

TABLE 3.1: ESTIMATED TRIP GENERATION

ITE Land Use	Units	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
222 - Multifamily Housing (High-Rise)	782	55	156	211	155	95	250

3.3 Trip Distribution and Assignment

The site-generated trips were assigned to the road network based on the existing distribution of traffic at the study area intersections. **Table 3.2** summarizes the estimated site trip distribution.

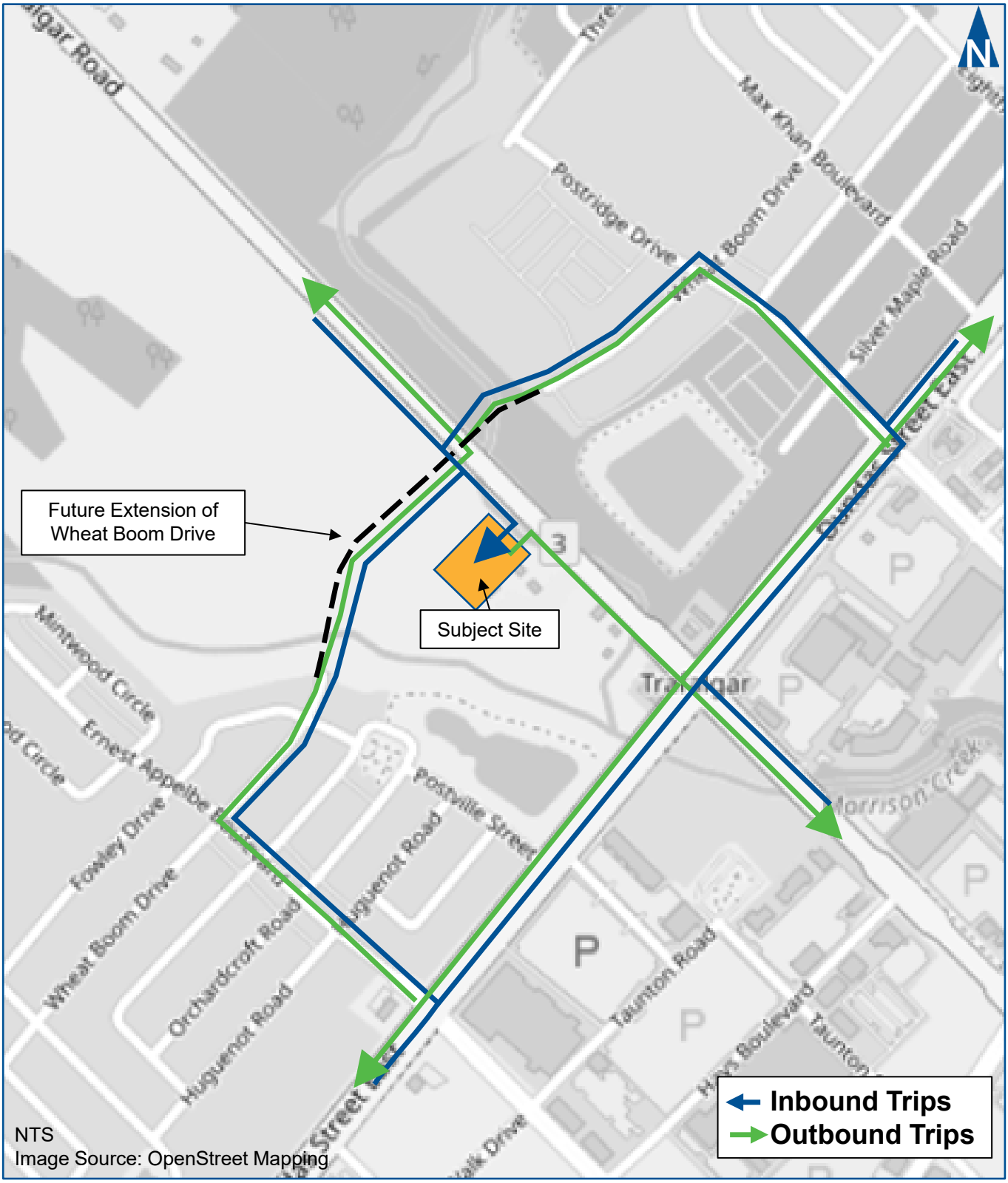
TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
North	23%	24%	19%	26%
South	14%	20%	18%	15%
East	21%	37%	38%	21%
West	42%	19%	25%	38%
Total	**100%**	**100%**	**100%**	**100%**

[8] Institute of Transportation Engineers, *Trip Generation Manual,* 11th ed., (Washington, DC: ITE, 2021).

As the site driveway is to operate as a right-in/right-out driveway, the site trips that cannot make left turns in or out of the subject site are assumed to use parallel roads such as Postridge Drive, Ernest Appelbe Boulevard and Wheat Boom Drive. **Figure 3.2** illustrates the proposed routing of the site-generated trips.

Figure 3.3 illustrates the trip assignment to be generated by the development.



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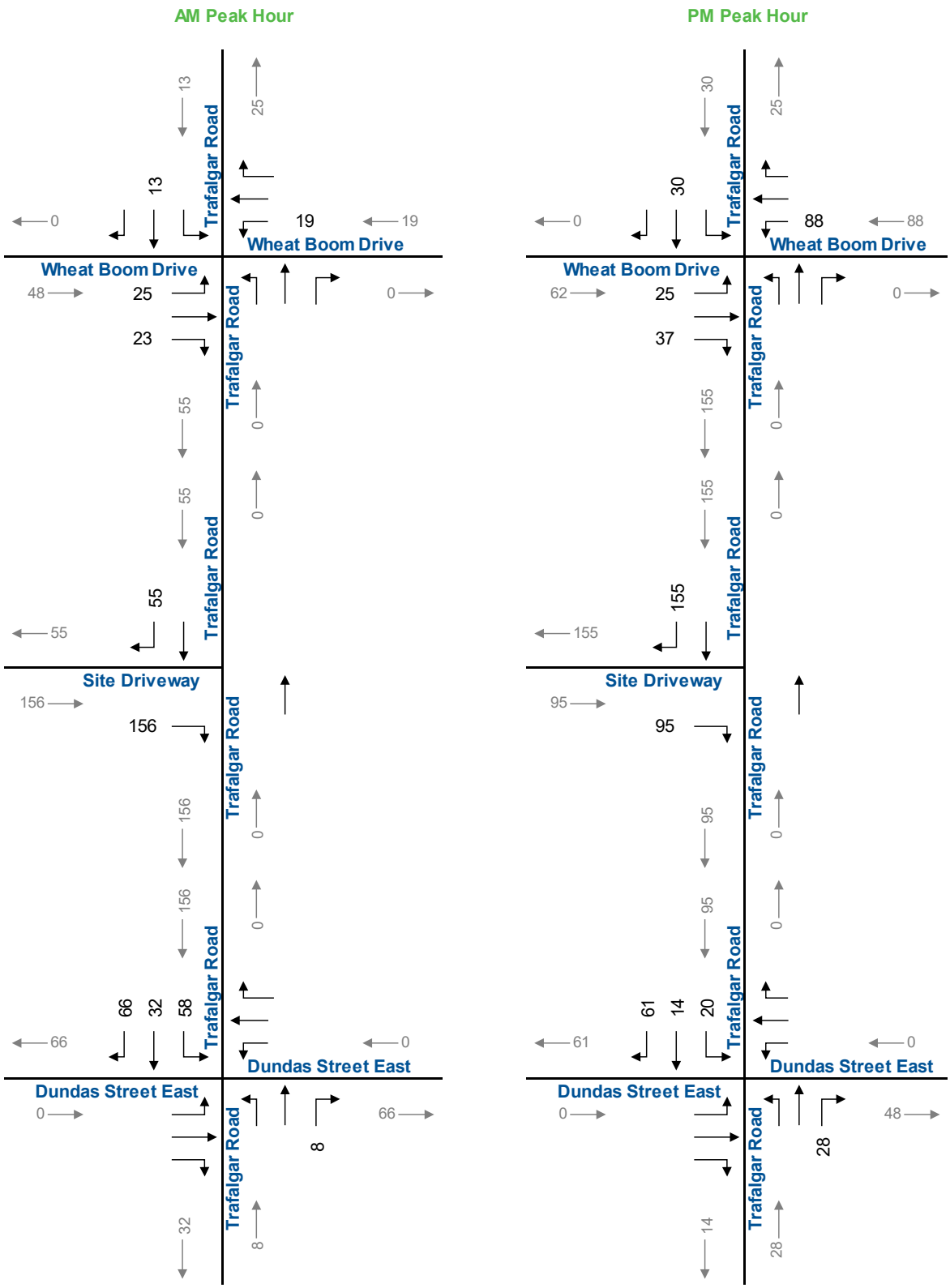
Site Generated Routing

Figure 3.2



Site Generated Traffic Forecasts

Figure 3.3

4 Evaluation of Future Traffic Conditions

The assessment of future conditions in this section includes the following components necessary to assess the traffic implications on the adjacent road network:

- Future background traffic estimates
- Level of service analysis for background traffic (pre-development)
- Future total traffic estimates; and
- Level of service analysis for total traffic (post-development).

4.1 Road Network Improvements

Based on the Halton Region's Capital Implementation Plan (2018-2031)[9], the Region plans to widen Trafalgar Road from four to six lanes from Highway 407 to Dundas Street, with constructions slated for 2020. Preliminary design drawings were obtained from the Trafalgar Road Environment Study Report[10]. It indicates left and right-turn lanes will be provided on Trafalgar Road at the signalized intersections of Dundas Street East and Wheat Boom Drive. The preliminary design also shows a raised centre median on Trafalgar Road which prohibits left turns in and out of the subject site. The preliminary design also indicates high Occupancy Vehicle (HOV) lanes on Trafalgar Road and Dundas Street.

Upon completing the widening of Trafalgar Road to 6 lanes throughout the project limits (i.e., all three segments), there is a future opportunity to consider the introduction of High Occupancy Vehicle (HOV) curb lanes, allowing a mix of transit and private vehicles with two or more occupants. As transit ridership builds, there is also the opportunity to convert the HOV lanes into curbside Bus Rapid Transit (BRT) lanes. Conversion from curbside HOV/ Transit lanes to curbside BRT lanes would not require roadway reconstruction. Much of the transition would be related to changes in signage and pavement markings.

The operation timing of the Trafalgar Road widening and HOV curb lane implementation on both Trafalgar Road and Dundas Street West is expected at a minimum during the horizon year 2028. Opening day

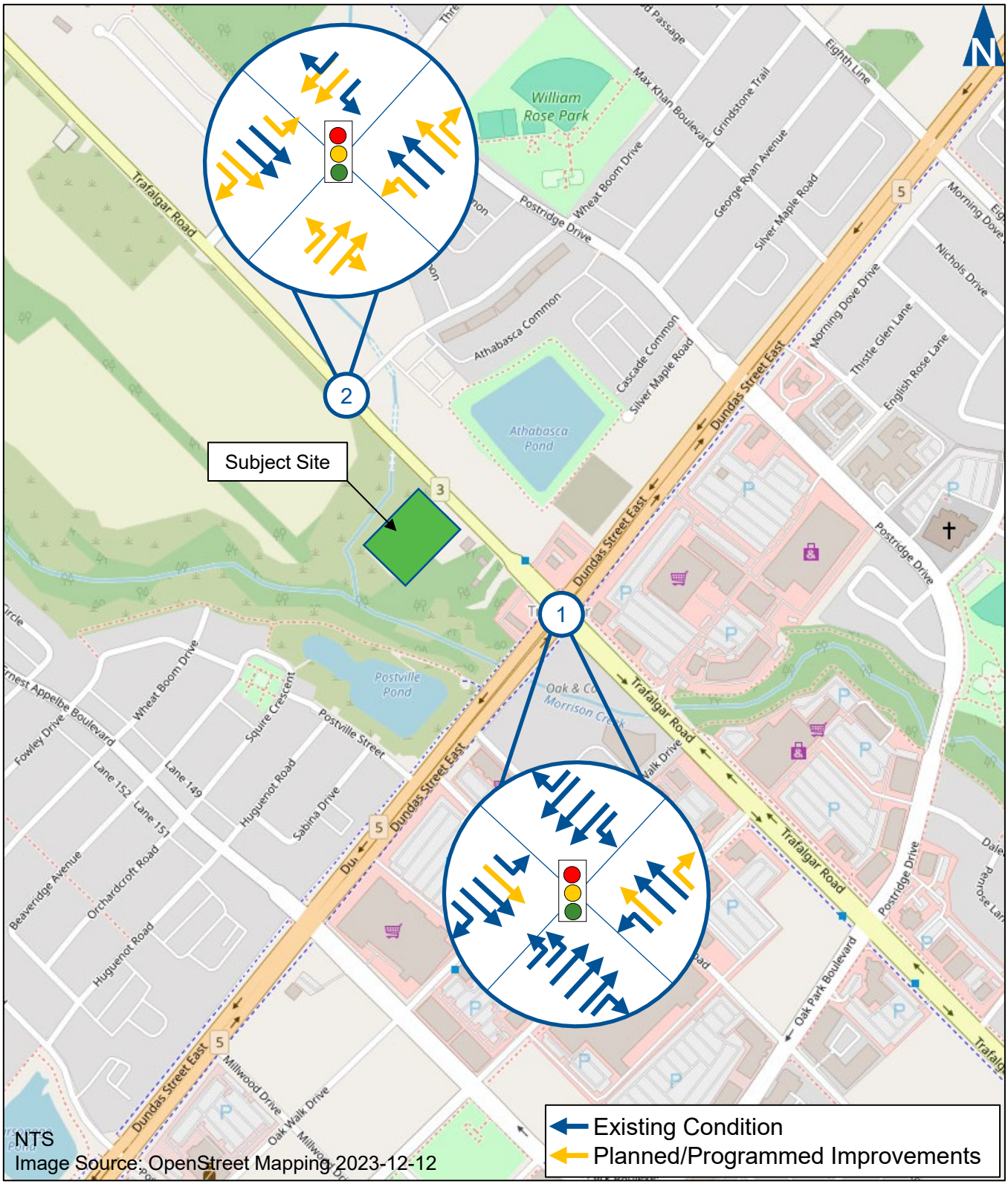
[9] Halton Region, *Transportation Development and Non-Development Capital Implementation Plan (2018 – 2031),* (Halton Region, 2018).
[10] AECOM, *Environment Study Report, Trafalgar Road (Regional Road 3) Improvements Class Environmental Assessment Study from Cornwall Road to Highway 407,* (AECOM: Town of Oakville, April 2016).

lane configuration on Trafalgar Road is assumed to be two (2) general-purpose lanes and one (1) HOV curb lane in each direction.

It is noted that a detailed design of the Trafalgar Corridor is in progress. As such, the future intersection lane configurations within the corridor are based on the Preferred Preliminary Design Plates[11].

Figure 4.1 illustrates the future road network.

[11] Town of Oakville, Preferred Preliminary Design Plates – Trafalgar Road Corridor Study, 2015



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Future (2034) Lane Configuration & Traffic Control

Figure 4.1

4.2 Future Forecasts

4.2.1 2034 Background Forecasts

The future background traffic volumes have been estimated by applying a growth rate of 2% compounded per annum to the existing traffic volumes.

Development traffic within the study area has also been accounted for based on projections in the Green Ginger Phase 2 Traffic Study[12] prepared by GHD Limited. This study also provided projections for the future intersection of Trafalgar Road and Wheat Boom Drive.

Additionally, as it is anticipated that the adjacent property to the south will be developed in the short term, projections for this development have also been estimated. Based on preliminary information provided by the project team, it is assumed that this development will consist of a 25-storey tower with 317 residential units.

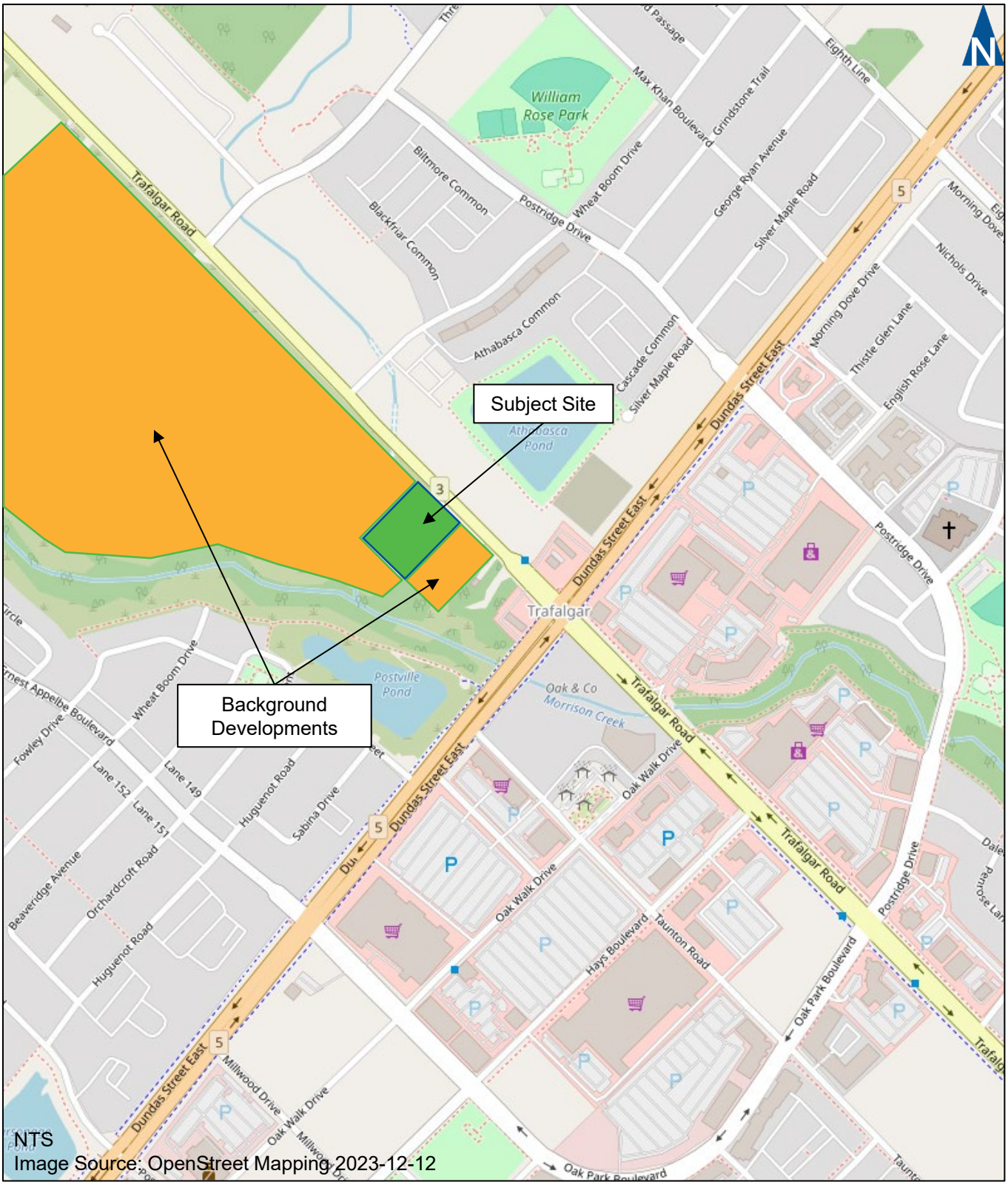
Appendix D provides the forecast traffic volumes for the above-noted development applications. **Figure 4.2** illustrates the locations of the background developments. **Figure 4.3** illustrate the forecast year 2034 background traffic volumes for the weekday AM and PM peak hours.

4.2.2 2034 Total Forecasts

The 2034 future total traffic volumes forecast includes the background and site-generated traffic volumes.

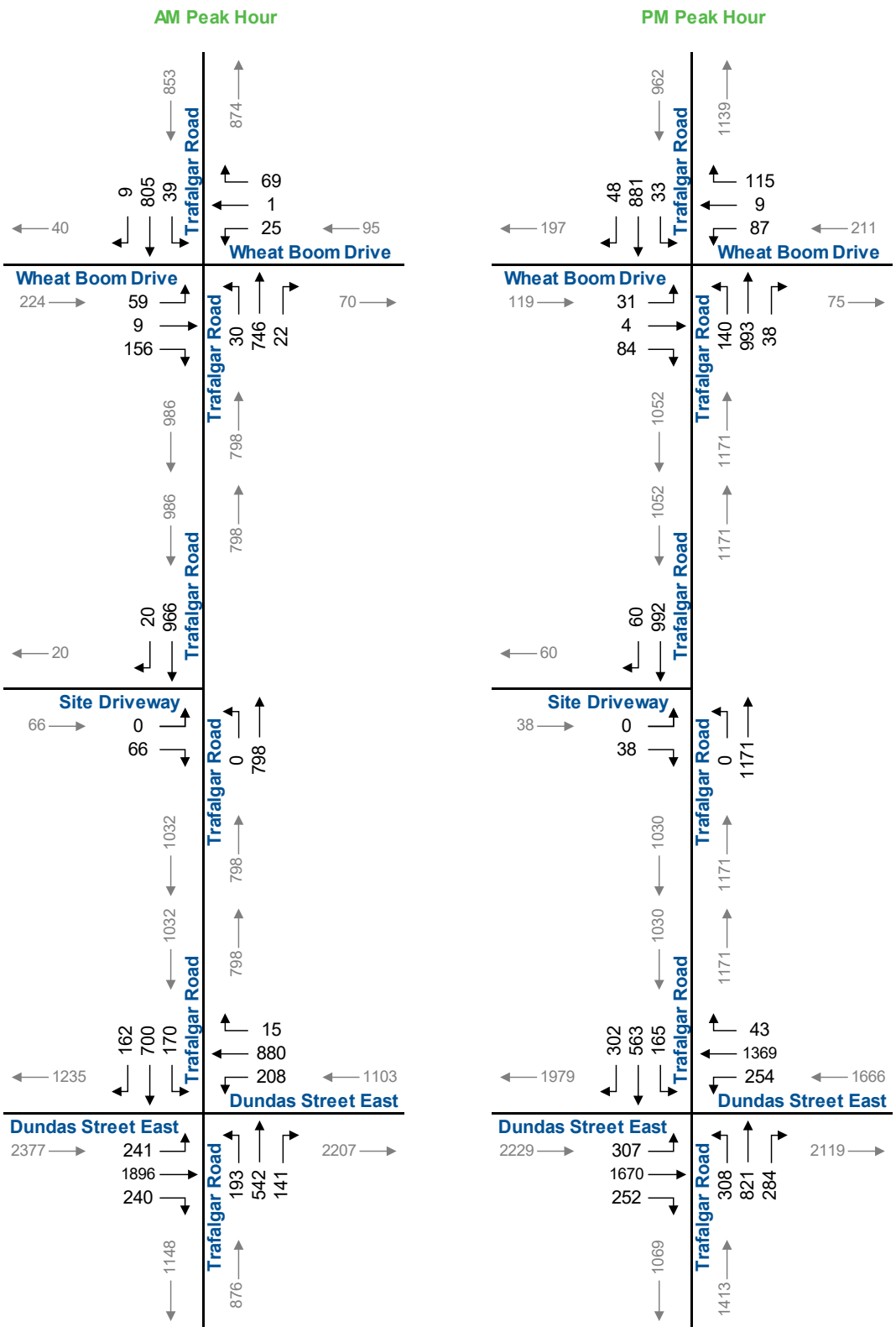
Figure 4.4 illustrates the forecast year 2034 total traffic volumes for the weekday AM and PM peak hours.

[12] GHD Ltd, *Green Ginger Development Inc., Green Ginger Phase 2 Traffic Impact Study,* (GHD Ltd, September 2016).



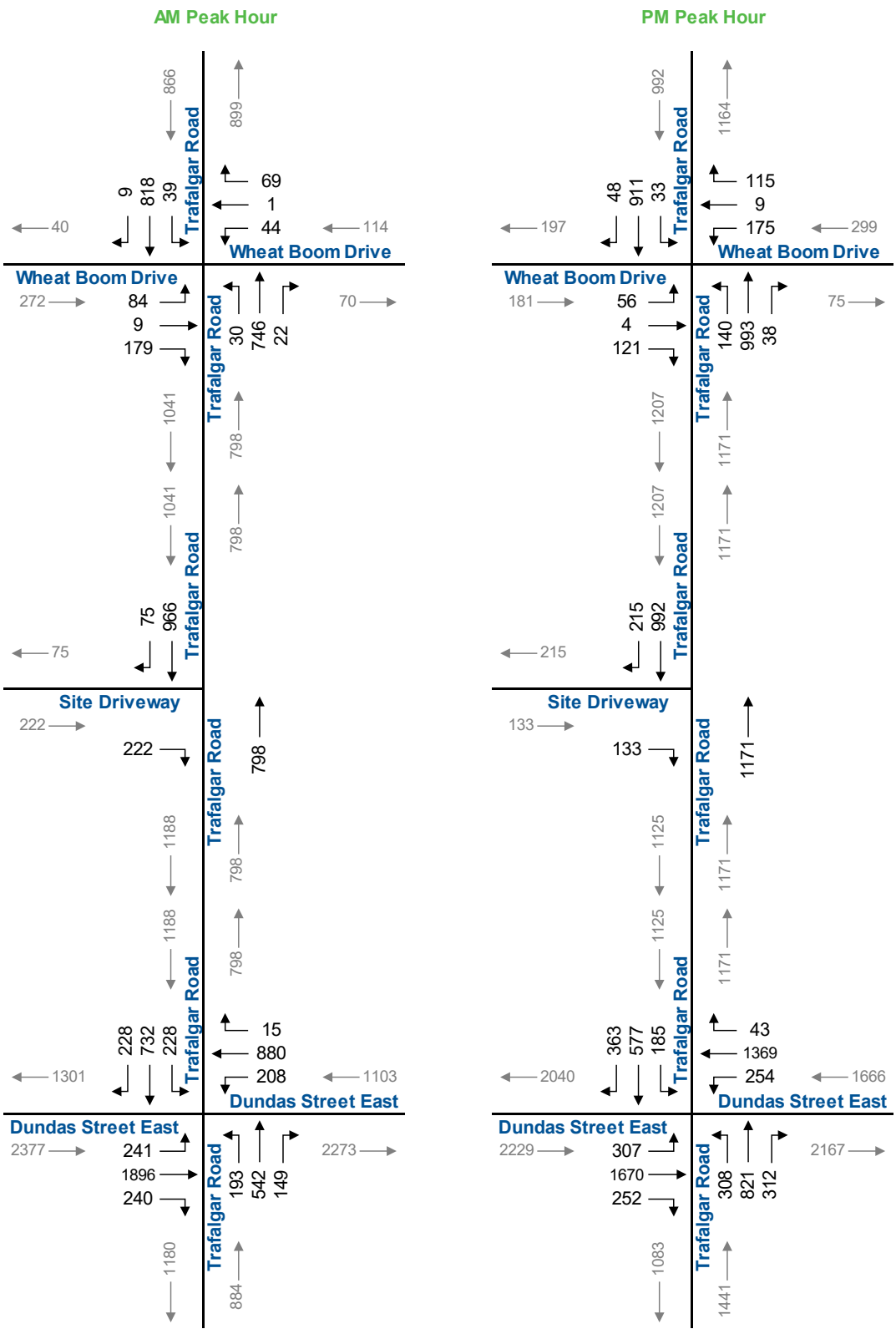
Background Development Locations

Figure 4.2



2034 Background Traffic Forecasts

Figure 4.3



2034 Total Traffic Forecasts

Figure 4.4

4.3 Operational Analysis

Level of service analyses was conducted using Synchro 11 with HCM 2000 procedures for the weekday AM and PM peak hour conditions at the study area intersections using the total background traffic forecasts with existing signal timings splits and cycle lengths.

To assess the implications of the combination of mixed traffic lanes and HOV Lanes, the analyses assumed that the HOV lanes would carry 20 percent of overall through traffic on Trafalgar Road and Dundas Street West in addition to the right-turning traffic. A lane utilization factor of 0.80 was applied to the Synchro model to account for the HOV usage.

The same signal timings and phasing were used in both models. This process was followed for the 2034 background and total traffic analysis scenarios.

Table 4.1 summarizes the capacity analyses for the study area intersections, respectively. The capacity analysis results are included in **Appendix E**.

The analyses indicate that the site-generated traffic will not impact the study area intersections. The following sub-sections outline the operations of the study area intersections.

4.3.1 Trafalgar Road at Dundas Street East

The results of the analyses indicate that the intersection of Trafalgar Road and Dundas Street East is forecast to operate with poor level of service under 2034 Background and Total Traffic conditions during the AM and PM Peak hours. The Dundas Street approaches are forecast to operate at LOS E/F and v/c ratios approaching and exceeding capacity.

Due to the high levels of congestion occurring and the expected long-term transit network anticipated to be developed (BRT along Trafalgar Road and Dundas Street), further remedial measures to improve intersection capacity are not likely to be implemented. Instead, future improvements to the transportation network are expected to focus on public transit infrastructure to reduce the demand for private automobiles.

By focusing on shifting commuter travel to public transit, intersection operations could be expected to maintain the status quo (capacity condition during peak hours) or possibly improve if fewer vehicles

transverse the intersections during the peak hours of a typical weekday.

4.3.2 Trafalgar Road at Wheat Boom Drive

The intersection of Trafalgar Road and Wheat Boom Drive is forecast to operate with an acceptable level of service during the AM and PM peak hours.

4.3.3 Trafalgar Road at Site Driveway

The intersection of Trafalgar Road and the Site Driveway is forecast to operate at an acceptable level of service during the AM and PM peak hours.

TABLE 4.1: FUTURE INTERSECTION OPERATIONS

Analysis Period	Intersection	Horizon Year	Control Type	MOE	Direction / Movement / Approach																Overall
					Eastbound				Westbound				Northbound				Southbound				
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Trafalgar Road & Dundas Street East	2024 Background	TCS	LOS	E	F	C	F	F	D	C	E	D	C	C	C	D	D	C	D	F
				Delay	58	209	31	176	130	44	32	60	38	31	29	32	35	37	34	36	102
				V/C	0.58	1.36	0.30		1.11	0.71	0.01		0.71	0.36	0.10		0.57	0.52	0.12		1.02
				Q	49	339	44		104	115	0		52	60	15		45	85	18		
				Ex	85		85		160		70		120		100		50		50		
				Avail.	36		41		56		70		68		85		5		32		
		2024 Total	TCS	LOS	E	F	C	F	F	D	C	E	D	C	C	C	D	D	C	D	F
				Delay	58	209	31	176	130	44	32	60	40	31	29	32	47	37	35	39	101
				V/C	0.58	1.36	0.30		1.11	0.71	0.01		0.73	0.36	0.11		0.77	0.54	0.22		1.04
				Q	49	339	44		104	115	0		56	60	15		63	89	29		
				Ex	85		85		160		70		120				50		50		
				Avail.	36		41		56		70		64				-13		21		
	Trafalgar Road & Wheat Boom Drive	2024 Background	TCS	LOS	D	D	>	D	D	C	>	D	A	A	A	A	A	A	A	A	A
				Delay	38	36	>	36	36	35	>	35	3	3	2	3	3	3	2	3	8
				V/C	0.35	0.12	>		0.20	0.03	>		0.08	0.23	0.02		0.10	0.25	0.01		0.27
				Q	24	13	>		13	0	>		4	21	2		5	23	1		
				Ex	50		>		50		>		120				50		50		
				Avail.	26		>		37		>		116				45		49		
		2024 Total	TCS	LOS	D	D	>	D	D	C	>	D	A	A	A	A	A	A	A	A	A
				Delay	38	35	>	36	37	34	>	35	3	3	3	3	3	3	3	3	9
				V/C	0.45	0.19	>		0.35	0.03	>		0.09	0.24	0.02		0.10	0.26	0.01		0.29
				Q	31	17	>		19	0	>		5	24	3		5	27	1		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	19		>		31		>		46		48		45		49		
	Trafalgar Road & Site Driveway	2024 Background	TWSC	LOS			B	B						A		A		A	>	A	0
				Delay			11	11						0		0		0	>	0	
				V/C			0.11							0.17				0.25	>		
				Q			3							0				0	>		
				Ex															>		
				Avail.															>		
		2024 Total	TWSC	LOS			B	B						A		A		A	>	A	0
				Delay			14	14						0		0		0	>	0	
				V/C			0.38							0.17				0.25	>		
				Q			14							0				0	>		
				Ex															>		
				Avail.															>		
PM Peak Hour	Trafalgar Road & Dundas Street East	2024 Background	TCS	LOS	E	F	D	F	F	F	C	F	F	D	C	D	C	D	C	D	F
				Delay	71	184	37	152	82	100	32	95	86	38	34	49	34	37	34	36	97
				V/C	0.80	1.30	0.33		0.96	1.09	0.03		1.01	0.48	0.20		0.56	0.44	0.21		1.12
				Q	68	298	48		113	226	0		123	77	22		46	70	22		
				Ex	85		85		160		70		120		100		50		50		
				Avail.	17		37		47		70		-3		78		4		28		
		2024 Total	TCS	LOS	E	F	D	F	F	F	C	F	F	D	D	D	D	D	D	D	F
				Delay	71	184	37	152	82	100	32	95	90	41	36	50	49	37	35	39	95
				V/C	0.80	1.30	0.33		0.96	1.09	0.03		1.02	0.64	0.29		0.78	0.45	0.25		1.12
				Q	68	298	48		113	226	0		125	105	37		62	71	24		
				Ex	85		85		160		70		120				50		50		
				Avail.	17		37		47		70		-5				-12		26		
	Trafalgar Road & Wheat Boom Drive	2024 Background	TCS	LOS	D	D	>	D	D	D	>	D	A	A	A	A	A	A	A	A	A
				Delay	45	43	>	43	52	43	>	47	8	4	3	5	4	4	3	4	10
				V/C	0.22	0.04	>		0.60	0.08	>		0.43	0.32	0.03		0.12	0.28	0.03		0.45
				Q	17	0	>		38	12	>		29	41	3		6	36	3		
				Ex	50		>		50		>		120				50		50		
				Avail.	33		>		12		>		91				44		47		
		2024 Total	TCS	LOS	D	D	>	D	E	D	>	D	B	A	A	A	A	A	A	A	B
				Delay	41	39	>	40	66	39	>	55	14	7	5	8	7	7	5	7	15
				V/C	0.26	0.05	>		0.82	0.07	>		0.50	0.34	0.02		0.13	0.31	0.03		0.57
				Q	26	8	>		73	11	>		42	57	4		8	51	4		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	24		>		-23		>		8		46		42		46		
	Trafalgar Road & Site Driveway	2024 Background	TWSC	LOS			B	B						A		A		A	>	A	0
				Delay			10	10						0		0		0	>	0	
				V/C			0.06							0.25				0.25	>		
				Q			2							0				0	>		
				Ex															>		
				Avail.															>		
		2024 Total	TWSC	LOS			B	B						A		A		A	>	A	1
				Delay			11	11						0		0		0	>	0	
				V/C			0.20							0.25				0.25	>		
				Q			6							0				0	>		
				Ex															>		
				Avail.															>		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control

< - Shared Left-turn
> - Shared Right-turn

4.4 Alternative Forecasts (Bus Rapid Transit)

The forecasts contained in **Section 4.2** utilized a growth rate of 2% per annum compounded annually to obtain the general growth in traffic to the year 2028. However, it is anticipated that the long-term strategy plan for the overall study area will consist of implementing Bus Rapid Transit (BRT) along the Dundas Street and Trafalgar Road corridors to improve the public transit network.

The Trafalgar Road Environment Study Report[13] incorporated updated micro-simulation network modelling with BRT implemented and indicated a reduction in overall volumes at the intersection of Trafalgar Road and Dundas Street. **Table 4.2** illustrates the comparison.

TABLE 4.2: VOLUME COMPARISON

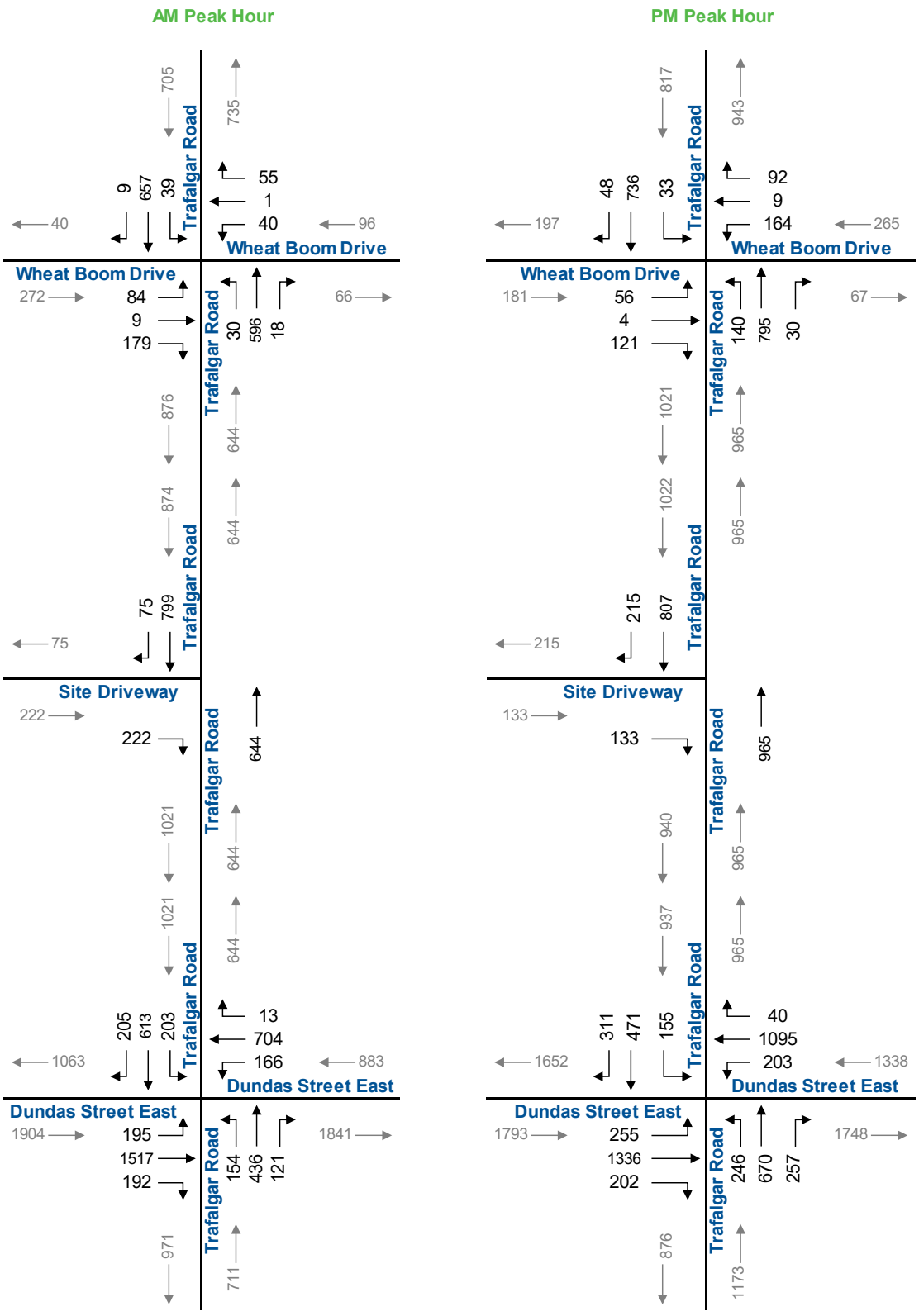
Intersection	Approach	Volume*		% Difference
		Existing	2031 BRT	
Trafalgar Road and Dundas Street	East	1,367	1,094	-20%
	West	1,737	1,304	-25%
	North	919	910	-1%
	South	1,186	949	-20%
	Total	**5,209**	**4,257**	**-18%**

*Taken from Trafalgar Road (Regional Road 3) Improvements Class EA, April 2015

For this reason, updated forecasts were completed for the Trafalgar Road and Dundas Street intersection, assuming BRT will be operational. For this report, it has been assumed that all approaches would see a volume reduction of 20%, except for the north approach to account for various transit provisions and a shift towards transit usage as a primary mode choice.

Figure 4.5 illustrates the alternative 2034 total forecast for the weekday AM and PM peak hours.

[13] AECOM, *Environment Study Report, Trafalgar Road (Regional Road 3) Improvements Class Environmental Assessment Study from Cornwall Road to Highway 407,* (AECOM: Town of Oakville, April 2016).



2034 Total Traffic Forecasts (Alternative)

Figure 4.5

Under the assumption that BRT will be operational, the study area intersection of Dundas Street and Trafalgar Road has been reassessed. **Table 4.3** summarizes the capacity analyses. **Appendix F1** includes the capacity analysis results. The following outlines the operations:

- Future traffic conditions with the alternative forecasts indicate that Trafalgar Road and Dundas Street East will result in improved operations for the overall intersection.

TABLE 4.3: OPERATIONAL ASSESSMENT (ALTERNATIVE FORECASTS)

Analysis Period	Intersection	Horizon Year	Control Type	MOE	Direction / Movement / Approach																
					Eastbound				Westbound				Northbound				Southbound				Overall
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Trafalgar Road & Dundas Street East	2024 Total	TCS	LOS	E	D	C	**D**	E	C	C	**C**	D	D	D	**D**	D	D	C	**D**	**D**
				Delay	63	41	23	**41**	62	27	22	**34**	55	38	37	**42**	53	41	24	**40**	**40**
				V/C	0.60	0.90	0.17		0.83	0.41	0.01		0.76	0.38	0.09		0.76	0.53	0.15		**0.82**
				Q	42	196	20		70	73	0		56	56	16		67	79	16		
				Ex	85		85		160		70		120				50		50		
				Avail.	43		65		90		70		64				-17		34		
	Trafalgar Road & Wheat Boom Drive	2024 Total	TCS	LOS	D	C	>	**D**	D	C	>	**D**	A	A	A	**A**	A	A	A	**A**	**A**
				Delay	38	35	>	**36**	37	34	>	**35**	3	3	3	**3**	3	3	3	**3**	**10**
				V/C	0.44	0.19	>		0.31	0.02	>		0.09	0.19	0.02		0.07	0.26	0.01		**0.29**
				Q	31	17	>		18	0	>		4	19	2		5	27	1		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	19		>		32		>		46		48		45		49		
PM Peak Hour	Trafalgar Road & Dundas Street East	2024 Total	TCS	LOS	E	E	C	**E**	D	D	C	**D**	D	D	C	**D**	D	D	D	**D**	**D**
				Delay	63	80	34	**72**	51	51	32	**50**	49	39	34	**40**	38	37	35	**37**	**53**
				V/C	0.66	1.04	0.22		0.76	0.88	0.03		0.81	0.52	0.18		0.67	0.45	0.25		**0.90**
				Q	53	213	31		77	150	0		78	84	21		51	71	24		
				Ex	85		85		160		70		120				50		50		
				Avail.	32		54		83		70		42				-1		26		
	Trafalgar Road & Wheat Boom Drive	2024 Total	TCS	LOS	D	D	>	**D**	E	D	>	**D**	B	A	A	**A**	A	A	A	**A**	**B**
				Delay	42	40	>	**40**	63	40	>	**54**	14	6	5	**7**	6	7	5	**7**	**15**
				V/C	0.27	0.05	>		0.79	0.06	>		0.51	0.27	0.02		0.10	0.31	0.03		**0.57**
				Q	26	8	>		68	11	>		43	44	4		8	52	4		
				Ex	50		>		50		>		50		50		50		50		
				Avail.	24		>		-18		>		7		46		42		46		

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control

< - Shared Left-turn
> - Shared Right-turn

5 Mitigation Measures

The operational analysis indicates that at the intersection of Trafalgar Road and Dundas Street East, several movements are operating with a high level of delay and exceeding capacity during the weekday peak hours under existing conditions.

Halton Region's current Capital Projects Plan identifies Trafalgar Road will be widened from four to six lanes from Highway 407 to Dundas Street, with constructions slated for 2020. High Occupancy Vehicle (HOV) lanes on Trafalgar Road and Dundas Street are also proposed to be implemented. With the above improvements implemented, the intersection of Trafalgar Road with Dundas Street East is expected to experience significant congestion for several movements based on analysis completed for the 2028 future conditions. It is noted that this congestion is likely to occur without the proposed development.

With continued population and employment growth in the GTHA, traffic congestion in Oakville will continue. Because of its unique location between significant population centres in Toronto and Hamilton, Oakville experiences many trips with no origin or destination in the Town. Some of these trips are shortcuts on Town roads when a driver perceives congestion and believes travel time will be shorter through the Town rather than on Provincial highways or regional roads.

Widening existing roads or building new ones, in most circumstances, will encroach on private property, impact mature trees and green space or compromise the current public realm (e.g., sidewalks, boulevards). A more sustainable transportation strategy is to move more people per kilometre by walking, cycling and transit or in combination with high occupancy vehicles.

Due to the high levels of congestion occurring today at the intersection and the expected future growth in population and employment for Oakville, remedial measures to improve intersection capacity are not likely to be implemented. Instead, future improvements to the transportation network are expected to primarily focus on public transit infrastructure as this is one of the critical policies that will be implemented in the Region's updated Transportation Master Plan[14].

By focusing on shifting commuter travel to public transit, intersection operations could be expected to maintain the status quo (capacity conditions during peak hours) or possibly improve if fewer vehicles traverse the intersections during the peak hours of a typical weekday.

[14] Halton Region, *Official Plan,* (Halton Region, December 2009).

5.1 Right Turn Lane

The proposed driveway connection to Trafalgar Road was assessed to determine if the projected traffic volumes warrant installing a right-turn lane along the major roadway.

Although right turns are generally made more efficiently than left turn movements, exclusive right turn lanes are often provided for many of the same reasons that left turn lanes are provided.

MTO guidelines (Geometric Design Standards for Ontario Highways) note that right-turn lanes or tapers may be considered where right-turn volumes exceed 60 vehicles per hour (vph) and where right-turning vehicles create a hazard or reduce capacity at the intersection. The forecast right-turn movement at Trafalgar Road and the Proposed Driveway indicates a projected right-turn movement of 215 vehicles per hour.

With the proposed development having access through a single right in/out driveway to Trafalgar Road, it is suggested that a southbound right turn taper be constructed to allow right-turning traffic to safely slow down before turning without interfering with through traffic. The right turn taper should conform to the design guidelines outlined in the Transportation of Canada Geometric Design Guide for Canadian Roads[15]. Based on a review of these standards, the southbound right turn taper along Trafalgar Road at the proposed driveway should consist of a 75-metre taper with 30 metre recover taper.

The development frontage, however, is only 70.0 metres, and the Trafalgar Road EA Study shows a southbound bus bay and taper lane immediately to the north, along most of the property frontage for 3070 Trafalgar Road. Based on this, it has been assumed that the design will need to consider a 70-metre taper.

Appendix F2 includes a function design of an interim (pre-widening) and ultimate (post-widening) scenario.

[15] Transportation Association of Canada, *Geometric Design Guide for Canadian Roads*, (Ottawa: TAC, 2017).

6 Parking

The site concept plan includes 948 parking spaces (830 occupants and 118 visitor spaces). A total of 13 (5 visitor and 8 occupant) barrier free parking spaces are proposed. This exceeds the minimum requirement of 12 barrier free spaces set by the Town of Oakville. The site's short-term bicycle parking supply is 61 spaces, while 150 spaces supply long-term.

6.1 Zoning By-Law

Zoning By-law 2009-189 is the current in-force By-law for the Town of Oakville for lands between Dundas Street and Highway 407. In contrast to generic minimum parking requirements, Zoning By-law 2009-189 provides maximum limits to restrict the number of spaces that can be constructed rather than establish a minimum number that must be provided. The maximum parking rate for the proposed development is as follows:

- Apartment (More than 4 storeys): up to 1.25 parking spaces per dwelling unit, plus 0.2 parking spaces per dwelling unit for visitors. Additional parking spaces shall not be permitted. In the Trafalgar Urban Core Zone, no parking spaces shall be permitted in a surface parking area, with the exception of visitor parking spaces which may be located underground, in a parking garage or in a surface parking area.

In contrast to generic minimum parking requirements, Zoning By-law 2009-189 sets a maximum limit to cap the number of parking developers may provide. By limiting the amount of vehicle parking, the municipality demonstrates a solid commitment to alternative modes of transportation (transit/walking/cycling).

Table 6.1 summarizes Zoning By-law 2009-189 maximum parking standard calculations for the development. As indicated, under the Town's Zoning By-law, the proposed development shall not exceed 1,134 parking spaces.

TABLE 6.1: ZONING MAXIMUM REQUIREMENTS

Use	Units	Maximum Parking Rate		Calcuation (Spaces)
Apartment > 4-Storeys	782	Occupant	1.25 spaces per unit	978
	782	Visitor	0.20 spaces per unit	156
Maximum Parking Permitted			**1.45 spaces per unit**	**1,134**

The proposed supply of 948 parking spaces (1.15 per unit) satisfies the Zoning requirements. The Project will advance and implement many of the recommendations from the Zoning By-law 2009-189 as the maximum number of parking spaces is not exceeded.

6.1.1 Section 8 Special Provisions

A site-specific zoning special provision for 3064 Trafalgar Road is part of the North Oakville Zoning By-law 2009-189. Section 8 does not eliminate the parent zoning by-law, but includes the following amendments for the subject site:

- Minimum number of parking spaces for an apartment building or mixed-use building of 1.0 parking spaces per dwelling unit, plus 0.15 parking spaces per dwelling unit for visitors;
- Minium number of designated accessible parking spaces for residential uses, 1% of the total number of parking spaces provided;
- Maximum number of parking spaces on a surface parking area, 10;
- A surface parking area is not permitted with 25 metres of Trafalgar Road;
- Visitor parking spaces are the only permitted parking spaces in a surface parking area;
- A minimum of 20% of the parking spaces in a building shall include the provision for the installation of electric motor vehicle supply equipment; and
- Ventilation shafts/housing and stairways associated with an underground parking garage are not permitted between a building wall and Trafalgar Road.

6.2 Proxy Parking Demand

With restrictive maximum limits on the number of parking spaces and to provide further support that the proposed supply of 1.09 spaces per unit will not result in a shortfall of parking, parking data for residential buildings was compiled from parking utilization surveys completed for a typical multi-family building. It is noted that a similar site could not be located within the immediate study area given the high-rise nature of this development; thus, a broader area was utilized that was consistent with high-rise buildings within Halton Region.

Available information about each site, such as the number of units, walking distance to the nearest GO Station, peak parking demand and

demand rates, is outlined in **Table 6.2**. Parking surveys are provided in **Appendix G**.

TABLE 6.2: RESIDENTIAL PARKING SURVEY RESULTS

Municipality	Address	Distance to Rail Station	Number of Storeys	Number of Units	Type	Demand	
						Peak Parking Demand	Rater Per Unit
Oakville	1260 Marlborough Court	2.4 Km (GO Oakville)	14	222	Resident	82	0.37
					Visitor	26	0.12
					Total	**108**	**0.49**
Milton	100 Millside Drive	2.0 km (GO Milton)	16	154	Resident	123	0.80
					Visitor	21	0.14
					Total	**144**	**0.94**
Burlington	551 Maple Avenue	3.0 km (GO Burlington)	21	186	Resident	149	0.80
					Visitor	36	0.19
					Total	**185**	**0.99**

It should be noted that the proposed development is located within 5.5 km of the GO Oakville Station and is within a similar distance as the residential sites surveyed.

Parking demand rates ranged from 0.49 to 0.99 spaces per unit, which indicates that the developments generally generate less than 1.00 parking space per unit to meet residential and visitor demand.

Chart 6.3 – **6.5** outlines the parking demand trend of the surveyed sites.

CHART 6.3: 1260 MARLBOROUGH COURT PARKING DEMAND TREND

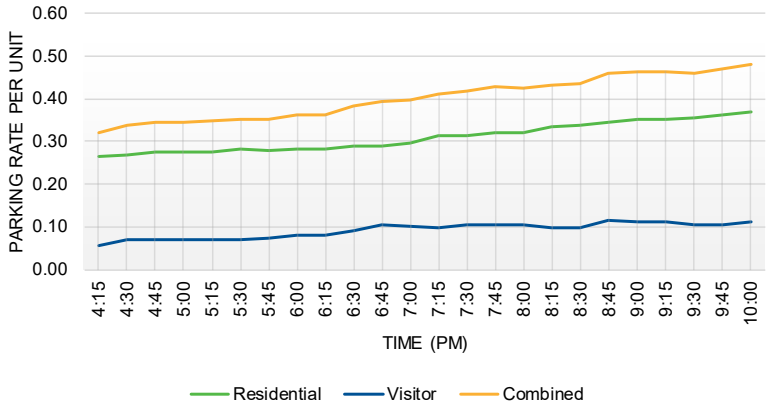


CHART 6.4: 100 MILLSIDE DRIVE PARKING DEMAND TREND

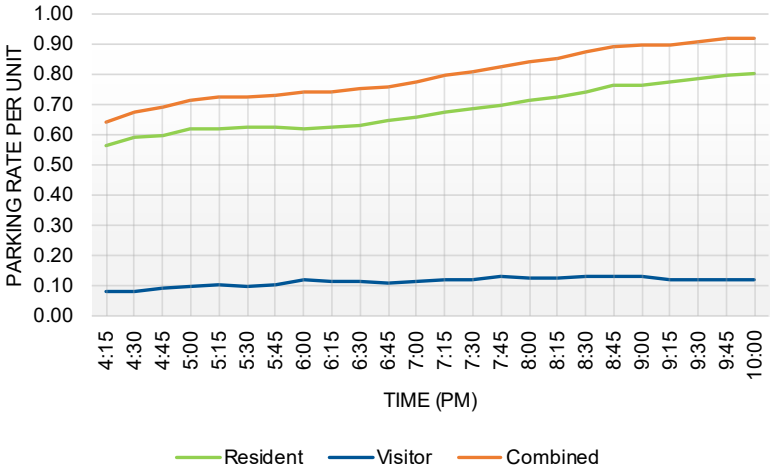
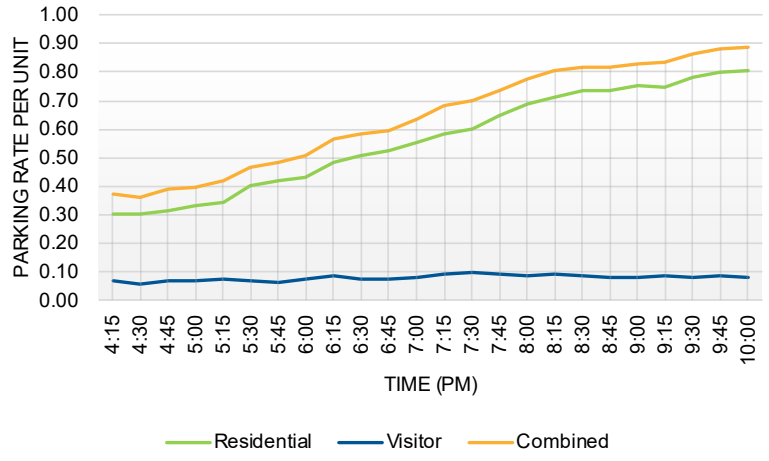


CHART 6.5: 551 MAPLE AVENUE PARKING DEMAND TREND



6.3 ITE Parking Generation

The Institute of Transportation Engineers (ITE) produces a periodic report titled Parking Generation, the prevailing national standard in determining parking demand for development. ITE standards are based on parking demand studies submitted to ITE by various parties, including public agencies, developers and consulting firms. The most recent parking generation manual available is the 5th edition[16] and is a comparative starting point to determine baseline assumptions.

This study includes ITE peak period parking demand rates as guidelines to benchmark how the proposed supply compares to Multi-Family (High-Rise) developments. The following ITE Land Use Code (LUC) was reviewed:

- LUC 222 – Multi-family Housing (High-Rise): High-rise multifamily housing includes apartments and condominiums with more than 10 levels (floors) of residence. They are likely to have one or more elevators. The weekday peak parking demand ratio is 0.98 per dwelling unit.

6.4 Projected Demand

A summary of the peak parking demand expected for the proposed development based on the varied methodologies is provided in **Table 6.6**. The following summarizes the parking demand rates utilized:

- The surveyed parking demand suggested that high-rise sites within Halton Region observed a peak parking demand of 0.99 spaces per unit.
- The ITE parking demand rates suggest that high-rise sites were observed with a peak parking demand of 0.98 spaces per unit.

The projected demand is forecast to be in the order of 774 spaces.

TABLE 6.6: PROJECTED PARKING DEMAND

Methodology	Units	Parking Rate	Parking Generation (spaces)
Proxy Site Parking Data (Halton Region)	782	0.99 spaces per unit	774
ITE Parking Demand	782	0.98 spaces per unit	766

[16] Institute of Transportation Engineers, *Parking Generation,* 5th ed., (Washington, DC: ITE, 2019).

The projected demand suggests the peak parking demand for a Multi-Family (High-Rise) development is considerably lower than the maximum parking supply outlined by the Town's by-law. Furthermore, the development proposes a parking supply of 948 spaces, more than the minimum projected demand.

6.5 Bicycle Parking

The Town's *Zoning By-law 2009-189 -Section 5.7* stipulates that developments are required to provide bicycle parking. The minimum bicycle parking rates are as follows:

- Residential: 0.75 spaces per dwelling unit
- Visitor: 0.25 spaces per dwelling unit; and
- Notwithstanding the rates outlined above, bicycle parking shall not exceed 200 spaces.

Based on these requirements, the proposed development is required to provide 200 bicycle spaces: 150 residential and 50 visitor spaces. A total of 150 long-term (occupant) and 61 short-term (visitor) spaces are provided, which meets the zoning requirement.

Bicycle parking for residents (long term) is in the underground parking garage. Space should also be provided for bicycle repairs and cleaning. Any spare car parking spaces can be temporality converted to bicycle storage, and storage lockers can be converted where residents can hang their bicycles from the ceiling of the locker. This additional storage area will allow residents to incorporate cycling as a transportation option.

The proposed site plan includes 32 ground floor (surface) and 29 underground visitor bicycle parking spaces. The provision of this additional storage area will allow visitors to the site the option to incorporate cycling as a transportation option. The bicycle parking area should be easily accessible near the main entrances or through walkways within the development directly connected to Trafalgar Road, providing adequate access from the development to the street network.

7 Transportation Demand Management

A Transportation Demand Management (TDM) plan aims to reduce the development's overall traffic and parking impacts by implementing strategies to affect the demand side of the transportation equation rather than the supply side. By their very nature, TDM programs attempt to change people's behaviour and be successful; they must rely on incentives or disincentives to makeshifts in behaviour attractive to the commuter.

TDM strategies include financial incentives, time incentives, the provision of new or enhanced commuter services, dissemination of information, and marketing alternative services. TDM strategies include all the incentives and disincentives that increase people's likelihood of changing travel behaviour.

The TDM plan has been formulated to extend reasonable and practical strategies that encourage residents and visitors to take alternative modes of transportation. The strategies identified are expected to improve transportation access and connectivity within the development and the rest of the study area. For each strategy, an explanation and description of what the Applicant proposes to provide are provided.

7.1 Through Design

Several factors that influence peoples' travel mode choices are supporting land-use/infrastructure that encourages people to choose travel modes other than driving alone. These strategies are already accounted for through the overall development design and include the following:

- **Housing Density** - Designing the plan with increased densities reduces Greenhouse Gas (GHG) emissions associated with traffic in several ways. Density is usually measured in persons, jobs, or dwellings per unit area. Increased densities generally shorten the distance people travel and provide greater options for the mode of travel. This strategy also provides a foundation for the implementation of many other methods which would benefit from increased densities.
- **Pedestrian Environment** - Accessibility to and from development is essential in helping to ensure that those that can walk do. Proper pedestrian connections from the surrounding community to the development should be constructed to ensure safety and enhance the overall pedestrian experience.

  Walking is encouraged by providing a pedestrian-friendly site layout with an extensive network of sidewalks and entrances at

key points within site and connecting to the future pedestrian network along Trafalgar Road. Most sites have direct public pedestrian access via multiple street-level entrances from Trafalgar Road. This is intended to provide a comprehensive network of pedestrian connections for an enhanced pedestrian experience for all site users.

By taking advantage of the future public sidewalk network to attract and serve pedestrians, combined with multiple pedestrian connections within site, the development offers walkability as one of the critical design features.

- **Bicycle Facilities** - Increasing bicycling to, from, and within Oakville is crucial to reducing vehicle trips. The number of people bicycling is directly related to the quality of the bicycling network and the presence of bicycle facilities. As outlined in the improvement plan for Trafalgar Road, separated cycling facilities are proposed along Trafalgar Road, providing the site with the ability to serve by bicycle infrastructure adequately.
- **Bicycle Parking** - The Town of Oakville By-law includes bicycle parking rates for multi-family developments requiring a residential bicycle parking rate of 0.75 spaces per unit and a visitor supply of 0.25 spaces. The site's short-term bicycle parking supply is identified as 73 spaces. The site's long-term bicycle parking supply is 150 spaces. Overall, 211 bicycle parking spaces are provided, meeting the Zoning By-law requirements.
- **Transit-Oriented Development** does much more than shift automobile trips to transit. People who live or work in communities with high-quality public transit tend to own fewer automobiles and drive fewer annual miles than they otherwise would. With the development adjacent to a future bus rapid transit corridor that will provide connections to the GO Transit Stations, the development will attract residents who will utilize high-order transit for primary commuting options rather than automobiles.

  At the development level, direct links connecting residents and visitors to nearby transit stops are planned to be provided as part of the overall design scheme making the development area more navigable toward transit

7.2 Proposed Measures

The proposed strategies identified herein will be implemented to reduce the number of auto trips made to/from the development.

- **Welcome Packet** - The Applicant will develop marketing/informational materials as part of their initial scope of work and will be provided to residents as part of the purchase agreement. Available information should include schedules for local and regional transit services, bicycle and trail networks and the location of retail and recreational establishments. Information on transportation options and links to the appropriate website should be conveyed to all prospective residents as a component of a resident welcome packet.
- **Unbundled Parking** - Implementing a paid-parking operation is one of the most effective TDM strategies for encouraging alternative travel habits. The development will lease parking spaces separately from purchasing a unit to encourage residents to utilize sustainable travel modes. This is more equitable and efficient since occupants are not forced to pay for parking they do not need, allowing consumers to adjust their parking supply to reflect their needs.

  The Draft Plan of Condominium and the Condo Declaration would also ensure that visitor spaces could not be sold and or used for residents, as these are not unitized and form part of the common elements. Signage with visitor parking time limits will be at the discretion of the future condominium corporation.
- **Parking Supply** - Free and abundant parking encourages people to drive alone rather than car or vanpool, drop off or pick up, walk, cycle, or take transit. At the same time, however, the uses proposed on the site require a certain amount of base parking supply to be successful. When too much parking is provided and is provided free of cost to the user, alternative sustainable modes are put at a substantial marketing disadvantage.
- **On-Site Bicycle Repair Facility** - Providing essential tools for keeping bicycles in good working order can encourage residents to try biking and keep them riding. Bicycle repair facilities, such as hand tools and an air compressor for tires, are small investments that can keep bicycles in circulation and maximize bicycle trips. Do-it-yourself bicycle repair stands will be provided, including tire gauges, air pumps, wrenches, and other tools for minor repairs. A repair facility could be located within the underground parking garage for use by residents, and a

secondary facility is located adjacent to the commercial block for use by employees.

- **Visibility of Bicycle Parking** – a painted pedestrian pathway from the bicycle parking area to the vestibule will be provided as a visible clue to residents of the secure bicycle parking area.

The TDM plan proposes an approach that balances these two competing needs by suggesting a parking strategy that sets the minimum parking requirement rates close to the requirements without exceeding the supply. This will help control the amount of vehicular traffic generated by the site during peak hours and ensure that parking is not-over provided relative to area transportation characteristics, which are expected to trend towards less reliance on the private automobile.

7.3 Potential Reduction

As the Town of Oakville does not have a worksheet that quantifies the reduction in travel demand/parking demand, the City of Kitchener's TDM Checklist has been relied upon to provide a broad overview of the site's potential in reducing vehicle trips. **Appendix H** contains the City of Kitchener's TDM checklist. It indicates a potential reduction of 11% in vehicle trips/parking demand by implementing the proposed TDM measures.

Increasing awareness of sustainable transportation opportunities for residents can assist in lowering the site's parking demand and, ultimately, the site's transportation impacts. General education of all modes of transportation, including their benefits and how to use them best, is vital to TDM's success.

8 Conclusions and Recommendations

8.1 Conclusions

Transportation Impact Study

This study evaluated the impacts of constructing 782 residential units in two 33-storey buildings on a parcel of land bounded by Trafalgar Road north of Dundas Street East. Access to the site is proposed via one right-in/right-out driveway to Trafalgar Road. The proposed development is projected to generate approximately 211 new vehicle trips during the weekday AM peak hour and 250 new vehicle trips during the weekday PM peak hour.

Detailed traffic analysis was conducted for each of the study area intersections under Base conditions and 2034 Background and Total conditions.

The new traffic forecast to be added by full-build out of the development to the study area roadways results in relatively small impacts at the various study intersections. The analysis has further determined that the proposed driveway to Trafalgar Road will operate at LOS B during the weekday peak periods under the 2034 Total conditions.

With the proposed development having access through a single right in/out driveway to Trafalgar Road, it is suggested that a southbound right turn taper be constructed to allow right-turning traffic to safely slow down before turning without interfering with traffic on Trafalgar Road.

It is acknowledged that deficiencies currently exist at the Trafalgar Road and Dundas Street East intersection that can be expected to persist with anticipated traffic growth, independent of the development.

A variety of roadway improvements are planned within the study area to address the existing and long-term impacts of traffic growth, including the widening of Trafalgar Road and the implementation of High Occupancy Vehicle (HOV) lanes on Trafalgar Road and Dundas Street. It is understood that these improvements will provide some relief to operational issues, however, capacity constraints will persist for the overall transportation network.

Due to the high levels of congestion occurring and the expected long-term transit network anticipated to be developed (BRT along Trafalgar Road and Dundas Street), further remedial measures to improve intersection capacity are not likely to be implemented. Instead, future

improvements to the transportation network are expected to focus on public transit infrastructure.

By focusing on shifting commuter travel to public transit, intersection operations are expected to maintain the status quo (capacity condition during peak hours) or to possibly improve if fewer vehicles transverse the intersections during the peak hours of a typical weekday.

Parking Study

The proposed site provides for a total of 948 parking spaces: equating to a parking rate of 1.15 parking spaces per unit (resident and visitor).

In contrast to generic minimum parking requirements, The Town of Oakville's Zoning By-law 2009-189 provides maximum limits to restrict the total number of spaces that can be constructed rather than establish a minimum number that must be provided. The parking requirement under Zoning By-Law 2009-189 stipulates a maximum parking supply of 1,134 spaces: equating to a parking rate of 1.45 spaces per unit (resident and visitor). The proposed parking supply of 948 parking spaces satisfies the Zoning requirements as the maximum supply is not exceeded.

With restrictive maximum limits on the number of parking spaces, and to provide further support that the proposed supply of 1.15 spaces per unit will not result in a shortfall of parking, projected peak parking demand for the site has been estimated based on compiled parking surveys as well as industry standard rates contained within the ITE Parking Generation. Based on these methodologies, forecast parking demand for the proposed development is projected to be 774 parking spaces.

With the proposed HOV lanes, future BRT and multi-use trails on both Trafalgar Road and Dundas Street East, the development has the potential to be transit supportive and promote active transportation. It will also introduce the residential population of the development to maximize the benefits of the site's location to a comprehensive and integrated transit system (Oakville Transit and GO Transit). As the development promotes the use of other modes of transportation through a limited number of on-site vehicle parking, the development has a significant role in setting an example for residents to consider non-automotive travel if they chose.

Overall, the forecasted demand provides a statistically valid justification that the proposed parking supply of 948 spaces is sufficient for the intended use.

8.2 Recommendations

- The Town of Oakville recognizes the conclusions drawn above
- The Town of Oakville supports the proposed parking supply of 1.15 spaces per unit
- A southbound right turn taper be provided along Trafalgar Road at the proposed driveway
- Consider unbundling parking, where parking spaces are provided at a separate cost to residents; and
- Provision of secure, visible bicycle parking area with a bicycle repair area.

Appendix A

Terms of Reference

From: Aquisha Khan
To: Andrew Evans
Cc: Adam Makarewicz; Ayesha.Khan@halton.ca; Krusto, Matt
Subject: RE: (220140) OPA Application - additional height - 3060 & 3068 Trafalgar TIS Scope of Work
Date: February 12, 2024 12:02:57 PM
Attachments: image001.png

Hi Andrew;

Thank you for the TOR, please find my comments listed below.

Thanks

Have a wonderful day !

Aquisha Khan, (She/Her/Hers), P. Eng.,
Transportation Engineer, East Oakville
Transportation Planning Services,
Town of Oakville | P: 905-845-6601, Ext. 3236 | C: 289-952-9345 | www.oakville.ca

Aquisha Khan, (She/Her/Hers), P. Eng.
Transportation Engineer
Transportation and Engineering
Town of Oakville | 905-845-6601, ext.3236 | www.oakville.ca

From: Andrew Evans <aevans@ptsl.com>
Sent: Wednesday, February 7, 2024 9:35 AM
To: Aquisha Khan <aquisha.khan@oakville.ca>; Mary Dimas <mary.dimas@oakville.ca>
Cc: Adam Makarewicz <amakarewicz@ptsl.com>
Subject: (220140) OPA Application - additional height - 3060 & 3068 Trafalgar TIS Scope of Work

Greetings,

Paradigm Transportation Solutions Limited is preparing the **Transportation Impact Assessment, Parking Study, and Transportation Demand Management Plan** for a proposed residential development of the lands 3064 Trafalgar Road, Oakville, ON.

Below is a brief description of the concept and our proposed terms of reference for the TIS and Parking study. Please review and provide comment at your earliest convenience.

SITE DESCRIPTION

The property owner is looking to file a separate application for an OPA application to request permission to add three storeys on each tower, totalling 60 units (30 in each tower), for approximately 782 units' total. **The concept plan is attached**.

Vehicle access is proposed via one right-in/right-out only driveway to Trafalgar Road.

Paradigm will update the previous TIS and Parking studies which have been based on the following scope.

PROPOSED TERMS OF REFERENCE

Study Area Intersections:

- Trafalgar Road and Dundas Street (signalized);
- Trafalgar Road and Wheat Bloom Drive (signalized); and
- Proposed Ri/Ro connection to Trafalgar Road.

Analysis Periods:

- Weekday AM peak hour; and
- Weekday PM peak hour.

Horizon Year

- Five-years from the assumed full build-out (Year 2039).[AK] Please clarify the following study horizons: 2024,2029, 2039 & 2044?

Existing Data:

- 2023 Turning Movement counts at the study area driveways to be grown to a 2024 base year condition using 2.0% Growth Rate

Analysis

- Synchro 11 analysis

[AK] Capacity Analysis to include the following Traffic Condition sections: Existing, Future Background, Site and Future Total

Background Traffic

- Generalized growth rate same as previous submissions (2%)[AK] ok
- Active Development Applications: same as previous submission[AK] ok

Parking Study:

- To estimate the parking demand generated by the proposed development and establish the number of on-site parking spaces that should be provided,

recognizing site constraints and local conditions.

[AK] Include Bicycle parking, loading area.

- A TDM strategy will be developed to satisfy the parking demands of the proposed development. **– to be discussed with the Town of Oakville**[AK] - this to be moved to the TDM Strategy section

[AK] Update/Include Site Access and Circulation

- Turning Movement Plan

[AK] Update/Include Transportation System Mitigation Measures
[AK] Include a TDM Strategy Section

Report

- We will document the study methodologies, findings, and conclusions in a report with appendices containing the detailed analysis results and any data collected.

Please let us know your comments on the study.

Thank you and regards.

Andrew Evans, M.Sc.
Transportation Planner, Associate
*** Vacation Notice – March 11th to March 21st 2024 ***

5A-150 Pinebush Road Cambridge ON N1R 8J8
p: 905.381.2229 x **305**
e: aevans@ptsl.com
w: www.ptsl.com

Office Hours: 07:30 – 17:30 M-T, closed Fridays

Appendix B

Turning Movement Counts

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Trafalgar Road & Dundas Street
Site Code: 220208
Start Date: 12/01/2022

Turning Movement Data

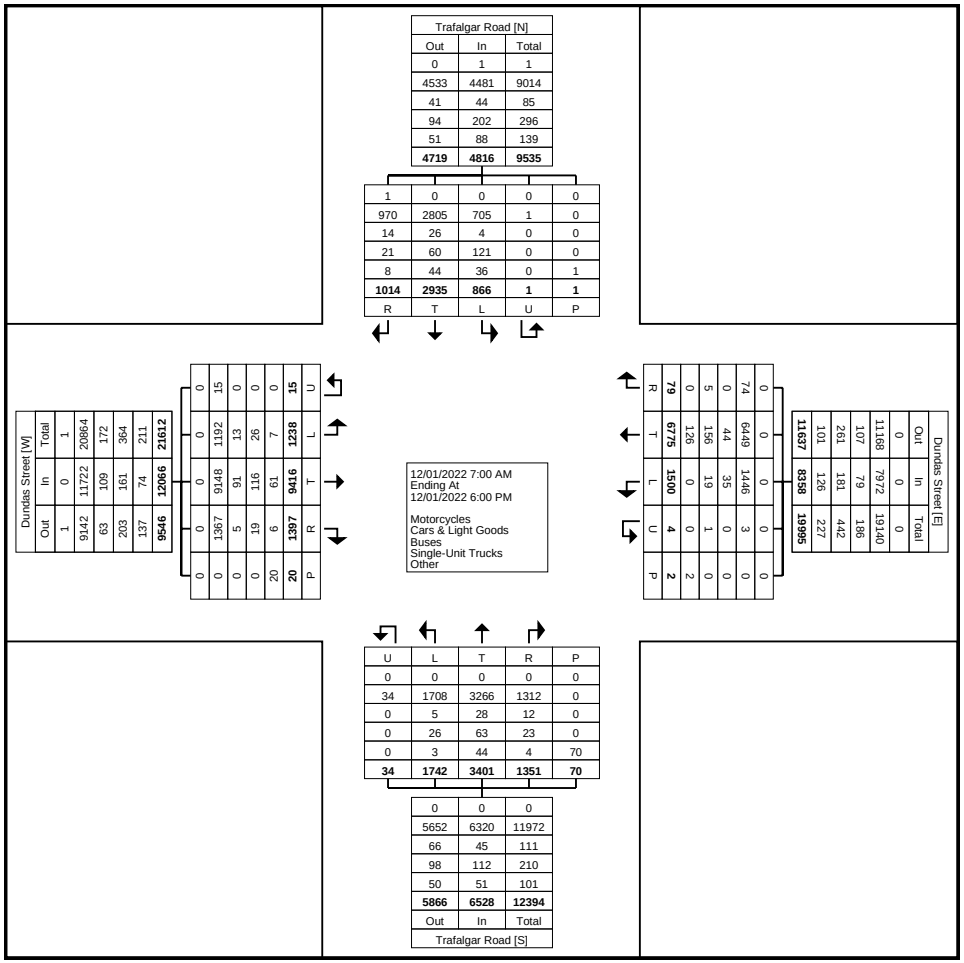
Start Time	Dundas Street Eastbound						Dundas Street Westbound						Trafalgar Road Northbound						Trafalgar Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	44	287	31	0	1	362	32	157	1	0	0	190	19	49	18	0	0	86	23	47	28	0	0	98	736
7:15 AM	37	332	36	0	2	405	25	150	1	0	0	176	21	61	15	0	4	97	32	83	24	0	0	139	817
7:30 AM	44	414	38	0	0	496	31	145	4	0	0	180	24	93	20	0	0	137	27	105	17	0	0	149	962
7:45 AM	41	470	41	0	2	552	43	148	1	0	0	192	21	89	23	0	0	133	19	115	22	0	0	156	1033
Hourly Total	166	1503	146	0	5	1815	131	600	7	0	0	738	85	292	76	0	4	453	101	350	91	0	0	542	3548
8:00 AM	41	359	55	0	1	455	42	170	3	0	0	215	38	101	18	1	3	158	20	116	28	0	0	164	992
8:15 AM	52	361	42	0	2	455	36	193	3	1	0	233	41	123	34	0	1	198	25	107	17	0	0	149	1035
8:30 AM	47	305	51	2	0	405	43	183	1	0	0	227	52	104	34	0	0	190	29	125	21	0	0	175	997
8:45 AM	61	305	43	0	0	409	51	182	2	0	0	235	48	106	32	1	1	187	21	113	22	0	0	156	987
Hourly Total	201	1330	191	2	3	1724	172	728	9	1	0	910	179	434	118	2	5	733	95	461	88	0	0	644	4011
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	21	232	44	0	0	297	51	151	2	0	0	204	48	77	46	3	2	174	29	75	20	0	0	124	799
11:15 AM	23	232	41	2	0	298	44	164	6	0	0	214	42	70	34	1	3	147	29	62	16	0	0	107	766
11:30 AM	27	202	34	0	2	263	39	166	5	0	0	210	59	65	33	0	5	157	34	95	19	0	0	148	778
11:45 AM	38	247	48	1	1	334	64	162	8	0	0	234	57	74	37	2	6	170	34	79	26	0	0	139	877
Hourly Total	109	913	167	3	3	1192	198	643	21	0	0	862	206	286	150	6	16	648	126	311	81	0	0	518	3220
12:00 PM	28	234	38	1	0	301	54	171	3	0	0	228	50	94	56	2	2	202	42	98	19	0	0	159	890
12:15 PM	24	268	50	0	3	342	55	202	3	0	0	260	47	75	53	3	6	178	27	70	19	0	0	116	896
12:30 PM	25	232	33	0	0	290	60	183	4	0	0	247	57	74	63	2	2	196	30	79	23	0	0	132	865
12:45 PM	27	265	47	0	0	339	59	221	1	0	0	281	72	65	53	1	3	191	18	63	22	0	0	103	914
Hourly Total	104	999	168	1	3	1272	228	777	11	0	0	1016	226	308	225	8	13	767	117	310	83	0	0	510	3565
1:00 PM	28	228	25	0	0	281	54	177	1	0	0	232	61	70	51	1	1	183	23	75	16	0	0	114	810
1:15 PM	23	258	46	0	1	327	58	210	1	1	0	270	68	71	41	0	5	180	12	70	20	0	0	102	879
1:30 PM	37	226	40	0	1	303	69	185	0	0	0	254	63	90	47	0	2	200	13	88	42	0	1	143	900
1:45 PM	25	285	39	1	2	350	59	244	1	0	0	304	71	71	58	1	2	201	20	67	22	0	0	109	964
Hourly Total	113	997	150	1	4	1261	240	816	3	1	0	1060	263	302	197	2	10	764	68	300	100	0	1	468	3553
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	32	277	43	0	0	352	55	241	5	0	0	301	73	153	48	3	6	277	36	99	31	0	0	166	1096
3:15 PM	40	273	40	0	0	353	35	279	1	0	0	315	65	176	44	1	3	286	32	98	62	0	0	192	1146
3:30 PM	37	277	47	1	0	362	54	275	0	0	0	329	73	128	47	1	0	249	28	96	49	0	0	173	1113
3:45 PM	33	262	53	1	0	349	26	281	1	0	0	308	60	151	49	1	1	261	33	107	52	0	0	192	1110
Hourly Total	142	1089	183	2	0	1416	170	1076	7	0	0	1253	271	608	188	6	10	1073	129	400	194	0	0	723	4465
4:00 PM	55	314	49	1	1	419	42	268	3	0	0	313	76	143	42	0	1	261	25	86	49	0	0	160	1153
4:15 PM	45	330	51	1	0	427	43	261	1	0	0	305	66	142	59	0	1	267	32	106	40	1	0	179	1178
4:30 PM	56	319	49	0	0	424	41	273	3	0	0	317	71	147	43	1	1	262	33	93	36	0	0	162	1165

4:45 PM	48	314	37	1	0	400	44	278	4	0	0	326	54	140	60	0	2	254	28	99	46	0	0	173	1153
Hourly Total	204	1277	186	3	1	1670	170	1080	11	0	0	1261	267	572	204	1	5	1044	118	384	171	1	0	674	4649
5:00 PM	52	334	46	0	0	432	56	262	4	1	0	323	62	154	55	0	2	271	35	115	39	0	0	189	1215
5:15 PM	55	345	57	0	0	457	54	270	2	1	2	327	62	151	52	1	3	266	20	103	64	0	0	187	1237
5:30 PM	52	324	59	1	0	436	46	269	1	0	0	316	65	151	48	2	0	266	30	95	52	0	0	177	1195
5:45 PM	40	305	44	2	1	391	35	254	3	0	0	292	56	143	38	6	2	243	27	106	51	0	0	184	1110
Hourly Total	199	1308	206	3	1	1716	191	1055	10	2	2	1258	245	599	193	9	7	1046	112	419	206	0	0	737	4757
Grand Total	1238	9416	1397	15	20	12066	1500	6775	79	4	2	8358	1742	3401	1351	34	70	6528	866	2935	1014	1	1	4816	31768
Approach %	10.3	78.0	11.6	0.1	-	-	17.9	81.1	0.9	0.0	-	-	26.7	52.1	20.7	0.5	-	-	18.0	60.9	21.1	0.0	-	-	-
Total %	3.9	29.6	4.4	0.0	-	38.0	4.7	21.3	0.2	0.0	-	26.3	5.5	10.7	4.3	0.1	-	20.5	2.7	9.2	3.2	0.0	-	15.2	-
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	1	0	-	1	1
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.1	0.0	-	0.0	0.0
Cars & Light Goods	1192	9148	1367	15	-	11722	1446	6449	74	3	-	7972	1708	3266	1312	34	-	6320	705	2805	970	1	-	4481	30495
% Cars & Light Goods	96.3	97.2	97.9	100.0	-	97.1	96.4	95.2	93.7	75.0	-	95.4	98.0	96.0	97.1	100.0	-	96.8	81.4	95.6	95.7	100.0	-	93.0	96.0
Buses	13	91	5	0	-	109	35	44	0	0	-	79	5	28	12	0	-	45	4	26	14	0	-	44	277
% Buses	1.1	1.0	0.4	0.0	-	0.9	2.3	0.6	0.0	0.0	-	0.9	0.3	0.8	0.9	0.0	-	0.7	0.5	0.9	1.4	0.0	-	0.9	0.9
Single-Unit Trucks	26	116	19	0	-	161	19	156	5	1	-	181	26	63	23	0	-	112	121	60	21	0	-	202	656
% Single-Unit Trucks	2.1	1.2	1.4	0.0	-	1.3	1.3	2.3	6.3	25.0	-	2.2	1.5	1.9	1.7	0.0	-	1.7	14.0	2.0	2.1	0.0	-	4.2	2.1
Articulated Trucks	7	61	6	0	-	74	0	126	0	0	-	126	3	44	4	0	-	51	36	43	8	0	-	87	338
% Articulated Trucks	0.6	0.6	0.4	0.0	-	0.6	0.0	1.9	0.0	0.0	-	1.5	0.2	1.3	0.3	0.0	-	0.8	4.2	1.5	0.8	0.0	-	1.8	1.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	1
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	10.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	18	-	-	-	-	-	2	-	-	-	-	-	70	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	90.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Trafalgar Road & Dundas Street
Site Code: 220208
Start Date: 12/01/2022



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Trafalgar Road & Dundas Street
Site Code: 220208
Start Date: 12/01/2022

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Dundas Street Eastbound						Dundas Street Westbound						Trafalgar Road Northbound						Trafalgar Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:45 AM	41	470	41	0	2	552	43	148	1	0	0	192	21	89	23	0	0	133	19	115	22	0	0	156	1033
8:00 AM	41	359	55	0	1	455	42	170	3	0	0	215	38	101	18	1	3	158	20	116	28	0	0	164	992
8:15 AM	52	361	42	0	2	455	36	193	3	1	0	233	41	123	34	0	1	198	25	107	17	0	0	149	1035
8:30 AM	47	305	51	2	0	405	43	183	1	0	0	227	52	104	34	0	0	190	29	125	21	0	0	175	997
Total	181	1495	189	2	5	1867	164	694	8	1	0	867	152	417	109	1	4	679	93	463	88	0	0	644	4057
Approach %	9.7	80.1	10.1	0.1	-	-	18.9	80.0	0.9	0.1	-	-	22.4	61.4	16.1	0.1	-	-	14.4	71.9	13.7	0.0	-	-	-
Total %	4.5	36.8	4.7	0.0	-	46.0	4.0	17.1	0.2	0.0	-	21.4	3.7	10.3	2.7	0.0	-	16.7	2.3	11.4	2.2	0.0	-	15.9	-
PHF	0.870	0.795	0.859	0.250	-	0.846	0.953	0.899	0.667	0.250	-	0.930	0.731	0.848	0.801	0.250	-	0.857	0.802	0.926	0.786	0.000	-	0.920	0.980
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	176	1468	186	2	-	1832	152	624	6	1	-	783	146	395	104	1	-	646	89	440	83	0	-	612	3873
% Cars & Light Goods	97.2	98.2	98.4	100.0	-	98.1	92.7	89.9	75.0	100.0	-	90.3	96.1	94.7	95.4	100.0	-	95.1	95.7	95.0	94.3	-	-	95.0	95.5
Buses	4	11	1	0	-	16	9	10	0	0	-	19	2	6	5	0	-	13	0	6	1	0	-	7	55
% Buses	2.2	0.7	0.5	0.0	-	0.9	5.5	1.4	0.0	0.0	-	2.2	1.3	1.4	4.6	0.0	-	1.9	0.0	1.3	1.1	-	-	1.1	1.4
Single-Unit Trucks	0	11	1	0	-	12	3	33	2	0	-	38	4	9	0	0	-	13	4	13	3	0	-	20	83
% Single-Unit Trucks	0.0	0.7	0.5	0.0	-	0.6	1.8	4.8	25.0	0.0	-	4.4	2.6	2.2	0.0	0.0	-	1.9	4.3	2.8	3.4	-	-	3.1	2.0
Articulated Trucks	1	5	1	0	-	7	0	27	0	0	-	27	0	7	0	0	-	7	0	4	1	0	-	5	46
% Articulated Trucks	0.6	0.3	0.5	0.0	-	0.4	0.0	3.9	0.0	0.0	-	3.1	0.0	1.7	0.0	0.0	-	1.0	0.0	0.9	1.1	-	-	0.8	1.1
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	5	-	-	-	-	-	0	-	-	-	-	-	4	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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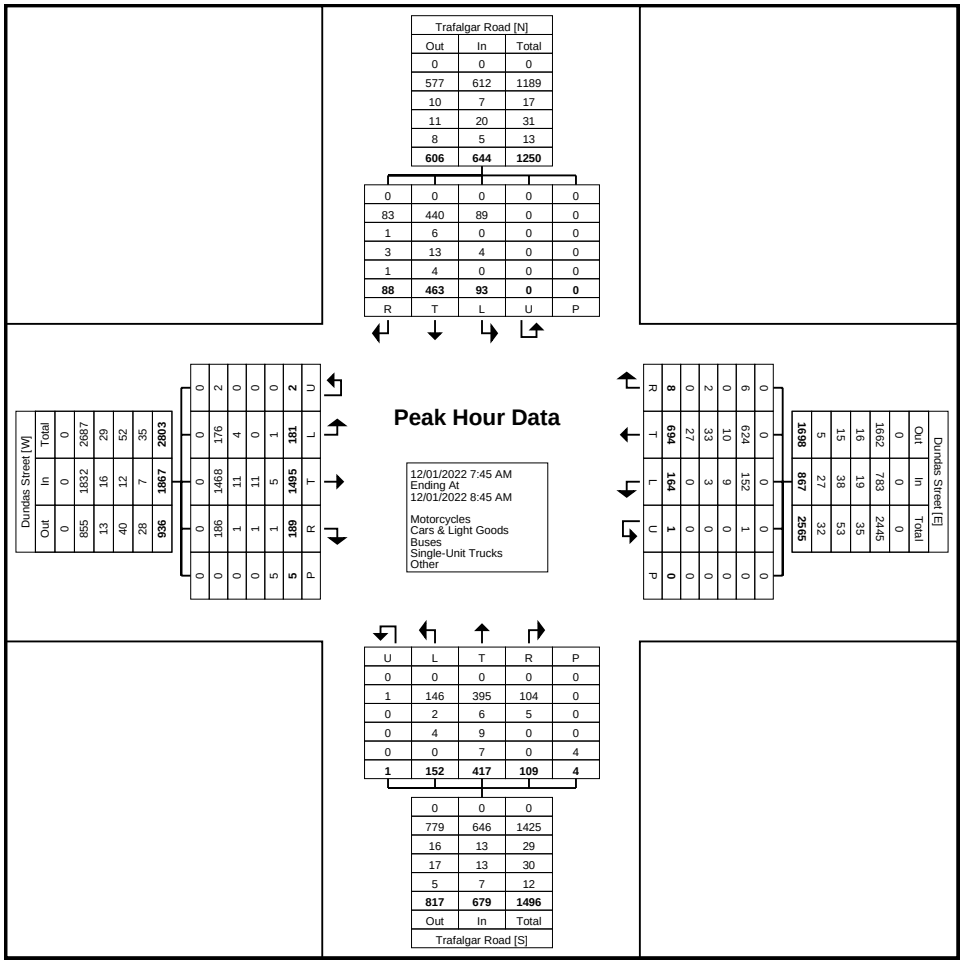

Turning Movement Peak Hour Data Plot (7:45 AM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Trafalgar Road & Dundas Street
Site Code: 220208
Start Date: 12/01/2022

Turning Movement Peak Hour Data (12:00 PM)

Start Time	Dundas Street Eastbound						Dundas Street Westbound						Trafalgar Road Northbound						Trafalgar Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	28	234	38	1	0	301	54	171	3	0	0	228	50	94	56	2	2	202	42	98	19	0	0	159	890
12:15 PM	24	268	50	0	3	342	55	202	3	0	0	260	47	75	53	3	6	178	27	70	19	0	0	116	896
12:30 PM	25	232	33	0	0	290	60	183	4	0	0	247	57	74	63	2	2	196	30	79	23	0	0	132	865
12:45 PM	27	265	47	0	0	339	59	221	1	0	0	281	72	65	53	1	3	191	18	63	22	0	0	103	914
Total	104	999	168	1	3	1272	228	777	11	0	0	1016	226	308	225	8	13	767	117	310	83	0	0	510	3565
Approach %	8.2	78.5	13.2	0.1	-	-	22.4	76.5	1.1	0.0	-	-	29.5	40.2	29.3	1.0	-	-	22.9	60.8	16.3	0.0	-	-	-
Total %	2.9	28.0	4.7	0.0	-	35.7	6.4	21.8	0.3	0.0	-	28.5	6.3	8.6	6.3	0.2	-	21.5	3.3	8.7	2.3	0.0	-	14.3	-
PHF	0.929	0.932	0.840	0.250	-	0.930	0.950	0.879	0.688	0.000	-	0.904	0.785	0.819	0.893	0.667	-	0.949	0.696	0.791	0.902	0.000	-	0.802	0.975
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	99	968	164	1	-	1232	221	738	11	0	-	970	222	288	216	8	-	734	87	292	79	0	-	458	3394
% Cars & Light Goods	95.2	96.9	97.6	100.0	-	96.9	96.9	95.0	100.0	-	-	95.5	98.2	93.5	96.0	100.0	-	95.7	74.4	94.2	95.2	-	-	89.8	95.2
Buses	0	5	0	0	-	5	2	0	0	0	-	2	0	3	0	0	-	3	0	2	0	0	-	2	12
% Buses	0.0	0.5	0.0	0.0	-	0.4	0.9	0.0	0.0	-	-	0.2	0.0	1.0	0.0	0.0	-	0.4	0.0	0.6	0.0	-	-	0.4	0.3
Single-Unit Trucks	5	17	4	0	-	26	5	20	0	0	-	25	4	9	8	0	-	21	28	10	4	0	-	42	114
% Single-Unit Trucks	4.8	1.7	2.4	0.0	-	2.0	2.2	2.6	0.0	-	-	2.5	1.8	2.9	3.6	0.0	-	2.7	23.9	3.2	4.8	-	-	8.2	3.2
Articulated Trucks	0	9	0	0	-	9	0	19	0	0	-	19	0	8	1	0	-	9	2	6	0	0	-	8	45
% Articulated Trucks	0.0	0.9	0.0	0.0	-	0.7	0.0	2.4	0.0	-	-	1.9	0.0	2.6	0.4	0.0	-	1.2	1.7	1.9	0.0	-	-	1.6	1.3
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	33.3	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	13	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	66.7	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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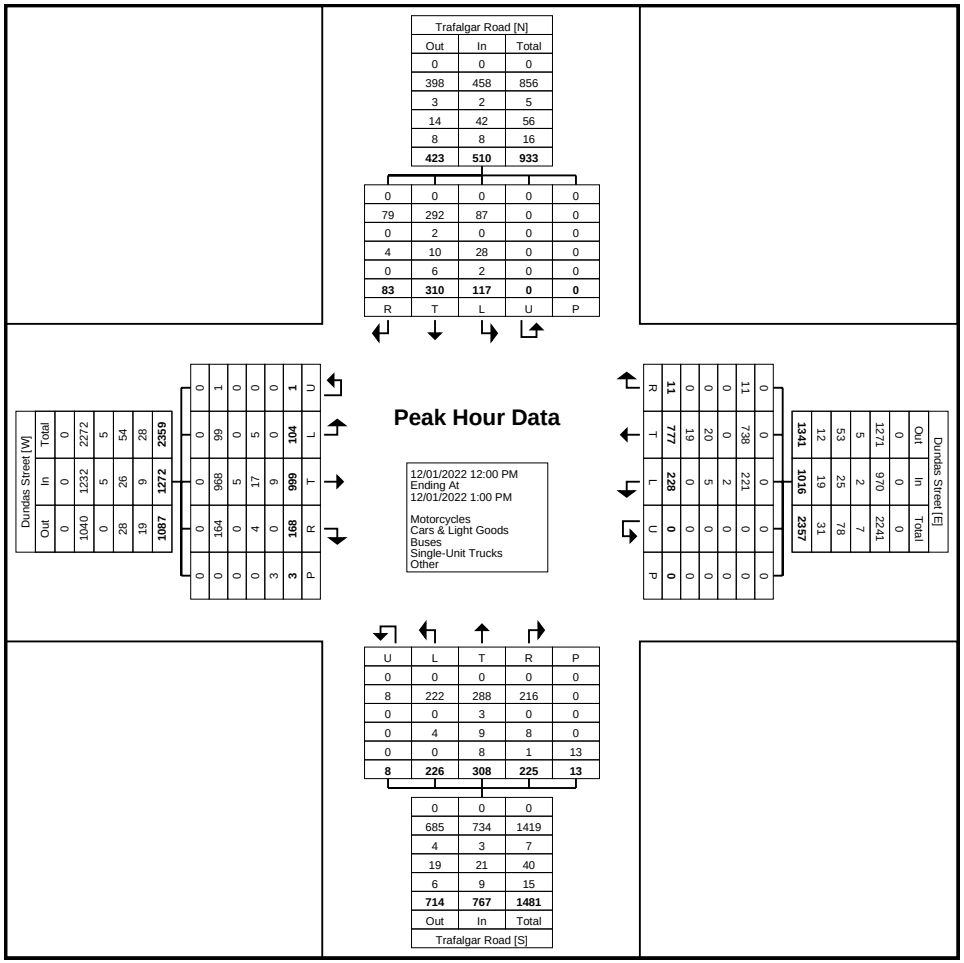

Turning Movement Peak Hour Data Plot (12:00 PM)

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Trafalgar Road & Dundas Street
Site Code: 220208
Start Date: 12/01/2022

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Dundas Street Eastbound						Dundas Street Westbound						Trafalgar Road Northbound						Trafalgar Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:45 PM	48	314	37	1	0	400	44	278	4	0	0	326	54	140	60	0	2	254	28	99	46	0	0	173	1153
5:00 PM	52	334	46	0	0	432	56	262	4	1	0	323	62	154	55	0	2	271	35	115	39	0	0	189	1215
5:15 PM	55	345	57	0	0	457	54	270	2	1	2	327	62	151	52	1	3	266	20	103	64	0	0	187	1237
5:30 PM	52	324	59	1	0	436	46	269	1	0	0	316	65	151	48	2	0	266	30	95	52	0	0	177	1195
Total	207	1317	199	2	0	1725	200	1079	11	2	2	1292	243	596	215	3	7	1057	113	412	201	0	0	726	4800
Approach %	12.0	76.3	11.5	0.1	-	-	15.5	83.5	0.9	0.2	-	-	23.0	56.4	20.3	0.3	-	-	15.6	56.7	27.7	0.0	-	-	-
Total %	4.3	27.4	4.1	0.0	-	35.9	4.2	22.5	0.2	0.0	-	26.9	5.1	12.4	4.5	0.1	-	22.0	2.4	8.6	4.2	0.0	-	15.1	-
PHF	0.941	0.954	0.843	0.500	-	0.944	0.893	0.970	0.688	0.500	-	0.988	0.935	0.968	0.896	0.375	-	0.975	0.807	0.896	0.785	0.000	-	0.960	0.970
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	205	1286	197	2	-	1690	196	1066	11	1	-	1274	242	588	210	3	-	1043	103	401	201	0	-	705	4712
% Cars & Light Goods	99.0	97.6	99.0	100.0	-	98.0	98.0	98.8	100.0	50.0	-	98.6	99.6	98.7	97.7	100.0	-	98.7	91.2	97.3	100.0	-	-	97.1	98.2
Buses	0	8	0	0	-	8	4	1	0	0	-	5	0	2	0	0	-	2	0	3	0	0	-	3	18
% Buses	0.0	0.6	0.0	0.0	-	0.5	2.0	0.1	0.0	0.0	-	0.4	0.0	0.3	0.0	0.0	-	0.2	0.0	0.7	0.0	-	-	0.4	0.4
Single-Unit Trucks	1	15	2	0	-	18	0	6	0	1	-	7	1	3	5	0	-	9	5	4	0	0	-	9	43
% Single-Unit Trucks	0.5	1.1	1.0	0.0	-	1.0	0.0	0.6	0.0	50.0	-	0.5	0.4	0.5	2.3	0.0	-	0.9	4.4	1.0	0.0	-	-	1.2	0.9
Articulated Trucks	1	8	0	0	-	9	0	6	0	0	-	6	0	3	0	0	-	3	5	4	0	0	-	9	27
% Articulated Trucks	0.5	0.6	0.0	0.0	-	0.5	0.0	0.6	0.0	0.0	-	0.5	0.0	0.5	0.0	0.0	-	0.3	4.4	1.0	0.0	-	-	1.2	0.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	7	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-

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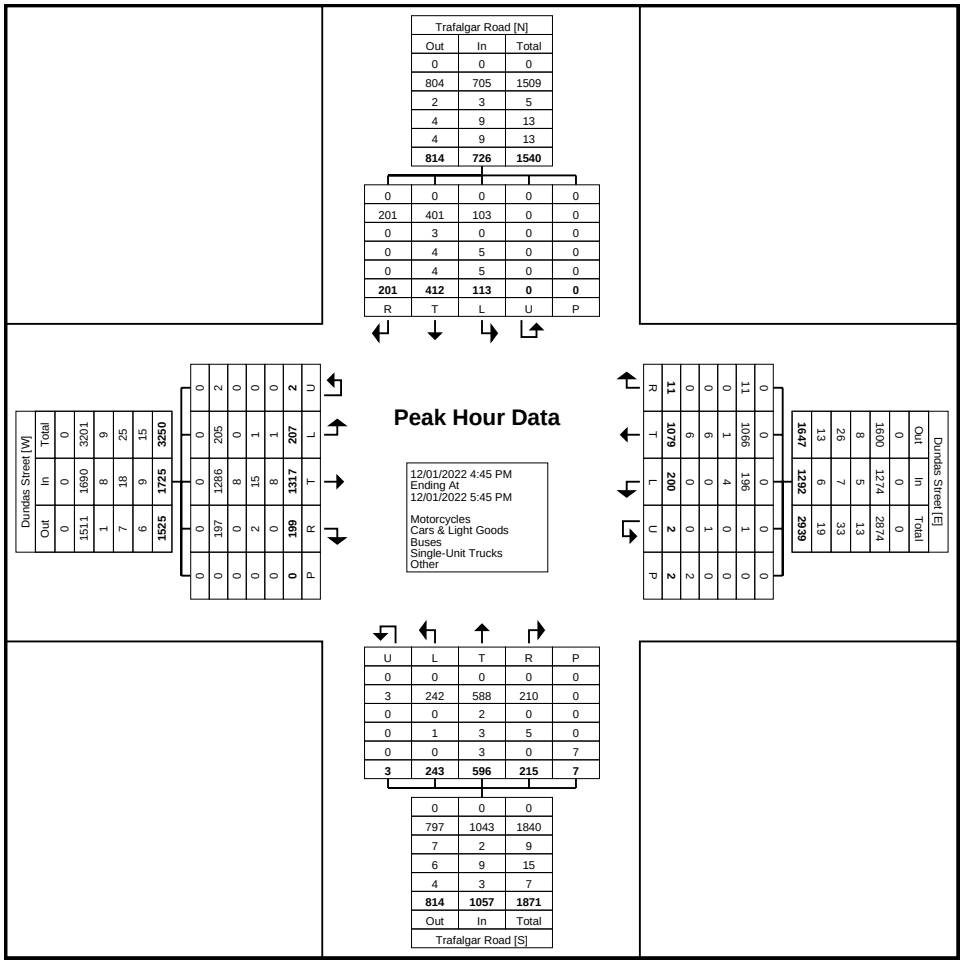
Site Code: 220208
Start Date: 12/01/2022



Turning Movement Peak Hour Data Plot (4:45 PM)

Date: 29-May-2020
Intersection: Dundas St @ Trafalgar Rd

8 Phase Basic Timing Sheet												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**2 Ped**	**4 Ped**	**6 Ped**	**8 Ped**
Phases in use	x	x	x	x	x	x	x	x	x	x	x	x
Direction	WBLT	EB	NBLT	SB	EBLT	WB	SBLT	NB				
Min Green	7	20	7	10	7	20	7	10				
Veh Ext.	3.5	5.5	3.5	3.5	3.5	5.5	3.5	3.5				
Yellow	3.0	3.7	3.0	3.7	3.0	3.7	3.0	3.7				
Red	1	2.7	1	2.8	2	2.7	1	2.8				
Walk		7		7		7		7				
Don't Walk		27		27		27		27				
Max 1	20	55	20	35	20	55	20	35				
Max 2	20	60	20	40	20	60	20	40				
Max 3												
Veh Recall			x									
Ped Recall												

Notes:
Pedestrian Reservice Active
Local Zero Override Active
Sync Reference 3:15

Pattern 1
Time: 6:00
Cycle Length: 130
Offset (%): 14%

Direction	WBLT	EB	NBLT	SB
Phase	*1*	*2*	*3*	*4*
%	11%	39%	14%	36%
Direction	**EBLT**	**WB**	**SBLT**	**NB**
Phase	*5*	*6*	*7*	*8*
%	17%	33%	10%	40%

Pattern 2
Time: 10:00
Cycle Length: 120
Offset (%): 6%

Direction	WBLT	EB	NBLT	SB
Phase	*1*	*2*	*3*	*4*
%	14%	36%	12%	38%
Direction	**EBLT**	**WB**	**SBLT**	**NB**
Phase	*5*	*6*	*7*	*8*
%	12%	38%	15%	35%

Pattern 3
Time: 15:15
Cycle Length: 130
Offset (%): 31%

Direction	WBLT	EB	NBLT	SB
Phase	*1*	*2*	*3*	*4*
%	16%	36%	12%	36%
Direction	**EBLT**	**WB**	**SBLT**	**NB**
Phase	*5*	*6*	*7*	*8*
%	16%	36%	12%	36%

Pattern 4
Time: 19:00
Cycle Length: 120
Offset (%): 14%

Direction	WBLT	EB	NBLT	SB
Phase	*1*	*2*	*3*	*4*
%	13%	38%	12%	37%
Direction	**EBLT**	**WB**	**SBLT**	**NB**
Phase	*5*	*6*	*7*	*8*
%	13%	38%	12%	37%

Pattern 5
Time: 22:00
Cycle Length: Local
Offset (%):

Direction	WBLT	EB	NBLT	SB
Phase	*1*	*2*	*3*	*4*
%				
Direction	**EBLT**	**WB**	**SBLT**	**NB**
Phase	5	6	7	8
%				

Pattern 6
Time:
Cycle Length:
Offset (%):

Direction				
Phase	*1*	*2*	*3*	*4*
%				
Direction				
Phase	5	6	7	8
%				

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Trafalgar Road & Wheat Boom Drive
Site Code: 220208
Start Date: 12/01/2022

Turning Movement Data

Start Time	Wheat Boom Drive Westbound					Trafalgar Road Northbound					Trafalgar Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	
7:00 AM	2	7	0	0	9	98	5	0	0	103	5	104	0	0	109	221
7:15 AM	2	17	0	0	19	110	0	0	0	110	3	141	0	0	144	273
7:30 AM	6	17	0	0	23	138	5	0	0	143	4	158	0	0	162	328
7:45 AM	1	11	0	0	12	127	4	0	0	131	8	161	0	0	169	312
Hourly Total	11	52	0	0	63	473	14	0	0	487	20	564	0	0	584	1134
8:00 AM	2	15	0	0	17	131	2	0	0	133	4	143	0	0	147	297
8:15 AM	4	13	0	0	17	158	7	0	0	165	4	161	0	0	165	347
8:30 AM	4	12	0	0	16	121	2	0	0	123	9	171	0	0	180	319
8:45 AM	4	15	0	0	19	140	5	0	0	145	14	155	0	0	169	333
Hourly Total	14	55	0	0	69	550	16	0	0	566	31	630	0	0	661	1296
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	2	11	0	0	13	99	1	0	0	100	4	114	0	0	118	231
11:15 AM	4	13	0	0	17	95	10	0	0	105	1	116	0	0	117	239
11:30 AM	6	9	0	0	15	90	5	0	0	95	0	133	0	0	133	243
11:45 AM	3	14	0	0	17	119	2	0	0	121	2	146	0	0	148	286
Hourly Total	15	47	0	0	62	403	18	0	0	421	7	509	0	0	516	999
12:00 PM	4	10	0	0	14	111	5	0	0	116	2	145	0	0	147	277
12:15 PM	6	10	0	0	16	110	5	0	0	115	0	129	0	0	129	260
12:30 PM	4	8	0	0	12	98	4	0	0	102	4	143	0	0	147	261
12:45 PM	3	11	0	0	14	103	5	0	0	108	11	108	0	0	119	241
Hourly Total	17	39	0	0	56	422	19	0	0	441	17	525	0	0	542	1039
1:00 PM	1	10	0	0	11	98	5	0	0	103	7	113	0	0	120	234
1:15 PM	2	6	0	0	8	98	5	0	0	103	17	120	0	0	137	248
1:30 PM	7	14	0	0	21	118	8	0	0	126	14	112	0	0	126	273
1:45 PM	6	7	0	0	13	105	7	0	0	112	3	104	0	0	107	232
Hourly Total	16	37	0	0	53	419	25	0	0	444	41	449	0	0	490	987
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	8	15	0	0	23	156	5	0	0	161	3	160	0	0	163	347
3:15 PM	17	19	0	0	36	198	3	0	0	201	3	174	0	0	177	414
3:30 PM	17	38	0	0	55	153	10	0	0	163	5	172	0	0	177	395
3:45 PM	11	21	0	0	32	178	4	0	0	182	12	172	0	0	184	398
Hourly Total	53	93	0	0	146	685	22	0	0	707	23	678	0	0	701	1554
4:00 PM	14	25	0	0	39	189	7	0	0	196	7	146	0	0	153	388
4:15 PM	8	27	0	0	35	185	6	0	0	191	4	175	0	0	179	405
4:30 PM	13	14	0	0	27	201	6	0	0	207	6	142	0	0	148	382
4:45 PM	13	27	0	0	40	198	3	0	0	201	5	164	0	0	169	410

Hourly Total	48	93	0	0	141	773	22	0	0	795	22	627	0	0	649	1585
5:00 PM	10	15	0	0	25	211	7	0	0	218	5	192	0	0	197	440
5:15 PM	2	21	0	0	23	194	9	0	0	203	7	189	0	0	196	422
5:30 PM	18	27	0	0	45	198	12	0	0	210	9	160	0	0	169	424
5:45 PM	5	10	0	0	15	180	11	0	0	191	4	159	1	0	164	370
Hourly Total	35	73	0	0	108	783	39	0	0	822	25	700	1	0	726	1656
Grand Total	209	489	0	0	698	4508	175	0	0	4683	186	4682	1	0	4869	10250
Approach %	29.9	70.1	0.0	-	-	96.3	3.7	0.0	-	-	3.8	96.2	0.0	-	-	-
Total %	2.0	4.8	0.0	-	6.8	44.0	1.7	0.0	-	45.7	1.8	45.7	0.0	-	47.5	-
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	188	380	0	-	568	4306	158	0	-	4464	148	4335	1	-	4484	9516
% Cars & Light Goods	90.0	77.7	-	-	81.4	95.5	90.3	-	-	95.3	79.6	92.6	100.0	-	92.1	92.8
Buses	12	4	0	-	16	31	7	0	-	38	1	41	0	-	42	96
% Buses	5.7	0.8	-	-	2.3	0.7	4.0	-	-	0.8	0.5	0.9	0.0	-	0.9	0.9
Single-Unit Trucks	9	103	0	-	112	121	10	0	-	131	36	209	0	-	245	488
% Single-Unit Trucks	4.3	21.1	-	-	16.0	2.7	5.7	-	-	2.8	19.4	4.5	0.0	-	5.0	4.8
Articulated Trucks	0	2	0	-	2	50	0	0	-	50	1	97	0	-	98	150
% Articulated Trucks	0.0	0.4	-	-	0.3	1.1	0.0	-	-	1.1	0.5	2.1	0.0	-	2.0	1.5
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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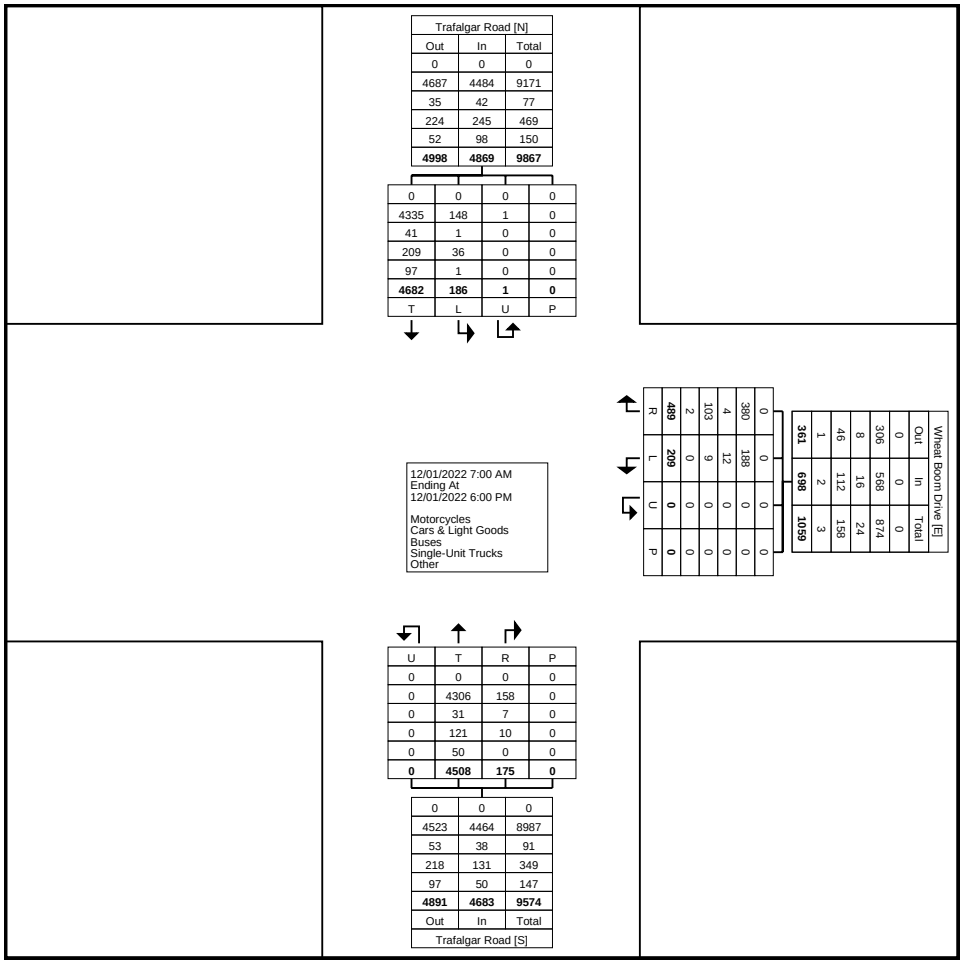
Site Code: 220208
Start Date: 12/01/2022



Turning Movement Data Plot

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5A-150 Pinebush Rd

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Count Name: Trafalgar Road & Wheat Boom Drive
Site Code: 220208
Start Date: 12/01/2022

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Wheat Boom Drive Westbound					Trafalgar Road Northbound					Trafalgar Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
8:00 AM	2	15	0	0	17	131	2	0	0	133	4	143	0	0	147	297
8:15 AM	4	13	0	0	17	158	7	0	0	165	4	161	0	0	165	347
8:30 AM	4	12	0	0	16	121	2	0	0	123	9	171	0	0	180	319
8:45 AM	4	15	0	0	19	140	5	0	0	145	14	155	0	0	169	333
Total	14	55	0	0	69	550	16	0	0	566	31	630	0	0	661	1296
Approach %	20.3	79.7	0.0	-	-	97.2	2.8	0.0	-	-	4.7	95.3	0.0	-	-	-
Total %	1.1	4.2	0.0	-	5.3	42.4	1.2	0.0	-	43.7	2.4	48.6	0.0	-	51.0	-
PHF	0.875	0.917	0.000	-	0.908	0.870	0.571	0.000	-	0.858	0.554	0.921	0.000	-	0.918	0.934
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	9	39	0	-	48	522	12	0	-	534	26	586	0	-	612	1194
% Cars & Light Goods	64.3	70.9	-	-	69.6	94.9	75.0	-	-	94.3	83.9	93.0	-	-	92.6	92.1
Buses	3	0	0	-	3	6	3	0	-	9	0	13	0	-	13	25
% Buses	21.4	0.0	-	-	4.3	1.1	18.8	-	-	1.6	0.0	2.1	-	-	2.0	1.9
Single-Unit Trucks	2	16	0	-	18	16	1	0	-	17	5	22	0	-	27	62
% Single-Unit Trucks	14.3	29.1	-	-	26.1	2.9	6.3	-	-	3.0	16.1	3.5	-	-	4.1	4.8
Articulated Trucks	0	0	0	-	0	6	0	0	-	6	0	9	0	-	9	15
% Articulated Trucks	0.0	0.0	-	-	0.0	1.1	0.0	-	-	1.1	0.0	1.4	-	-	1.4	1.2
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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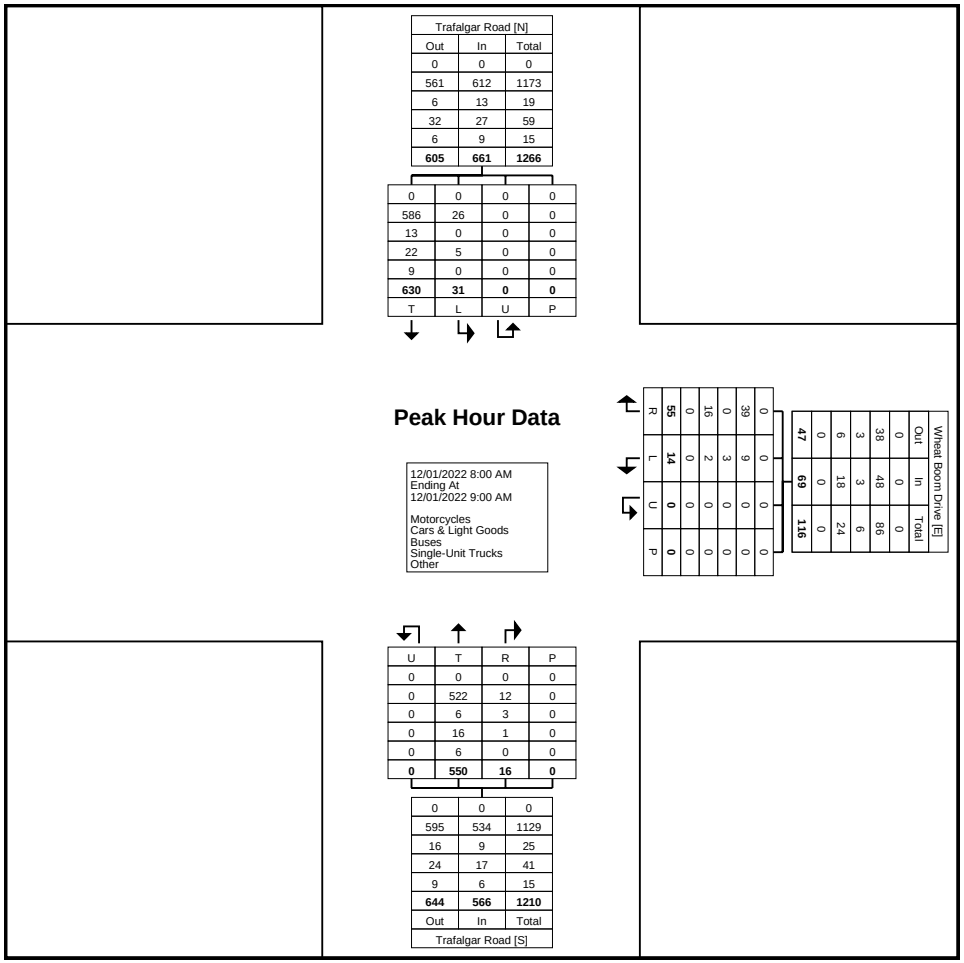

Turning Movement Peak Hour Data Plot (8:00 AM)

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Count Name: Trafalgar Road & Wheat Boom Drive
Site Code: 220208
Start Date: 12/01/2022

Turning Movement Peak Hour Data (11:45 AM)

Start Time	Wheat Boom Drive Westbound					Trafalgar Road Northbound					Trafalgar Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
11:45 AM	3	14	0	0	17	119	2	0	0	121	2	146	0	0	148	286
12:00 PM	4	10	0	0	14	111	5	0	0	116	2	145	0	0	147	277
12:15 PM	6	10	0	0	16	110	5	0	0	115	0	129	0	0	129	260
12:30 PM	4	8	0	0	12	98	4	0	0	102	4	143	0	0	147	261
Total	17	42	0	0	59	438	16	0	0	454	8	563	0	0	571	1084
Approach %	28.8	71.2	0.0	-	-	96.5	3.5	0.0	-	-	1.4	98.6	0.0	-	-	-
Total %	1.6	3.9	0.0	-	5.4	40.4	1.5	0.0	-	41.9	0.7	51.9	0.0	-	52.7	-
PHF	0.708	0.750	0.000	-	0.868	0.920	0.800	0.000	-	0.938	0.500	0.964	0.000	-	0.965	0.948
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	17	23	0	-	40	407	16	0	-	423	6	489	0	-	495	958
% Cars & Light Goods	100.0	54.8	-	-	67.8	92.9	100.0	-	-	93.2	75.0	86.9	-	-	86.7	88.4
Buses	0	0	0	-	0	3	0	0	-	3	0	2	0	-	2	5
% Buses	0.0	0.0	-	-	0.0	0.7	0.0	-	-	0.7	0.0	0.4	-	-	0.4	0.5
Single-Unit Trucks	0	19	0	-	19	21	0	0	-	21	2	61	0	-	63	103
% Single-Unit Trucks	0.0	45.2	-	-	32.2	4.8	0.0	-	-	4.6	25.0	10.8	-	-	11.0	9.5
Articulated Trucks	0	0	0	-	0	7	0	0	-	7	0	11	0	-	11	18
% Articulated Trucks	0.0	0.0	-	-	0.0	1.6	0.0	-	-	1.5	0.0	2.0	-	-	1.9	1.7
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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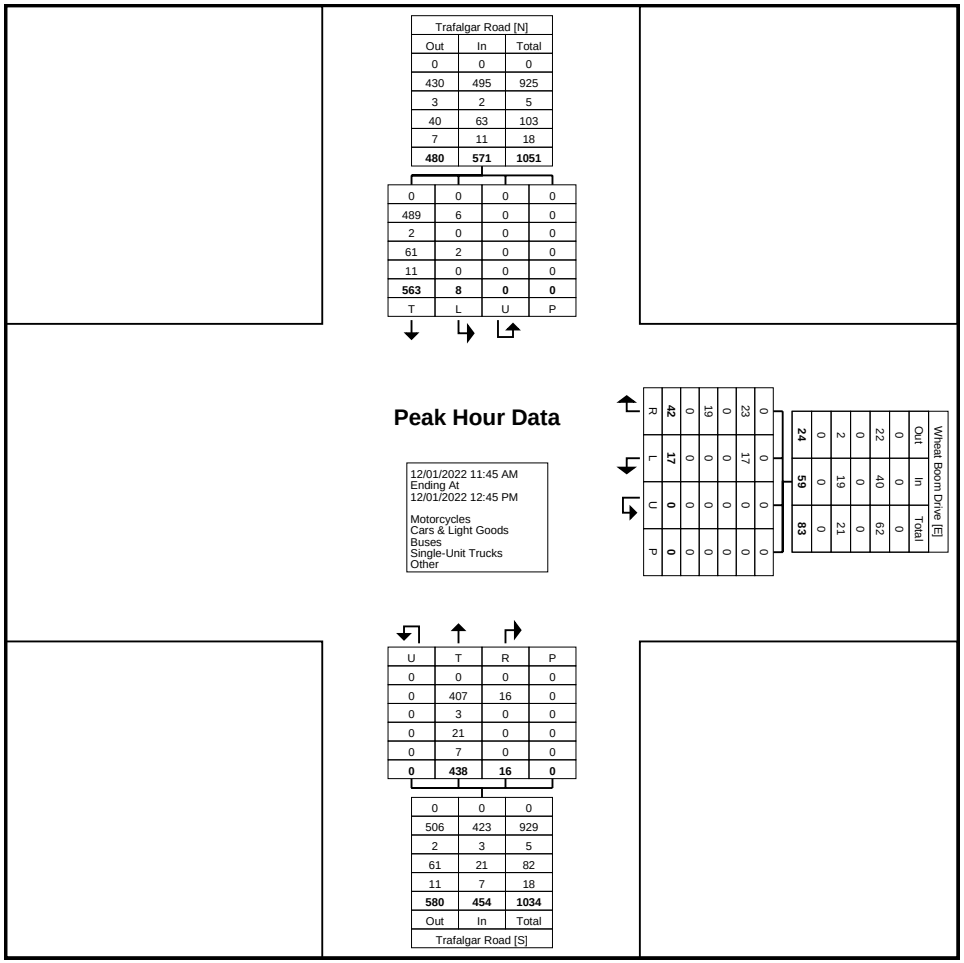

Turning Movement Peak Hour Data Plot (11:45 AM)

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Count Name: Trafalgar Road & Wheat Boom Drive
Site Code: 220208
Start Date: 12/01/2022

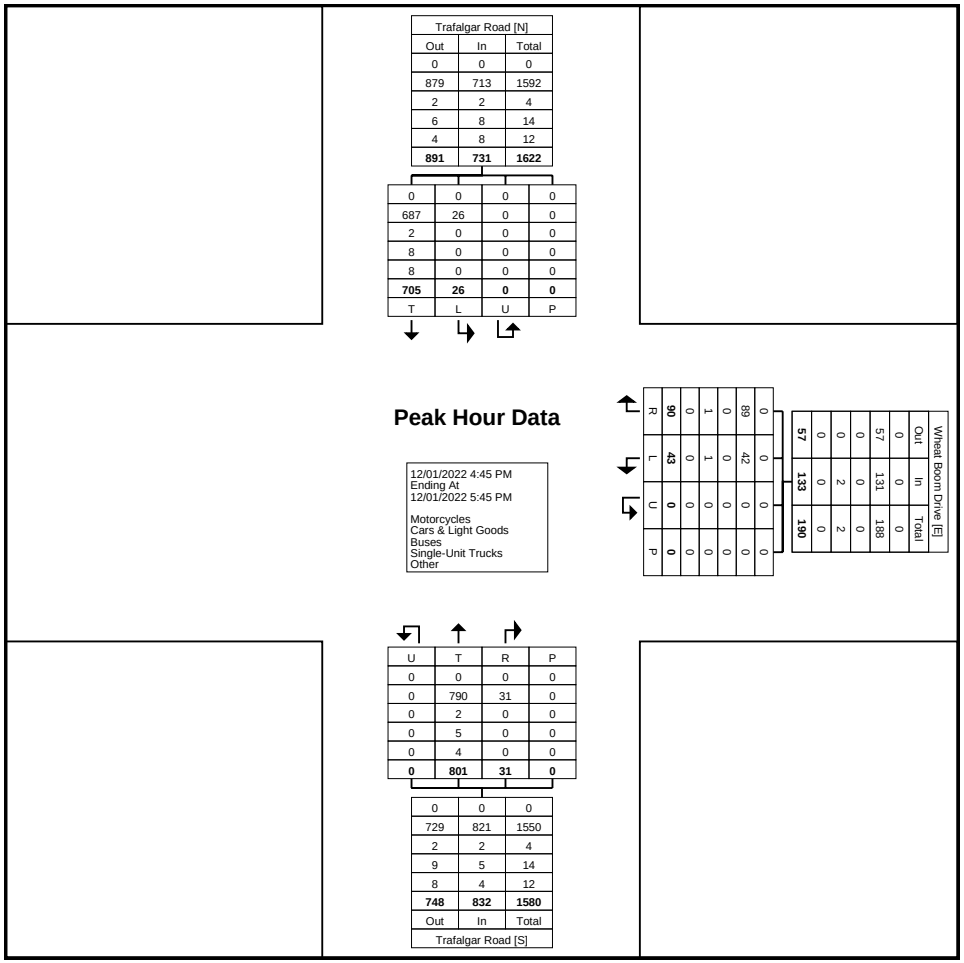
Turning Movement Peak Hour Data (4:45 PM)

Start Time	Wheat Boom Drive Westbound					Trafalgar Road Northbound					Trafalgar Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Int. Total
4:45 PM	13	27	0	0	40	198	3	0	0	201	5	164	0	0	169	410
5:00 PM	10	15	0	0	25	211	7	0	0	218	5	192	0	0	197	440
5:15 PM	2	21	0	0	23	194	9	0	0	203	7	189	0	0	196	422
5:30 PM	18	27	0	0	45	198	12	0	0	210	9	160	0	0	169	424
Total	43	90	0	0	133	801	31	0	0	832	26	705	0	0	731	1696
Approach %	32.3	67.7	0.0	-	-	96.3	3.7	0.0	-	-	3.6	96.4	0.0	-	-	-
Total %	2.5	5.3	0.0	-	7.8	47.2	1.8	0.0	-	49.1	1.5	41.6	0.0	-	43.1	-
PHF	0.597	0.833	0.000	-	0.739	0.949	0.646	0.000	-	0.954	0.722	0.918	0.000	-	0.928	0.964
Motorcycles	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	42	89	0	-	131	790	31	0	-	821	26	687	0	-	713	1665
% Cars & Light Goods	97.7	98.9	-	-	98.5	98.6	100.0	-	-	98.7	100.0	97.4	-	-	97.5	98.2
Buses	0	0	0	-	0	2	0	0	-	2	0	2	0	-	2	4
% Buses	0.0	0.0	-	-	0.0	0.2	0.0	-	-	0.2	0.0	0.3	-	-	0.3	0.2
Single-Unit Trucks	1	1	0	-	2	5	0	0	-	5	0	8	0	-	8	15
% Single-Unit Trucks	2.3	1.1	-	-	1.5	0.6	0.0	-	-	0.6	0.0	1.1	-	-	1.1	0.9
Articulated Trucks	0	0	0	-	0	4	0	0	-	4	0	8	0	-	8	12
% Articulated Trucks	0.0	0.0	-	-	0.0	0.5	0.0	-	-	0.5	0.0	1.1	-	-	1.1	0.7
Bicycles on Road	0	0	0	-	0	0	0	0	-	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Trafalgar Road & Wheat Boom Drive
Site Code: 220208
Start Date: 12/01/2022



Turning Movement Peak Hour Data Plot (4:45 PM)

Date: 01-Jan-20
Intersection: Trafalgar Road & Wheat Boom

8 Phase Basic Timing Sheet												
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**2 Ped**	**4 Ped**	**6 Ped**	**8 Ped**
Phases in use		x				x		x	X			
Direction	SBLT	NB	WBLT	EB	NBLT	SB	EBLT	WB				
Min Green		20				20		10				
Veh Ext.		5.0				5.0		3.0				
Yellow		4.6				4.6		3.3				
Red		2				2		2.2				
Walk		7										
Don't Walk		28										
Max 1		60				60		30				
Max 2												
Max 3												
Veh Recall		X				X						
Ped Recall		X										
Notes:	Set Sync Reference to 3:15											

Pattern 1
Time: 6:00
Cycle Length: 120
Offset (%): 0%

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%		75		
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%		75		25

Pattern 2
Time: 9:30, 19:00
Cycle Length: 100
Offset (%): 11%

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%		70		
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%		70		23

Pattern 3
Time: 15:15
Cycle Length: 120
Offset (%): 11%

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%		75		
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%		75		25

Pattern 4
Time: 21:00
Cycle Length: Local
Offset (%):

Direction	SBLT	NB	WBLT	EB
Phase	1	2	3	4
%				
Direction	NBLT	SB	EBLT	WB
Phase	5	6	7	8
%				

Pattern 5
Time:
Cycle Length:
Offset (%):

Direction				
Phase	1	2	3	4
%				
Direction				
Phase	5	6	7	8
%				

Pattern 6
Time:
Cycle Length:
Offset (%):

Direction				
Phase	1	2	3	4
%				
Direction				
Phase	5	6	7	8
%				

Appendix C

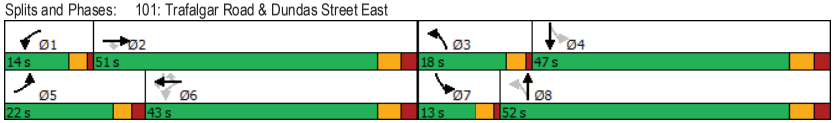
Existing Operations

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	1555	197	171	722	8	158	434	113	97	482	92
Future Volume (vph)	188	1555	197	171	722	8	158	434	113	97	482	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		0	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99		0.99	1.00		0.98	1.00					0.98
Frt			0.850			0.850		0.969				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3273	4759	1538	1752	5085	1482	1703	3369	0	1770	3505	1538
Flt Permitted	0.950			0.109			0.317			0.361		
Satd. Flow (perm)	3252	4759	1516	201	5085	1447	567	3369	0	672	3505	1514
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			169			172		28				172
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			419.7	
Travel Time (s)		66.9			55.9			68.7			30.2	
Confl. Peds. (#/hr)	10		2	2		10	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 (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Adj. Flow (vph)	204	1690	214	186	785	9	172	472	123	105	524	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	1690	214	186	785	9	172	595	0	105	524	100
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
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
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8			4		6
Detector Phase	5	2	2	1	6	6	3	8		7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0		7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5		11.5	40.5	40.4
Total Split (s)	22.0	51.0	51.0	14.0	43.0	43.0	18.0	52.0		13.0	47.0	43.0
Total Split (%)	16.9%	39.2%	39.2%	10.8%	33.1%	33.1%	13.8%	40.0%		10.0%	36.2%	33.1%
Maximum Green (s)	17.0	44.6	44.6	10.0	36.6	36.6	14.0	45.5		9.0	40.5	36.6
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7		3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8		1.0	2.8	2.7
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)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5		4.0	6.5	6.4
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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5		3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max		Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	27.0		27.0			27.0	27.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	17.0	44.6	44.6	49.0	36.6	36.6	61.0	45.5		52.0	40.5	36.6
Actuated g/C Ratio	0.13	0.34	0.34	0.38	0.28	0.28	0.47	0.35		0.40	0.31	0.28
v/c Ratio	0.48	1.04	0.34	0.95	0.55	0.02	0.44	0.50		0.31	0.48	0.18
Control Delay	56.5	73.8	9.4	85.1	41.4	0.0	24.3	33.3		22.4	38.0	0.7
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	56.5	73.8	9.4	85.1	41.4	0.0	24.3	33.3		22.4	38.0	0.7
LOS	E	E	A	F	D	A	C	C		C	D	A
Approach Delay		65.6			49.3			31.3			30.7	
Approach LOS		E			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 50.8		Intersection LOS: D	
Intersection Capacity Utilization 94.0%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Queues
101: Trafalgar Road & Dundas Street East

Existing - 2024
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	204	1690	214	186	785	9	172	595	105	524	100
v/c Ratio	0.48	1.04	0.34	0.95	0.55	0.02	0.44	0.50	0.31	0.48	0.18
Control Delay	56.5	73.8	9.4	85.1	41.4	0.0	24.3	33.3	22.4	38.0	0.7
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	56.5	73.8	9.4	85.1	41.4	0.0	24.3	33.3	22.4	38.0	0.7
Queue Length 50th (m)	26.7	~179.2	8.2	32.9	66.0	0.0	26.8	62.9	15.6	60.2	0.0
Queue Length 95th (m)	39.7	#210.2	27.7	#82.1	80.4	0.0	42.4	81.3	27.2	77.8	0.0
Internal Link Dist (m)		905.2			753.0			930.2		395.7	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0		50.0		50.0
Base Capacity (vph)	428	1632	631	195	1431	530	388	1197	344	1091	549
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	0.48	1.04	0.34	0.95	0.55	0.02	0.44	0.50	0.31	0.48	0.18

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
101: Trafalgar Road & Dundas Street East

Existing - 2024
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	188	1555	197	171	722	8	158	434	113	97	482	92
Future Volume (vph)	188	1555	197	171	722	8	158	434	113	97	482	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5		4.0	6.5	6.4
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3273	4759	1516	1752	5085	1447	1702	3369		1770	3505	1514
Flt Permitted	0.95	1.00	1.00	0.11	1.00	1.00	0.32	1.00		0.36	1.00	1.00
Satd. Flow (perm)	3273	4759	1516	202	5085	1447	568	3369		672	3505	1514
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)	204	1690	214	186	785	9	172	472	123	105	524	100
RTOR Reduction (vph)	0	0	111	0	0	6	0	18	0	0	0	72
Lane Group Flow (vph)	204	1690	103	186	785	3	172	577	0	105	524	28
Confl. Peds. (#/hr)	10		2	2		10	3					3
Heavy Vehicles (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8			4		6
Actuated Green, G (s)	17.0	44.6	44.6	46.6	36.6	36.6	58.5	45.5		49.5	40.5	36.6
Effective Green, g (s)	17.0	44.6	44.6	46.6	36.6	36.6	58.5	45.5		49.5	40.5	36.6
Actuated g/C Ratio	0.13	0.34	0.34	0.36	0.28	0.28	0.45	0.35		0.38	0.31	0.28
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5		4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5		3.5	3.5	5.5
Lane Grp Cap (vph)	428	1632	520	191	1431	407	377	1179		331	1091	426
v/s Ratio Prot	0.06	c0.36		c0.07	0.15		c0.05	c0.17		0.02	0.15	
v/s Ratio Perm			0.07	0.27		0.00	0.16			0.10		0.02
v/c Ratio	0.48	1.04	0.20	0.97	0.55	0.01	0.46	0.49		0.32	0.48	0.07
Uniform Delay, d1	52.4	42.7	30.1	34.1	39.7	33.6	22.8	33.1		26.7	36.2	34.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.8	32.0	0.9	58.6	1.5	0.0	3.9	1.5		2.5	1.5	0.3
Delay (s)	56.1	74.7	30.9	92.8	41.2	33.6	26.7	34.6		29.2	37.7	34.5
Level of Service	E	E	C	F	D	C	C	C		C	D	C
Approach Delay (s)		68.5			50.9			32.8			36.1	
Approach LOS		E			D			C			D	

Intersection Summary				
HCM 2000 Control Delay	53.6	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	21.9	
Intersection Capacity Utilization	94.0%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	57	572	17	32	655
Future Volume (vph)	15	57	572	17	32	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt		0.850	0.996			
Flt Protected	0.950					0.998
Satd. Flow (prot)	1770	1583	3525	0	0	3532
Flt Permitted	0.950					0.893
Satd. Flow (perm)	1770	1583	3525	0	0	3161
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		62	6			
Link Speed (k/h)	50		50			50
Link Distance (m)	168.6		419.7			442.3
Travel Time (s)	12.1		30.2			31.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	62	622	18	35	712
Shared Lane Traffic (%)						
Lane Group Flow (vph)	16	62	640	0	0	747
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Minimum Split (s)	23.7	23.7	41.6		26.6	26.6
Total Split (s)	30.0	30.0	90.0		90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%		75.0%	75.0%
Maximum Green (s)	24.5	24.5	83.4		83.4	83.4
Yellow Time (s)	3.3	3.3	4.6		4.6	4.6
All-Red Time (s)	2.2	2.2	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	5.5	5.5	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Walk Time (s)	7.0	7.0	7.0			
Flash Dont Walk (s)	11.0	11.0	28.0			
Pedestrian Calls (#/hr)	0	0	0			
Act Effct Green (s)	24.5	24.5	83.4			83.4
Actuated g/C Ratio	0.20	0.20	0.70			0.70
v/c Ratio	0.04	0.17	0.26			0.34
Control Delay	38.9	10.8	7.1			7.8
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	38.9	10.8	7.1			7.8

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	D	B	A			A
Approach Delay	16.6		7.1			7.8
Approach LOS	B		A			A

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green			
Natural Cycle: 70			
Control Type: Pretimed			
Maximum v/c Ratio: 0.34			
Intersection Signal Delay: 8.0		Intersection LOS: A	
Intersection Capacity Utilization 59.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 102: Trafalgar Road & Wheat Bloom Drive

Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	16	62	640	747
v/c Ratio	0.04	0.17	0.26	0.34
Control Delay	38.9	10.8	7.1	7.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	38.9	10.8	7.1	7.8
Queue Length 50th (m)	3.2	0.0	27.6	35.1
Queue Length 95th (m)	9.6	12.0	35.5	44.6
Internal Link Dist (m)	144.6		395.7	418.3
Turn Bay Length (m)				
Base Capacity (vph)	361	372	2451	2196
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	0.04	0.17	0.26	0.34

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	15	57	572	17	32	655
Future Volume (vph)	15	57	572	17	32	655
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.6			6.6
Lane Util. Factor	1.00	1.00	0.95			0.95
Frt	1.00	0.85	1.00			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3524			3531
Flt Permitted	0.95	1.00	1.00			0.89
Satd. Flow (perm)	1770	1583	3524			3159
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	62	622	18	35	712
RTOR Reduction (vph)	0	49	2	0	0	0
Lane Group Flow (vph)	16	13	638	0	0	747
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	24.5	24.5	83.4			83.4
Effective Green, g (s)	24.5	24.5	83.4			83.4
Actuated g/C Ratio	0.20	0.20	0.70			0.70
Clearance Time (s)	5.5	5.5	6.6			6.6
Lane Grp Cap (vph)	361	323	2449			2195
v/s Ratio Prot	c0.01		0.18			
v/s Ratio Perm		0.01				c0.24
v/c Ratio	0.04	0.04	0.26			0.34
Uniform Delay, d1	38.3	38.3	6.8			7.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.2	0.2	0.3			0.4
Delay (s)	38.6	38.5	7.1			7.7
Level of Service	D	D	A			A
Approach Delay (s)	38.5		7.1			7.7
Approach LOS	D		A			A

Intersection Summary

HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.1
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

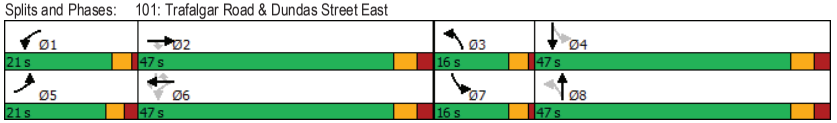
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	1370	207	208	1123	11	253	620	224	118	429	209
Future Volume (vph)	215	1370	207	208	1123	11	253	620	224	118	429	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		0	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Ped Bike Factor	0.99		0.99	1.00		0.97	1.00	1.00		1.00		0.99
Frt			0.850			0.850		0.960				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	5136	1583	1787	4988	1615	1770	3428	0	1805	3574	1599
Flt Permitted	0.950			0.099			0.391			0.106		
Satd. Flow (perm)	3414	5136	1563	186	4988	1566	728	3428	0	201	3574	1578
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			191			104		40				227
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			420.4	
Travel Time (s)		66.9			55.9			68.7			30.3	
Confl. Peds. (#/hr)	16		1	1		16	1		1	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 (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Adj. Flow (vph)	234	1489	225	226	1221	12	275	674	243	128	466	227
Shared Lane Traffic (%)												
Lane Group Flow (vph)	234	1489	225	226	1221	12	275	917	0	128	466	227
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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0		2.0	10.0	2.0
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
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6		2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8			4		6
Detector Phase	5	2	2	1	6	6	3	8		7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0		7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5		11.5	40.5	40.4
Total Split (s)	21.0	47.0	47.0	21.0	47.0	47.0	16.0	47.0		16.0	47.0	47.0
Total Split (%)	16.0%	35.9%	35.9%	16.0%	35.9%	35.9%	12.2%	35.9%		12.2%	35.9%	35.9%
Maximum Green (s)	16.0	40.6	40.6	17.0	40.6	40.6	12.0	40.5		12.0	40.5	40.6
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7		3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8		1.0	2.8	2.7
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)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5		4.0	6.5	6.4
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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5		3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max		Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0			7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	27.0		27.0			27.0	27.0
Pedestrian Calls (#/hr)		0	0		0	0		0			0	0
Act Effct Green (s)	16.0	40.6	40.6	60.0	40.6	40.6	55.0	40.5		55.0	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.46	0.31	0.31	0.42	0.31		0.42	0.31	0.31
v/c Ratio	0.56	0.94	0.37	0.77	0.79	0.02	0.69	0.84		0.55	0.42	0.35
Control Delay	59.8	55.8	9.0	48.9	45.8	0.1	34.9	48.8		32.3	37.4	5.7
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	59.8	55.8	9.0	48.9	45.8	0.1	34.9	48.8		32.3	37.4	5.7
LOS	E	E	A	D	D	A	C	D		C	D	A
Approach Delay		50.9			45.9			45.6			27.8	
Approach LOS		D			D			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 131			
Actuated Cycle Length: 131			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 44.9		Intersection LOS: D	
Intersection Capacity Utilization 99.6%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Queues
101: Trafalgar Road & Dundas Street East

Existing - 2024
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	234	1489	225	226	1221	12	275	917	128	466	227
v/c Ratio	0.56	0.94	0.37	0.77	0.79	0.02	0.69	0.84	0.55	0.42	0.35
Control Delay	59.8	55.8	9.0	48.9	45.8	0.1	34.9	48.8	32.3	37.4	5.7
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	59.8	55.8	9.0	48.9	45.8	0.1	34.9	48.8	32.3	37.4	5.7
Queue Length 50th (m)	31.3	144.1	6.5	41.7	111.1	0.0	47.8	118.0	20.2	52.9	0.0
Queue Length 95th (m)	45.4	#174.6	27.0	#80.5	129.8	0.0	70.1	145.4	35.8	69.3	18.7
Internal Link Dist (m)		905.2			753.0			930.2		396.4	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0		50.0		50.0
Base Capacity (vph)	419	1591	616	292	1545	557	401	1087	231	1104	645
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.94	0.37	0.77	0.79	0.02	0.69	0.84	0.55	0.42	0.35

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
101: Trafalgar Road & Dundas Street East

Existing - 2024
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	215	1370	207	208	1123	11	253	620	224	118	429	209
Future Volume (vph)	215	1370	207	208	1123	11	253	620	224	118	429	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5		4.0	6.5	6.4
Lane Util. Factor	0.97	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	5136	1563	1787	4988	1566	1769	3429		1805	3574	1578
Flt Permitted	0.95	1.00	1.00	0.10	1.00	1.00	0.39	1.00		0.11	1.00	1.00
Satd. Flow (perm)	3433	5136	1563	185	4988	1566	729	3429		202	3574	1578
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)	234	1489	225	226	1221	12	275	674	243	128	466	227
RTOR Reduction (vph)	0	0	132	0	0	8	0	28	0	0	0	157
Lane Group Flow (vph)	234	1489	93	226	1221	4	275	889	0	128	466	70
Confl. Peds. (#/hr)	16		1	1		16	1		1	1		1
Heavy Vehicles (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8			4		6
Actuated Green, G (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5		52.5	40.5	40.6
Effective Green, g (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5		52.5	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.44	0.31	0.31	0.40	0.31		0.40	0.31	0.31
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5		4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5		3.5	3.5	5.5
Lane Grp Cap (vph)	419	1591	484	289	1545	485	387	1060		227	1104	489
v/s Ratio Prot	0.07	c0.29		c0.10	0.24		c0.07	c0.26		0.05	0.13	
v/s Ratio Perm			0.06	0.24		0.00	0.22			0.17		0.04
v/c Ratio	0.56	0.94	0.19	0.78	0.79	0.01	0.71	0.84		0.56	0.42	0.14
Uniform Delay, d1	54.2	43.9	33.2	33.6	41.3	31.3	29.5	42.2		28.8	36.0	32.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.3	11.7	0.9	18.8	4.2	0.0	10.6	8.0		9.8	1.2	0.6
Delay (s)	59.5	55.7	34.1	52.3	45.5	31.3	40.1	50.2		38.5	37.1	33.3
Level of Service	E	E	C	D	D	C	D	D		D	D	C
Approach Delay (s)		53.6			46.5			47.8			36.3	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	47.8	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	21.9	
Intersection Capacity Utilization	99.6%	ICU Level of Service	F	
Analysis Period (min)	15			

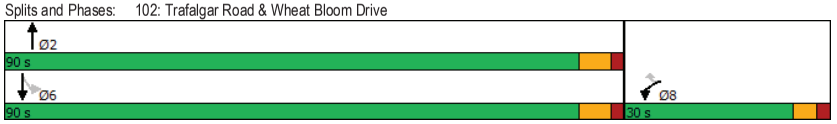
c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	45	94	833	32	27	733
Future Volume (vph)	45	94	833	32	27	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95
Frt		0.850	0.994			
Flt Protected	0.950					0.998
Satd. Flow (prot)	1770	1583	3518	0	0	3532
Flt Permitted	0.950					0.892
Satd. Flow (perm)	1770	1583	3518	0	0	3157
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		102	7			
Link Speed (k/h)	50		50			50
Link Distance (m)	218.1		420.4			441.6
Travel Time (s)	15.7		30.3			31.8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	102	905	35	29	797
Shared Lane Traffic (%)						
Lane Group Flow (vph)	49	102	940	0	0	826
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.6		3.6			3.6
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15		15	25	
Number of Detectors	1	1	2		1	2
Detector Template	Left	Right	Thru		Left	Thru
Leading Detector (m)	2.0	2.0	10.0		2.0	10.0
Trailing Detector (m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0		0.0	0.0
Detector 1 Size(m)	2.0	2.0	0.6		2.0	0.6
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0		0.0	0.0
Detector 2 Position(m)			9.4			9.4
Detector 2 Size(m)			0.6			0.6
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	20.0		20.0	20.0

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Minimum Split (s)	23.5	23.5	41.6		28.6	28.6
Total Split (s)	30.0	30.0	90.0		90.0	90.0
Total Split (%)	25.0%	25.0%	75.0%		75.0%	75.0%
Maximum Green (s)	24.5	24.5	83.4		83.4	83.4
Yellow Time (s)	3.3	3.3	4.6		4.6	4.6
All-Red Time (s)	2.2	2.2	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0			0.0
Total Lost Time (s)	5.5	5.5	6.6			6.6
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	5.0		5.0	5.0
Recall Mode	None	None	Max		Max	Max
Walk Time (s)			7.0			
Flash Dont Walk (s)			28.0			
Pedestrian Calls (#/hr)			0			
Act Effct Green (s)	10.2	10.2	83.4			83.4
Actuated g/C Ratio	0.10	0.10	0.79			0.79
v/c Ratio	0.29	0.42	0.34			0.33
Control Delay	49.1	14.5	3.6			3.6
Queue Delay	0.0	0.0	0.0			0.0
Total Delay	49.1	14.5	3.6			3.6
LOS	D	B	A			A
Approach Delay	25.7		3.6			3.6
Approach LOS	C		A			A

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 105.7			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.42			
Intersection Signal Delay: 5.3		Intersection LOS: A	
Intersection Capacity Utilization 58.4%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 102: Trafalgar Road & Wheat Bloom Drive



Lane Group	WBL	WBR	NBT	SBT
Lane Group Flow (vph)	49	102	940	826
v/c Ratio	0.29	0.42	0.34	0.33
Control Delay	49.1	14.5	3.6	3.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	49.1	14.5	3.6	3.6
Queue Length 50th (m)	10.0	0.0	23.9	21.1
Queue Length 95th (m)	22.0	16.1	32.5	29.2
Internal Link Dist (m)	194.1		396.4	417.6
Turn Bay Length (m)				
Base Capacity (vph)	410	444	2776	2489
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	0.12	0.23	0.34	0.33

Intersection Summary

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	45	94	833	32	27	733
Future Volume (vph)	45	94	833	32	27	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	6.6			6.6
Lane Util. Factor	1.00	1.00	0.95			0.95
Frt	1.00	0.85	0.99			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1770	1583	3519			3533
Flt Permitted	0.95	1.00	1.00			0.89
Satd. Flow (perm)	1770	1583	3519			3157
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	102	905	35	29	797
RTOR Reduction (vph)	0	92	1	0	0	0
Lane Group Flow (vph)	49	10	939	0	0	826
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	10.2	10.2	83.4			83.4
Effective Green, g (s)	10.2	10.2	83.4			83.4
Actuated g/C Ratio	0.10	0.10	0.79			0.79
Clearance Time (s)	5.5	5.5	6.6			6.6
Vehicle Extension (s)	3.0	3.0	5.0			5.0
Lane Grp Cap (vph)	170	152	2776			2490
v/s Ratio Prot	c0.03		c0.27			
v/s Ratio Perm		0.01				0.26
v/c Ratio	0.29	0.06	0.34			0.33
Uniform Delay, d1	44.4	43.4	3.2			3.2
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	0.9	0.2	0.3			0.4
Delay (s)	45.3	43.6	3.5			3.5
Level of Service	D	D	A			A
Approach Delay (s)	44.2		3.5			3.5
Approach LOS	D		A			A

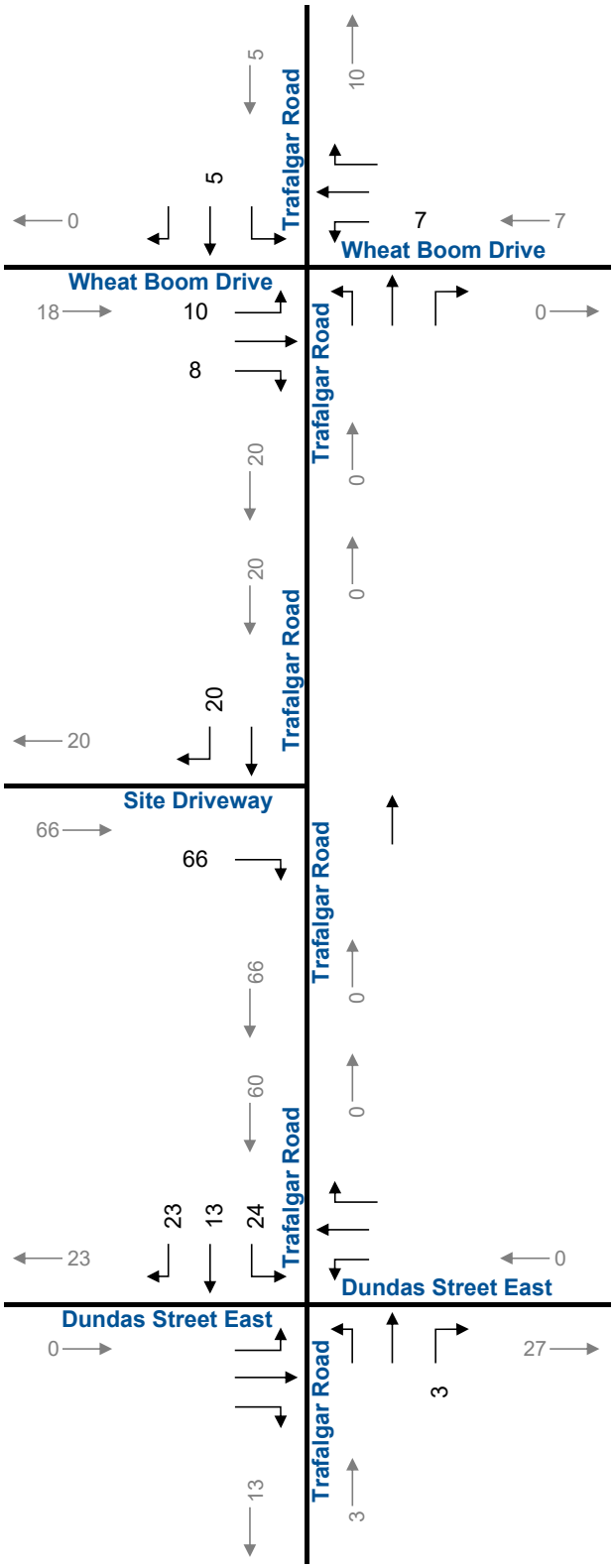
Intersection Summary				
HCM 2000 Control Delay	6.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	105.7	Sum of lost time (s)	12.1
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

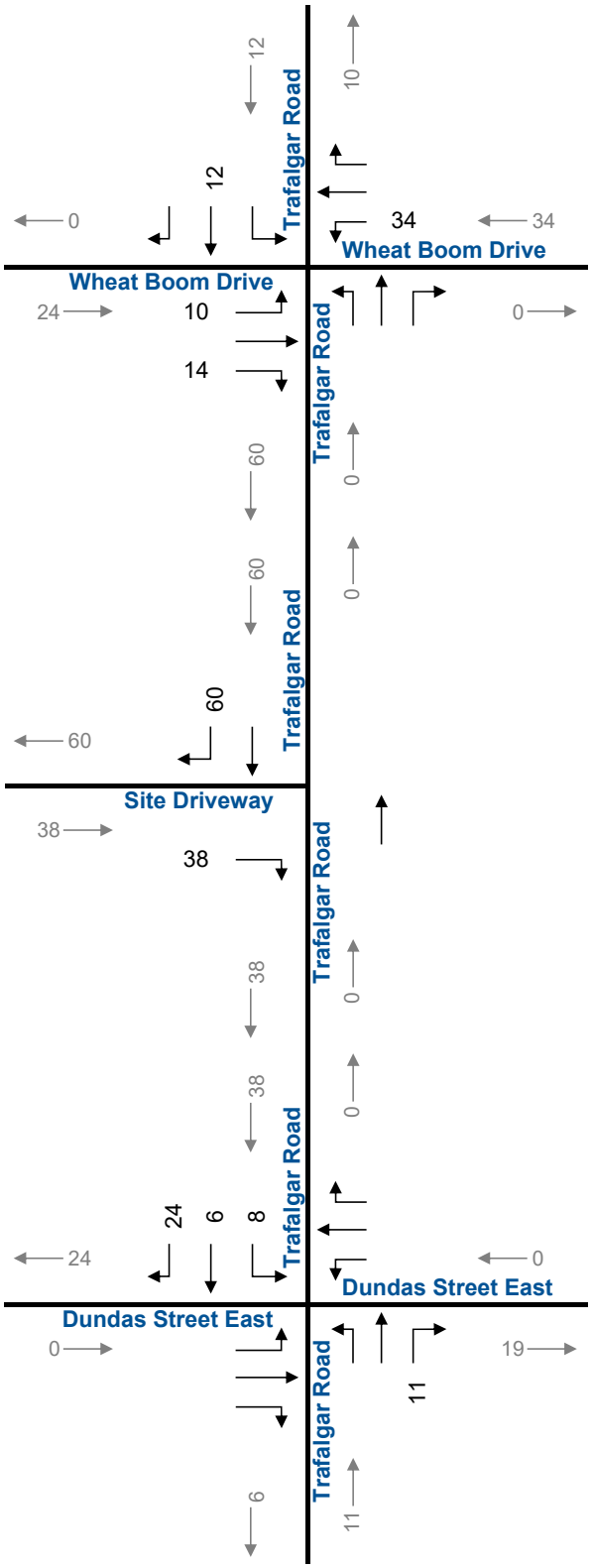
Appendix D

Other Area Projections

AM Peak Hour



PM Peak Hour



Appendix E

Future Operations

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	66	0	798	966	20
Future Volume (vph)	0	66	0	798	966	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	*0.80	*0.80	0.91
Frt		0.865			0.997	
Flt Protected						
Satd. Flow (prot)	0	1611	0	4471	4457	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4471	4457	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	88.9			197.6	211.8	
Travel Time (s)	6.4			14.2	15.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	72	0	867	1050	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	72	0	867	1072	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		
* User Entered Value			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	66	0	798	966	20
Future Volume (Veh/h)	0	66	0	798	966	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	72	0	867	1050	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				198	212	
pX, platoon unblocked	0.93	1.00	1.00			
vC, conflicting volume	1350	361	1072			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1088	352	1065			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	89	100			
cM capacity (veh/h)	195	643	649			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	72	289	289	289	420	420	232
Volume Left	0	0	0	0	0	0	0
Volume Right	72	0	0	0	0	0	22
cSH	643	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.11	0.17	0.17	0.17	0.25	0.25	0.14
Queue Length 95th (m)	3.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.3	0.0			0.0		
Approach LOS	B						

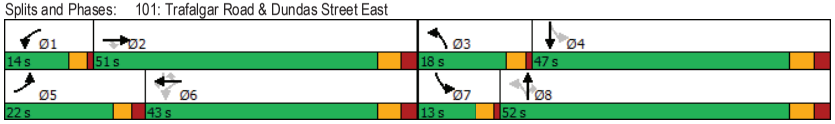
Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	29.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	1896	240	208	880	15	193	542	141	170	700	162
Future Volume (vph)	241	1896	240	208	880	15	193	542	141	170	700	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	1.00		0.99			0.98	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)	3273	4183	1538	1752	4471	1482	1703	4427	1509	1770	4427	1538
Flt Permitted	0.950			0.106			0.184			0.348		
Satd. Flow (perm)	3263	4183	1516	196	4471	1447	330	4427	1509	648	4427	1514
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153			172			153			172
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			197.6	
Travel Time (s)		66.9			55.9			68.7			14.2	
Confl. Peds. (#/hr)	10		2	2		10	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 (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Adj. Flow (vph)	262	2061	261	226	957	16	210	589	153	185	761	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	262	2061	261	226	957	16	210	589	153	185	761	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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5	40.5	11.5	40.5	40.4
Total Split (s)	22.0	51.0	51.0	14.0	43.0	43.0	18.0	52.0	52.0	13.0	47.0	43.0
Total Split (%)	16.9%	39.2%	39.2%	10.8%	33.1%	33.1%	13.8%	40.0%	40.0%	10.0%	36.2%	33.1%
Maximum Green (s)	17.0	44.6	44.6	10.0	36.6	36.6	14.0	45.5	45.5	9.0	40.5	36.6
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8	2.8	1.0	2.8	2.7
Lost Time Adjust (s)	-1.0	-2.4	-2.4	-1.0	-2.4	-2.4	0.0	-2.5	0.0	0.0	-2.5	-2.4
Total Lost Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	6.5	4.0	4.0	4.0
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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	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)	18.0	47.0	47.0	51.0	39.0	39.0	61.0	48.0	45.5	52.0	43.0	39.0
Actuated g/C Ratio	0.14	0.36	0.36	0.39	0.30	0.30	0.47	0.37	0.35	0.40	0.33	0.30
v/c Ratio	0.58	1.36	0.40	1.09	0.71	0.03	0.70	0.36	0.24	0.55	0.52	0.31
Control Delay	58.1	201.8	14.3	119.8	44.1	0.1	34.1	30.6	5.3	28.8	36.7	6.7
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	58.1	201.8	14.3	119.8	44.1	0.1	34.1	30.6	5.3	28.8	36.7	6.7
LOS	E	F	B	F	D	A	C	C	A	C	D	A
Approach Delay		168.3			57.8			27.3			30.7	
Approach LOS		F			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 145			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.36			
Intersection Signal Delay: 96.4		Intersection LOS: F	
Intersection Capacity Utilization 100.5%		ICU Level of Service G	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	262	2061	261	226	957	16	210	589	153	185	761	176
v/c Ratio	0.58	1.36	0.40	1.09	0.71	0.03	0.70	0.36	0.24	0.55	0.52	0.31
Control Delay	58.1	201.8	14.3	119.8	44.1	0.1	34.1	30.6	5.3	28.8	36.7	6.7
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	58.1	201.8	14.3	119.8	44.1	0.1	34.1	30.6	5.3	28.8	36.7	6.7
Queue Length 50th (m)	34.5	~304.5	19.9	~50.9	95.8	0.0	33.6	47.7	0.0	28.9	68.9	0.8
Queue Length 95th (m)	49.4	#339.1	44.1	#104.4	115.3	0.0	51.5	60.4	14.9	45.2	84.7	18.1
Internal Link Dist (m)		905.2			753.0			930.2			173.6	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0			50.0		50.0
Base Capacity (vph)	453	1512	645	208	1341	554	302	1634	627	336	1464	574
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	0.58	1.36	0.40	1.09	0.71	0.03	0.70	0.36	0.24	0.55	0.52	0.31

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	1896	240	208	880	15	193	542	141	170	700	162
Future Volume (vph)	241	1896	240	208	880	15	193	542	141	170	700	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	6.5	4.0	4.0	4.0
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	4183	1516	1752	4471	1447	1703	4427	1509	1770	4427	1514
Flt Permitted	0.95	1.00	1.00	0.11	1.00	1.00	0.18	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	3273	4183	1516	196	4471	1447	329	4427	1509	648	4427	1514
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)	262	2061	261	226	957	16	210	589	153	185	761	176
RTOR Reduction (vph)	0	0	98	0	0	11	0	0	99	0	0	120
Lane Group Flow (vph)	262	2061	163	226	957	5	210	589	54	185	761	56
Confl. Peds. (#/hr)	10		2	2		10	3					3
Heavy Vehicles (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Actuated Green, G (s)	17.0	44.6	44.6	46.6	36.6	36.6	58.5	45.5	45.5	49.5	40.5	36.6
Effective Green, g (s)	18.0	47.0	47.0	48.6	39.0	39.0	58.5	48.0	45.5	49.5	43.0	39.0
Actuated g/C Ratio	0.14	0.36	0.36	0.37	0.30	0.30	0.45	0.37	0.35	0.38	0.33	0.30
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Lane Grp Cap (vph)	453	1512	548	204	1341	434	296	1634	528	324	1464	454
v/s Ratio Prot	0.08	c0.49		c0.09	0.21		c0.08	0.13		0.04	0.17	
v/s Ratio Perm			0.11	0.32		0.00	c0.24		0.04	0.18		0.04
v/c Ratio	0.58	1.36	0.30	1.11	0.71	0.01	0.71	0.36	0.10	0.57	0.52	0.12
Uniform Delay, d1	52.4	41.5	29.7	34.7	40.5	32.0	24.5	29.8	28.5	28.1	35.2	33.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	167.7	1.4	94.9	3.3	0.0	13.5	0.6	0.4	7.1	1.3	0.6
Delay (s)	57.7	209.2	31.1	129.6	43.8	32.0	38.0	30.5	28.9	35.2	36.5	33.6
Level of Service	E	F	C	F	D	C	D	C	C	D	D	C
Approach Delay (s)		175.9			59.8			31.9			35.8	
Approach LOS		F			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	101.9	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	100.5%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	9	156	25	1	69	30	746	22	39	805	9
Future Volume (vph)	59	9	156	25	1	69	30	746	22	39	805	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	*0.80
Frt		0.858			0.852				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	2557	0	1770	2539	0	1770	4471	1267	1770	4471	1267
Flt Permitted	0.695			0.513			0.271			0.295		
Satd. Flow (perm)	1295	2557	0	956	2539	0	505	4471	1267	550	4471	1267
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		160			185				24			23
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		170.8			127.3			211.8			452.6	
Travel Time (s)		12.3			9.2			15.2			32.6	
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
Adj. Flow (vph)	64	10	170	27	1	75	33	811	24	42	875	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	180	0	27	76	0	33	811	24	42	875	10
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	34.4	34.4		34.4	34.4		41.6	41.6	41.6	41.6	41.6	41.6
Total Split (s)	44.0	44.0		44.0	44.0		76.0	76.0	76.0	76.0	76.0	76.0
Total Split (%)	36.7%	36.7%		36.7%	36.7%		63.3%	63.3%	63.3%	63.3%	63.3%	63.3%
Maximum Green (s)	38.5	38.5		38.5	38.5		69.4	69.4	69.4	69.4	69.4	69.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.2	2.2		2.2	2.2		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.4	-2.4		-2.4	-2.4		-2.5	-2.5	-2.5	-2.5	-2.5	-2.5
Total Lost Time (s)	3.1	3.1		3.1	3.1		4.1	4.1	4.1	4.1	4.1	4.1
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
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)	21.0	21.0		21.0	21.0		28.0	28.0	28.0	28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	13.5	13.5		13.5	13.5		73.8	73.8	73.8	73.8	73.8	73.8
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.78	0.78	0.78	0.78	0.78	0.78
v/c Ratio	0.35	0.36		0.20	0.15		0.08	0.23	0.02	0.10	0.25	0.01
Control Delay	41.2	10.0		38.4	0.6		3.3	3.1	1.2	3.4	3.1	0.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.2	10.0		38.4	0.6		3.3	3.1	1.2	3.4	3.1	0.6
LOS	D	B		D	A		A	A	A	A	A	A
Approach Delay		18.2			10.5			3.0			3.1	
Approach LOS		B			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 94.5			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.36			
Intersection Signal Delay: 5.1		Intersection LOS: A	
Intersection Capacity Utilization 59.2%		ICU Level of Service B	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 102: Trafalgar Road & Wheat Boom Drive

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	64	180	27	76	33	811	24	42	875	10
v/c Ratio	0.35	0.36	0.20	0.15	0.08	0.23	0.02	0.10	0.25	0.01
Control Delay	41.2	10.0	38.4	0.6	3.3	3.1	1.2	3.4	3.1	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.2	10.0	38.4	0.6	3.3	3.1	1.2	3.4	3.1	0.6
Queue Length 50th (m)	11.0	2.0	4.5	0.0	1.1	12.5	0.0	1.4	13.7	0.0
Queue Length 95th (m)	23.7	13.2	12.5	0.0	3.9	20.7	2.1	4.6	22.6	0.7
Internal Link Dist (m)		146.8		103.3		187.8			428.6	
Turn Bay Length (m)	50.0		50.0		50.0		50.0	50.0		50.0
Base Capacity (vph)	560	1198	414	1205	394	3490	994	429	3490	994
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	0.11	0.15	0.07	0.06	0.08	0.23	0.02	0.10	0.25	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	9	156	25	1	69	30	746	22	39	805	9
Future Volume (vph)	59	9	156	25	1	69	30	746	22	39	805	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		3.1	3.1		4.1	4.1	4.1	4.1	4.1	4.1
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	*0.80	*0.80	1.00	*0.80	*0.80
Frt	1.00	0.86		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	2558		1770	2539		1770	4471	1267	1770	4471	1267
Flt Permitted	0.70	1.00		0.51	1.00		0.27	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	1295	2558		955	2539		505	4471	1267	549	4471	1267
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)	64	10	170	27	1	75	33	811	24	42	875	10
RTOR Reduction (vph)	0	137	0	0	65	0	0	0	5	0	0	2
Lane Group Flow (vph)	64	43	0	27	11	0	33	811	19	42	875	8
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	11.1	11.1		11.1	11.1		71.3	71.3	71.3	71.3	71.3	71.3
Effective Green, g (s)	13.5	13.5		13.5	13.5		73.8	73.8	73.8	73.8	73.8	73.8
Actuated g/C Ratio	0.14	0.14		0.14	0.14		0.78	0.78	0.78	0.78	0.78	0.78
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	185	365		136	362		394	3491	989	428	3491	989
v/s Ratio Prot		0.02			0.00			0.18			c0.20	
v/s Ratio Perm	c0.05			0.03			0.07		0.01	0.08		0.01
v/c Ratio	0.35	0.12		0.20	0.03		0.08	0.23	0.02	0.10	0.25	0.01
Uniform Delay, d1	36.5	35.3		35.7	34.9		2.4	2.8	2.3	2.5	2.8	2.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.1		0.7	0.0		0.4	0.2	0.0	0.5	0.2	0.0
Delay (s)	37.6	35.5		36.4	34.9		2.8	2.9	2.3	2.9	3.0	2.3
Level of Service	D	D		D	C		A	A	A	A	A	A
Approach Delay (s)		36.0			35.3			2.9			3.0	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.27			
Actuated Cycle Length (s)	94.5	Sum of lost time (s)	7.2	
Intersection Capacity Utilization	59.2%	ICU Level of Service	B	
Analysis Period (min)	15			

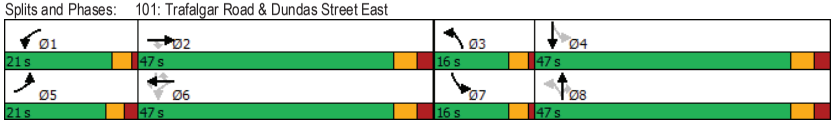
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	307	1670	252	254	1369	43	308	621	284	165	563	302
Future Volume (vph)	307	1670	252	254	1369	43	308	621	284	165	563	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	1.00		0.99			0.97	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)	3433	4515	1583	1787	4385	1615	1770	4515	1615	1805	4515	1599
Flt Permitted	0.950			0.099			0.297			0.260		
Satd. Flow (perm)	3425	4515	1563	186	4385	1566	553	4515	1594	494	4515	1578
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168			104			307			328
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			197.0	
Travel Time (s)		66.9			55.9			68.7			14.2	
Confl. Peds. (#/hr)	16		1	1		16	1		1	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 (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Adj. Flow (vph)	334	1815	274	276	1488	47	335	675	309	179	612	328
Shared Lane Traffic (%)												
Lane Group Flow (vph)	334	1815	274	276	1488	47	335	675	309	179	612	328
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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5	40.5	11.5	40.5	40.4
Total Split (s)	21.0	47.0	47.0	21.0	47.0	47.0	16.0	47.0	47.0	16.0	47.0	47.0
Total Split (%)	16.0%	35.9%	35.9%	16.0%	35.9%	35.9%	12.2%	35.9%	35.9%	12.2%	35.9%	35.9%
Maximum Green (s)	16.0	40.6	40.6	17.0	40.6	40.6	12.0	40.5	40.5	12.0	40.5	40.6
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8	2.8	1.0	2.8	2.7
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)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	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)	16.0	40.6	40.6	60.0	40.6	40.6	55.0	40.5	40.5	55.0	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.46	0.31	0.31	0.42	0.31	0.31	0.42	0.31	0.31
v/c Ratio	0.80	1.30	0.46	0.95	1.09	0.08	0.98	0.48	0.44	0.55	0.44	0.46
Control Delay	70.7	176.6	16.3	75.6	97.0	0.3	73.3	38.2	5.8	28.9	37.4	5.7
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	70.7	176.6	16.3	75.6	97.0	0.3	73.3	38.2	5.8	28.9	37.4	5.7
LOS	E	F	B	E	F	A	E	D	A	C	D	A
Approach Delay		143.9			91.3			39.5			26.7	
Approach LOS		F			F			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 131			
Actuated Cycle Length: 131			
Natural Cycle: 145			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.30			
Intersection Signal Delay: 89.3		Intersection LOS: F	
Intersection Capacity Utilization 109.2%		ICU Level of Service H	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	334	1815	274	276	1488	47	335	675	309	179	612	328
v/c Ratio	0.80	1.30	0.46	0.95	1.09	0.08	0.98	0.48	0.44	0.55	0.44	0.46
Control Delay	70.7	176.6	16.3	75.6	97.0	0.3	73.3	38.2	5.8	28.9	37.4	5.7
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	70.7	176.6	16.3	75.6	97.0	0.3	73.3	38.2	5.8	28.9	37.4	5.7
Queue Length 50th (m)	46.1	~262.4	21.5	57.3	~190.2	0.0	60.6	62.1	0.4	29.1	55.3	0.0
Queue Length 95th (m)	#67.9	#297.5	48.1	#113.2	#225.7	0.0	#122.8	77.1	21.9	45.6	69.5	22.0
Internal Link Dist (m)		905.2			753.0			930.2			173.0	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0			50.0		50.0
Base Capacity (vph)	419	1399	600	292	1359	557	343	1395	704	327	1395	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	0.80	1.30	0.46	0.95	1.09	0.08	0.98	0.48	0.44	0.55	0.44	0.46

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	307	1670	252	254	1369	43	308	621	284	165	563	302
Future Volume (vph)	307	1670	252	254	1369	43	308	621	284	165	563	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4515	1563	1787	4385	1566	1769	4515	1594	1805	4515	1578
Flt Permitted	0.95	1.00	1.00	0.10	1.00	1.00	0.30	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	3433	4515	1563	185	4385	1566	554	4515	1594	495	4515	1578
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)	334	1815	274	276	1488	47	335	675	309	179	612	328
RTOR Reduction (vph)	0	0	116	0	0	32	0	0	212	0	0	226
Lane Group Flow (vph)	334	1815	158	276	1488	15	335	675	97	179	612	102
Confl. Peds. (#/hr)	16		1	1		16	1		1	1		1
Heavy Vehicles (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Actuated Green, G (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5	40.5	52.5	40.5	40.6
Effective Green, g (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5	40.5	52.5	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.44	0.31	0.31	0.40	0.31	0.31	0.40	0.31	0.31
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Lane Grp Cap (vph)	419	1399	484	289	1359	485	333	1395	492	318	1395	489
v/s Ratio Prot	0.10	c0.40		c0.12	0.34		c0.09	0.15		0.05	0.14	
v/s Ratio Perm			0.10	0.30		0.01	c0.31		0.06	0.17		0.06
v/c Ratio	0.80	1.30	0.33	0.96	1.09	0.03	1.01	0.48	0.20	0.56	0.44	0.21
Uniform Delay, d1	55.9	45.2	34.7	39.2	45.2	31.5	34.6	36.8	33.3	26.7	36.2	33.3
Progression 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
Incremental Delay, d2	14.6	139.2	1.8	42.6	54.7	0.1	50.8	1.2	0.9	7.0	1.0	1.0
Delay (s)	70.5	184.4	36.5	81.8	99.9	31.6	85.5	38.0	34.2	33.7	37.2	34.3
Level of Service	E	F	D	F	F	C	F	D	C	C	D	C
Approach Delay (s)		152.0			95.3			49.1			35.8	
Approach LOS		F			F			D			D	

Intersection Summary				
HCM 2000 Control Delay	96.8	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.12			
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	21.9	
Intersection Capacity Utilization	109.2%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	4	84	87	9	115	140	993	38	33	881	48
Future Volume (vph)	31	4	84	87	9	115	140	993	38	33	881	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	1.00	1.00	*0.80	*1.00
Frt		0.856			0.861				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	2551	0	1770	2566	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.650			0.681			0.247			0.211		
Satd. Flow (perm)	1211	2551	0	1269	2566	0	460	4471	1583	393	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		164			125				41			52
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			155.0			200.6			464.4	
Travel Time (s)		13.8			11.2			14.4			33.4	
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)	34	4	91	95	10	125	152	1079	41	36	958	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	95	0	95	135	0	152	1079	41	36	958	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	35.5	35.5		35.5	35.5		41.6	41.6	41.6	41.6	41.6	41.6
Total Split (s)	35.5	35.5		35.5	35.5		90.0	90.0	90.0	90.0	90.0	90.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		71.7%	71.7%	71.7%	71.7%	71.7%	71.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		83.4	83.4	83.4	83.4	83.4	83.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.2	2.2		2.2	2.2		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
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
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)	16.0	16.0		16.0	16.0		28.0	28.0	28.0	28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	14.0	14.0		14.0	14.0		85.3	85.3	85.3	85.3	85.3	85.3
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.77	0.77	0.77	0.77	0.77	0.77
v/c Ratio	0.22	0.21		0.60	0.31		0.43	0.32	0.03	0.12	0.28	0.04
Control Delay	46.0	1.1		61.0	11.0		9.8	4.6	1.4	5.2	4.4	1.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	1.1		61.0	11.0		9.8	4.6	1.4	5.2	4.4	1.3
LOS	D	A		E	B		A	A	A	A	A	A
Approach Delay		12.9			31.6			5.1			4.3	
Approach LOS		B			C			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125.5			
Actuated Cycle Length: 111.4			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 7.4		Intersection LOS: A	
Intersection Capacity Utilization 72.7%		ICU Level of Service C	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 102: Trafalgar Road & Wheat Boom Drive

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	34	95	95	135	152	1079	41	36	958	52
v/c Ratio	0.22	0.21	0.60	0.31	0.43	0.32	0.03	0.12	0.28	0.04
Control Delay	46.0	1.1	61.0	11.0	9.8	4.6	1.4	5.2	4.4	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	1.1	61.0	11.0	9.8	4.6	1.4	5.2	4.4	1.3
Queue Length 50th (m)	7.0	0.0	20.4	1.2	9.9	25.7	0.0	1.7	22.0	0.0
Queue Length 95th (m)	16.8	0.3	38.2	12.0	28.7	41.2	2.9	6.0	35.7	3.2
Internal Link Dist (m)		168.1		131.0		176.6			440.4	
Turn Bay Length (m)	50.0		50.0		50.0		50.0	50.0		50.0
Base Capacity (vph)	326	807	342	783	352	3423	1221	300	3423	1224
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	0.10	0.12	0.28	0.17	0.43	0.32	0.03	0.12	0.28	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	4	84	87	9	115	140	993	38	33	881	48
Future Volume (vph)	31	4	84	87	9	115	140	993	38	33	881	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	*0.80	1.00	1.00	*0.80	*1.00
Frt	1.00	0.86		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	2552		1770	2566		1770	4471	1583	1770	4471	1583
Flt Permitted	0.65	1.00		0.68	1.00		0.25	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	1212	2552		1268	2566		461	4471	1583	393	4471	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	34	4	91	95	10	125	152	1079	41	36	958	52
RTOR Reduction (vph)	0	83	0	0	109	0	0	0	10	0	0	12
Lane Group Flow (vph)	34	12	0	95	26	0	152	1079	31	36	958	40
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	14.0	14.0		14.0	14.0		85.3	85.3	85.3	85.3	85.3	85.3
Effective Green, g (s)	14.0	14.0		14.0	14.0		85.3	85.3	85.3	85.3	85.3	85.3
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	152	320		159	322		352	3423	1212	300	3423	1212
v/s Ratio Prot		0.00			0.01			0.24			0.21	
v/s Ratio Perm	0.03			c0.07			c0.33		0.02	0.09		0.03
v/c Ratio	0.22	0.04		0.60	0.08		0.43	0.32	0.03	0.12	0.28	0.03
Uniform Delay, d1	43.8	42.8		46.0	43.0		4.6	4.0	3.1	3.4	3.9	3.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.0		5.9	0.1		3.8	0.2	0.0	0.8	0.2	0.1
Delay (s)	44.6	42.8		52.0	43.1		8.4	4.3	3.2	4.2	4.1	3.2
Level of Service	D	D		D	D		A	A	A	A	A	A
Approach Delay (s)		43.3			46.8			4.7			4.1	
Approach LOS		D			D			A			A	

Intersection Summary						
HCM 2000 Control Delay	9.9	HCM 2000 Level of Service	A			
HCM 2000 Volume to Capacity ratio	0.45					
Actuated Cycle Length (s)	111.4	Sum of lost time (s)	12.1			
Intersection Capacity Utilization	72.7%	ICU Level of Service	C			
Analysis Period (min)	15					

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	38	0	1171	992	60
Future Volume (vph)	0	38	0	1171	992	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	*0.80	*0.80	0.91
Frt		0.865			0.991	
Flt Protected						
Satd. Flow (prot)	0	1611	0	4471	4430	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4471	4430	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	113.2			197.0	200.6	
Travel Time (s)	8.2			14.2	14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	41	0	1273	1078	65
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	41	0	1273	1143	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	30.5%	ICU Level of Service	A
Analysis Period (min)	15		
* User Entered Value			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	38	0	1171	992	60
Future Volume (Veh/h)	0	38	0	1171	992	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	41	0	1273	1078	65
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				197	201	
pX, platoon unblocked	0.91	0.97	0.97			
vC, conflicting volume	1535	392	1143			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1019	256	1032			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	100			
cM capacity (veh/h)	213	720	648			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	41	424	424	424	431	431	281
Volume Left	0	0	0	0	0	0	0
Volume Right	41	0	0	0	0	0	65
cSH	720	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.25	0.25	0.25	0.25	0.25	0.17
Queue Length 95th (m)	1.4	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	10.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.3	0.0			0.0		
Approach LOS	B						

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		30.5%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	222	0	798	966	75
Future Volume (vph)	0	222	0	798	966	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	*0.80	*0.80	0.91
Frt		0.865			0.989	
Flt Protected						
Satd. Flow (prot)	0	1611	0	4471	4421	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4471	4421	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	88.9			197.6	211.8	
Travel Time (s)	6.4			14.2	15.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	241	0	867	1050	82
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	241	0	867	1132	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		
* User Entered Value			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	222	0	798	966	75
Future Volume (Veh/h)	0	222	0	798	966	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	241	0	867	1050	82
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				198	212	
pX, platoon unblocked	0.93	0.99	0.99			
vC, conflicting volume	1380	391	1132			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1079	351	1099			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	62	100			
cM capacity (veh/h)	198	639	625			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	241	289	289	289	420	420	292
Volume Left	0	0	0	0	0	0	0
Volume Right	241	0	0	0	0	0	82
cSH	639	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.38	0.17	0.17	0.17	0.25	0.25	0.17
Queue Length 95th (m)	14.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	14.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	14.0	0.0			0.0		
Approach LOS	B						

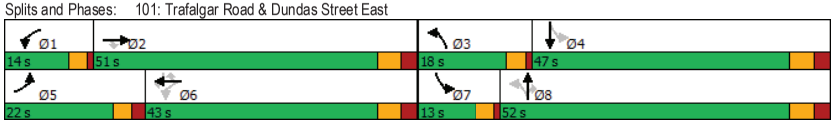
Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	40.7%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	1896	240	208	880	15	193	542	149	228	732	228
Future Volume (vph)	241	1896	240	208	880	15	193	542	149	228	732	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	1.00		0.99			0.98	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)	3273	4183	1538	1752	4471	1482	1703	4427	1509	1770	4427	1538
Flt Permitted	0.950			0.106			0.169			0.348		
Satd. Flow (perm)	3263	4183	1516	196	4471	1447	303	4427	1509	648	4427	1514
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153			172			162			214
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			197.6	
Travel Time (s)		66.9			55.9			68.7			14.2	
Confl. Peds. (#/hr)	10		2	2		10	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 (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Adj. Flow (vph)	262	2061	261	226	957	16	210	589	162	248	796	248
Shared Lane Traffic (%)												
Lane Group Flow (vph)	262	2061	261	226	957	16	210	589	162	248	796	248
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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5	40.5	11.5	40.5	40.4
Total Split (s)	22.0	51.0	51.0	14.0	43.0	43.0	18.0	52.0	52.0	13.0	47.0	43.0
Total Split (%)	16.9%	39.2%	39.2%	10.8%	33.1%	33.1%	13.8%	40.0%	40.0%	10.0%	36.2%	33.1%
Maximum Green (s)	17.0	44.6	44.6	10.0	36.6	36.6	14.0	45.5	45.5	9.0	40.5	36.6
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8	2.8	1.0	2.8	2.7
Lost Time Adjust (s)	-1.0	-2.4	-2.4	-1.0	-2.4	-2.4	0.0	-2.5	0.0	0.0	-2.5	-2.4
Total Lost Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	6.5	4.0	4.0	4.0
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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	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)	18.0	47.0	47.0	51.0	39.0	39.0	61.0	48.0	45.5	52.0	43.0	39.0
Actuated g/C Ratio	0.14	0.36	0.36	0.39	0.30	0.30	0.47	0.37	0.35	0.40	0.33	0.30
v/c Ratio	0.58	1.36	0.40	1.09	0.71	0.03	0.72	0.36	0.26	0.74	0.54	0.41
Control Delay	58.1	201.8	14.3	119.8	44.1	0.1	36.0	30.6	5.3	39.6	37.2	9.1
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	58.1	201.8	14.3	119.8	44.1	0.1	36.0	30.6	5.3	39.6	37.2	9.1
LOS	E	F	B	F	D	A	D	C	A	D	D	A
Approach Delay		168.3			57.8			27.5			32.3	
Approach LOS		F			E			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 135			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.36			
Intersection Signal Delay: 94.8		Intersection LOS: F	
Intersection Capacity Utilization 100.5%		ICU Level of Service G	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Queues
101: Trafalgar Road & Dundas Street East

Total (2034)
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	262	2061	261	226	957	16	210	589	162	248	796	248
v/c Ratio	0.58	1.36	0.40	1.09	0.71	0.03	0.72	0.36	0.26	0.74	0.54	0.41
Control Delay	58.1	201.8	14.3	119.8	44.1	0.1	36.0	30.6	5.3	39.6	37.2	9.1
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	58.1	201.8	14.3	119.8	44.1	0.1	36.0	30.6	5.3	39.6	37.2	9.1
Queue Length 50th (m)	34.5	~304.5	19.9	~50.9	95.8	0.0	33.6	47.7	0.0	40.4	72.7	6.6
Queue Length 95th (m)	49.4	#339.1	44.1	#104.4	115.3	0.0	#55.5	60.4	15.3	#63.2	89.0	28.7
Internal Link Dist (m)		905.2			753.0			930.2			173.6	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0			50.0		50.0
Base Capacity (vph)	453	1512	645	208	1341	554	292	1634	633	336	1464	604
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	0.58	1.36	0.40	1.09	0.71	0.03	0.72	0.36	0.26	0.74	0.54	0.41

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
101: Trafalgar Road & Dundas Street East

Total (2034)
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	241	1896	240	208	880	15	193	542	149	228	732	228
Future Volume (vph)	241	1896	240	208	880	15	193	542	149	228	732	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	6.5	4.0	4.0	4.0
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	4183	1516	1752	4471	1447	1703	4427	1509	1770	4427	1514
Flt Permitted	0.95	1.00	1.00	0.11	1.00	1.00	0.17	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	3273	4183	1516	196	4471	1447	303	4427	1509	648	4427	1514
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)	262	2061	261	226	957	16	210	589	162	248	796	248
RTOR Reduction (vph)	0	0	98	0	0	11	0	0	105	0	0	150
Lane Group Flow (vph)	262	2061	163	226	957	5	210	589	57	248	796	98
Confl. Peds. (#/hr)	10		2	2		10	3					3
Heavy Vehicles (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Actuated Green, G (s)	17.0	44.6	44.6	46.6	36.6	36.6	58.5	45.5	45.5	49.5	40.5	36.6
Effective Green, g (s)	18.0	47.0	47.0	48.6	39.0	39.0	58.5	48.0	45.5	49.5	43.0	39.0
Actuated g/C Ratio	0.14	0.36	0.36	0.37	0.30	0.30	0.45	0.37	0.35	0.38	0.33	0.30
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Lane Grp Cap (vph)	453	1512	548	204	1341	434	287	1634	528	324	1464	454
v/s Ratio Prot	0.08	c0.49		c0.09	0.21		c0.08	0.13		0.05	0.18	
v/s Ratio Perm			0.11	0.32		0.00	c0.25		0.04	0.24		0.06
v/c Ratio	0.58	1.36	0.30	1.11	0.71	0.01	0.73	0.36	0.11	0.77	0.54	0.22
Uniform Delay, d1	52.4	41.5	29.7	34.7	40.5	32.0	24.9	29.8	28.5	31.1	35.5	34.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	167.7	1.4	94.9	3.3	0.0	15.2	0.6	0.4	15.8	1.5	1.1
Delay (s)	57.7	209.2	31.1	129.6	43.8	32.0	40.0	30.5	28.9	46.9	36.9	35.2
Level of Service	E	F	C	F	D	C	D	C	C	D	D	D
Approach Delay (s)		175.9			59.8			32.3			38.5	
Approach LOS		F			E			C			D	

Intersection Summary				
HCM 2000 Control Delay	100.6	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	100.5%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	9	179	44	1	69	30	746	22	39	818	9
Future Volume (vph)	84	9	179	44	1	69	30	746	22	39	818	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	*0.80
Frt		0.857			0.852				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	2554	0	1770	2539	0	1770	4471	1267	1770	4471	1267
Flt Permitted	0.695			0.478			0.265			0.293		
Satd. Flow (perm)	1295	2554	0	890	2539	0	494	4471	1267	546	4471	1267
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		155			185				24			23
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		170.8			127.3			211.8			452.6	
Travel Time (s)		12.3			9.2			15.2			32.6	
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
Adj. Flow (vph)	91	10	195	48	1	75	33	811	24	42	889	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	205	0	48	76	0	33	811	24	42	889	10
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	34.4	34.4		34.4	34.4		41.6	41.6	41.6	41.6	41.6	41.6
Total Split (s)	44.0	44.0		44.0	44.0		76.0	76.0	76.0	76.0	76.0	76.0
Total Split (%)	36.7%	36.7%		36.7%	36.7%		63.3%	63.3%	63.3%	63.3%	63.3%	63.3%
Maximum Green (s)	38.5	38.5		38.5	38.5		69.4	69.4	69.4	69.4	69.4	69.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.2	2.2		2.2	2.2		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.4	-2.4		-2.4	-2.4		-2.5	-2.5	-2.5	-2.5	-2.5	-2.5
Total Lost Time (s)	3.1	3.1		3.1	3.1		4.1	4.1	4.1	4.1	4.1	4.1
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
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)	21.0	21.0		21.0	21.0		28.0	28.0	28.0	28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	14.9	14.9		14.9	14.9		72.8	72.8	72.8	72.8	72.8	72.8
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.77	0.77	0.77	0.77	0.77	0.77
v/c Ratio	0.45	0.39		0.34	0.14		0.09	0.24	0.02	0.10	0.26	0.01
Control Delay	43.2	12.4		42.2	0.5		3.9	3.5	1.5	4.0	3.6	0.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	12.4		42.2	0.5		3.9	3.5	1.5	4.0	3.6	0.7
LOS	D	B		D	A		A	A	A	A	A	A
Approach Delay		21.9			16.7			3.5			3.6	
Approach LOS		C			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 94.9			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.45			
Intersection Signal Delay: 6.7		Intersection LOS: A	
Intersection Capacity Utilization 59.2%		ICU Level of Service B	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 102: Trafalgar Road & Wheat Boom Drive

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	91	205	48	76	33	811	24	42	889	10
v/c Ratio	0.45	0.39	0.34	0.14	0.09	0.24	0.02	0.10	0.26	0.01
Control Delay	43.2	12.4	42.2	0.5	3.9	3.5	1.5	4.0	3.6	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.2	12.4	42.2	0.5	3.9	3.5	1.5	4.0	3.6	0.7
Queue Length 50th (m)	15.9	5.1	8.3	0.0	1.2	14.1	0.0	1.6	15.8	0.0
Queue Length 95th (m)	31.2	17.0	19.3	0.0	4.5	24.2	2.5	5.3	26.9	0.8
Internal Link Dist (m)		146.8		103.3		187.8			428.6	
Turn Bay Length (m)	50.0		50.0		50.0		50.0	50.0		50.0
Base Capacity (vph)	558	1189	383	1200	378	3428	977	418	3428	977
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	0.16	0.17	0.13	0.06	0.09	0.24	0.02	0.10	0.26	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	9	179	44	1	69	30	746	22	39	818	9
Future Volume (vph)	84	9	179	44	1	69	30	746	22	39	818	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		3.1	3.1		4.1	4.1	4.1	4.1	4.1	4.1
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	*0.80	*0.80	1.00	*0.80	*0.80
Frt	1.00	0.86		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	2555		1770	2539		1770	4471	1267	1770	4471	1267
Flt Permitted	0.70	1.00		0.48	1.00		0.27	1.00	1.00	0.29	1.00	1.00
Satd. Flow (perm)	1295	2555		891	2539		494	4471	1267	546	4471	1267
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)	91	10	195	48	1	75	33	811	24	42	889	10
RTOR Reduction (vph)	0	131	0	0	64	0	0	0	6	0	0	2
Lane Group Flow (vph)	91	74	0	48	12	0	33	811	18	42	889	8
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	12.5	12.5		12.5	12.5		70.3	70.3	70.3	70.3	70.3	70.3
Effective Green, g (s)	14.9	14.9		14.9	14.9		72.8	72.8	72.8	72.8	72.8	72.8
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	203	401		139	398		378	3429	971	418	3429	971
v/s Ratio Prot		0.03			0.00			0.18			c0.20	
v/s Ratio Perm	c0.07			0.05			0.07		0.01	0.08		0.01
v/c Ratio	0.45	0.19		0.35	0.03		0.09	0.24	0.02	0.10	0.26	0.01
Uniform Delay, d1	36.3	34.7		35.7	33.9		2.8	3.1	2.6	2.8	3.2	2.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.2		1.5	0.0		0.5	0.2	0.0	0.5	0.2	0.0
Delay (s)	37.8	35.0		37.1	33.9		3.2	3.3	2.6	3.3	3.4	2.6
Level of Service	D	C		D	C		A	A	A	A	A	A
Approach Delay (s)		35.8			35.2			3.3			3.4	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.29			
Actuated Cycle Length (s)	94.9	Sum of lost time (s)	7.2	
Intersection Capacity Utilization	59.2%	ICU Level of Service	B	
Analysis Period (min)	15			

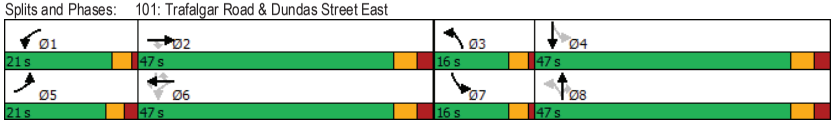
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	307	1670	252	254	1369	43	308	821	312	185	577	363
Future Volume (vph)	307	1670	252	254	1369	43	308	821	312	185	577	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	1.00		0.99			0.97	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)	3433	4515	1583	1787	4385	1615	1770	4515	1615	1805	4515	1599
Flt Permitted	0.950			0.099			0.288			0.156		
Satd. Flow (perm)	3425	4515	1563	186	4385	1566	536	4515	1594	296	4515	1578
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168			104			286			395
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			197.0	
Travel Time (s)		66.9			55.9			68.7			14.2	
Confl. Peds. (#/hr)	16		1	1		16	1		1	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 (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Adj. Flow (vph)	334	1815	274	276	1488	47	335	892	339	201	627	395
Shared Lane Traffic (%)												
Lane Group Flow (vph)	334	1815	274	276	1488	47	335	892	339	201	627	395
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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5	40.5	11.5	40.5	40.4
Total Split (s)	21.0	47.0	47.0	21.0	47.0	47.0	16.0	47.0	47.0	16.0	47.0	47.0
Total Split (%)	16.0%	35.9%	35.9%	16.0%	35.9%	35.9%	12.2%	35.9%	35.9%	12.2%	35.9%	35.9%
Maximum Green (s)	16.0	40.6	40.6	17.0	40.6	40.6	12.0	40.5	40.5	12.0	40.5	40.6
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8	2.8	1.0	2.8	2.7
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)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	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)	16.0	40.6	40.6	60.0	40.6	40.6	55.0	40.5	40.5	55.0	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.46	0.31	0.31	0.42	0.31	0.31	0.42	0.31	0.31
v/c Ratio	0.80	1.30	0.46	0.95	1.09	0.08	0.99	0.64	0.49	0.77	0.45	0.52
Control Delay	70.7	176.6	16.3	75.6	97.0	0.3	77.2	41.5	9.4	43.2	37.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.7	176.6	16.3	75.6	97.0	0.3	77.2	41.5	9.4	43.2	37.6	5.8
LOS	E	F	B	E	F	A	E	D	A	D	D	A
Approach Delay		143.9			91.3			42.2			28.2	
Approach LOS		F			F			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 131			
Actuated Cycle Length: 131			
Natural Cycle: 145			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.30			
Intersection Signal Delay: 87.5		Intersection LOS: F	
Intersection Capacity Utilization 109.2%		ICU Level of Service H	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Queues
101: Trafalgar Road & Dundas Street East

Total (2034)
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	334	1815	274	276	1488	47	335	892	339	201	627	395
v/c Ratio	0.80	1.30	0.46	0.95	1.09	0.08	0.99	0.64	0.49	0.77	0.45	0.52
Control Delay	70.7	176.6	16.3	75.6	97.0	0.3	77.2	41.5	9.4	43.2	37.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.7	176.6	16.3	75.6	97.0	0.3	77.2	41.5	9.4	43.2	37.6	5.8
Queue Length 50th (m)	46.1	~262.4	21.5	57.3	~190.2	0.0	60.6	86.9	10.3	33.2	57.0	0.0
Queue Length 95th (m)	#67.9	#297.5	48.1	#113.2	#225.7	0.0	#124.8	105.0	37.0	#61.7	71.3	23.9
Internal Link Dist (m)		905.2			753.0			930.2			173.0	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0			50.0		50.0
Base Capacity (vph)	419	1399	600	292	1359	557	338	1395	690	262	1395	761
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	0.80	1.30	0.46	0.95	1.09	0.08	0.99	0.64	0.49	0.77	0.45	0.52

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
101: Trafalgar Road & Dundas Street East

Total (2034)
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	307	1670	252	254	1369	43	308	821	312	185	577	363
Future Volume (vph)	307	1670	252	254	1369	43	308	821	312	185	577	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4515	1563	1787	4385	1566	1769	4515	1594	1805	4515	1578
Flt Permitted	0.95	1.00	1.00	0.10	1.00	1.00	0.29	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	3433	4515	1563	185	4385	1566	537	4515	1594	297	4515	1578
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)	334	1815	274	276	1488	47	335	892	339	201	627	395
RTOR Reduction (vph)	0	0	116	0	0	32	0	0	198	0	0	273
Lane Group Flow (vph)	334	1815	158	276	1488	15	335	892	141	201	627	122
Confl. Peds. (#/hr)	16		1	1		16	1		1	1		1
Heavy Vehicles (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Actuated Green, G (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5	40.5	52.5	40.5	40.6
Effective Green, g (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5	40.5	52.5	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.44	0.31	0.31	0.40	0.31	0.31	0.40	0.31	0.31
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Lane Grp Cap (vph)	419	1399	484	289	1359	485	328	1395	492	257	1395	489
v/s Ratio Prot	0.10	c0.40		c0.12	0.34		c0.09	0.20		0.07	0.14	
v/s Ratio Perm			0.10	0.30		0.01	c0.32		0.09	0.24		0.08
v/c Ratio	0.80	1.30	0.33	0.96	1.09	0.03	1.02	0.64	0.29	0.78	0.45	0.25
Uniform Delay, d1	55.9	45.2	34.7	39.2	45.2	31.5	34.5	39.0	34.3	28.3	36.3	33.8
Progression 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
Incremental Delay, d2	14.6	139.2	1.8	42.6	54.7	0.1	55.3	2.3	1.5	20.7	1.0	1.2
Delay (s)	70.5	184.4	36.5	81.8	99.9	31.6	89.8	41.2	35.8	49.0	37.4	35.0
Level of Service	E	F	D	F	F	C	F	D	D	D	D	D
Approach Delay (s)		152.0			95.3			50.4			38.5	
Approach LOS		F			F			D			D	

Intersection Summary				
HCM 2000 Control Delay	95.0	HCM 2000 Level of Service	F	
HCM 2000 Volume to Capacity ratio	1.12			
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	21.9	
Intersection Capacity Utilization	109.2%	ICU Level of Service	H	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	4	121	175	9	115	140	993	38	33	911	48
Future Volume (vph)	56	4	121	175	9	115	140	993	38	33	911	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	1.00	1.00	*0.80	*1.00
Frt		0.854			0.861				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	2545	0	1770	2566	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.650			0.650			0.230			0.203		
Satd. Flow (perm)	1211	2545	0	1211	2566	0	428	4471	1583	378	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		154			125				41			52
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			155.0			200.6			464.4	
Travel Time (s)		13.8			11.2			14.4			33.4	
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)	61	4	132	190	10	125	152	1079	41	36	990	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	136	0	190	135	0	152	1079	41	36	990	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	35.5	35.5		35.5	35.5		41.6	41.6	41.6	41.6	41.6	41.6
Total Split (s)	35.5	35.5		35.5	35.5		90.0	90.0	90.0	90.0	90.0	90.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		71.7%	71.7%	71.7%	71.7%	71.7%	71.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		83.4	83.4	83.4	83.4	83.4	83.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.2	2.2		2.2	2.2		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
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
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)	16.0	16.0		16.0	16.0		28.0	28.0	28.0	28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	22.8	22.8		22.8	22.8		83.6	83.6	83.6	83.6	83.6	83.6
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.71	0.71	0.71	0.71	0.71	0.71
v/c Ratio	0.26	0.22		0.82	0.23		0.50	0.34	0.04	0.14	0.31	0.05
Control Delay	42.9	5.1		72.3	8.9		16.7	7.7	2.2	8.6	7.5	2.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	5.1		72.3	8.9		16.7	7.7	2.2	8.6	7.5	2.0
LOS	D	A		E	A		B	A	A	A	A	A
Approach Delay		16.8			46.0			8.6			7.2	
Approach LOS		B			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125.5			
Actuated Cycle Length: 118.5			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 12.9		Intersection LOS: B	
Intersection Capacity Utilization 74.0%		ICU Level of Service D	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 102: Trafalgar Road & Wheat Boom Drive

Queues
102: Trafalgar Road & Wheat Boom Drive

Total (2034)
PM Peak Hour

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	61	136	190	135	152	1079	41	36	990	52
v/c Ratio	0.26	0.22	0.82	0.23	0.50	0.34	0.04	0.14	0.31	0.05
Control Delay	42.9	5.1	72.3	8.9	16.7	7.7	2.2	8.6	7.5	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.9	5.1	72.3	8.9	16.7	7.7	2.2	8.6	7.5	2.0
Queue Length 50th (m)	12.8	0.0	44.8	1.2	15.6	39.2	0.0	2.6	35.0	0.0
Queue Length 95th (m)	25.8	7.7	72.5	11.3	41.9	56.8	3.8	8.2	51.2	4.3
Internal Link Dist (m)		168.1		131.0		176.6			440.4	
Turn Bay Length (m)	50.0		50.0		50.0		50.0	50.0		50.0
Base Capacity (vph)	307	760	307	744	301	3153	1128	266	3153	1132
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	0.20	0.18	0.62	0.18	0.50	0.34	0.04	0.14	0.31	0.05

Intersection Summary

HCM Signalized Intersection Capacity Analysis
102: Trafalgar Road & Wheat Boom Drive

Total (2034)
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	4	121	175	9	115	140	993	38	33	911	48
Future Volume (vph)	56	4	121	175	9	115	140	993	38	33	911	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	*0.80	1.00	1.00	*0.80	*1.00
Frt	1.00	0.85		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	2546		1770	2566		1770	4471	1583	1770	4471	1583
Flt Permitted	0.65	1.00		0.65	1.00		0.23	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	1212	2546		1210	2566		428	4471	1583	379	4471	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	4	132	190	10	125	152	1079	41	36	990	52
RTOR Reduction (vph)	0	110	0	0	101	0	0	0	12	0	0	15
Lane Group Flow (vph)	61	26	0	190	34	0	152	1079	29	36	990	37
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	22.8	22.8		22.8	22.8		83.6	83.6	83.6	83.6	83.6	83.6
Effective Green, g (s)	22.8	22.8		22.8	22.8		83.6	83.6	83.6	83.6	83.6	83.6
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.71	0.71	0.71	0.71	0.71	0.71
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	233	489		232	493		301	3154	1116	267	3154	1116
v/s Ratio Prot		0.01			0.01			0.24			0.22	
v/s Ratio Perm	0.05			c0.16			c0.36		0.02	0.10		0.02
v/c Ratio	0.26	0.05		0.82	0.07		0.50	0.34	0.03	0.13	0.31	0.03
Uniform Delay, d1	40.7	39.0		45.9	39.2		8.0	6.8	5.2	5.7	6.6	5.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.0		19.7	0.1		5.9	0.3	0.0	1.0	0.3	0.1
Delay (s)	41.3	39.1		65.5	39.2		13.9	7.1	5.3	6.7	6.9	5.3
Level of Service	D	D		E	D		B	A	A	A	A	A
Approach Delay (s)		39.8			54.6			7.8			6.8	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	118.5	Sum of lost time (s)	12.1	
Intersection Capacity Utilization	74.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	133	0	1171	992	215
Future Volume (vph)	0	133	0	1171	992	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	*0.80	*0.80	0.91
Frt		0.865			0.973	
Flt Protected						
Satd. Flow (prot)	0	1611	0	4471	4350	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4471	4350	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	113.2			197.0	200.6	
Travel Time (s)	8.2			14.2	14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	145	0	1273	1078	234
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	145	0	1273	1312	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
* User Entered Value			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	133	0	1171	992	215
Future Volume (Veh/h)	0	133	0	1171	992	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	145	0	1273	1078	234
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				197	201	
pX, platoon unblocked	0.88	0.94	0.94			
vC, conflicting volume	1619	476	1312			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	761	223	1112			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	80	100			
cM capacity (veh/h)	300	734	587			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	145	424	424	424	431	431	450
Volume Left	0	0	0	0	0	0	0
Volume Right	145	0	0	0	0	0	234
cSH	734	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.25	0.25	0.25	0.25	0.25	0.26
Queue Length 95th (m)	5.9	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.1	0.0			0.0		
Approach LOS	B						

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		38.9%	ICU Level of Service	A
Analysis Period (min)		15		

Appendix F1

Alternative Forecasts/Operations

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	222	0	644	766	75
Future Volume (vph)	0	222	0	644	766	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	*0.80	*0.80	0.91
Frt		0.865			0.987	
Flt Protected						
Satd. Flow (prot)	0	1611	0	4471	4412	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4471	4412	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	88.9			197.6	211.8	
Travel Time (s)	6.4			14.2	15.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	241	0	700	833	82
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	241	0	700	915	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		
* User Entered Value			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	222	0	644	766	75
Future Volume (Veh/h)	0	222	0	644	766	75
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	241	0	700	833	82
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				198	212	
pX, platoon unblocked	0.94					
vC, conflicting volume	1107	319	915			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	885	319	915			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	64	100			
cM capacity (veh/h)	267	677	741			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	241	233	233	233	333	333	249
Volume Left	0	0	0	0	0	0	0
Volume Right	241	0	0	0	0	0	82
cSH	677	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.36	0.14	0.14	0.14	0.20	0.20	0.15
Queue Length 95th (m)	12.9	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.2	0.0			0.0		
Approach LOS	B						

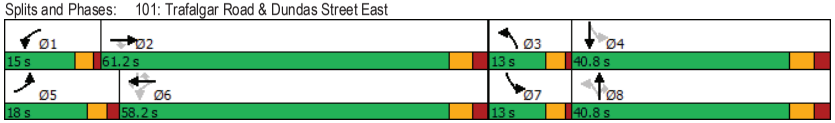
Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	36.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1517	192	166	704	13	154	436	121	203	613	205
Future Volume (vph)	195	1517	192	166	704	13	154	436	121	203	613	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	1.00		0.99			0.98	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)	3273	4183	1538	1752	4471	1482	1703	4427	1509	1770	4427	1538
Flt Permitted	0.950			0.076			0.219			0.345		
Satd. Flow (perm)	3260	4183	1516	140	4471	1447	392	4427	1509	643	4427	1514
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			175			97			132			223
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			197.6	
Travel Time (s)		66.9			55.9			68.7			14.2	
Confl. Peds. (#/hr)	10		2	2		10	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 (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Adj. Flow (vph)	212	1649	209	180	765	14	167	474	132	221	666	223
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	1649	209	180	765	14	167	474	132	221	666	223
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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5	40.5	11.5	40.5	40.4
Total Split (s)	18.0	61.2	61.2	15.0	58.2	58.2	13.0	40.8	40.8	13.0	40.8	58.2
Total Split (%)	13.8%	47.1%	47.1%	11.5%	44.8%	44.8%	10.0%	31.4%	31.4%	10.0%	31.4%	44.8%
Maximum Green (s)	13.0	54.8	54.8	11.0	51.8	51.8	9.0	34.3	34.3	9.0	34.3	51.8
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8	2.8	1.0	2.8	2.7
Lost Time Adjust (s)	-1.0	-2.4	-2.4	-1.0	-2.4	-2.4	0.0	-2.5	0.0	0.0	-2.5	-2.4
Total Lost Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	6.5	4.0	4.0	4.0
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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	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)	14.0	57.2	57.2	67.2	54.2	54.2	45.8	36.8	34.3	45.8	36.8	54.2
Actuated g/C Ratio	0.11	0.44	0.44	0.52	0.42	0.42	0.35	0.28	0.26	0.35	0.28	0.42
v/c Ratio	0.60	0.90	0.27	0.81	0.41	0.02	0.73	0.38	0.27	0.73	0.53	0.29
Control Delay	63.2	41.3	5.9	57.2	27.5	0.1	48.9	38.5	7.5	45.9	41.2	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	41.3	5.9	57.2	27.5	0.1	48.9	38.5	7.5	45.9	41.2	4.0
LOS	E	D	A	E	C	A	D	D	A	D	D	A
Approach Delay		40.0			32.7			35.5			34.6	
Approach LOS		D			C			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 130			
Actuated Cycle Length: 130			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 36.6		Intersection LOS: D	
Intersection Capacity Utilization 88.7%		ICU Level of Service E	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Queues
101: Trafalgar Road & Dundas Street East

Total (2034) Alternative
AM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	212	1649	209	180	765	14	167	474	132	221	666	223
v/c Ratio	0.60	0.90	0.27	0.81	0.41	0.02	0.73	0.38	0.27	0.73	0.53	0.29
Control Delay	63.2	41.3	5.9	57.2	27.5	0.1	48.9	38.5	7.5	45.9	41.2	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	41.3	5.9	57.2	27.5	0.1	48.9	38.5	7.5	45.9	41.2	4.0
Queue Length 50th (m)	28.5	168.3	5.2	30.8	59.6	0.0	30.6	42.8	0.0	41.7	63.2	0.0
Queue Length 95th (m)	42.2	195.7	20.4	#70.3	73.2	0.0	#55.5	55.5	16.0	#66.6	78.8	15.6
Internal Link Dist (m)		905.2			753.0			930.2			173.6	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0			50.0		50.0
Base Capacity (vph)	352	1840	765	221	1864	659	228	1253	495	304	1253	761
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	0.60	0.90	0.27	0.81	0.41	0.02	0.73	0.38	0.27	0.73	0.53	0.29

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
101: Trafalgar Road & Dundas Street East

Total (2034) Alternative
AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	1517	192	166	704	13	154	436	121	203	613	205
Future Volume (vph)	195	1517	192	166	704	13	154	436	121	203	613	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	6.5	4.0	4.0	4.0
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3273	4183	1516	1752	4471	1447	1702	4427	1509	1770	4427	1514
Flt Permitted	0.95	1.00	1.00	0.08	1.00	1.00	0.22	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)	3273	4183	1516	140	4471	1447	393	4427	1509	642	4427	1514
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)	212	1649	209	180	765	14	167	474	132	221	666	223
RTOR Reduction (vph)	0	0	98	0	0	8	0	0	97	0	0	130
Lane Group Flow (vph)	212	1649	111	180	765	6	167	474	35	221	666	93
Confl. Peds. (#/hr)	10		2	2		10	3					3
Heavy Vehicles (%)	7%	9%	5%	3%	2%	9%	6%	3%	7%	2%	3%	5%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Actuated Green, G (s)	13.0	54.8	54.8	62.8	51.8	51.8	43.3	34.3	34.3	43.3	34.3	51.8
Effective Green, g (s)	14.0	57.2	57.2	64.8	54.2	54.2	43.3	36.8	34.3	43.3	36.8	54.2
Actuated g/C Ratio	0.11	0.44	0.44	0.50	0.42	0.42	0.33	0.28	0.26	0.33	0.28	0.42
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Lane Grp Cap (vph)	352	1840	667	218	1864	603	221	1253	398	291	1253	631
v/s Ratio Prot	0.06	c0.39		c0.08	0.17		0.05	0.11		c0.05	0.15	
v/s Ratio Perm			0.07	0.34		0.00	0.20		0.02	c0.20		0.06
v/c Ratio	0.60	0.90	0.17	0.83	0.41	0.01	0.76	0.38	0.09	0.76	0.53	0.15
Uniform Delay, d1	55.3	33.7	22.0	33.3	26.7	22.2	33.5	37.4	36.1	35.7	39.3	23.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	7.3	0.5	28.6	0.7	0.0	21.1	0.9	0.4	16.9	1.6	0.5
Delay (s)	62.8	41.0	22.5	61.9	27.3	22.2	54.6	38.3	36.5	52.6	40.9	24.0
Level of Service	E	D	C	E	C	C	D	D	D	D	D	C
Approach Delay (s)		41.3			33.7			41.5			39.9	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM 2000 Control Delay	39.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	88.7%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	9	179	40	1	55	30	596	18	35	822	9
Future Volume (vph)	84	9	179	40	1	55	30	596	18	35	822	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	*0.80
Frt		0.857			0.852				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	2554	0	1770	2539	0	1770	4471	1267	1770	4471	1267
Flt Permitted	0.707			0.477			0.264			0.360		
Satd. Flow (perm)	1317	2554	0	889	2539	0	492	4471	1267	671	4471	1267
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		153			267				23			23
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		170.8			127.3			211.8			452.6	
Travel Time (s)		12.3			9.2			15.2			32.6	
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
Adj. Flow (vph)	91	10	195	43	1	60	33	648	20	38	893	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	205	0	43	61	0	33	648	20	38	893	10
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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	34.4	34.4		34.4	34.4		41.6	41.6	41.6	41.6	41.6	41.6
Total Split (s)	44.0	44.0		44.0	44.0		76.0	76.0	76.0	76.0	76.0	76.0
Total Split (%)	36.7%	36.7%		36.7%	36.7%		63.3%	63.3%	63.3%	63.3%	63.3%	63.3%
Maximum Green (s)	38.5	38.5		38.5	38.5		69.4	69.4	69.4	69.4	69.4	69.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.2	2.2		2.2	2.2		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.4	-2.4		-2.4	-2.4		-2.5	-2.5	-2.5	-2.5	-2.5	-2.5
Total Lost Time (s)	3.1	3.1		3.1	3.1		4.1	4.1	4.1	4.1	4.1	4.1
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
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)	21.0	21.0		21.0	21.0		28.0	28.0	28.0	28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	14.8	14.8		14.8	14.8		73.0	73.0	73.0	73.0	73.0	73.0
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.77	0.77	0.77	0.77	0.77	0.77
v/c Ratio	0.44	0.39		0.31	0.10		0.09	0.19	0.02	0.07	0.26	0.01
Control Delay	43.0	12.8		41.2	0.3		3.9	3.3	1.3	3.6	3.6	0.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	12.8		41.2	0.3		3.9	3.3	1.3	3.6	3.6	0.7
LOS	D	B		D	A		A	A	A	A	A	A
Approach Delay		22.1			17.2			3.3			3.6	
Approach LOS		C			B			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 95			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.44			
Intersection Signal Delay: 6.9		Intersection LOS: A	
Intersection Capacity Utilization 55.8%		ICU Level of Service B	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 102: Trafalgar Road & Wheat Boom Drive

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	91	205	43	61	33	648	20	38	893	10
v/c Ratio	0.44	0.39	0.31	0.10	0.09	0.19	0.02	0.07	0.26	0.01
Control Delay	43.0	12.8	41.2	0.3	3.9	3.3	1.3	3.6	3.6	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	12.8	41.2	0.3	3.9	3.3	1.3	3.6	3.6	0.7
Queue Length 50th (m)	15.9	5.3	7.4	0.0	1.2	10.7	0.0	1.4	15.8	0.0
Queue Length 95th (m)	31.0	17.2	17.7	0.0	4.4	18.8	2.0	4.7	26.7	0.7
Internal Link Dist (m)		146.8		103.3		187.8			428.6	
Turn Bay Length (m)	50.0		50.0		50.0		50.0	50.0		50.0
Base Capacity (vph)	566	1186	382	1245	377	3434	978	515	3434	978
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	0.16	0.17	0.11	0.05	0.09	0.19	0.02	0.07	0.26	0.01

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	9	179	40	1	55	30	596	18	35	822	9
Future Volume (vph)	84	9	179	40	1	55	30	596	18	35	822	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.1	3.1		3.1	3.1		4.1	4.1	4.1	4.1	4.1	4.1
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	*0.80	*0.80	1.00	*0.80	*0.80
Frt	1.00	0.86		1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	2555		1770	2541		1770	4471	1267	1770	4471	1267
Flt Permitted	0.71	1.00		0.48	1.00		0.26	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	1318	2555		888	2541		491	4471	1267	671	4471	1267
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)	91	10	195	43	1	60	33	648	20	38	893	10
RTOR Reduction (vph)	0	129	0	0	51	0	0	0	5	0	0	2
Lane Group Flow (vph)	91	76	0	43	10	0	33	648	15	38	893	8
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	12.4	12.4		12.4	12.4		70.5	70.5	70.5	70.5	70.5	70.5
Effective Green, g (s)	14.8	14.8		14.8	14.8		73.0	73.0	73.0	73.0	73.0	73.0
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	205	398		138	395		377	3435	973	515	3435	973
v/s Ratio Prot		0.03			0.00			0.14			c0.20	
v/s Ratio Perm	c0.07			0.05			0.07		0.01	0.06		0.01
v/c Ratio	0.44	0.19		0.31	0.02		0.09	0.19	0.02	0.07	0.26	0.01
Uniform Delay, d1	36.4	34.9		35.6	34.0		2.7	3.0	2.6	2.7	3.2	2.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.2		1.3	0.0		0.5	0.1	0.0	0.3	0.2	0.0
Delay (s)	37.9	35.1		36.9	34.0		3.2	3.1	2.6	3.0	3.4	2.6
Level of Service	D	D		D	C		A	A	A	A	A	A
Approach Delay (s)		36.0			35.2			3.1			3.3	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio	0.29			
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	7.2	
Intersection Capacity Utilization	55.8%	ICU Level of Service	B	
Analysis Period (min)	15			

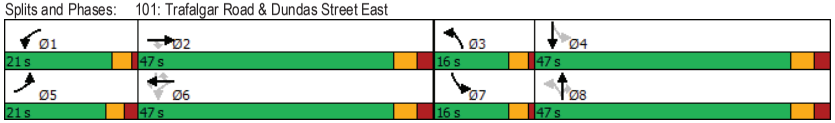
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	255	1336	202	203	1095	40	246	670	257	185	577	363
Future Volume (vph)	255	1336	202	203	1095	40	246	670	257	185	577	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		85.0	160.0		70.0	120.0		0.0	50.0		50.0
Storage Lanes	2		1	1		1	1		1	1		1
Taper Length (m)	75.0			65.0			100.0			75.0		
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Ped Bike Factor	1.00		0.99			0.97	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)	3433	4515	1583	1787	4385	1615	1770	4515	1615	1805	4515	1599
Flt Permitted	0.950			0.099			0.288			0.232		
Satd. Flow (perm)	3421	4515	1563	186	4385	1566	536	4515	1594	441	4515	1578
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168			104			279			395
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		929.2			777.0			954.2			197.0	
Travel Time (s)		66.9			55.9			68.7			14.2	
Confl. Peds. (#/hr)	16		1	1		16	1		1	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 (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Adj. Flow (vph)	277	1452	220	221	1190	43	267	728	279	201	627	395
Shared Lane Traffic (%)												
Lane Group Flow (vph)	277	1452	220	221	1190	43	267	728	279	201	627	395
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)		7.2			7.2			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	6
Switch Phase												
Minimum Initial (s)	7.0	20.0	20.0	7.0	20.0	20.0	7.0	10.0	10.0	7.0	10.0	20.0
Minimum Split (s)	12.0	40.4	40.4	11.5	40.4	40.4	11.5	40.5	40.5	11.5	40.5	40.4
Total Split (s)	21.0	47.0	47.0	21.0	47.0	47.0	16.0	47.0	47.0	16.0	47.0	47.0
Total Split (%)	16.0%	35.9%	35.9%	16.0%	35.9%	35.9%	12.2%	35.9%	35.9%	12.2%	35.9%	35.9%
Maximum Green (s)	16.0	40.6	40.6	17.0	40.6	40.6	12.0	40.5	40.5	12.0	40.5	40.6
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7	3.0	3.7	3.7
All-Red Time (s)	2.0	2.7	2.7	1.0	2.7	2.7	1.0	2.8	2.8	1.0	2.8	2.7
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)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	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)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		27.0	27.0		27.0	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)	16.0	40.6	40.6	60.0	40.6	40.6	55.0	40.5	40.5	55.0	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.46	0.31	0.31	0.42	0.31	0.31	0.42	0.31	0.31
v/c Ratio	0.66	1.04	0.37	0.76	0.88	0.08	0.79	0.52	0.41	0.65	0.45	0.52
Control Delay	63.2	78.5	11.2	47.1	51.2	0.3	43.3	38.9	5.6	33.3	37.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	78.5	11.2	47.1	51.2	0.3	43.3	38.9	5.6	33.3	37.6	5.8
LOS	E	E	B	D	D	A	D	D	A	C	D	A
Approach Delay		68.7			49.1			32.5			26.6	
Approach LOS		E			D			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 131			
Actuated Cycle Length: 131			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 47.3		Intersection LOS: D	
Intersection Capacity Utilization 99.0%		ICU Level of Service F	
Analysis Period (min) 15			
* User Entered Value			

Splits and Phases: 101: Trafalgar Road & Dundas Street East



Queues
101: Trafalgar Road & Dundas Street East

Total (2034) Alternative
PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	277	1452	220	221	1190	43	267	728	279	201	627	395
v/c Ratio	0.66	1.04	0.37	0.76	0.88	0.08	0.79	0.52	0.41	0.65	0.45	0.52
Control Delay	63.2	78.5	11.2	47.1	51.2	0.3	43.3	38.9	5.6	33.3	37.6	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.2	78.5	11.2	47.1	51.2	0.3	43.3	38.9	5.6	33.3	37.6	5.8
Queue Length 50th (m)	37.6	~177.0	10.1	40.3	127.6	0.0	46.1	67.9	0.0	33.2	57.0	0.0
Queue Length 95th (m)	53.1	#212.5	31.2	#77.0	150.4	0.0	#77.7	83.7	20.5	50.9	71.3	23.9
Internal Link Dist (m)		905.2			753.0			930.2			173.0	
Turn Bay Length (m)	85.0		85.0	160.0		70.0	120.0			50.0		50.0
Base Capacity (vph)	419	1399	600	292	1359	557	338	1395	685	310	1395	761
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	1.04	0.37	0.76	0.88	0.08	0.79	0.52	0.41	0.65	0.45	0.52

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
101: Trafalgar Road & Dundas Street East

Total (2034) Alternative
PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	255	1336	202	203	1095	40	246	670	257	185	577	363
Future Volume (vph)	255	1336	202	203	1095	40	246	670	257	185	577	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Lane Util. Factor	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4515	1563	1787	4385	1566	1769	4515	1594	1805	4515	1578
Flt Permitted	0.95	1.00	1.00	0.10	1.00	1.00	0.29	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	3433	4515	1563	185	4385	1566	537	4515	1594	441	4515	1578
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)	277	1452	220	221	1190	43	267	728	279	201	627	395
RTOR Reduction (vph)	0	0	116	0	0	30	0	0	193	0	0	273
Lane Group Flow (vph)	277	1452	104	221	1190	13	267	728	86	201	627	122
Confl. Peds. (#/hr)	16		1	1		16	1		1	1		1
Heavy Vehicles (%)	2%	1%	2%	1%	4%	0%	2%	1%	0%	0%	1%	1%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	custom
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2	6		6	8		8	4		6
Actuated Green, G (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5	40.5	52.5	40.5	40.6
Effective Green, g (s)	16.0	40.6	40.6	57.6	40.6	40.6	52.5	40.5	40.5	52.5	40.5	40.6
Actuated g/C Ratio	0.12	0.31	0.31	0.44	0.31	0.31	0.40	0.31	0.31	0.40	0.31	0.31
Clearance Time (s)	5.0	6.4	6.4	4.0	6.4	6.4	4.0	6.5	6.5	4.0	6.5	6.4
Vehicle Extension (s)	3.5	5.5	5.5	3.5	5.5	5.5	3.5	3.5	3.5	3.5	3.5	5.5
Lane Grp Cap (vph)	419	1399	484	289	1359	485	328	1395	492	301	1395	489
v/s Ratio Prot	0.08	c0.32		c0.10	0.27		c0.07	0.16		0.06	0.14	
v/s Ratio Perm			0.07	0.24		0.01	c0.25		0.05	0.21		0.08
v/c Ratio	0.66	1.04	0.22	0.76	0.88	0.03	0.81	0.52	0.18	0.67	0.45	0.25
Uniform Delay, d1	54.9	45.2	33.4	33.4	42.8	31.5	29.6	37.3	33.1	27.3	36.3	33.8
Progression 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
Incremental Delay, d2	8.0	34.5	1.0	17.4	8.1	0.1	19.5	1.4	0.8	11.2	1.0	1.2
Delay (s)	62.9	79.7	34.4	50.8	51.0	31.6	49.1	38.7	33.8	38.4	37.4	35.0
Level of Service	E	E	C	D	D	C	D	D	C	D	D	D
Approach Delay (s)		72.2			50.4			39.8			36.8	
Approach LOS		E			D			D			D	

Intersection Summary				
HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.90			
Actuated Cycle Length (s)	131.0	Sum of lost time (s)	21.9	
Intersection Capacity Utilization	99.0%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	4	121	164	9	92	140	795	30	33	922	48
Future Volume (vph)	56	4	121	164	9	92	140	795	30	33	922	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	50.0		0.0	50.0		50.0	50.0		50.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	*0.80	1.00	*0.80	*0.80	1.00	*0.80	1.00	1.00	*0.80	*1.00
Frt		0.854			0.864				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	2545	0	1770	2575	0	1770	4471	1583	1770	4471	1583
Flt Permitted	0.669			0.650			0.227			0.273		
Satd. Flow (perm)	1246	2545	0	1211	2575	0	423	4471	1583	509	4471	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		150			100				33			52
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		192.1			155.0			200.6			464.4	
Travel Time (s)		13.8			11.2			14.4			33.4	
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)	61	4	132	178	10	100	152	864	33	36	1002	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	136	0	178	110	0	152	864	33	36	1002	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)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway 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
Turning Speed (k/h)	25		15	25		15	25		15	25		15
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)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
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)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	35.5	35.5		35.5	35.5		41.6	41.6	41.6	41.6	41.6	41.6
Total Split (s)	35.5	35.5		35.5	35.5		90.0	90.0	90.0	90.0	90.0	90.0
Total Split (%)	28.3%	28.3%		28.3%	28.3%		71.7%	71.7%	71.7%	71.7%	71.7%	71.7%
Maximum Green (s)	30.0	30.0		30.0	30.0		83.4	83.4	83.4	83.4	83.4	83.4
Yellow Time (s)	3.3	3.3		3.3	3.3		4.6	4.6	4.6	4.6	4.6	4.6
All-Red Time (s)	2.2	2.2		2.2	2.2		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
Total Lost Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
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)	16.0	16.0		16.0	16.0		28.0	28.0	28.0	28.0	28.0	28.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0	0	0	0	0
Act Effct Green (s)	21.8	21.8		21.8	21.8		83.7	83.7	83.7	83.7	83.7	83.7
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.71	0.71	0.71	0.71	0.71	0.71
v/c Ratio	0.27	0.23		0.79	0.20		0.50	0.27	0.03	0.10	0.32	0.05
Control Delay	43.1	5.6		70.3	10.0		16.5	6.9	2.3	7.5	7.2	2.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	5.6		70.3	10.0		16.5	6.9	2.3	7.5	7.2	2.0
LOS	D	A		E	A		B	A	A	A	A	A
Approach Delay		17.2			47.3			8.1			6.9	
Approach LOS		B			D			A			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 125.5			
Actuated Cycle Length: 117.6			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 12.6		Intersection LOS: B	
Intersection Capacity Utilization 72.1%		ICU Level of Service C	
Analysis Period (min) 15			

* User Entered Value

Splits and Phases: 102: Trafalgar Road & Wheat Boom Drive

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	61	136	178	110	152	864	33	36	1002	52
v/c Ratio	0.27	0.23	0.79	0.20	0.50	0.27	0.03	0.10	0.32	0.05
Control Delay	43.1	5.6	70.3	10.0	16.5	6.9	2.3	7.5	7.2	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	5.6	70.3	10.0	16.5	6.9	2.3	7.5	7.2	2.0
Queue Length 50th (m)	12.8	0.0	41.5	1.2	15.0	28.2	0.0	2.5	34.0	0.0
Queue Length 95th (m)	25.7	8.3	67.8	10.5	42.5	43.7	3.6	7.6	51.9	4.3
Internal Link Dist (m)		168.1		131.0		176.6			440.4	
Turn Bay Length (m)	50.0		50.0		50.0		50.0	50.0		50.0
Base Capacity (vph)	318	762	309	732	301	3180	1135	362	3180	1141
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	0.19	0.18	0.58	0.15	0.50	0.27	0.03	0.10	0.32	0.05

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	4	121	164	9	92	140	795	30	33	922	48
Future Volume (vph)	56	4	121	164	9	92	140	795	30	33	922	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	*0.80	1.00	1.00	*0.80	*1.00
Frt	1.00	0.85		1.00	0.86		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	2546		1770	2574		1770	4471	1583	1770	4471	1583
Flt Permitted	0.67	1.00		0.65	1.00		0.23	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	1246	2546		1210	2574		422	4471	1583	509	4471	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	4	132	178	10	100	152	864	33	36	1002	52
RTOR Reduction (vph)	0	111	0	0	81	0	0	0	10	0	0	15
Lane Group Flow (vph)	61	25	0	178	29	0	152	864	23	36	1002	37
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	21.8	21.8		21.8	21.8		83.7	83.7	83.7	83.7	83.7	83.7
Effective Green, g (s)	21.8	21.8		21.8	21.8		83.7	83.7	83.7	83.7	83.7	83.7
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.71	0.71	0.71	0.71	0.71	0.71
Clearance Time (s)	5.5	5.5		5.5	5.5		6.6	6.6	6.6	6.6	6.6	6.6
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	230	471		224	477		300	3182	1126	362	3182	1126
v/s Ratio Prot		0.01			0.01			0.19			0.22	
v/s Ratio Perm	0.05			c0.15			c0.36		0.01	0.07		0.02
v/c Ratio	0.27	0.05		0.79	0.06		0.51	0.27	0.02	0.10	0.31	0.03
Uniform Delay, d1	41.0	39.4		45.8	39.5		7.6	6.1	5.0	5.3	6.3	5.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.0		17.4	0.1		6.0	0.2	0.0	0.5	0.3	0.1
Delay (s)	41.7	39.5		63.2	39.5		13.6	6.3	5.0	5.8	6.6	5.1
Level of Service	D	D		E	D		B	A	A	A	A	A
Approach Delay (s)		40.1			54.1			7.3			6.5	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM 2000 Control Delay	14.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.57			
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	12.1	
Intersection Capacity Utilization	72.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	133	0	965	992	215
Future Volume (vph)	0	133	0	965	992	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	*0.80	*0.80	0.91
Frt		0.865			0.973	
Flt Protected						
Satd. Flow (prot)	0	1611	0	4471	4350	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	4471	4350	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	113.2			197.0	200.6	
Travel Time (s)	8.2			14.2	14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	145	0	1049	1078	234
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	145	0	1049	1312	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
* User Entered Value			

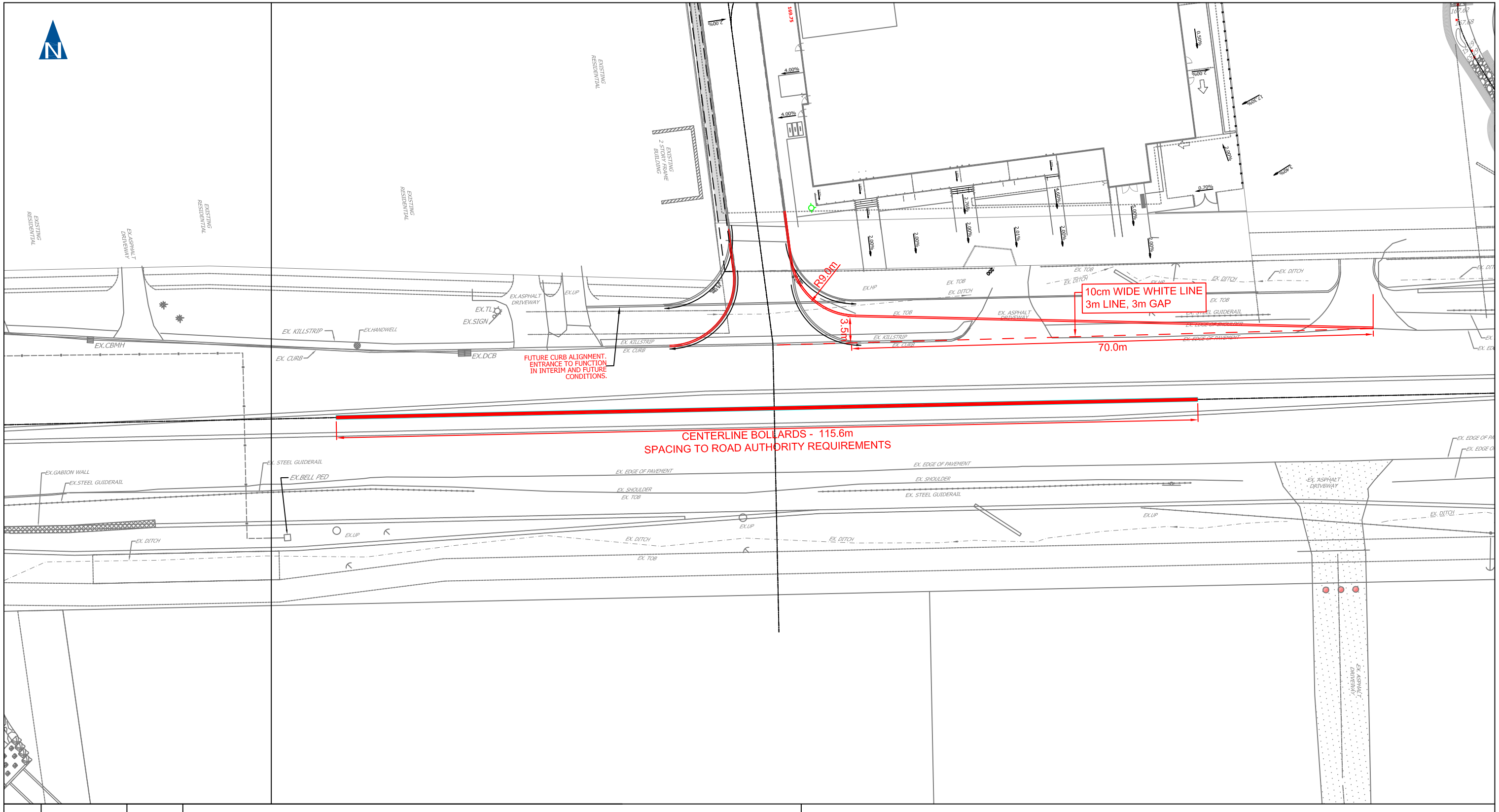
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	133	0	965	992	215
Future Volume (Veh/h)	0	133	0	965	992	215
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	145	0	1049	1078	234
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				197	201	
pX, platoon unblocked	0.92	0.94	0.94			
vC, conflicting volume	1545	476	1312			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	841	227	1114			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	80	100			
cM capacity (veh/h)	278	731	586			

Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	145	350	350	350	431	431	450
Volume Left	0	0	0	0	0	0	0
Volume Right	145	0	0	0	0	0	234
cSH	731	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.20	0.21	0.21	0.21	0.25	0.25	0.26
Queue Length 95th (m)	5.9	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	11.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.1	0.0			0.0		
Approach LOS	B						

Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization		38.9%	ICU Level of Service	A
Analysis Period (min)		15		

Appendix F2

Right Turn Taper Functional Design

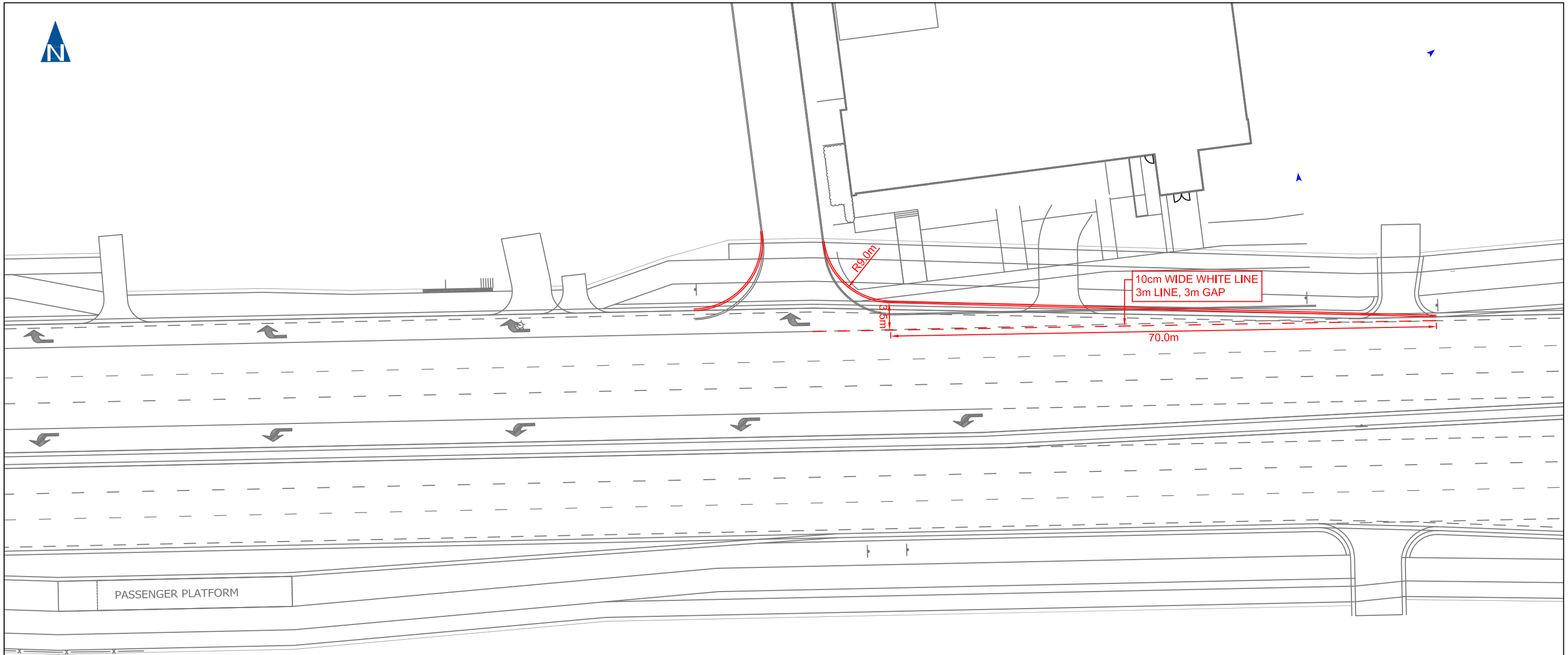


NO.	DATE	INITIAL	REVISION DETAIL

FUNCTIONAL DESIGN
INTERIM CONDITIONS - CENTRELINE BOLLARDS
3064 TRAFALGAR ROAD - RIGHT-TURN TAPER

paradigm TRANSPORTATION SOLUTIONS LIMITED

PROJECT NO.: 220140	DATE: MAY 2023	SCALE: 1:500	DRAWING NO.: 01
DRAWN: SC	DESIGN: SC	CHECK: AMa	



FUNCTIONAL DESIGN
3064 TRAFALGAR ROAD - RIGHT-TURN TAPER

NO.	DATE	INITIAL	REVISION DETAIL

paradigm TRANSPORTATION SOLUTIONS LIMITED	PROJECT NO.: 220140	DATE: APRIL 2023	SCALE: 1:500	DRAWING NO.: 01
	DRAWN: SC	DESIGN: SC	CHECK: AMa	

Appendix G

Observed Parking Demand

33 Whitmer Street - 148 Residential Units										Overall	1.04
										Visitor - Max Observed	0.19
										Resident - Max Observe	0.84
TIME ENDING	Saturday November 4 2017			Tuesday October 31 2017			Wednesday November 1 2017			Average		
	Visitor	Residential	Total	Visitor	Residential	Total	Visitor	Residential	Total	Visitor	Residential	Total
16:15	2	96	98	1	90	91	3	80	83	2	89	91
16:30	2	98	100	2	91	93	3	85	88	2	91	94
16:45	2	100	102	2	95	97	3	83	86	2	93	95
17:00	2	103	105	2	97	99	3	86	89	2	95	98
17:15	2	102	104	2	99	101	3	91	94	2	97	100
17:30	2	105	107	2	99	101	3	93	96	2	99	101
17:45	2	107	109	2	105	107	3	96	99	2	103	105
18:00	4	104	108	5	104	109	6	95	101	5	101	106
18:15	4	105	109	5	111	116	6	103	109	5	106	111
18:30	6	110	116	5	115	120	7	106	113	6	110	116
18:45	7	114	121	5	113	118	7	106	113	6	111	117
19:00	8	117	125	7	116	123	9	110	119	8	114	122
19:15	8	120	128	8	116	124	9	110	119	8	115	124
19:30	8	119	127	9	118	127	10	112	122	9	116	125
19:45	11	117	128	11	122	133	12	116	128	11	118	130
20:00	13	114	127	14	122	136	15	115	130	14	117	131
20:15	18	117	135	15	120	135	18	112	130	17	116	133
20:30	20	120	140	18	118	136	20	111	131	19	116	136
20:45	21	117	138	19	117	136	21	114	135	20	116	136
21:00	23	120	143	20	114	134	23	113	136	22	116	138
21:15	25	121	146	21	118	139	24	118	142	23	119	142
21:30	27	121	148	24	120	144	27	119	146	26	120	146
21:45	29	123	152	24	122	146	28	121	149	27	122	149
22:00	31	127	158	26	125	151	30	124	154	29	125	154

33 Whitmer Street is that are located within the southeast corner of Main Street West and Whitmer Street in Milton, Ontario. This development is made up of a six-storey buildings with a total of 148 residential units varying from 1 bedroom to 2 bedrooms. There is 149 residential parking spaces and 38 visitor parking spaces.

100 Millside Drive - 154 Residential Units										Overall	0.97
										Visitor - Max Observed	0.13
										Resident - Max Observe	0.83
TIME ENDING	Saturday November 4 2017			Tuesday October 31 2017			Wednesday November 1 2017			Average		
	Visitor	Residential	Total	Visitor	Residential	Total	Visitor	Residential	Total	Visitor	Residential	Total
16:15	16	92	108	11	85	96	10	84	94	12	87	99
16:30	15	95	110	14	91	105	10	87	97	13	91	104
16:45	16	96	112	16	91	107	12	90	102	15	92	107
17:00	16	96	112	17	95	112	12	95	107	15	95	110
17:15	18	97	115	18	93	111	13	97	110	16	96	112
17:30	17	100	117	16	93	109	14	95	109	16	96	112
17:45	17	99	116	16	92	108	16	98	114	16	96	113
18:00	20	100	120	16	89	105	21	98	119	19	96	115
18:15	18	102	120	16	90	106	20	97	117	18	96	114
18:30	17	104	121	17	91	108	20	98	118	18	98	116
18:45	16	105	121	17	94	111	18	101	119	17	100	117
19:00	17	109	126	18	94	112	19	101	120	18	101	119
19:15	18	112	130	18	97	115	21	102	123	19	104	123
19:30	21	113	134	18	98	116	18	106	124	19	106	125
19:45	20	113	133	18	103	121	22	106	128	20	107	127
20:00	21	116	137	18	104	122	20	109	129	20	110	129
20:15	21	116	137	19	108	127	19	112	131	20	112	132
20:30	21	118	139	21	112	133	18	114	132	20	115	135
20:45	20	121	141	22	116	138	19	115	134	20	117	138
21:00	22	122	144	21	116	137	18	115	133	20	118	138
21:15	20	121	141	19	117	136	17	120	137	19	119	138
21:30	20	122	142	19	119	138	18	122	140	19	121	140
21:45	21	123	144	19	122	141	17	123	140	19	123	142
22:00	21	123	144	19	125	144	16	122	138	19	123	142

100 Millside Drive is located within the northeast corner of Martin Street and Millside Drive in Milton, Ontario. This development is made up of a sixteen-storey buildings with a total of 154 residential units .

Appendix H

City of Kitchener TDM Checklist

PARTS TDM: City of Kitchener TDM Checklist

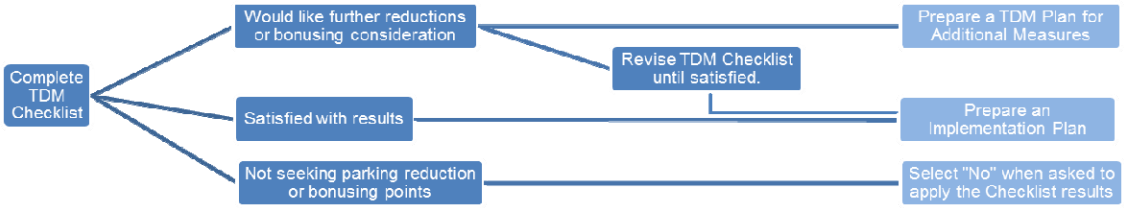
Applicant Name:		**Date of Application (YY-MM-DD):**	Apr-24
Site Location:	3064 TrafalgarRoad, Oakville	**Landowner / Developer Name:**	
Zone:		**TDM Checklist No. (filled by staff):**	

Using the TDM Report Checklist

The TDM Checklist is one component of submitting a TDM Report, and a tool intended for Developers' use when determining potential parking reductions in exchange for certain TDM measures. Derived from the Region of Waterloo's TDM Checklist and Parking Management Worksheet, this City of Kitchener TDM Checklist is required to be completed for all developments within Station Areas with the exception of residential developments with 6 units or less. Currently, this Checklist applies to lands located within the Station Study Areas identified in PARTS Phase 1, and supersedes the Region's Checklist and Parking Management Worksheet for any developments within those defined areas.

TDM Report Reference Guide

A Reference Guide has been prepared for submission of a TDM Report, and can be found appended to the PARTS Phase 2: TDM Strategy.
The general process behind completing a TDM Report is depicted by the diagram below.



* Specific requirements for an Implementation Plan or TDM Plan are included within the Reference Guide.

Instructions to Complete the TDM Checklist

To complete the TDM Checklist, fill out Table A and Table B. Once completed, review the Summary Results in Table C and Table D.

Table A is broken down into two sections. Please complete Table A1 with any applicable parking and bicycle parking requirements from Schedule 6 of the Zoning By-law for your site. Mixed-use developments may also be eligible for shared parking space reductions where the development will use unassigned parking spaces; if in Table A1 you specify parking requirements for multiple land uses, Table A2 will automatically calculate shared parking rates and a percent parking reduction.

Table B indicates optional TDM measures that can included by the developer in exchange for potential parking reductions. Complete Table B for a potential parking reduction.

TABLE A — SHARED PARKING REQUIREMENTS

Mixed-use developments may be eligible for parking space reductions based on shared parking ratios between uses. Please fill out the yellow boxes in the table below based on the Zoning By-Law requirements for parking and bicycle parking for your land use(s). Orange boxes will automatically show your results.

TABLE A1. Zoning By-law Requirements			TABLE A2. Shared Parking Rate Breakdown							
			Morning		Noon		Afternoon		Evening	
Land Use	Parking	Class A Bike Parking	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
Office	0	0	0	0	0	0	0	0	0	0
Medical	0	0	0	0	0	0	0	0	0	0
Real Estate			0	0	0	0	0	0	0	0
Financial Institution	0	0	0	0	0	0	0	0	0	0
Retail	0	0	0	0	0	0	0	0	0	0
Personal Services	0	0								
Art Gallery	0	0								
Museum	0	0								
Repair Establishment	0	0								
Restaurant/Take-out Restaurant	0	0	0	0	0	0	0	0	0	0
Hotel (rooms)	0	0	0	0	0	0	0	0	0	0
Hotel (Function Space)	0	0	0	0	0	0	0	0	0	0
Residential - Resident	840	150	756	756	546	546	756	756	840	840
Residential - Visitor	118	61	24	24	24	24	59	71	118	118
Other	0	0	0	0	0	0	0	0	0	0
Total Required Parking	958	211	780	780	570	570	815	827	958	958
Shared / Unassigned Required Parking	**958**		Parking Reduction (Individual Uses)		**0**	% Reduction Over Unshared Parking (Individual Uses)		**0.0**		
Plaza Complex or Mixed-Office-Residential [T]	0	0	Parking Reduction (Plaza / Mixed [TT])		0	% Reduction Over Unshared Parking (Plaza / Mixed [TT])		#DIV/0!		

[T] Note: See Zoning By-Law S.6 to calculate parking requirement for Plaza / Mixed uses. | [TT] Note: For further potential reductions, apply individual use rates in Table A1.

Shared Parking Summary	Yes or No ?	Resultant Parking Required
Would you like to apply Table A shared rates for a parking reduction?	Yes	958.0 Spaces

Note: to apply these rates, 100% of parking must be shared between uses and unassigned. If you would like to use shared parking rates for only a portion of the required parking spaces, you must provide the proposed shared parking rates and applicable reductions in an Implementation Plan or TDM Plan within the TDM Report.

PARTS TDM: City of Kitchener TDM Checklist

TABLE B	OPTIONAL TDM MEASURES

Certain TDM measures are required by the Zoning By-Law. Exceeding these minimum requirements is optional and can lead to parking reductions based on the discretion of the City of Kitchener. To complete this form, please fill out the yellow boxes in the table below with details about your development proposal. Please refer to the Urban Design Manual for feature design standards.

Measure	Features	Parking Reduction Available	To a Maximum Reduction of		Developer Proposes Provision of		Maximum Reduction Allowable	Bonusing Points (TBD)
			Amount	Unit	Amount	Unit		
B1	Provision of bicycle parking spaces beyond the minimum amount required by the Zoning By-law.	1 car space reduction per 5 bicycle spaces beyond minimum Zoning By-law requirement.	10%	of total parking required	0	Bicycle Spaces beyond minimum required	0	
B2	Non-residential uses: provision of shower and change facilities at an amount of not less than 13m2 in equal proportion of male and female facilities (Note: maximum reduction amount calculated based on required bicycle parking).	2 car space reduction for each additional shower facility provided at (13m2).	0	parking space(s)	1	m2 of shower / change facilities	0	
B3*	Non-residential (office) uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publically accessible for a development with at least 25 required parking spaces, and 1 additional car share vehicle and dedicated parking space for every 50 additional required parking spaces. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	0	parking space(s)	1	Non-residential car share vehicle(s) and Space(s)	0	
	Residential uses: Provision of 1 car share vehicle and dedicated parking space in a priority location that is publically accessible unless it is a private shared vehicle for every 75 dwelling units. (Note: maximum reduction amount calculated based on required parking).	4 car space reduction for each car share vehicle and dedicated parking space provided	48	parking space(s)	1	Residential car share vehicle(s) and Space(s)	4	
B4	Non-residential uses: Provision of ride share parking spaces in a priority location.	3 car space reduction for each ride share space provided	5%	of total parking required	1	Priority Car Pool Spaces	0	
B5	Provision of active uses at-grade along street frontages.	1% car space reduction	1%	of total parking required	☑ Yes	Check "Yes" (left) if you will provide	9	
B6*	The building owner/occupant will provide subsidized transit passes for all occupants for a period of two years.	10% car space reduction	10%	of total parking required	☐ Yes	Check "Yes" (left) if you will provide	0	
B7	Building owner/occupant agrees to charge for parking as a separate cost to occupants.	10% car space reduction	10%	of total parking required	☑ Yes	Check "Yes" (left) if you will provide	95	
B8*	Employment Uses: Building owner/occupant agrees to join Travelwise (TMA) that provides ride matching services for car/vanpooling and emergency ride home options.	10% car space reduction	10%	of total parking required	☐ Yes	Check "Yes" (left) if you will provide	0	
B9	Enhanced bus shelters with seating are provided at the transit stop immediately adjacent to the development in consultation with the City of Kitchener and the Region of Waterloo.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B10	Provide television monitors in visible and accessible locations on site and in adjacent transit stops to allow to City of Kitchener and the Region of Waterloo to display information regarding public transportation.	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☐ Yes	Check "Yes" (left) if you will provide	0	
B11	Provision of bicycle self-service station equipped with tools necessary to perform basic repairs and maintenance	Not Applicable for parking reduction	Can only be applied to bonusing consideration		☑ Yes	Check "Yes" (left) if you will provide	0	
B12	25% to 49% of required parking is located underground or in a structure	Not Applicable for parking reduction	Can only be applied to bonusing consideration Select only one option (right)		☐ Yes	Check "Yes" (left) if you will provide	0	
	50% - 74% of required parking is located underground or in a structure				☐ Yes	Check "Yes" (left) if you will provide	0	
	A minimum of 75% of required parking is located underground or in a structure				☑ Yes	Check "Yes" (left) if you will provide	0	
B13	Non-residential use: Implements paid parking system, where price is set greater than the cost of a monthly transit pass, on all or part of the site (e.g. parking permits, paid parking near main entrances, enabled by gate and transponder access, or Pay & Display stations).	1% car space reduction for every 10% of parking spaces under a paid parking system	10%	of total parking required	0%	% of total parking spaces under paid parking system	0	

* If you have selected Measures B3, B6 or B8 for a parking reduction, you must demonstrate to the satisfaction of the Director of Transportation Services that you will be able to achieve the proposed TDM measure, including any ongoing programming or management that may be required for program success.

TABLE C	POTENTIAL PARKING REDUCTION SUMMARY	
Displayed below are the potential reductions to required parking spaces available based on the amounts entered into Table A and Table B above.		
Original # Parking Spaces Required:	958	0
Shared Parking Reduction [P]:	0	0
Parking Reduction for TDM Measures B1-B12:	108	0
Total Parking Reduction:	108	0
Resultant Parking Requirement:	850	0
PERCENT REDUCTION	11	#DIV/0!

[P] Note: If applicable, Parking Reductions for Plaza / Mixed-Use are noted in brown

TABLE D	BONUSING POINT SCORE SUMMARY *	
If you achieved a Bonusing Points score greater than X, you may be eligible for bonusing. Please contact City of Kitchener staff for more details.		
Total Bonusing Points Achieved	0	
Eligible for Bonusing Consideration?	No	

*Approach to bonusing to be determined by City staff

NEXT STEPS
Thank you for completing the TDM Checklist. Please select whether you would like to apply for a potential parking reduction at the bottom of this page. Refer to the TDM Report Reference Guide for submission requirements to City of Kitchener Staff. If you would like to achieve a greater parking reduction than may be considered through the TDM Checklist, you may develop a TDM Plan as set out in the TDM Report Reference Guide.

Would you like to apply Table C rates for a parking reduction?

If you selected No, please submit your completed Checklist to City staff for review.

Select an Option
Yes

If you selected Yes, please refer to the TDM Report Reference Guide for submission requirements of an Implementation Plan or TDM Plan.