



Trafalgar Road

BRITANNIA ROAD

Traffic Impact Study

White Squadron Draft Plan of Subdivision – MP4 Trafalgar

July 2025 | Project # 10265
 White Squadron INC. a division of Mattamy Homes Canada



EXECUTIVE SUMMARY

Introduction

- ▶ T.Y. Lin International Canada Inc. (TYLin) was retained by Milton P4 Trafalgar Landowners Group Inc. to prepare a Tertiary Plan Road Network Assessment (RNA) for all lands within the Trafalgar Secondary Plan area. Envisioned as a complete community, the Trafalgar Secondary Plan is focused on delivering connected neighbourhoods, parks and open space and a mix of uses and built form with densities that support future higher order transit.
- ▶ In order to realize the vision, the Secondary Plan requires a more detailed Tertiary Plan, the last layer between the policies and implementation by the draft plans of subdivision. The preparation of this Tertiary Plan has been guided by the objectives and detailed policies of the Secondary Plan.
- ▶ The RNA, required by the Town of Milton and Halton Region, was prepared in tandem with, and in support of, the overall Tertiary Plan for the Trafalgar lands within Milton's Phase 4 Lands. The Phase 4 Lands are defined in the Town's 2018 TMP as the next Urban Expansion Area for the year 2021 and beyond.
- ▶ Subsequently, TYLin was retained by White Squadron Inc., a division of Mattamy Homes Canada, to prepare a Traffic Impact Study (TIS) in support of a Draft Plan of Subdivision (DPS) Application for the White Squadron subdivision (herein referred to as the White Squadron lands), located within Trafalgar Secondary Plan (herein referred to as the MP4TC lands) in the Town of Milton.
- ▶ The base of the traffic forecast utilized within this study is sourced within the RNA study for the MP4TC lands, with changes to the densities considered for various land parcels as applicable.

The study intersections have been detailed below:

- ▶ Trafalgar Road and Britannia Road
- ▶ Eighth Line and Britannia Road
- ▶ Street 'A' (Collector P) and Britannia Road
- ▶ Street 'C' (Collector M) and Britannia Road
- ▶ Trafalgar Road and Street 'B' (Collector M)
- ▶ Street 'A' (Collector P) and 'Street 'B' (Collector M)
- ▶ Street 'C' (Collector M) and Street 'B' (Collector M)

- ▶ As per the subdivision draft plan dated May 28, 2025, the development statistics for the White Squadron lands consist of the following:
 - ▶ Single Detached Dwellings – 397 Units
 - ▶ Townhouse Dwellings – 395 Units
 - ▶ Medium Density Residential II Land
 - ▶ Medium Density Mixed Use Land
 - ▶ Neighbourhood Centre Mixed Use II Land
 - ▶ 1 Elementary School
 - ▶ The remaining development areas include parks, village square blocks, stormwater management ponds and Natural Heritage System (NHS) blocks.
- ▶ TYLin completed a review of the proposed subdivision draft plan design for the White Squadron lands based on the requirements on ROW, road bends and horizontal curvature, intersection spacing, intersection angle, daylight triangle / rounding and minimum tangent length at intersections. It is considered that the design of the roadways is deemed acceptable.
- ▶ To justify the substandard intersection spacing between Trafalgar Road at Britannia Road and Collector P at Britannia Road, the RNA study has conducted a sensitivity analysis to compare the full moves operation and Right-in/right-out operation on select intersections. Based on the RNA sensitivity analysis results, it is recommended that full-move intersections remain as proposed in the RNA for Collector P at Britannia Road on Britannia Road while the proposed intersection spacing, between Trafalgar Road at Britannia Road and Street A at Britannia Road, is considered acceptable and to be maintained due to NHS buffered area constraints.
- ▶ TYLin's 2023 TMC data, sourced from the RNA study, was collected after the 2022 Highway 401 widening from Mississauga to Milton. To reflect regional traffic growth, an annual growth rate of 2.65% was applied to traffic volumes on regional roadways. This adjusted dataset forms the 2025 baseline traffic volume analysis for this study.
- ▶ The horizon years of 2031 (build-out year of the White Squadron Lands) and 2041 (ten-year horizon) were adopted to assess the future traffic conditions. The study horizons align with the horizons assessed in the ongoing Trafalgar Tertiary Plan RNA study. The future traffic volume in 2031 horizon will include the White Squadron Lands trips plus the balance of MP4 Phase 1 lands, while the 2041 horizon will further incorporate the balance of MP4 Phase 2 lands.
- ▶ 5 out of total 38 RNA TAZs within the White Squadron lands are identified as the proposed subdivision for trip generation purposes. The resulting trips were then assigned to the collector road and broader transportation network based on each RNA TAZ's location within the Tertiary Plan.

- ▶ A total of 1,039 net auto trips, consisting of 387 inbound and 652 outbound trips, are estimated to be generated by the White Squadron Lands during the weekday AM peak hour. During the weekday PM peak hour, 648 inbound and 477 outbound net auto site trips are estimated, totaling 1,125 trips.
- ▶ The updated White Squadron Lands (TAZs 15, 17–20) trip generation would result in a net difference of -22 and -38 two-way trips in the AM and PM when compared to MP4 RNA Study.
- ▶ Based on the recommendations outlined in the Milton Transportation Master Plan (TMP) and the proposed lane configuration modifications detailed in the RNA for the MP4TC area, phased improvements have been adopted for the study intersections.

2031 Future Lane Configuration Modification and Responsibility

Intersection	Approach	Modification	Responsibility
Existing Intersections			
Trafalgar Road & Britannia Road	Eastbound and Westbound	▶ Auxiliary left turn lane	Region
	Northbound and Southbound	▶ 1 additional through lane (HOV) ▶ Auxiliary right turn lane	
Britannia Road & Eighth Line	Westbound	▶ Auxiliary right turn lane	Region / Town / MP4 Developers
Arterial-to-Collector Intersections			
Britannia Road & Collector P	Eastbound and Westbound	▶ Shared right turn movement ▶ Auxiliary left turn lane	MP4 Developers
	Northbound and Southbound	▶ 1 Shared through/right turn lane ▶ Auxiliary left turn lane	
Britannia Road & Collector M	Eastbound and Westbound	▶ Shared right turn movement ▶ Auxiliary left turn lane	MP4 Developers
	Northbound and Southbound	▶ 1 Shared through/right turn lane ▶ Auxiliary left turn lane	
Trafalgar Road & Collector M	Northbound and Southbound	▶ 1 additional through lane (HOV)	Region
	Northbound	▶ Shared right turn movement	MP4 Developers
	Southbound	▶ Auxiliary left turn lane	
	Westbound	▶ Single lane with shared left/right movements	

Intersection	Approach	Modification	Responsibility
Collector-to-Collector Intersections			
Local Street A / Collector P & Collector M	All directions	▶ Single lane approach (shared all movements)	MP4 Developers
Street L / Collector M	Eastbound	▶ Single lane with shared left/right movements	
	Northbound	▶ 1 Shared through/left turn lane	
	Southbound	▶ 1 Shared through/right turn lane	

2041 Future Lane Configuration Modification and Responsibility

Intersection	Approach	Modification	Responsibility
Existing Intersections			
Trafalgar Road & Britannia Road	Northbound and Southbound	▶ Dual left-turn lanes	Region

Baseline Traffic Conditions

- ▶ All study intersections are generally operating well overall, with acceptable delays and capacity during both the weekday AM and PM peak hours.

2031 Future Background Traffic Conditions

- ▶ The Eighth Line at Britannia Road is expected to operate within reserve capacity during both the AM and PM peak hours. Some individual movements are expected to experience LOS 'E' due to increased delays, though these movements remain within capacity.
- ▶ The intersection of Trafalgar Road at Britannia Road is anticipated to operate with some reserve capacity. Some critical movements are identified as approaching theoretical capacity.

2031 Future Total Traffic Conditions

- ▶ All existing, arterial-to-collector and collector-to-collector intersections are projected to operate within reserve capacity during both AM and PM peak hours, except for the intersection of Trafalgar Road and Britannia Road. Some individual movements experience LOS 'E' or 'F' due to longer delays but remain within capacity. These delays are partly attributed to the 140-second cycle lengths implemented along regional corridors, which increase delays for dedicated turning movements and minor approach vehicles.
- ▶ This performance is typical for major arterial intersections during peak hours, where operations often approach theoretical capacity. Outside peak hours, traffic flow at this intersection is expected to return to manageable levels.

2041 Future Background Traffic Conditions

- ▶ The intersection of Trafalgar Road at Britannia Road is anticipated to operate above theoretical capacity during PM peak hour. Critical movements are identified exceeding capacity. Additionally, movements approaching capacity include the westbound through, northbound through, and southbound left-turn movements.
- ▶ The intersection of Eighth Line and Britannia Road is projected to operate within capacity during the AM peak hour and with reserve capacity during the PM peak hour. Critical movements approaching theoretical capacity include the eastbound left-turn and northbound through/right-turn movements during the PM peak hour.

2041 Future Total Traffic Conditions

- ▶ The existing intersections are anticipated to operate with critical capacity, while the arterial-to-collector and collector-to-collector intersections are projected to operate within reserve capacity during both AM and PM peak hours. Some individual movements are expected to experience LOS 'E' due to increased delays, though these movements remain within capacity.
- ▶ For Trafalgar Road at Britannia Road, consistent with 2041 future background conditions, the intersection is anticipated to operate above theoretical capacity during PM peak hour. Critical movements are identified exceeding capacity, including the eastbound left-turn, northbound left-turn, and southbound through movements. Additionally, movements approaching capacity include the westbound through, northbound through, and southbound left-turn movements.
- ▶ The intersection of Eighth Line and Britannia Road is projected to operate within capacity during the AM peak hour and with reserve capacity during the PM peak hour. Critical movements approaching theoretical capacity include the eastbound left-turn and northbound through/right-turn movements during the PM peak hour.
- ▶ This performance is typical for the intersection of two major arterial roads during peak hours, where operations are expected to approach theoretical capacity. Outside of peak periods, traffic flow at this intersection is anticipated to return to manageable levels.
- ▶ In addition, the operation of some critical movements is primarily attributed to the inability to exclude Trafalgar site traffic from the 2051 JBPE forecasting model growth rates, as requested by the Region. This limitation stems from challenges in aligning trip distribution between the traffic models, resulting in the double counting of some Trafalgar site traffic. Consequently, this has led to an overestimation of traffic volumes for the 2041 future background and future total scenario.
- ▶ The proposed active transportation facilities within the site are designed to support internal connectivity for pedestrians and cyclists, while also linking to the broader active transportation

network identified in the Trafalgar Tertiary Plan.

- ▶ Collector P (24.0m ROW) will include in-boulevard bicycle lanes and sidewalks on both sides, providing direct cycling routes within the site.
 - ▶ Collector M (20.0m ROW) will include a multi-use path on one side and a sidewalk on the other side of the road, facilitating shared use for both pedestrians and cyclists.
 - ▶ Trafalgar Road (western boundary) are each planned to have multi-use paths on both sides, enhancing external connectivity to the surrounding network.
- ▶ The on-street parking plan is subject to refinement at the detailed design stage once residential driveways and all utilities are confirmed.

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1 INTRODUCTION

1.1 Scope and Objective

T.Y. Lin International Canada Inc. (TYLin) was retained by White Squadron Inc., a division of Mattamy Homes Canada, to prepare a Traffic Impact Study (TIS) in support of a Draft Plan of Subdivision (DPS) Application for the White Squadron subdivision (herein referred to as the White Squadron lands), located within Trafalgar Secondary Plan (herein referred to as the MP4TC lands) in the Town of Milton.

This TIS study, along with the other traffic studies in support of the Draft Plan of Subdivision Applications for the other land parcels within the MP4TC, have been completed using the most up-to-date development statistics available for each land parcel at the time of study completion.

This study is prepared to assess the land use plan and associated density proposed by White Squadron Inc. and proceed with the application process for the site. The base of the traffic forecast utilized within this study is sourced within the RNA study for the MP4TC lands, with changes to the densities considered for various land parcels as applicable. All analysis has been detailed within this report, and includes the following review:

- ▶ Review traffic forecast completed as part of the RNA study and update development density for the applicable land parcels to account for the latest development statistics proposed by each individual landowner.
- ▶ Using the updated traffic forecast, derive the 2031 (full build-out) and 2041 (ten-year horizon year) future background traffic volumes at the study intersections in order to assess projected traffic operations without the proposed site traffic in place and derive remedial measures as required.
- ▶ Remove and replace the estimated site traffic volumes assumed in the Trafalgar RNA as per updated subdivision statistics. As such, the estimated site generated traffic will be built upon the forecasted traffic volumes provided by the Trafalgar RNA study, which in turn will become our future traffic base model.
- ▶ Create a future conditions traffic operations model to assess the traffic impacts of the proposed development after introducing the estimated site generated traffic into the future background traffic model. Report any operational deficiencies and recommend mitigating measures, if necessary, to improve traffic operations, including recommending lane configuration changes, and/or traffic control alterations.
- ▶ Determine the future site-related impacts in the context of local transportation modes including reviews of transit, cycling and pedestrian facilities and circulation from the proposed development to the external road network.

- ▶ Compare trip generation assumptions provided in the Trafalgar RNA and the currently proposed draft plan.
- ▶ Review the subdivision plan with a study area road inventory review to confirm lane assignments, traffic controls, speed limits, and surrounding land uses and general study area characteristics.

The objective of this study is to determine the traffic volumes anticipated to be generated by the proposed development during the critical weekday AM and PM peak periods; to assess the impact of this traffic on the existing and future roadway network, recommend improvements to accommodate the projected traffic if any are needed, and confirm that the internal road network is consistent with Town standards and provides safe operation of vehicles within the proposed subdivision.

A copy of the Terms of Reference communication to date between the Town, Region, and TYLin is provided in **Appendix A**.

1.2 Planning Context and Relevant Background Studies

The Trafalgar Tertiary Plan has been developed within the context of provincial, regional, and municipal planning policies and initiatives. Transportation plans and studies that apply to the Trafalgar Tertiary Plan area have been summarized for reference purposes.

1.2.1 Town of Milton Transportation Master Plan (2018)

The 2018 Milton TMP is a document which outlines the long-term vision for the future of the Town of Milton's transportation system. More specifically, the TMP refers to itself as a "guiding document" for a "more balanced, multi-modal future." As with most master plans, the document provides policy context for the approach to achieving the vision, which includes an outline of capital improvements and additional studies, as required. Input from staff and decision makers, stakeholders, and resident were used to inform the direction of the TMP.

A total of twelve objectives were outlined in the Town's TMP, and a selection of the objectives that are most applicable to the Trafalgar Tertiary Plan are as follows:

- ▶ Development of a long-term transportation vision and overall road network philosophy to support the Town's future population projections and employment growth to 2031 and beyond;
- ▶ Providing overall direction for the Town to expand its transportation network in an integrated, efficient, and effective manner with respect to safety, transit, active transportation, complete streets, and environmental considerations;
- ▶ Development of a road classification hierarchy that reflects the dynamic shift towards

sustainable and alternate modes of transportation, and develop road cross sections to reflect any changes;

- ▶ Providing input to the preparation of the next Secondary Plan areas, including the Phase 4 Lands, and the required engineering input to develop the road network;
- ▶ Review and make recommendations on the Town’s current road standards, design criteria, and policies (including roundabouts) to ensure they meet the needs of all modes of transportation, while promoting the development of safe, efficient, livable and traffic calmed street networks;
- ▶ Investigate the need and justification for additional Highway 400 series overpasses, railway grade separations as well as mid-block flyovers;
- ▶ Investigate current and future deficiencies in roadway connectivity; and
- ▶ Enhancing active transportation routes, facilities, and connections throughout the Town’s urban and rural areas;
- ▶ Provide a framework by which decisions regarding the Town’s transportation system can be informed;
- ▶ Develop a transportation policy framework for the next Official Plan. This framework will be developed in consultation with all interested parties;
- ▶ Meaningfully engage the public and interested stakeholders in a dialogue to help shape the outcomes of the T.M.P.;
- ▶ Review major rights-of-ways to ensure responsibility is appropriately aligned with planned roadway function.

In the context of the MP4TC lands, the TMP provided an evaluation of conceptual road network alternatives, including considerations for land use, transit connectivity, active transportation opportunities, cost, and goods movement. A preferred set of road network alternatives for the MP4TC lands were identified, which has influenced the proposed road network presented herein.

1.2.2 Town of Milton Transportation Master Plan for the Trafalgar and Agerton Secondary Plan (2019-2022)

The TMP for the Trafalgar Agerton Secondary Plan was first completed in March of 2019, with an updated version circulated in December of 2020. Further drafts/addendums were circulated after this while the document was under review by Town and Regional Staff, with the most recent final traffic addendum circulated in March of 2022. The December 2020 TMP and the March 2022 Traffic Addendum were both reviewed as part of the preparation of the enclosed TIS.

The Trafalgar and Agerton TMP was prepared using Milton’s 2018 TMP as a guiding document and further developed the traffic planning already in place for the Trafalgar and Agerton

Secondary Plan areas. The TMP assessed the high-level impacts of the proposed Trafalgar and Agerton Secondary Plans on the adjacent arterial roads, collector roads, and major intersections.

The March 2022 TMP Addendum concluded that should the projected future total volumes be actualized, a total of five study intersections are expected to experience capacity issues under future total conditions.

The 2022 TMP Addendum recommends that in addition to applying signal timing optimization to study intersections, dedicated turning lanes, including dual left-turn lanes, can also be implemented to help improve operations for turning movements. However, many intersections will continue to operate with over-capacity movements under future total conditions despite these improvements should the projected volume be actualized. Regarding the dedicated turn lane improvements, TMP recommends that the “rights-of-way requirement be protected now, and the intersections be monitored regularly through the Region’s Traffic Count Program and be further considered in the future Municipal Class Environmental Assessment Studies.”

1.2.3 Trafalgar Secondary Plan (2019, 2024)

The Trafalgar Secondary Plan was adopted by the Town of Milton on March 25, 2019 (By-law 030-2019), and has since been amended in accordance with Ontario Land Tribunal Orders issued on February 8, 2024 and July 22, 2024. The Tertiary Plan for the TSPA has been prepared in accordance with the goals and objectives of the Trafalgar Secondary Plan.

From a transportation perspective, the Secondary Plan document outlines several goals and objectives for the TSPA, resulting in the vision of a multi-modal, connected community, requiring a road network of complete streets that are accessible to all users. Three of the mobility goals listed in section C.11.3.2 of the Trafalgar Secondary Plan are:

- ▶ Foster a connected and accessible on- and off-road pedestrian and cycling path network which promotes a culture of active transportation;
- ▶ Provide the opportunity for a local transit network that can support higher-order transit service on Trafalgar Road;
- ▶ Realize a network of Complete Streets that balance the needs of all road users, including pedestrians, cyclists, transit users, and motorists.

The Trafalgar Tertiary Plan includes a robust collector road network that proposes modifications to the Town’s standard right-of-way (ROW) collector road cross-sections. These proposed modifications often include active transportation elements, such as in-boulevard cycle tracks, buffered on-street cycle lanes, and Multi-use Paths (MUPs), that differ from the Town’s ROW standards in order to better achieve the level of active transportation connectivity envisioned by the Secondary Plan.

In addition to ensuring active transportation infrastructure is available and accessible to all users, the

proposed Trafalgar Tertiary Plan collector roads maintain general automobile travel lanes that are able to accommodate local transit vehicles (3.35m wide) while also providing on-street parking on at least one side of the road.

1.2.4 Planning Changes and Population Pledges

In accordance with the planning changes over the last few years, the 2022 Trafalgar TMP aims to target 30% of its new residential units to be designated as either affordable housing, assisted housing, stacked townhouses, back-to-back townhouses or apartments.

Since the completion of the 2022 Trafalgar TMP, the Trafalgar Tertiary Plan has increased its forecasted population and employment to align with the Region's Joint Best Planning Estimates. Population of 32,000 people has increased to 54,681 people. As for the employment population, the 2022 Trafalgar TMP forecasted 4,000 jobs while the Trafalgar Tertiary Plan forecasted 6,040 jobs. It should be noted that the employment jobs forecast in the Trafalgar Tertiary Plan includes work-from-home jobs estimates which accounts for 10% of the population translating to 1,493 jobs consisting of 1,140 commercial, 80 secondary school, 360 elementary school, and 4,500 work-from-home jobs.

1.2.5 Town of Milton Transportation Master Plan (2025)

The 2025 Milton TMP finalized on February, 2025 serves as an update to the previous 2018 Milton TMP that was discussed in **Section 1.2.1**. While the 2025 TMP maintains many of the objectives and goals identified in the 2018 TMP, there are some notable differences between the two plans such as active transportation infrastructure, right-of-way (ROW) widths, and road classifications.

In the 2025 TMP, the Town has recommended updated road classification and right-of-way widths to better accommodate the anticipated growth within Milton by incorporating active transportation infrastructure in urban areas. All ROWs except the laneway and rural roadway ROWs in the 2025 TMP were revised. One of the main differences is the revised ROWs in the 2025 TMP where on-street bicycle lanes were shifted to in-boulevard cycle tracks for all collector and arterial road cross-sections to provide that physical separation between cyclists and vehicles. This change also eliminates the multi-use paths that were previously identified in the 2018 TMP, by incorporating and separating both sidewalks and cycle tracks to be provided on both sides of the collector and arterial roads. In the previous 2018 TMP and Town standards, sidewalk widths were identified to be 1.5m for all local, collector, and arterial roads. In the 2025 TMP, sidewalk widths were increased from 1.5m to 1.8m for all roadway types.

1.2.6 Region of Halton Integrated Master Plan

The Region of Halton's Integrated Master Plan (IMP) is a long-term plan that aims to expand water, wastewater, and transportation infrastructure to accommodate the growing population in

the local municipalities within the Region to 2051 and beyond. The IMP states that it will:

- ▶ Guide the management and development of the Region's water, wastewater and transportation systems (including the active transportation network and master plan);
- ▶ Maximize capacity, system flexibility and extend the life expectancy of Regional water, wastewater and transportation infrastructure; and
- ▶ Outline the strategies for maintaining and improving these critical systems to ensure we meet the needs of the community now and in the future.

A selection of transportation strategies was also outlined in the IMP, in which are applicable to the Trafalgar Tertiary Plan, and are as follow:

- ▶ Optimizing existing/planned transportation network;
- ▶ Localized corridor widening and improvements;
- ▶ Flexibility and adaptability to support the evolution of Transit Priority Corridors;
- ▶ Prioritizing walking and cycling facilities, including at intersections;
- ▶ Identifying supporting strategies and technologies (for example, transit signal priority).

1.2.7 Trafalgar Tertiary Plan – Road Network Assessment

The Road Network Assessment (RNA) is under preparation in tandem with, and in support of, the overall tertiary plan for the Trafalgar lands within Milton's Phase 4 Lands (MP4TC).

The context of the RNA consists of the following:

- ▶ Review of applicable information from the Trafalgar & Agerton Secondary Plan;
- ▶ Review of existing transportation infrastructure and traffic operations within study area;
- ▶ Assessment of future background traffic operations for the planning horizons of 2031 and 2041 associated with background growth and developments surrounding the Trafalgar lands;
- ▶ Identification of traffic operations concerns and the potential mitigation measures or infrastructure improvements necessary to accommodate the impacts of background growth and site generated traffic for the planning horizons of 2031, 2041, and 2051;
- ▶ Assessment of Transit and Active Transportation Infrastructure; and
- ▶ Recommended public street network that incorporates more sustainable modes of transportation to reduce automobile dependency.

The base of the traffic forecast utilized within this study is sourced within the RNA study for the MP4TC lands, with changes to the densities considered for various land parcels as applicable.

2 SITE CHARACTERISTICS

2.1 Overall Study Area

The White Squadron lands are located within the MP4TC study area, which is contained between Derry Road to the north, E Lower Base Line to the south, Eight Line to the east and Sixth Line to the West. The development bounds, shown in green, are shown within the MP4TC lands, shown in red, in **Figure 2-1**.

Figure 2-1 MP4TC Study Area



2.2 Subject Lands Area

The White Squadron lands are located in the northern half of the MP4TC lands within the Town of Milton. The site is bounded by Trafalgar Road to the west, Britannia Road to the south and with adjacent development lands in other directions. An excerpt of the proposed draft plan, dated May 28, 2025, has been included in **Figure 2-2** and detailed layout is attached in **Appendix B**.

Figure 2-2 White Squadron Lands Draft Plan Excerpt



2.3 Study Intersections

For the purposes of this study, intersections were selected as the boundary road network intersections surrounding directly adjacent to the site along with the proposed access intersections to the external municipal roadway system. The study intersections have been detailed below (The proposed street names adopted in the draft plan correspond to the collector naming used in RNA study, as noted below):

- ▶ Trafalgar Road and Britannia Road
- ▶ Eighth Line and Britannia Road
- ▶ Street 'A' (Collector P) and Britannia Road
- ▶ Street 'C' (Collector M) and Britannia Road
- ▶ Trafalgar Road and Street 'B' (Collector M)
- ▶ Street 'A' (Collector P) and 'Street 'B' (Collector M)
- ▶ Street 'C' (Collector M) and Street 'B' (Collector M)

The remainder of the study intersections that are encompassed by the MP4TC lands are to be assessed as part of the TIS reports completed in support of the surrounding development lands and would consider traffic generated by the White Squadron lands as part of their review. As such the impacts of the overall MP4TC lands development on the overall study area roadway network will be reviewed when looking at the analysis completed for all TIS reports in support of the lands proposed within the area.

2.4 Development Plan Density

As per the subdivision draft plan dated May 28, 2025, the development statistics for the White Squadron lands consist of the following:

- ▶ Single Detached Dwellings – 397 Units
- ▶ Townhouse Dwellings – 395 Units
- ▶ Medium Density Residential II Land
- ▶ Medium Density Mixed Use Land
- ▶ Neighbourhood Centre Mixed Use II Land
- ▶ 1 Elementary School
- ▶ The remaining development areas include parks, village square blocks, stormwater management ponds and Natural Heritage System (NHS) blocks.

2.5 Development Road Network

The road network is proposed to be compliant with the road classification set forth as part of the Tertiary Plan for the MP4TC lands, dated December 2021. The White Squadron lands are proposed to be accessible from the boundary road network as follows:

- ▶ Via one full-moves intersection to Trafalgar Road;
- ▶ Via two full-moves intersections to Britannia Road.

The internal roadways intersecting the boundary road network are proposed as collector roadways, while the remainder of the internal roadway network is proposed to consist of minor local roads.

2.5.1 Proposed Road Network

Within the subject site, two future collector roads and local roads are proposed, as per the proposed Trafalgar Tertiary Plan road network and illustrated in **Figure 2-2**.

- ▶ **Collector M** is an east-west collector (labeled as Street 'B') traversing the subject site, originating from Trafalgar Road extending easterly ultimately diverging southward as Street 'C' and intersects Britannia Road at the southern site boundary. Both Street 'B' and 'C' are designated as Collector M, with a proposed 20m ROW width.

The 20m ROW collector cross-section consists of two general purpose driving lanes with an on-street parking lane, a sidewalk on one side and MUP on the other side of the road.

There is an opportunity to extend Street 'B' east of Street 'C' to the draft plan boundary to ultimately connect the collector road network with future development lands. It is recommended that the draft plan allow for this flexibility at the detailed design stage.

- ▶ **Collector P** is a north-south collector (labeled as Street 'A') intersecting Collector M to the north and extending to the south to Britannia Road. As specified in the MP4TC RNA, collector P is proposed with 24m ROW.

The cross section for 24m ROW includes two general-purpose driving lanes, sidewalks, in-boulevard bike lanes and on-street parking lanes on both sides of the street.

- ▶ **Local Roads** are proposed throughout the subject site to provide residents and visitor access to collector roads and surrounding road network. The proposed local roads will have a 16m ROW cross-section, consisting of two travel lanes with a sidewalk on at least one side of the road. The local laneways will facilitate the circulation of waste collection vehicles and fire vehicles.

Illustrative ROW cross sections discussed with the Town, provided by DSEL are attached in **Appendix C** and the detailed requirements are discussed in **Section 3.1**.

3 DRAFT PLAN REVIEW

TYLin completed a review of the proposed subdivision draft plan design for the White Squadron lands. The proposed design was evaluated based on the standards set forth by the Town of Milton 2024 Engineering and Parks Standards Manual (EPSM), the 2015 Halton Region Access Management Guidelines, the Tertiary Plan completed for the MP4TC lands (dated December 2021), as well as the Transportation Association of Canada (TAC) 2017 Geometric Design Guide for Canadian Roads.

It is considered that the design of the roadways is deemed acceptable and detailed review and findings have been summarized below.

3.1 ROW

According to the Town of Milton standards, the minimum ROW width requirement for minor collector roads is 24m, while it is 16m for minor local roads.

According to the Tertiary Plan for the MP4TC lands, collector roads are proposed with a ROW width of 20m depending on the roadway.

The proposed ROW widths established as part of the Tertiary Plan for the MP4TC lands derived specifically for the study area would take precedence over the Town of Milton standards.

Based on the draft plan of proposed subdivisions for White Squadron lands, the ROW widths of collector roads, local roads and laneways are summarized in **Table 3-1** below and illustrated in **Figure 3-1**.

Table 3-1 Proposed Right-of-Ways (ROW) Width

ROW Types	Collector Name	Street Index	Design Requirement		Proposed Width
			Town of Milton	Tertiary Plan for the MP4TC lands	
Minor Collector Roads	Collector P	Street 'A'	24m	20m	24m
	Collector M	Street 'B' and 'C'			20m
Minor Local Road		Other remaining streets	16m	-	16m

The proposed ROW widths of 24m and 20m for collector roads and 16m for local fall in line with the requirements specified in the Tertiary Plan for the MP4TC lands and Milton’s EPSM.

3.2 Road Bends and Horizontal Curvature

All roadway bends in the draft plan are designed with a radius of 13m or more. The centreline radius complies with the radius requirement of 12m specified in Ontario Building Code's Access Route Design and is deemed acceptable for the site.

Per the Town of Milton standards, a minimum horizontal curvature radius is 90m for both local and minor collector roadways.

These requirements regarding road bends and horizontal curvature have been met within the proposed draft plan design, as illustrated in **Figure 3-1**.

3.3 Intersection Spacing

According to the Town of Milton standards and TAC, the minimum intersection spacing required along local and collector roadways is measured centreline to centreline and summarized as below..

- ▶ 60m for four-legged intersections;
- ▶ 40m for three-legged intersections.

In addition, the Region guidelines specify the following minimum spacing for a C4 urban road, measured from stop bar to stop bar, encompassing Trafalgar Road and Britannia Road.

- ▶ 300m for a full-moves intersection;
- ▶ 115m for a right-in/right-out intersection.

The above requirements have been met within the proposed draft plan, except for the intersection spacing of **226m** between Trafalgar Road at Britannia Road and Street A at Britannia Road.

3.3.1 Britannia Road at Trafalgar Road Intersection Spacing Justification

The spacing for the intersections is considered acceptable given the spacing deficiency attributed by the NHS lands to the south and east which limit the location of the intersections. Also, given that Collector P services the neighbourhood centre mixed-use node east of the Trafalgar and Britannia intersection, it is important that these intersections operate as full-moves to facilitate traffic generated by the high-density residential and non-residential uses north and south of Britannia Road.

Moreover, the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads recommends a minimum 200 m intersection spacing along arterial roadways, generally only applicable in areas of intense existing development or restrictive physical controls.

To justify the substandard intersection spacing between Trafalgar Road at Britannia Road and Collector P at Britannia Road, the RNA study has conducted a sensitivity analysis to compare the

full moves operation and Right-in/right-out (RIRO) operation on Collector P at Britannia Road and Trafalgar Road at Street P (outside the study area). The detailed sensitivity analysis is extracted from RNA and provided in **Appendix D**.

The RNA sensitivity analysis investigated the impacts of restricting left turns and minor road through movements at proposed full-movement intersections under the RIRO configuration.

Critical operational performance on adjacent impacted intersections, including critical movements, volume-to-capacity (v/c) ratios, delays, and levels of service during AM and PM peak hours, was extracted from the RNA study in **Table 3-2**.

Table 3-2 Capacity Analysis Comparison Summary (Extracted from RNA)

Intersection	Critical Movement	Full Moves Scenario			RIRO Scenario		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
AM							
Trafalgar Road & Britannia Road	<i>Overall</i>	<i>0.81</i>	<i>47</i>	<i>D</i>	<i>1.02</i>	<i>90</i>	<i>F</i>
	EBL	0.91	82	F	1.36	243	F
	NBL	0.85	82	F	1.06	121	F
	NBT	0.84	30	C	1.09	85	F
	SBL	0.42	64	E	0.99	102	F
	SBT	0.85	45	D	1.09	84	F
	SBR	0.83	50	D	1.14	112	F
Trafalgar Road & Collector M	<i>Overall</i>	<i>0.73</i>	<i>15</i>	<i>B</i>	<i>0.93</i>	<i>46</i>	<i>D</i>
	WBLR	0.74	60	E	0.86	61	E
	NBTR	0.73	15	B	0.98	67	E
PM							
Trafalgar Road & Britannia Road	<i>Overall</i>	<i>1.07</i>	<i>85</i>	<i>F</i>	<i>1.29</i>	<i>167</i>	<i>F</i>
	EBL	1.34	223	F	1.74	403	F
	NBL	1.31	239	F	1.51	304	F
	NBT	0.91	25	C	1.23	173	F
	SBL	0.83	76	E	1.58	319	F
	SBT	1.15	118	F	1.26	154	F
	SBR	0.84	61	E	1.02	68	E
Trafalgar Road & Collector M	<i>Overall</i>	<i>0.83</i>	<i>18</i>	<i>B</i>	<i>1.02</i>	<i>59</i>	<i>E</i>
	WBLR	0.43	63	E	0.89	75	E
	NBTR	0.89	21	C	1.08	97	F

The sensitivity analysis demonstrates that a restricted RIRO configuration for Collector P at Britannia Road and Trafalgar Road at Street P results in worsening performance at the key intersection of Trafalgar Road at Britannia Road and Trafalgar Road at Collector M. Overall, the traffic performance in the area is more favourable when full-move intersections are provided.

Based on the RNA sensitivity analysis results, it is recommended that full-move intersections remain as proposed in the RNA for Collector P at Britannia Road while the proposed intersection spacing, between Trafalgar Road at Britannia Road and Street A at Britannia Road, is considered acceptable and to be maintained due to NHS buffered area constraints.

3.4 Intersection Angle

According to the Town and Region design standards, intersection angles are subject to the following requirements:

- ▶ 90 degrees for intersections with arterial and collector roadways;
- ▶ 80 – 90 degrees for intersections with local roads and laneways.

The majority of proposed intersections within the draft plan conform to the above requirements, with the exception of select collector intersections involving collector roads, which are proposed with intersection angles ranging from 80 to 90 degrees.

All proposed intersection angles, however, fall within the TAC-approved range of 70 – 100 degrees. Given this, the proposed intersection angles would not result in safety concerns and are considered acceptable for the development lands.

Please refer to **Figure 3-2** for a review of intersection angles within the lands.

3.5 Daylight Triangle / Rounding

According to the Town standards, the following minimum daylight triangle/rounding are applicable to the study intersections:

- ▶ 15m x 15m daylight triangles for any intersection with arterial roadways;
- ▶ 10m x 10m daylight triangles at collector-to-collector intersections;
- ▶ 7.5m x 7.5m daylight triangles at collector-to-local intersections;
- ▶ 5m daylight rounding at local-to-local and local-laneway intersections.

All the above minimum requirements have been met or exceeded within the proposed draft plan as illustrated in **Figure 3-3**.

3.6 Minimum Tangent Length at Intersections

According to the Town standards, the minimum tangent length requirements at intersections are summarized as follows:

- ▶ 30m along local roads and laneways;
- ▶ 50m along minor collector roads;

The above requirement has been met at most of the intersections.

For intersections where the minimum tangent length is not met or situated along curved road sections, TYLin completed a review of the intersection sight distance, which is required to be 65m for collector roadways and 30m for local roadways.

The review indicated that the available sightlines are fully contained within the ROW, and no concerns are projected regarding visibility or safety at these locations. The tangent length and intersection sight distance reviews have been illustrated in **Figure 3-4**.

Wyldeewood Golf And Country Club

Existing Residential

Existing Residential

TRAFALGAR ROAD

BRITANNIA ROAD

Existing Agricultural Future Development

Note:

- **ROW widths** of 20m for collector roads and 16m for local roads fall in line with the requirements specified in the Tertiary Plan for the MP4TC lands.
- The 24m ROW width for Street 'A' complies with the minor collector road requirement stated in 2024 Milton's Engineering and Parks Standards Manual
- **Horizontal Curve Radius** requirement per the Milton Design Standards is a minimum of 90m along local roads, 90m along minor collector roads and 130m along major collector roads.
- The centreline radii complies with the radius requirement of 12m specified in Ontario Building Code's Access Route Design and is deemed acceptable for the site.



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MATTAMY HOMES CANADA - WHITE SQUADRON DRAFT PLAN (MP4 LANDS) - TRAFFIC IMPACT STUDY
RIGHT-OF-WAY & HORIZONTAL CURVE RADIUS

SCALE
1:3

FIGURE NO.
FIG. 3-1
DATE
JUN 2025

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Wyldeewood Golf And Country Club

Existing Residential

Existing Residential

TRAFALGAR ROAD

BRITANNIA ROAD

Existing Agricultural
Future Development

- Note:
- Daylight triangles/rounding are required to be designed as follows:
 - 15x15m triangles at arterial intersections
 - 10x10m triangles at collector-to-collector intersections
 - 7.5x7.5m triangles at collector-local intersections
 - 5m rounding for local-local intersections and local-laneway intersections



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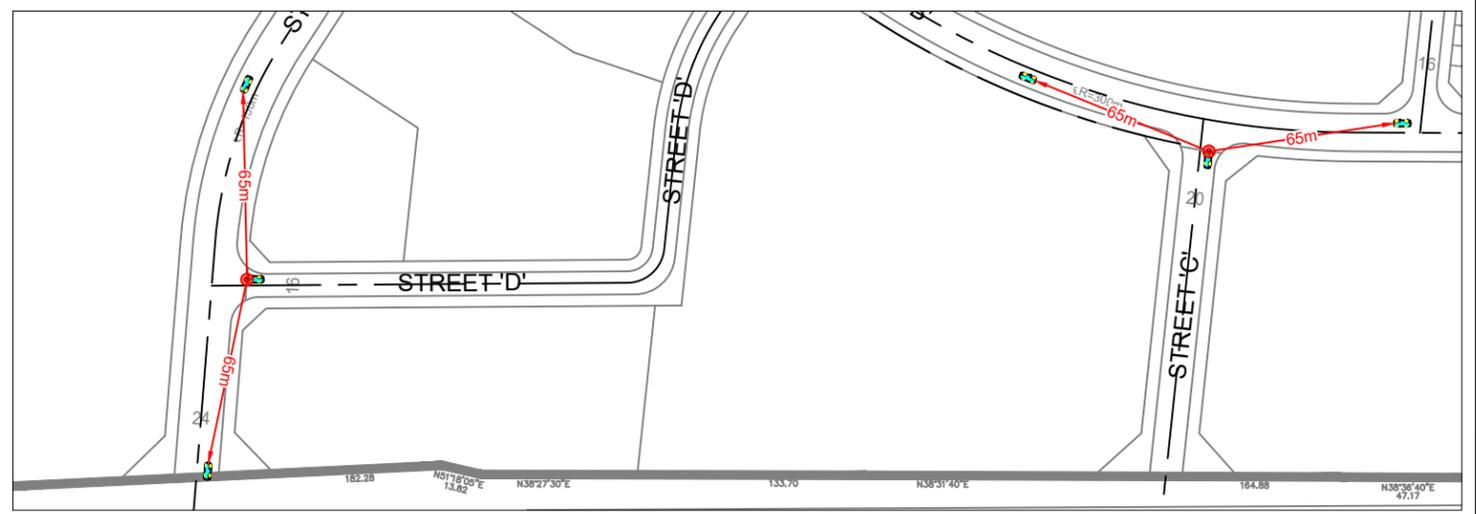
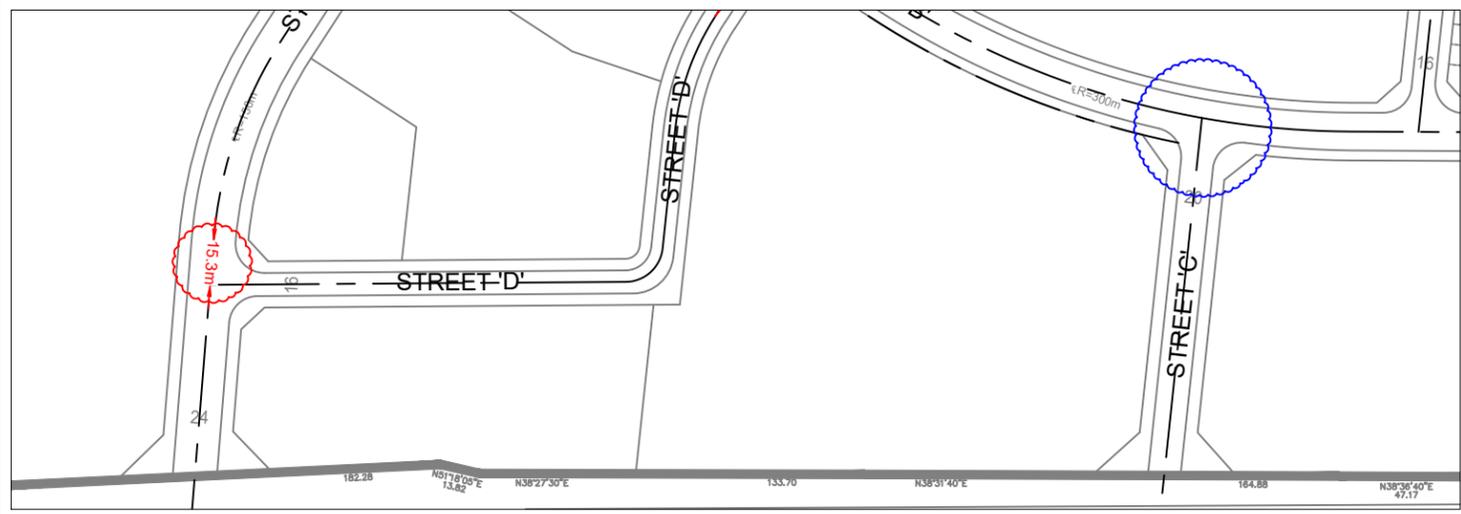
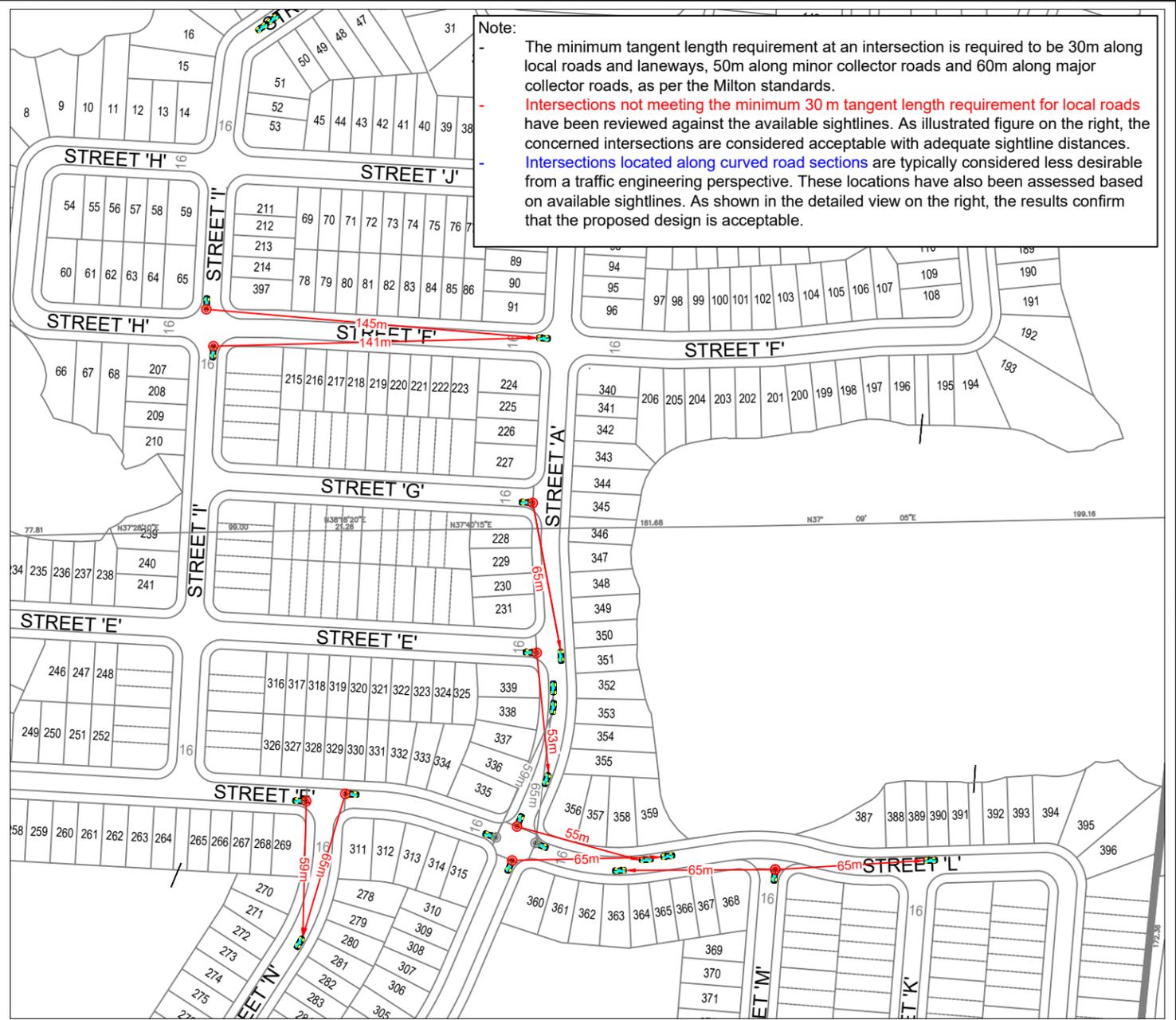
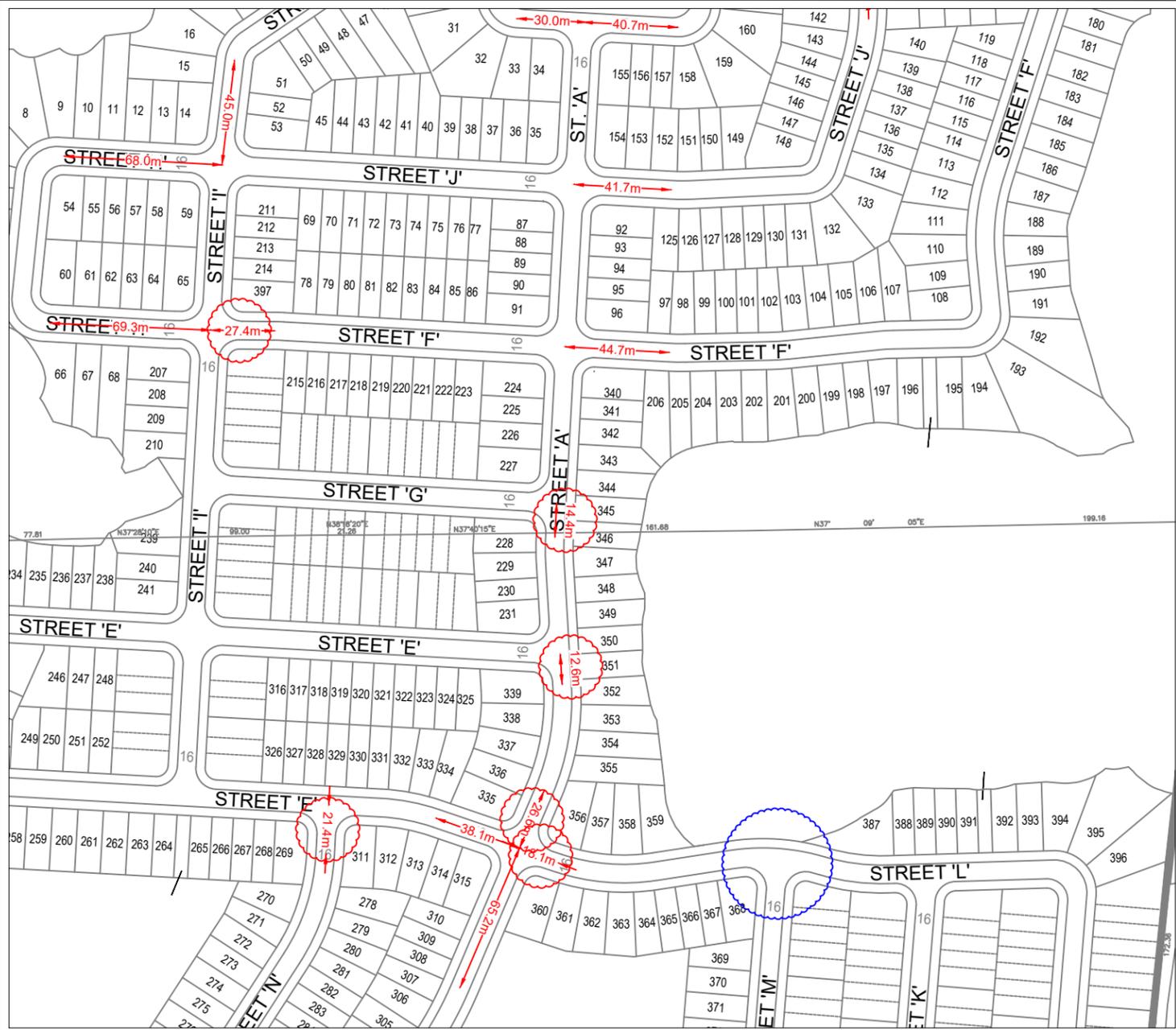
MATTAMY HOMES CANADA - WHITE SQUADRON DRAFT PLAN (MP4 LANDS) - TRAFFIC IMPACT STUDY
DAYLIGHT TRIANGLES / ROUNDINGS

SCALE
1:3

FIGURE NO.
FIG. 3-3
DATE
JUN 2025

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4 EXISTING CONDITIONS

4.1 Existing Roadway Network

The existing roadways included as part of this traffic impact study assessment include the following:

- ▶ **Trafalgar Road** is a north-south major arterial roadway under the jurisdiction of the Region of Halton, as per the Region of Halton Official Plan. Currently, the roadway has a five-lane rural cross-section consisting of two lanes in each direction and a centre median. Trafalgar Road has a posted speed limit of 70 km/h in the vicinity of Britannia Road, with paved shoulders and no sidewalks.
- ▶ **Britannia Road** is an existing east-west arterial roadway under the jurisdiction of Halton Region. The roadway has recently been upgraded to an urban six-lane cross-section with a posted speed limit of 60 km/h within the vicinity of the subject site.
- ▶ **Eighth Line** is a north-south collector roadway under the jurisdiction of the Town of Milton. Currently the roadway has a two-lane rural cross-section consisting of one lane in each direction. Eighth Line has a posted speed limit of 70 km/h in the vicinity of Britannia Road, with gravel shoulders and no sidewalks.

4.2 Existing Traffic Data

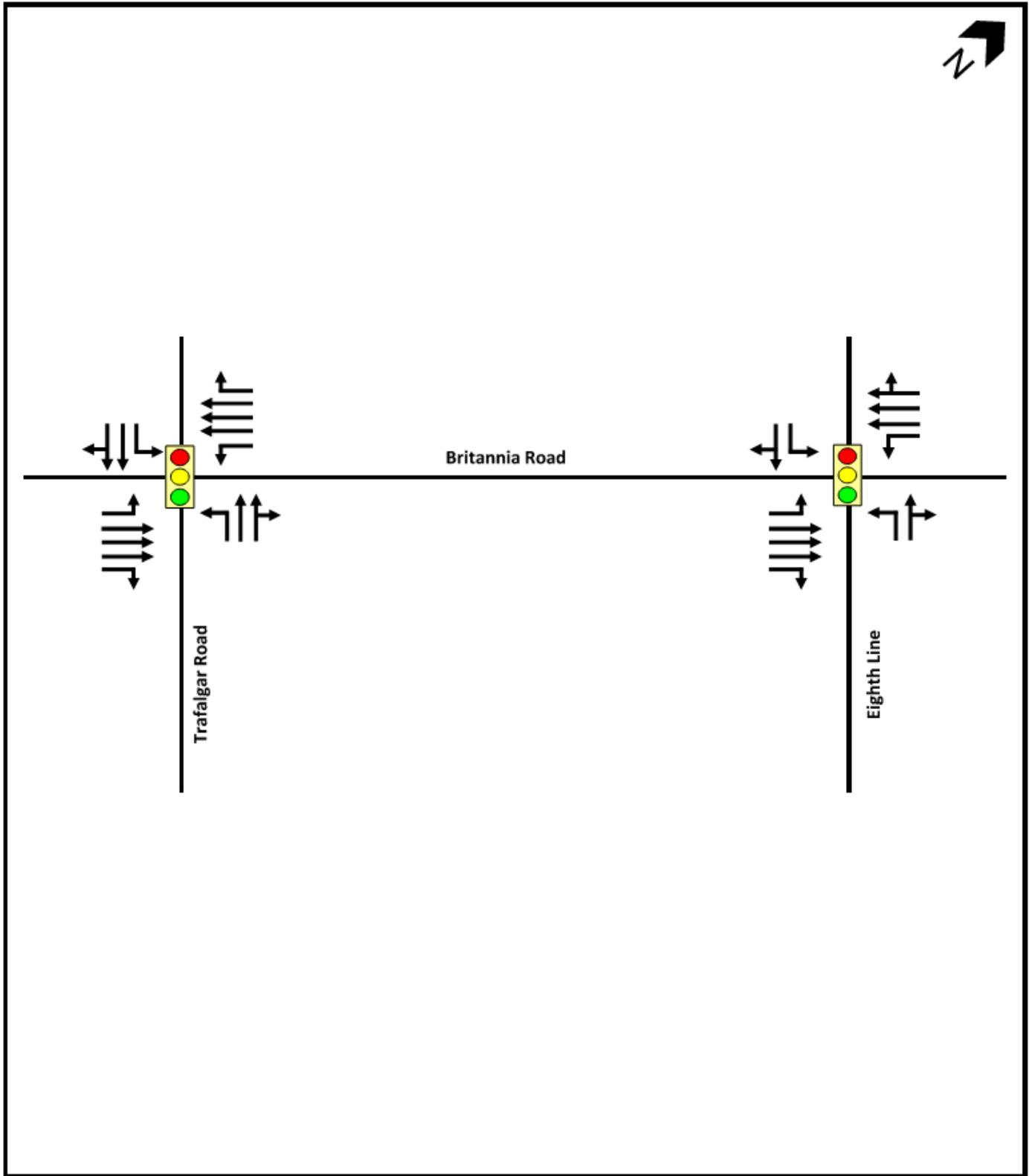
Existing signal timing plans (STPs) were obtained from Halton Region Staff for the existing study intersections, as applicable.

Turning movement count (TMC) data was collected on January 18, 2023 from 6:00 AM to 9:00 AM, 11:00 AM to 1:00 PM, and from 4:00 PM to 7:00 PM, from which the weekday AM and PM peak hours were identified.

TYLin's 2023 TMC data, sourced from the RNA study, was collected after the 2022 Highway 401 widening from Mississauga to Milton. To reflect regional traffic growth, an annual growth rate of 2.65% was applied to traffic volumes on regional roadways. This adjusted dataset forms the 2025 baseline traffic volume analysis for this study.

The existing signal timing plans and baseline traffic data are provided in **Appendix E**. Baseline lane configurations and traffic volumes at the existing study area intersections are provided in **Figure 4-1** and **Figure 4-2** respectively.

Figure 4-1 Existing Lane Configuration



Legend



Signalized Intersection



Existing Lane

Figure 4-2 Baseline Traffic Volume

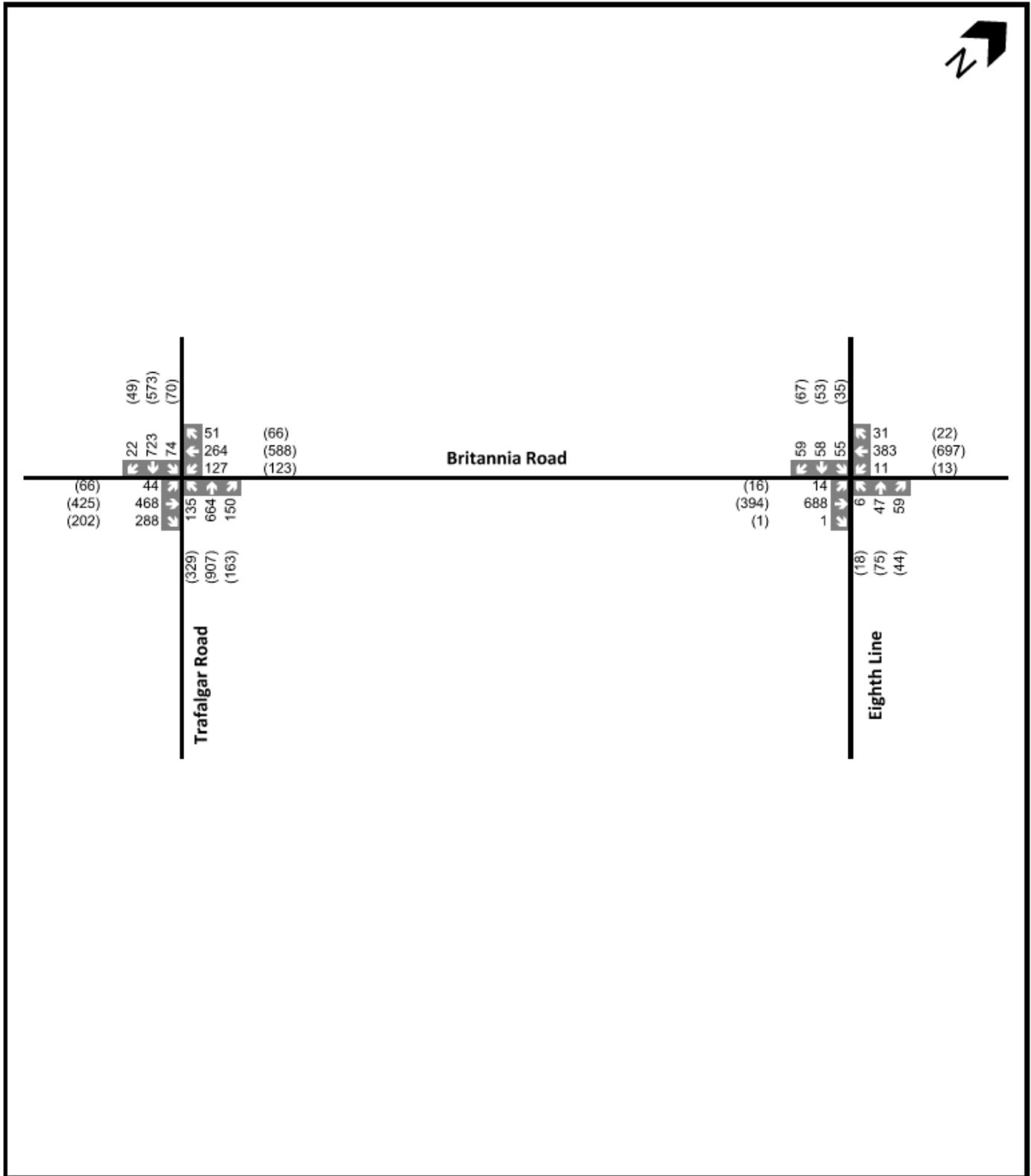


Figure 4-2

Baseline Traffic Volumes

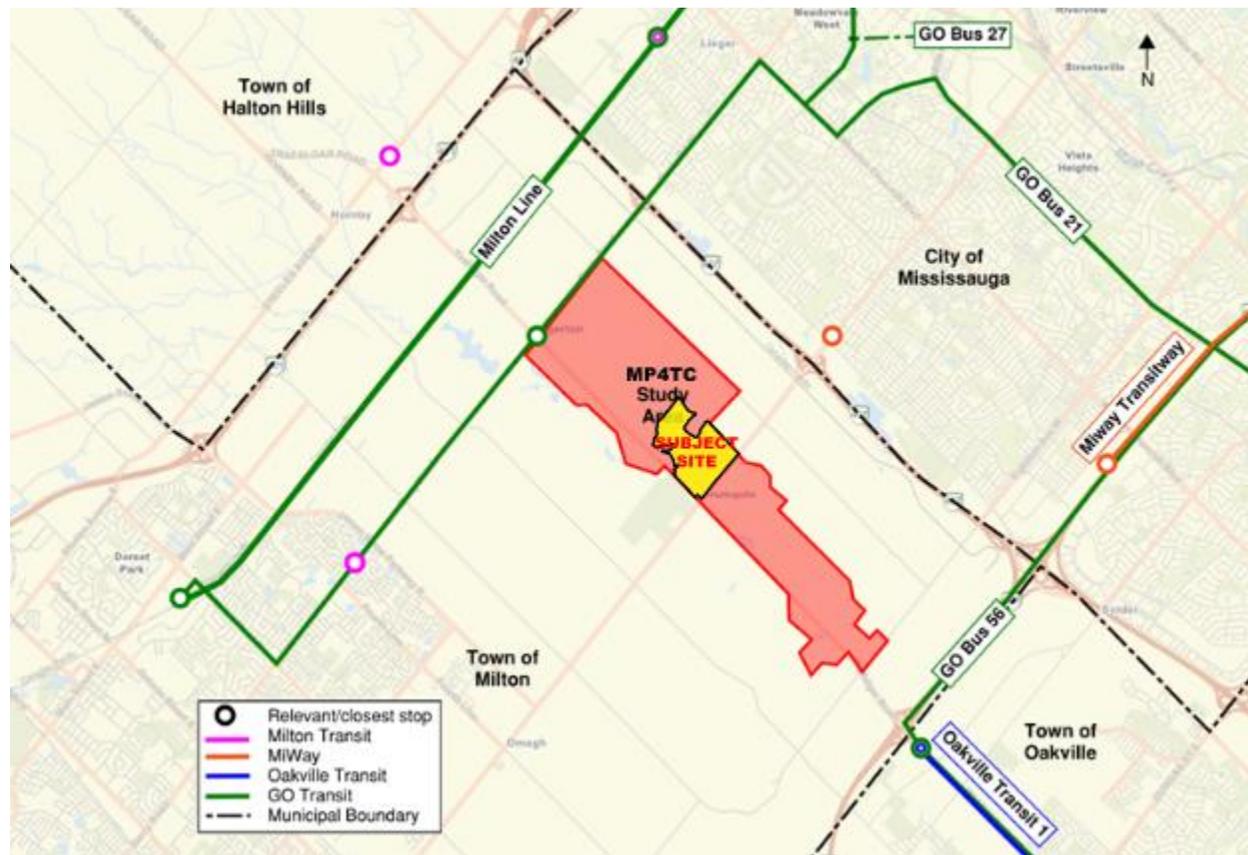
4.3 Existing Active Transportation Network

Given the rural context of the subject site, the existing road network does not provide sidewalks for pedestrians or other dedicated active transportation infrastructure, such as on-road bicycle lanes. While cyclists may use these roads under existing conditions, sharing the general purpose lanes with vehicles traveling at high operating speeds (70 km/h or higher) or using the paved shoulders, these are not considered safe cycling conditions.

4.4 Existing Transit Network

The study area is located outside of existing urban areas that provide local transit services, such as Milton to the northwest, Mississauga to the east, and Oakville to the south. Regional GO Transit routes and Bus Rapid Transit (BRT) Stations are located within the vicinity of the study area, however, the study area is not directly serviced by Regional transit at the time of this report. The existing transit route and stop plan is illustrated in **Figure 4-3**.

Figure 4-3 Existing Transit Routes and Stops



4.4.1 GO Transit

The Milton GO Station, located west of the subject site, is approximately a 15 km drive away from the intersection of Trafalgar Road and Britannia Road. The Milton GO Station provides access to the GO Train Milton Line, GO bus routes 21 – Milton and 27 – Milton / North York.

GO Train Milton Line is a generally east-west train line that operates from Union Station in the City of Toronto to Milton Station in the Town of Milton. The line runs on weekdays with a frequency of as low as 15 minutes. Eastbound service is available between 6:00 AM and 8:30 AM, while westbound service is available between 3:40 PM and 7:10 PM.

There are two stops in the vicinity of the study area.

- ▶ Milton Station is located approximately 8 km from the northwestern limit of the study area and is a 12-minute drive away.
- ▶ Lisgar Station, located in Mississauga, is located approximately 5 km from the northeastern limit of the study area and is a 7-minute drive away. This train service is not provided at weekends.

GO Bus Route 21 – Milton is a generally east-west bus route that operates between Union Station in the City of Toronto and Milton Station in the Town of Milton. Eastbound service is provided throughout the day on weekdays, except during the times which overlap with the GO Train schedule, starting from 3:45 AM to 12:25 AM into the following day. The earliest westbound service towards Milton Station departs Union Station at 5:40 AM while the final bus departs at 2:20 AM the next day. Service frequency is approximately 1 hour for both directions.

At the weekend the route operates with 1-hour service frequency from 5:00 AM to 2:00 AM. The nearest stop is at Derry Road and Trafalgar Road, which is directly at the northern boundary of the study area.

GO Bus Route 27 – Milton / North York is a generally east-west bus route that operates from Finch Bus Terminal in the City of Toronto to Milton Station in the Town of Milton. The route runs on weekdays with a 20-minute service frequency in the eastbound direction between 5:00 AM and 7:30 PM. Westbound service is provided at a frequency of 30 minutes between 5:00 and 9:00 PM on weekdays. The nearest stop is at Derry Road and Trafalgar Road, which is directly at the northern boundary of the study area. During the weekends, the complete route service is only provided in the eastbound direction, departing Milton GO at 5:35 AM and in the westbound direction, departing Finch Bus Terminal at 6:30 AM.

4.4.2 Milton Transit

The urban area of the Town of Milton is located to the northwest of the study area, and Milton Transit operates a total of 9 bus routes. The closest Milton Transit bus stops are located at the

Lisgar GO Station, Toronto Premium Outlets, and Trudeau Drive at Derry Road as indicated in **Figure 4-3**.

4.4.3 MiWay Transit

The City of Mississauga is generally located east and southeast of the study area, and MiWay Transit operates an extensive network of bus routes through the entire city. The closest bus stop is located at Britannia Road and the Ninth Line which is approximately 2 km from the eastern edge of the study area. **Figure 4-3** illustrates the existing transit routes in proximity to the study area.

4.4.4 City of Mississauga's Transitway

The western terminus of the Mississauga Transitway (BRT service that serves as an east-west transit spine through Mississauga), located at the interchange of Highway 403 and Winston Churchill, is approximately an 8 km drive away from the subject site and provides potential connections to other Mississauga bus routes and Toronto transit at the eastern terminus of the Transitway.

5 BACKGROUND CONDITIONS

5.1 Study Horizon Years

In this TIS, the horizon years of 2031 (build-out year of the White Squadron Lands) and 2041 (ten-year horizon) were adopted to assess the future traffic conditions. The study horizons align with the horizons assessed in the ongoing Trafalgar Tertiary Plan RNA study. The future traffic volume in 2031 horizon will include the White Squadron Lands trips plus the balance of MP4 Phase 1 lands, while the 2041 horizon will further incorporate the balance of MP4 Phase 2 lands.

5.2 Study Area Road Network Improvement

The existing roads within the study area (Trafalgar Road, Britannia Road, and Eighth Line) are expected to have road improvements completed by 2031, as per Halton Region's TMP, and recommendations made in Milton's TMP update (Feb 2025). Improvements to the existing road network to accommodate future development are also addressed in this report, as well as the RNA study.

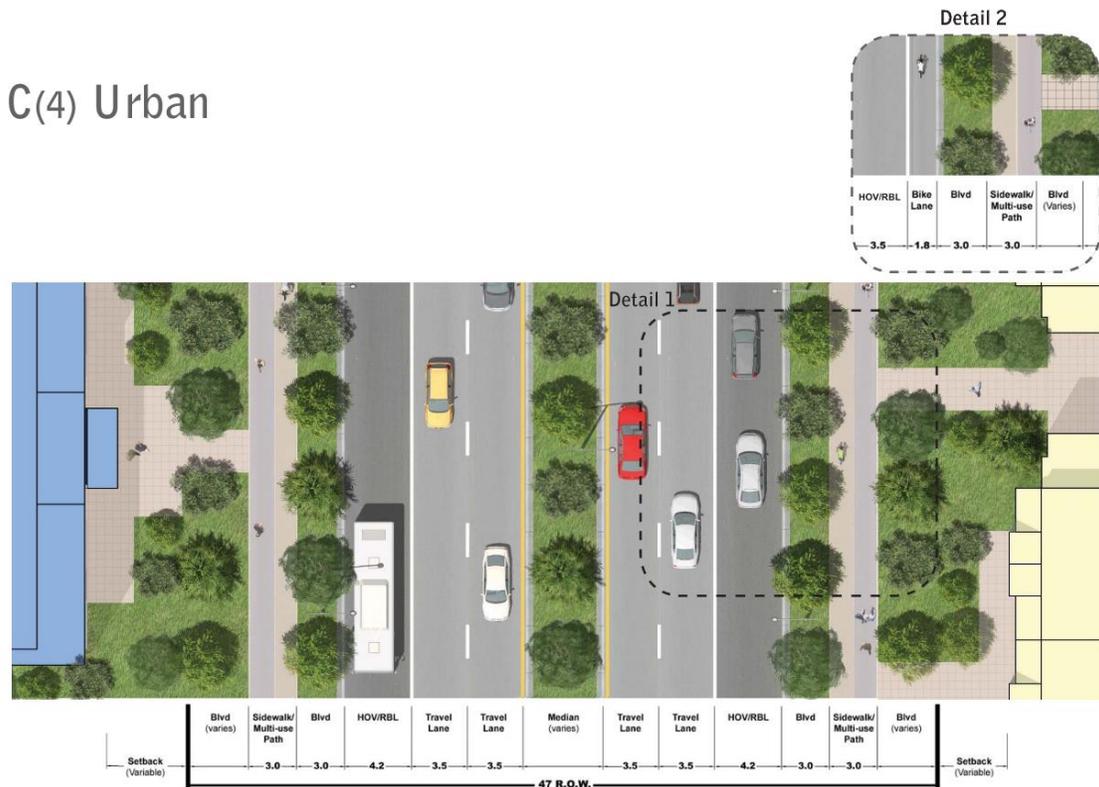
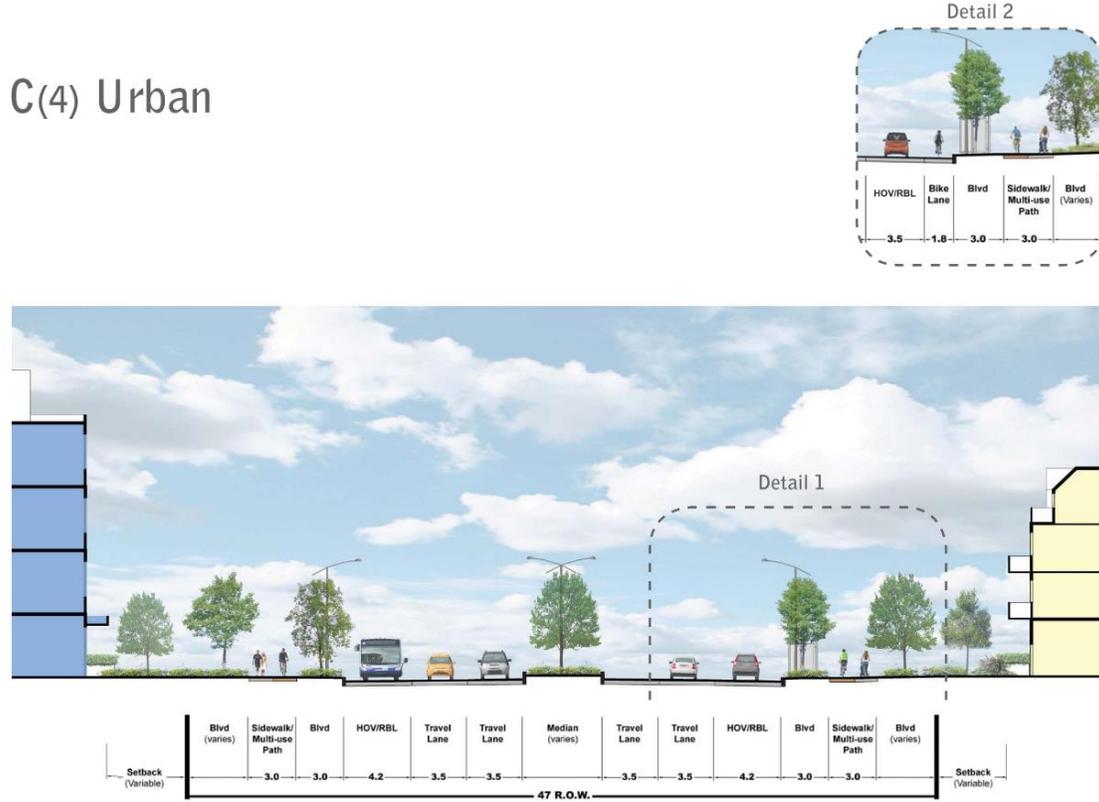
The Region's TMP classifies Trafalgar Road and Britannia Road as C4 Urban roads with a 47 metre right-of-way that includes six vehicular travel lanes, as shown in **Figure 5-1**, excerpts from the Halton TMP.

This will result in the existing roadways being widened from two lanes in each direction to three lanes, accommodating a High Occupancy Vehicle (HOV) lane in addition to two general purpose travel lanes in each direction. The urbanization of the roads will occur when they are widened, and the C4 urban road cross section includes provision for new active transportation infrastructure such as sidewalks, multi-use paths, and/or on-street bicycle lanes.

According to Halton Region's 2024 Budget and Business Plan, construction to widen Trafalgar Road to six lanes within the RNA study area is scheduled to begin in 2029/2030. Britannia Road, which was widened to six lanes near the end of 2024, was analyzed as a six-lane road in this assessment.

To assess the impacts of the Regional Road widening projects, Trafalgar Road and Britannia Road were evaluated as six-lane roads under 2031 future traffic conditions, as well as the 2041 horizon. Lane configuration improvements are proposed under both future background and total traffic scenarios to accommodate projected traffic volumes. These proposed improvements are consistent with the recommendations outlined in the Transportation Master Plan for the Trafalgar and Agerton Secondary Plan Areas Traffic Addendum, dated March 2022 (Trafalgar TMP).

Figure 5-1 Halton Region C(4) Urban 2031 Road Cross Section



5.3 Background Corridor Growth

In alignment with the methodology used in the MP4TC RNA study, the background growth rates for the White Squadron Lands study area were derived consistently with the MP4 RNA analysis for the 2031 and 2041 planning horizons. These growth rates account for cumulative impacts of population and employment forecasts based on the Region’s Joint Best Practices Estimates (JBPE) travel demand model to 2051 including background developments such as the Trafalgar GO Station and Agerton lands.

The Trafalgar GO Station is a significant transit development within the vicinity of the subject site. It is proposed to be located within the Agerton Secondary Plan Lands, north of the Trafalgar Tertiary Plan area. The Trafalgar GO Station is proposed to be placed within the Major Transit Station Area (MTSA) to provide effective rail connections to users as this is planned to have high-density employment and residential areas. As per the Transportation Master Plan for the Trafalgar and Agerton Secondary Plan (dated March 2022), the preferred location for the proposed Trafalgar GO Station is west of Trafalgar Road along the existing rail line.

For the 2031 horizon, the same background growth rate of 2.65%, applied to Regional Roads in the MP4 RNA, was used to project traffic volumes within this study area.

For the 2041 horizon, growth rates provided by Region and Town staff were applied to the 2031 volumes to reflect full background development impacts. As the Town’s growth rates did not include all of these developments, a combined growth rate approach was used for Town roads. Regional growth rates were added to the Town’s to better capture total background traffic growth, in line with MP4 RNA assumptions.

The updated growth rates applied to the study area corridors are summarized in **Table 5-1**.

Table 5-1 Updated Growth Rates Applied to Network

Corridor	2031 to 2041
Trafalgar Road	1%
Britannia Road east of Trafalgar Road	2%
Eighth Line	2.5%

5.4 Background Development

The RNA study incorporates a set of tertiary plan land uses and statistics provided by SGL for trip generation estimates. These site statistics are derived from the JBPE for the Trafalgar Secondary Plan area, as provided by the Town to the MP4TC Local Operations Group (LOG).

For the purposes of this TIS, the site statistics and trip generation estimate from the RNA study

have been adjusted by excluding the subject site to be included in background development traffic.

5.4.1 2031 Background Development – MP4 Phase 1

For the 2031 horizon year, the MP4 Phase 1 developments, excluding the subject site, were used to compute the 2031 background development traffic volume. To ensure consistency with RNA, the same site statistics assumption were adopted and the corresponding trip generations were derived using Institute of Transportation Engineers (ITE) 10th edition trip rates.

The ITE Land Use Codes for residential and non-residential land uses within MP4 Phase 1 are presented in **Table 5-2**, with detailed trip generation calculations provided in **Appendix G**. The overall MP4 Phase 1 developments were expected to generate a total of 4,618 vehicle trips during the AM peak hour, consisting of 1,726 inbound and 2,892 outbound trips, and 4,565 trips during the PM peak hour, consisting of 2,673 inbound and 1,892 outbound trips.

5.4.1.1 Updated Subdivision Draft Plan

Within the MP4 Phase 1 developments, ongoing subdivision applications for specific land parcels provide the most current site statistics throughout the application process. As a result, updated statistics for these parcels were utilized instead of RNA assumptions, and excluded from the trip generation calculation using ITE 10th edition trip rates above.

The total site statistics and corresponding ITE Land Use Codes for the updated draft plan are summarized in **Table 5-2**. The trip generation was derived separately, using ITE 11th Edition trip rates to reflect the latest development parameters. This TIS incorporated the updated draft plan, including the subdivision developed by Frontenac Forest Estates Inc.

► Frontenac Forest Estates Inc. Subdivision

The proposed subdivision development is located on the northern end of the MP4TC lands, bounded by Derry Road to the north, Eighth Line to the east, Trafalgar Road to the west and future development in MP4TC lands to the south. It is proposed to comprise 435 units of detached house dwellings, 855 units of townhouse dwellings, 701 units of neighbourhood centre, 356 units of medium density residential units, 1 school, retail and commercial areas.

Trip generation for the Frontenac development was estimated by applying ITE 11th Edition trip rates, with calculations detailed in **Appendix G**. It was expected to generate a total of 1,278 vehicle trips during the AM peak hour, consisting of 483 inbound and 795 outbound trips, and 1,297 trips during the PM peak hour, consisting of 749 inbound and 548 outbound trips.

Table 5-2 MP4 Phase 1 (without White Squadron Lands) – Overall Site Statistics

Land Use Type	Land Use	ITE Land Use Code	Parameters		Total
			RNA Assumption	Updated Draft Plan	
Residential	Single Family Detached	LUC 210	1,472	435	1,907
	Multifamily Housing (Low-rise)	LUC 220	1,361	855	2,216
	Multifamily Housing (Mid-rise)	LUC 221	431	356	787
	Multifamily Housing (High-rise)	LUC 222	6,978	701	7,679
	Total Residential Units			10,242	2,347
Non-Residential	Shopping Center (ft ²)	LUC 820	215,000	116,000	331,000
	Elementary School (Students)	LUC 520	2,175	725	2,900
	High School (Students)	LUC 530	1,500	-	1,500
	District Park (Acres)	LUC 411	15	-	15

5.4.2 2041 Background Development – MP4 Full Build-out

For the 2041 horizon year, the design parameters for the full build-out of the MP4 developments, excluding the subject site, were utilized, together with updated draft plan statistics, to estimate the 2041 background development trip generation.

Similar to 2031 horizon, trip generation estimates were derived using ITE 10th Edition trip rates for site statistics from the RNA and ITE 11th Edition trip rates for updated site statistics from the ongoing subdivision draft plan. The overall site statistics are presented in **Table 5-3** and the corresponding trip generation calculations for the 2041 background development traffic are summarized in **Appendix G**.

The overall MP4 full build-out developments were expected to generate a total of 8,051 vehicle trips during the AM peak hour, consisting of 2,907 inbound and 5,144 outbound trips, and 8,124 trips during the PM peak hour, consisting of 4,776 inbound and 3,348 outbound trips.

Table 5-3 MP4 Full Build-out (without White Squadron Lands) – Overall Site Statistics

Land Use Type	Land Use	ITE Land Use Code	Parameters		Total
			RNA Assumption	Updated Draft Plan	
Residential	Single Family Detached	LUC 210	2,708	435	3,143
	Multifamily Housing (Low-rise)	LUC 220	3,054	855	3,909
	Multifamily Housing (Mid-rise)	LUC 221	922	356	1,278
	Multifamily Housing (High-rise)	LUC 222	11,404	701	12,105
	Total Residential Units			18,088	2,347
Non-Residential	Shopping Center (ft ²)	LUC 820	364,900	116,000	480,900
	Elementary School (Students)	LUC 520	4,350	725	5,075
	High School (Students)	LUC 530	1,500	-	1,500
	District Park (Acres)	LUC 411	30	-	30

5.5 Future Background Traffic Volumes

For each horizon year, future background traffic volumes were derived by applying annual background corridor growth rates to the baseline traffic volumes and incorporating traffic from background developments.

For the 2031 horizon, growth rates were applied to existing baseline volumes without including traffic from the Agerton development or the full build-out of the Trafalgar Tertiary Plan’s collector road network and arterial-to-collector intersections, as confirmed through RNA discussions with Region and Town staff.

For the 2041 horizon, baseline volumes were updated to reflect continued growth, and background volumes were adjusted to account for cumulative traffic from planned developments, including the Agerton lands.

The resulting 2031 and 2041 future background volumes are provided in **Figure 5-2** and, **Figure 5-3** respectively.

Figure 5-2 2031 Future Background Volumes

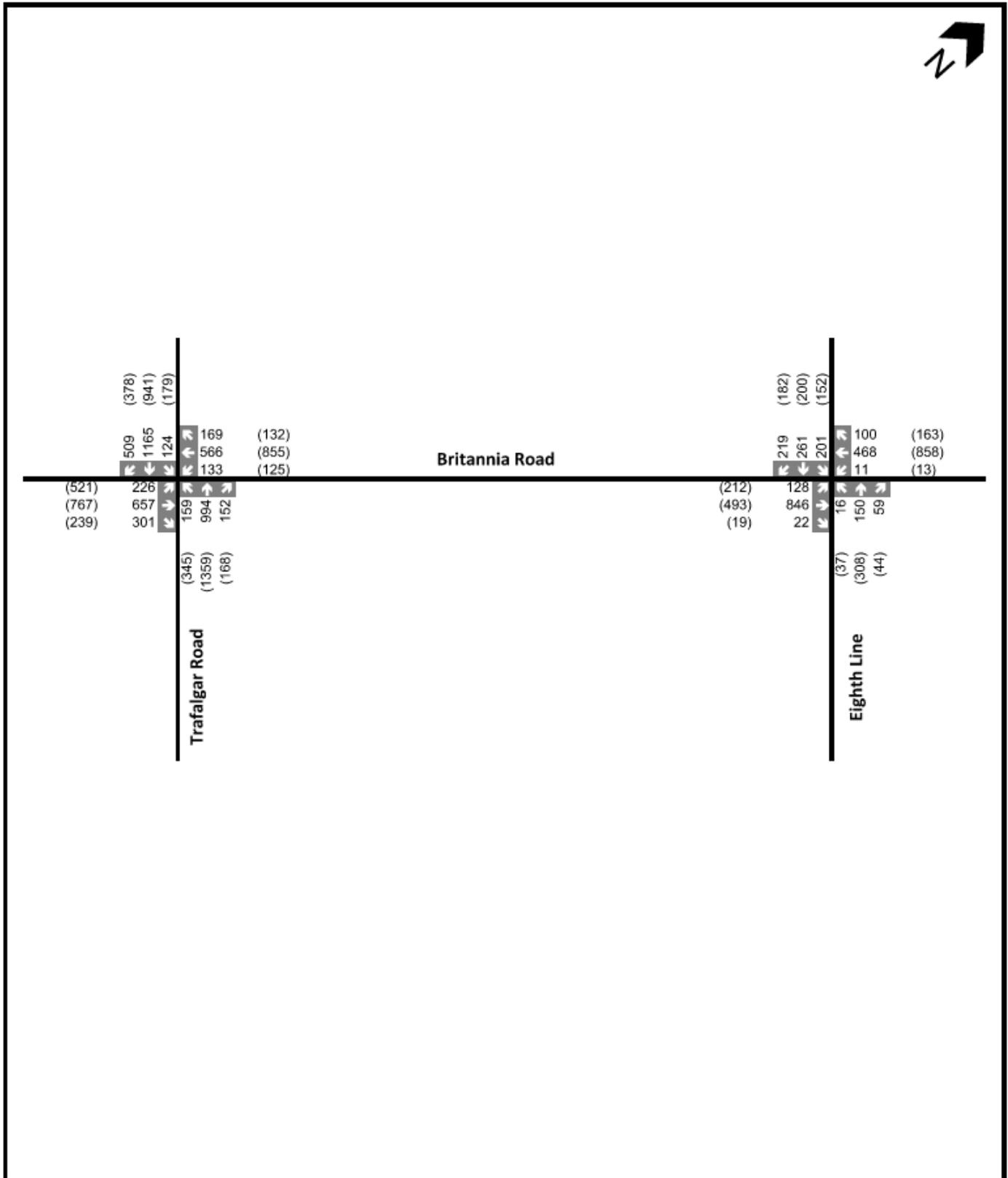


Figure 5-3

Figure 5-3 2041 Future Background Volumes

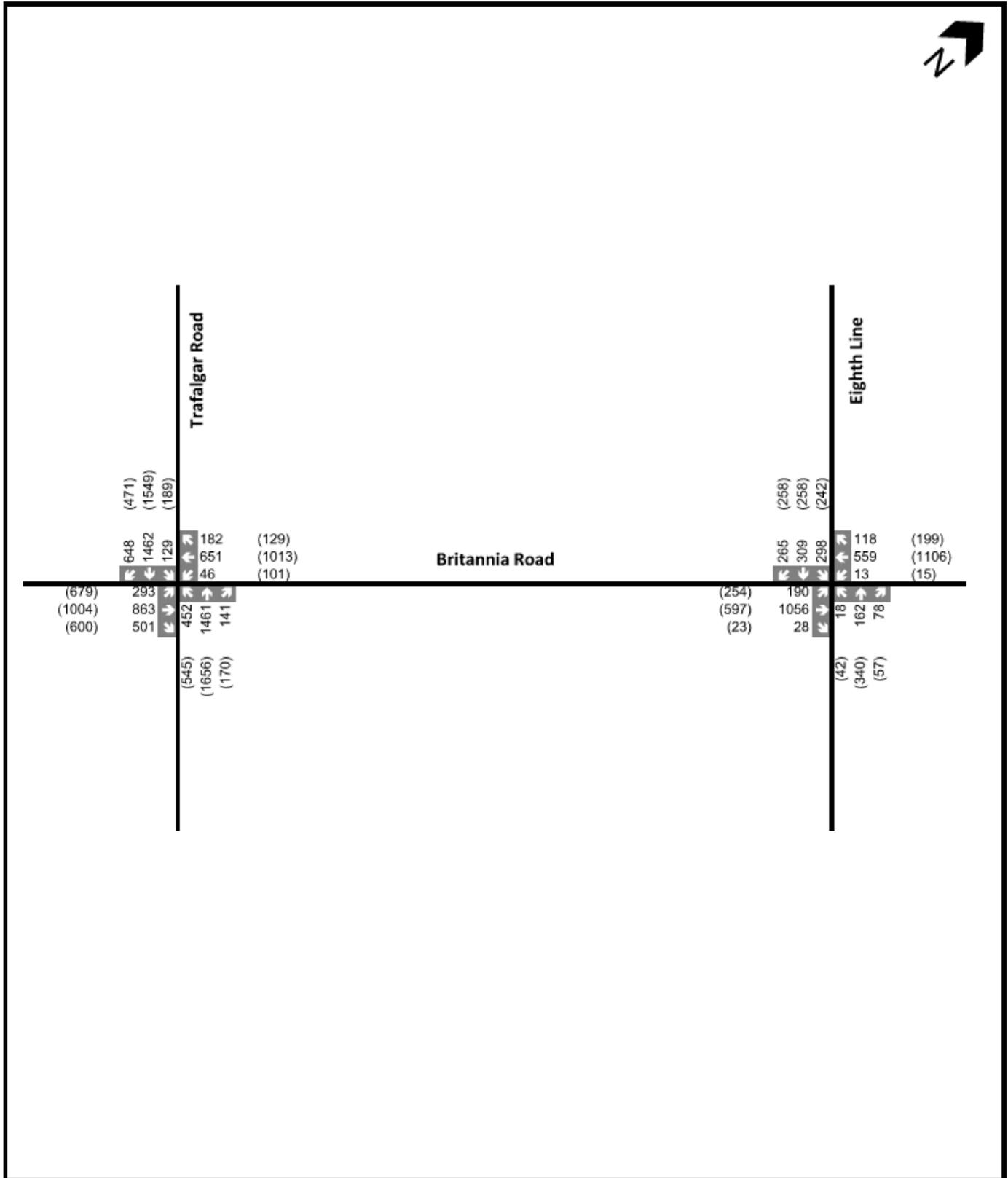


Figure 5-4

5.6 Future Active Transportation Network

The active transportation network planned across the RNA and Trafalgar Tertiary Plan area consists of a range of facilities including sidewalks, on-street bicycle lanes, multi-use paths (MUPs), and off-road trails. These elements are intended to support walking and cycling connections throughout the community.

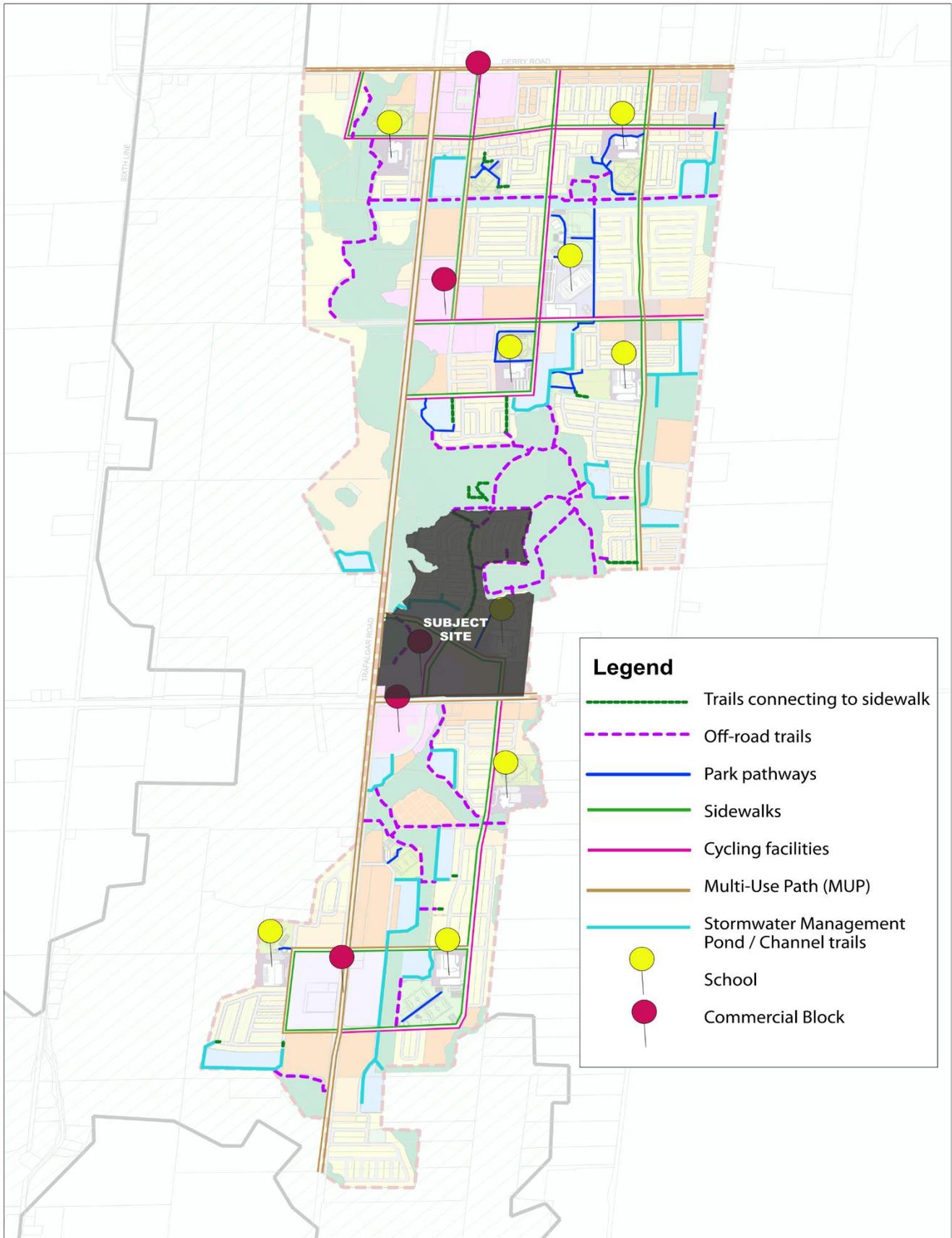
MUPs are identified along both sides of Trafalgar Road and Britannia Road, aligning with Halton Region's 2015 Active Transportation Master Plan. These facilities are expected to enhance connections across the Tertiary Plan area and will be confirmed through future stages of the Municipal Class Environmental Assessment process. Eighth Line, located to the east of the Mattamy site, is also planned to include active transportation infrastructure.

Within the RNA, the road network includes various classifications of collector roads with right-of-way (ROW) widths ranging from 20 to 26 metres. These collectors are planned to accommodate active transportation facilities such as sidewalks and on-street bicycle lanes, with specific configurations depending on the road classification and ROW. The Mattamy site includes two collector roads, Collector P (24m ROW) and Collector M (20m ROW), which will contribute to the broader connectivity framework.

An off-road trail network is also proposed, offering connections between residential areas and key community amenities including parks, schools, and the Natural Heritage System. These trails complement the on-street facilities and are planned to integrate with both internal and external active transportation systems.

Figure 5-5 (from the RNA Study) illustrates the proposed active transportation and trail networks, highlighting key connectivity points and community amenities.

Figure 5-4 Active Transportation Network



5.7 Future Transit Network

As identified in Halton Region's 2011 TMP, a future GO Train Station on the Milton line is to be located north of the subject lands. The proposed location is to be located along the existing Milton Line railway and its crossing of Trafalgar Road to the north of Derry Road. This future GO Train Station has also been identified within the TMP for the Trafalgar Agerton Secondary Plan area. The construction of a GO Train station at this location will provide future residents of the subject site access to regional, higher-order transit within the immediate vicinity of the site.

Based on Figure 7.1 – Transit Servicing Concept in Halton Region's TMP (attached in **Appendix F**), Trafalgar Road has been identified as a higher order transit corridor with conceptual plans for transit in reserved right of way. Similarly, Britannia Road within the MP4 RNA study area (south of the subject site) has also been identified as a regional higher order transit corridor and has been planned in concept to have semi-exclusive and/or exclusive right of way for transit operations. The Trafalgar Tertiary Plan has located higher density development along Trafalgar Road to provide the needed density of residences and employment uses to support the planned higher order transit corridor.

The planned regional higher order transit corridors within the broader Trafalgar Agerton Secondary Plan area could be further supplemented by local transit routes. These local transit routes would serve the residential areas and neighbourhood mixed use nodes while also providing connections to regional transit, such as GO Train and bus routes at the future GO Station within the Agerton lands. Provision of local transit routes through the subject site and the MP4 RNA area will be confirmed through the development application process.

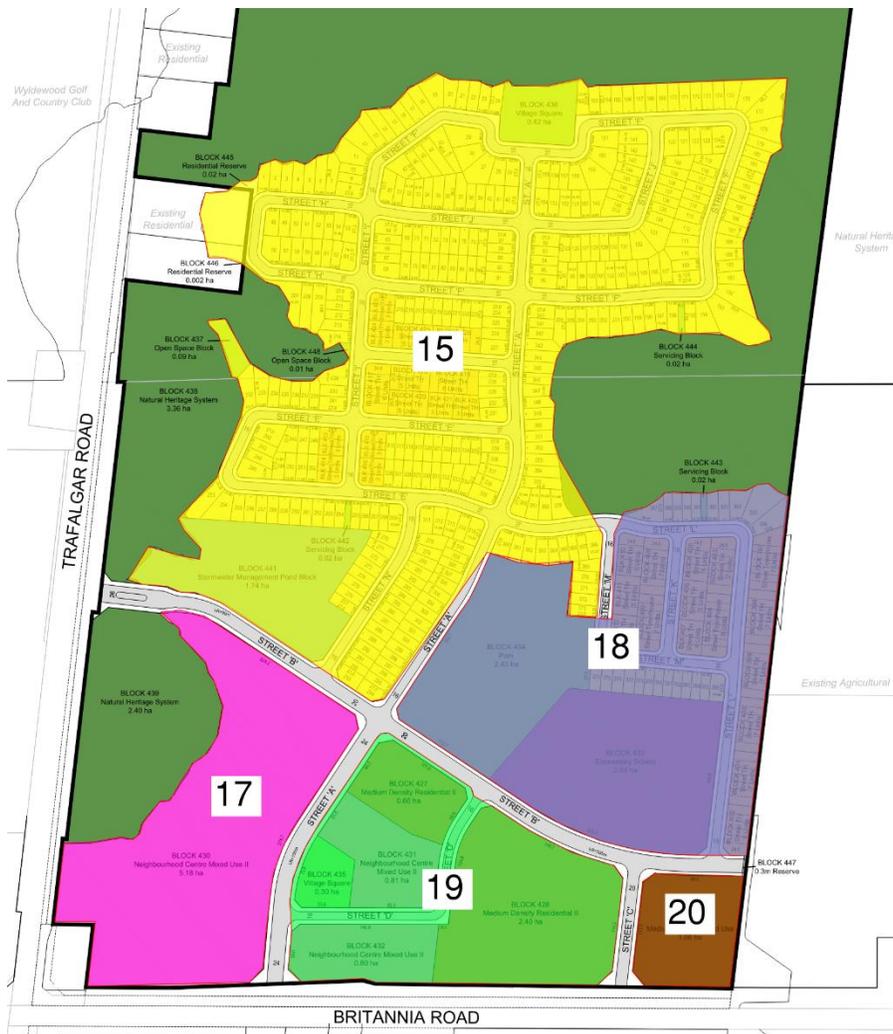
6 SITE GENERATED TRAFFIC

6.1 Traffic Analysis Zones

The overall Trafalgar Tertiary Plan was divided into a total of 38 Traffic Analysis Zones (TAZs) for trip generation and assignment. The TAZ boundaries are generally defined by the collector road network and Natural Heritage System features, mostly conforming to the shape of future development blocks where possible.

5 out of total 38 TAZs within the White Squadron lands are identified as the proposed subdivision for trip generation purposes. The resulting trips were then assigned to the collector road and broader transportation network based on each TAZ's location within the Tertiary Plan. The boundaries of these 7 TAZs are illustrated in **Figure 6-1**.

Figure 6-1 Traffic Analysis Zones (TAZ) for White Squadron Lands



6.2 Mode Split

A non-automobile mode split reduction of 28% was applied to trips generated by all land use types in the Tertiary Plan area. The 28% mode split reduction is in line with that applied in the Trafalgar TMP, which was explained as being applied “as per the 2031 targets specified by the Region’s 2011 TMP (5 percent active transportation, 20 percent transit, and 3 percent other transportation demand management)”.

Taking into account the future active transportation infrastructure, trail network, High-Occupancy-Vehicle (HOV) / Transit priority lanes, and Trafalgar GO Stations that will be implemented within, or in close proximity to, the Trafalgar Tertiary Plan, it is TYLin’s opinion that a mode split reduction of 28% is reasonable.

6.3 Site Trip Generation

As discussed in **Section 2.4**, the proposed subdivision consists of detached house and townhouse dwellings, medium density residential units, neighbourhood centre, retail & commercial areas, school and lands with other usage. For analysis purposes, the types of development are categorized using Institute of Transportation Engineers (ITE) Land Use Code (LUC) and summarized in the **Table 6-1**.

Table 6-1 White Squadron Draft Plan– Overall Site Statistics for Trip Generation

Land Use Type	Proposed Land Use	ITE Land Use Code	Parameters	Unit
Residential	Detached House Dwellings (of all types)	Single Family Detached (LUC 210)	397	Units
	Townhouse Dwellings (of all types)	Multifamily Housing (Low-rise) (LUC 220)	395	Units
	Medium Density Residential II	Multifamily Housing (Mid-rise) (LUC 221)	50 ¹	Units
	Medium Density Mixed Use			
	Neighbourhood Centre Mixed Use II	Multifamily Housing (High-rise) (LUC 222)	1,371 ¹	Units
Total Residential Units			2,213	Units
Non-Residential	Retail & Commercial Areas	Shopping Center (LUC 820)	66,000 ¹	GFA (ft ²)
	School	Elementary School (LUC 520)	725 ¹	Students

Note 1 – The design parameters for medium density residential units, mixed use residential units, shopping center and Elementary School are to be confirmed in the later stage. To ensure consistency, the GFA and number of students adopted in RNA study were applied for analysis of this TIS.

Site trips of different zones, illustrated in **Figure 6-1**, were estimated using the ITE 11th Edition Trip Generation Manual using LUCs as noted in **Table 6-1**. The detailed estimated trip generation of the development from each zone are summarized in **Table 6-2** to **Table 6-6**.

Table 6-2 Zone 15 – Trip Generation Summary

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing ITE LUC 210 374 Units	Trip Generation Equation or Average Rate	Ln(T) = 0.91Ln(X) + 0.12			Ln(T) = 0.94Ln(X) + 0.27		
	Directional Split	25%	75%	-	63%	37%	-
	Gross Trips	62	185	247	216	127	343
	Mode Split Reduction (28%)	-17	-52	-69	-60	-36	-96
	Net Trips	45	133	178	156	91	247
Multi-family Housing (Low-rise) ITE LUC 220 57 Units	Trip Generation Equation or Average Rate	T = 0.31(X) + 22.85			T = 0.43(X) + 20.55		
	Directional Split	24%	76%	24%	76%	24%	76%
	Gross Trips	10	31	10	31	10	31
	Mode Split Reduction (28%)	-3	-9	-3	-9	-3	-9
	Net Trips	7	22	7	22	7	22
Total Trips Zone 15		52	155	207	176	103	279

Table 6-3 Zone 17 – Trip Generation Summary

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Multi-family Housing (Low-rise) ITE LUC 220 60 Units	Trip Generation Equation or Average Rate	T = 0.31(X) + 22.85			T = 0.43(X) + 20.55		
	Directional Split	24%	76%	-	63%	37%	-
	Gross Trips	10	31	41	29	17	46
	Mode Split Reduction (28%)	-3	-9	-12	-8	-5	-13
	Net Trips	7	22	29	21	12	33
Multi-family Housing (High-rise) ITE LUC 222 849 Units	Trip Generation Equation or Average Rate	T = 0.22(X) + 18.85			T = 0.26(X) + 23.12		
	Directional Split	26%	74%	-	62%	38%	-
	Gross Trips	54	152	206	151	93	244
	Mode Split Reduction (28%)	-15	-43	-58	-42	-26	-68
	Net Trips	39	109	148	109	67	176
Shopping Center	Trip Generation Equation or Average Rate	0.84			Ln(T) = 0.72Ln(X) + 3.02		

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
ITE LUC 820 25,000 sq.ft. GFA	Directional Split	62%	38%	-	48%	52%	-
	Gross Trips	13	8	21	100	108	208
	Mode Split Reduction (28%)	-4	-2	-6	-28	-30	-58
	Pass-by (34% PM)	0	0	0	-24	-24	-48
	Net Trips	9	6	15	48	54	102
Total Trips Zone 17		55	137	192	178	133	311

Table 6-4 Zone 18 – Trip Generation Summary

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing ITE LUC 210 23 Units	Trip Generation Equation or Average Rate	$\text{Ln}(T) = 0.91\text{Ln}(X) + 0.12$			$\text{Ln}(T) = 0.94\text{Ln}(X) + 0.27$		
	Directional Split	25%	75%	-	63%	37%	-
	Gross Trips	5	15	20	16	9	25
	Mode Split Reduction (28%)	-1	-4	-5	-4	-3	-7
	Net Trips	4	11	15	12	6	18
Multi-family Housing (Low-rise) ITE LUC 220 98 Units	Trip Generation Equation or Average Rate	$T = 0.31(X) + 22.85$			$T = 0.43(X) + 20.55$		
	Directional Split	24%	76%	24%	76%	24%	76%
	Gross Trips	13	40	13	40	13	40
	Mode Split Reduction (28%)	-4	-11	-4	-11	-4	-11
	Net Trips	9	29	9	29	9	29
Elementary School ITE LUC 520 725 Students	Trip Generation Equation or Average Rate	0.74			0.16		
	Directional Split	54%	46%	-	46%	54%	-
	Gross Trips	290	247	537	53	63	116
	Mode Split Reduction (28%)	-81	-69	-150	-15	-18	-33
	Net Trips	209	178	387	38	45	83
Total Trips Zone 18		222	218	440	79	68	147

Table 6-5 Zone 19 – Trip Generation Summary

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Multi-family Housing (Low-rise) ITE LUC 220 120 Units	Trip Generation Equation or Average Rate	T = 0.31(X) + 22.85			T = 0.43(X) + 20.55		
	Directional Split	24%	76%	-	63%	37%	-
	Gross Trips	14	46	60	45	27	72
	Mode Split Reduction (28%)	-4	-13	-17	-13	-8	-21
	Net Trips	10	33	43	32	19	51
Multi-family Housing (Mid-rise) ITE LUC 221 50 Units	Trip Generation Equation or Average Rate	T = 0.44(X) - 11.61			T = 0.39(X) + 0.34		
	Directional Split	23%	77%	-	61%	39%	-
	Gross Trips	2	8	10	12	8	20
	Mode Split Reduction (28%)	-1	-2	-3	-3	-2	-5
	Net Trips	1	6	7	9	6	15
Multi-family Housing (High-rise) ITE LUC 222 522 Units	Trip Generation Equation or Average Rate	T = 0.22(X) + 18.85			T = 0.26(X) + 23.12		
	Directional Split	26%	74%	-	62%	38%	-
	Gross Trips	35	99	134	99	60	159
	Mode Split Reduction (28%)	-10	-28	-38	-28	-17	-45
	Net Trips	25	71	96	71	43	114
Shopping Center ITE LUC 820 25,000 sq.ft. GFA	Trip Generation Equation or Average Rate	0.84			Ln(T) = 0.72Ln(X) + 3.02		
	Directional Split	62%	38%	-	48%	52%	-
	Gross Trips	13	8	21	100	108	208
	Mode Split Reduction (28%)	-4	-2	-6	-28	-30	-58
	Pass-by (34% PM)	0	0	0	-24	-24	-48
	Net Trips	9	6	15	48	54	102
Total Trips Zone 19		45	116	161	160	122	282

Table 6-6 Zone 20 – Trip Generation Summary

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Multi-family Housing (Low-rise) ITE LUC 220 60 Units	Trip Generation Equation or Average Rate	T = 0.31(X) + 22.85			T = 0.43(X) + 20.55		
	Directional Split	24%	76%	-	63%	37%	-
	Gross Trips	10	31	41	29	17	46
	Mode Split Reduction (28%)	-3	-9	-12	-8	-5	-13
	Net Trips	7	22	29	21	12	33
Shopping Center ITE LUC 820 16,000 sq.ft. GFA	Trip Generation Equation or Average Rate	0.84			Ln(T) = 0.72Ln(X) + 3.02		
	Directional Split	62%	38%	-	48%	52%	-
	Gross Trips	8	5	13	72	79	151
	Mode Split Reduction (28%)	-2	-1	-3	-20	-22	-42
	Pass-by (34% PM)	0	0	0	-18	-18	-36
	Net Trips	6	4	10	34	39	73
Total Trips Zone 20		13	26	39	55	51	106

Table 6-7 White Squadron Lands Total – Trip Generation Summary

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total Trips	Gross Trips	539	906	1,445	990	756	1,746
	Mode Split Reduction (28%)	-152	-254	-406	-276	-213	-489
	Pass-by (34% PM)	0	0	0	-66	-66	-132
	Net Trips	387	652	1,039	648	477	1,125
Adopted Trips in White Squadron TIS		387	652	1,039	648	477	1,125
Adopted Trips (TAZ 15, 17-20) in Trafalgar RNA		376	685	1,061	674	489	1,163
Net Difference		+11	-33	-22	-26	-12	-38

As summarized in **Table 6-7**, a total of 1,039 net auto trips, consisting of 387 inbound and 652 outbound trips, are estimated to be generated by the White Squadron Lands during the weekday AM peak hour. During the weekday PM peak hour, 648 inbound and 477 outbound net auto site trips are estimated, totaling 1,125 trips.

The updated White Squadron Lands (TAZs 15, 17–20) trip generation would result in a net difference of -22 and -38 two-way trips in the AM and PM when compared to MP4 RNA Study.

6.4 Site Trip Distribution and Assignment

To ensure consistency, the site trip distribution and assignment adopted for this TIS is sourced from the RNA study conducted for the MP4TC area. The key assumptions made in the RNA study are as follows.

Due to the current rural / greenfield status of the White Squadron lands, the Transportation Tomorrow Survey (TTS) data would not properly reflect the future land uses and associated travel patterns within the study area. Further, nearby future infrastructure improvements, the proposed GO Station, and other proposed developments will all contribute to changes in existing traffic patterns within the vicinity of the study area.

The Trafalgar TMP estimated the trip distribution of the Trafalgar and Agerton Secondary Plans using the Region’s 2031 EMME model. The external distribution was broken down by locations in the GTA, as summarized in Table 4-7 of the 2022 Trafalgar TMP Addendum, which is provided in **Appendix H**. TYLin used Table 4-7 as a base for trip distribution for the RNA area (also applied to this TIS study area) to remain in line with data upon which the Trafalgar TMP was based. TYLin’s distribution calculations based on the percentages and destinations in the TMP’s Table 4-7 have also been provided in **Appendix H**.

Table 6-8 summarizes the overall trip distribution for the TIS study area, while **Table 6-9** details the trip distribution at specific external gateways along the study area boundaries.

Table 6-8 Overall Directional Trip Distribution

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
North	21.7%	26.7%	26.7%	21.7%
South	15.3%	14.5%	14.5%	15.3%
East	19.1%	14.8%	14.8%	19.1%
West	43.9%	44.0%	44.0%	43.9%
Total	100%	100%	100%	100%

Table 6-9 External Gateway Trip Distribution

Direction	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
Trafalgar Road to/from North	21.74%	26.74%	26.74%	21.74%
Derry Road to/from East	5.25%	4.12%	4.12%	5.25%
Britannia Road to/from East	8.45%	6.52%	6.52%	8.45%
Lower Baseline to/from East	5.39%	4.11%	4.11%	5.39%
Trafalgar Road to/from South	15.28%	14.47%	14.47%	15.28%
Lower Baseline to/from West	1.76%	1.91%	1.91%	1.76%
Britannia Road to/from West	28.53%	26.87%	26.87%	28.53%
Derry Road to/from West	13.60%	15.26%	15.26%	13.60%
Total	100%	100%	100%	100%

6.5 Site Trip Assignment

Site assignment was based on a TAZ-specific level, as trip generation estimates were tailored to each TAZ’s proposed land uses and residential unit types. Trips were further subdivided into internal and external trips for assignment purposes.

The location of existing and future study intersections throughout the TIS study area is outlined in **Figure 6-2**, providing the intersection ID number assigned to each intersection and collector road names to be used in conjunction with site traffic volume figures.

The estimated site traffic volumes at the intersections in study area are provided in **Figure 6-2**.

6.5.1 External Assignment

External trips to/from each TAZ were assigned first to a collector road within or adjacent to the TAZ and then traveled via logical routing to one of the eight external road network gateways, dependent upon the direction of the trip and overall distribution of trips.

6.5.2 Internal Assignment

Internal site assignment was applied to non-residential land uses such as schools and commercial blocks that would attract vehicle trips from within the Tertiary Plan’s boundaries. The internal assignment of site trips did not further reduce the total net trips generated by the Tertiary Plan, it merely kept a portion of the trips internal to the site instead of 100% of the net trips being assigned to external road network gateways.

In the case of land uses for which internal assignment applied, such as schools, a “catchment area” approach as taken. For example, inbound and outbound internal trips generated by the school were assigned to/from each TAZ in the catchment area proportionate to the number of residential units in each TAZ.

Completing internal assignments should be considered a conservative measure, particularly when it comes to the design of the collector road intersections and assessment of capacity. Internal assignment accounts for trips completed between TAZs (between residential and non-residential land uses), and not just commuter traffic in and out of the Tertiary Plan area. This results in more varied travel patterns throughout the collector road network, ensuring the collector roads and intersections have been designed with sufficient capacity for both internal and external traffic travel patterns.

Figure 6-2 Study Intersections Key Map – Future Conditions

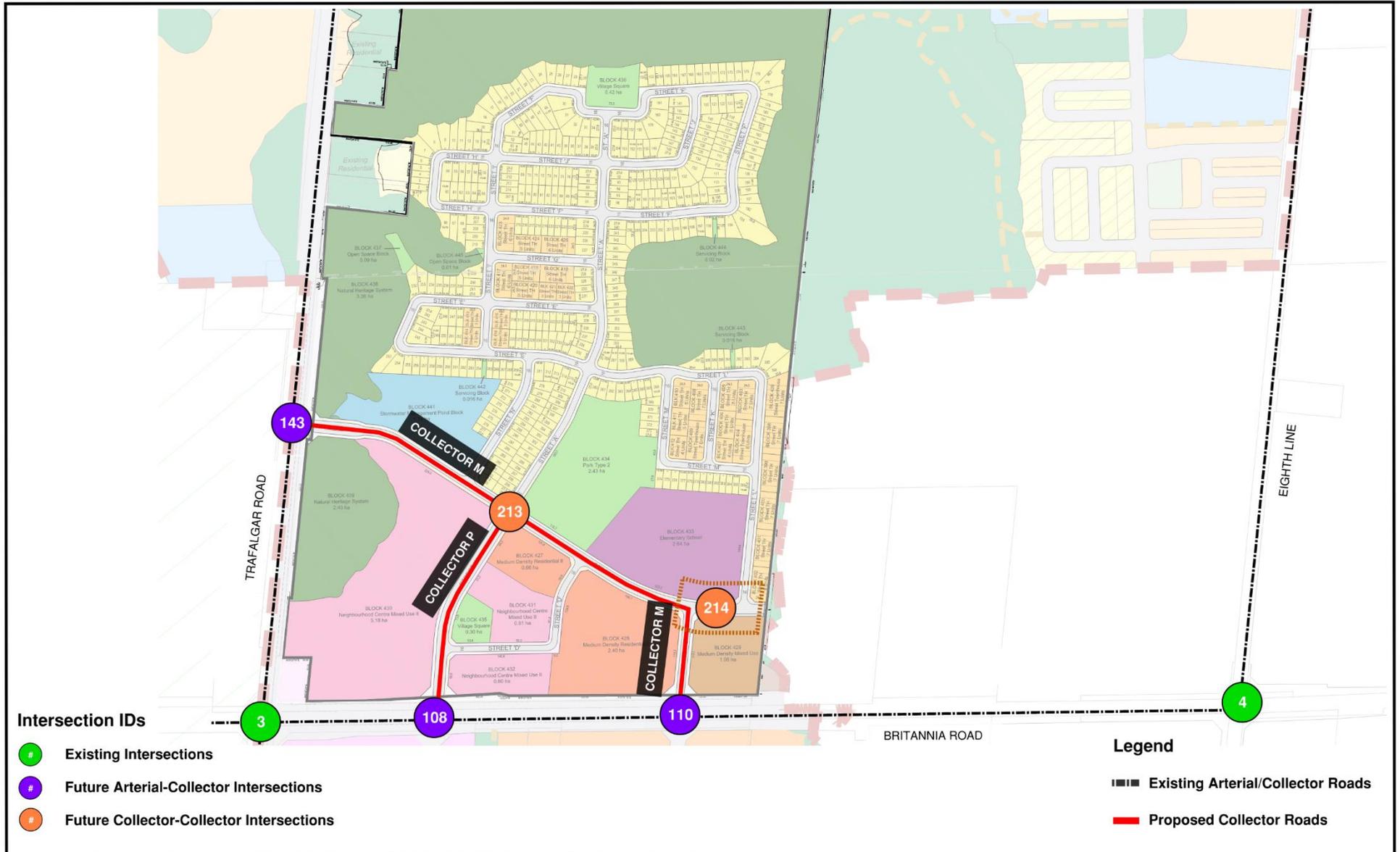
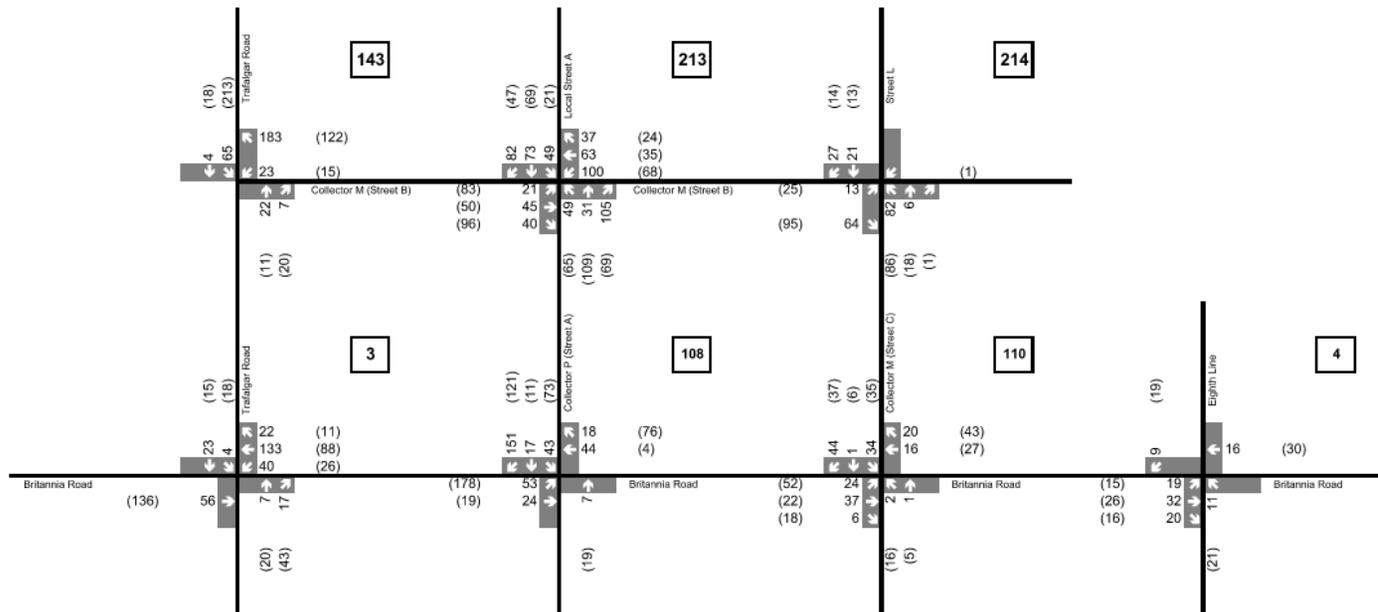


Figure 6-3 Site Traffic Volumes



Legend
 xx A.M. Peak Hour Traffic
 (xx) P.M. Peak Hour Traffic

Figure 6-3
Site Traffic Volumes

7 FUTURE CONDITIONS

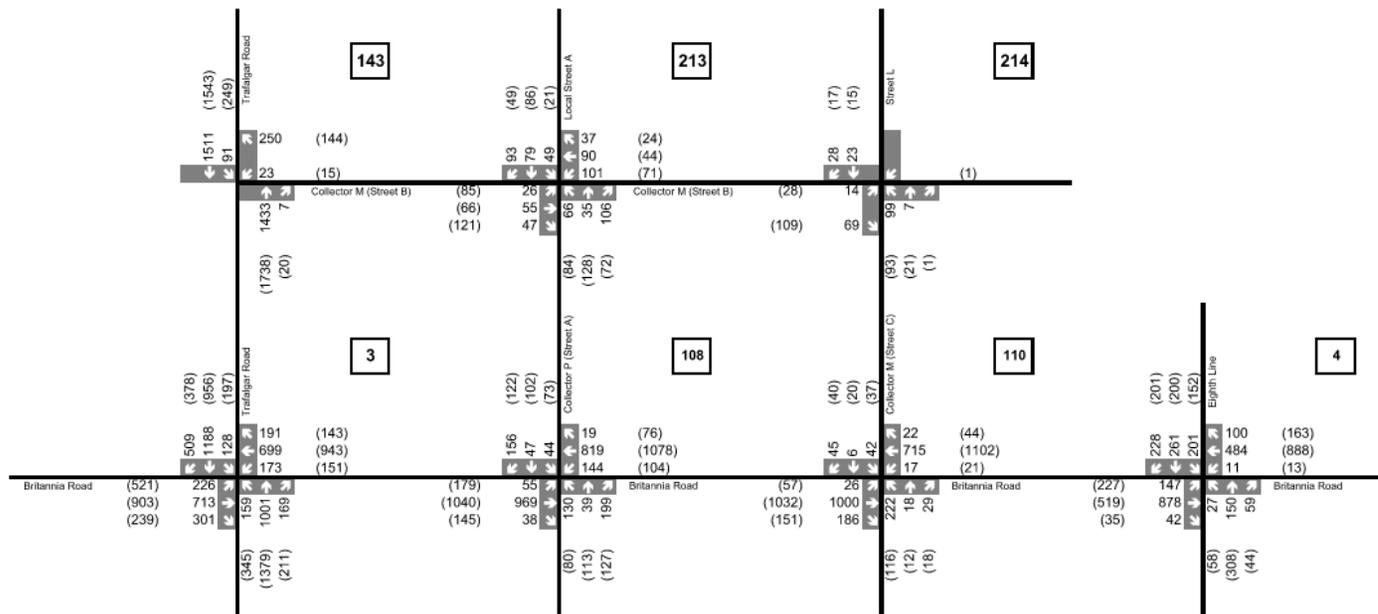
7.1 2031 Future Total

The 2031 future total volumes were developed by combining the 2031 future background volumes with the estimated site generated traffic. The resulting 2031 future total traffic volumes are provided in **Figure 7-1**.

7.2 2041 Future Total

The 2041 future total volumes were developed by combining the 2041 future background volumes with the estimated site generated traffic, Agerton development trips, and the background traffic rerouting adjustments derived from the March 2022 Trafalgar TMP Addendum. The resulting 2041 future total traffic volumes are provided in **Figure 7-2**.

Figure 7-1 2031 Future Total Traffic Volumes

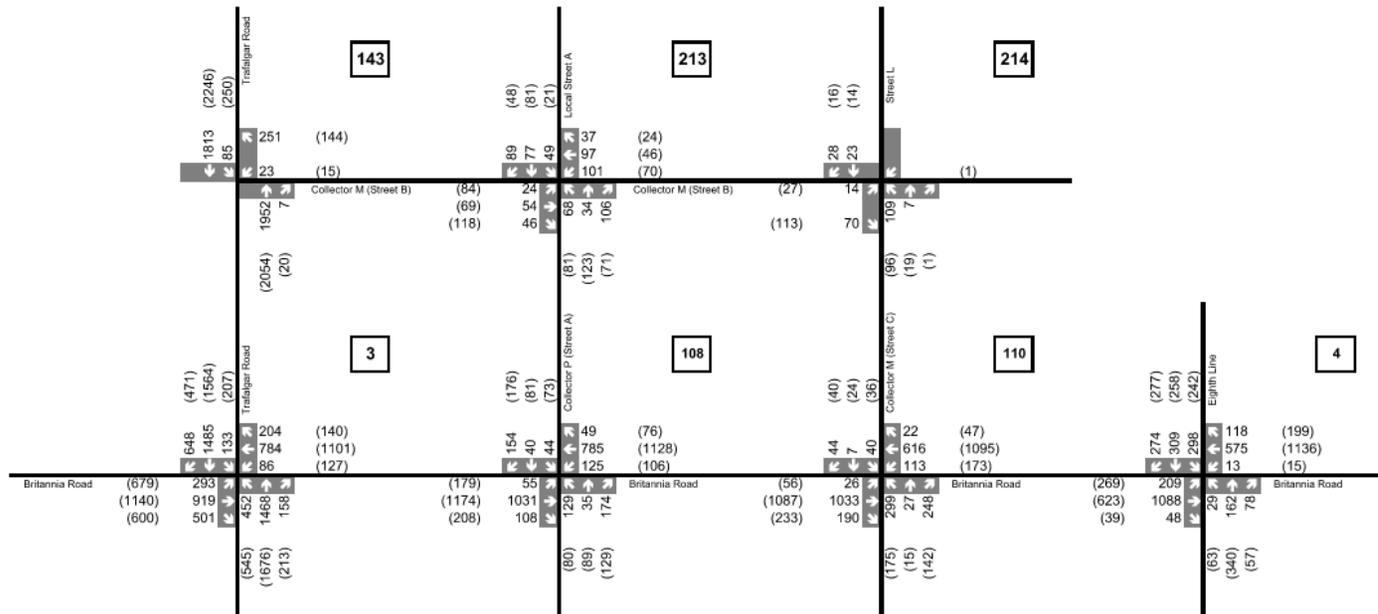


Legend
xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

Figure 7-1

2031 Future Total Traffic Volumes

Figure 7-2 2041 Future Total Traffic Volumes



Legend
xx A.M. Peak Hour Traffic
(xx) P.M. Peak Hour Traffic

Figure 7-2

2041 Future Total Traffic Volumes

7.3 Lane Configuration Modifications

Based on the recommendations outlined in the Milton Transportation Master Plan (TMP) and the proposed lane configuration modifications detailed in the RNA for the MP4TC area, phased improvements have been adopted for the study intersections.

For the 2031 horizon year, Phase 1 improvements, including the implementation of a High Occupancy Vehicle (HOV) curb lane on the two regional roads (Trafalgar Road and Britannia Road), have been incorporated into both the future background and future total scenarios. Detailed improvement and associated responsibility for 2031 scenario are summarized in **Table 7-1** and illustrated in **Figure 7-3**.

Table 7-1 2031 Future Lane Configuration Modification and Responsibility

Intersection	Approach	Modification	Responsibility
Existing Intersections			
Trafalgar Road & Britannia Road	Eastbound and Westbound	▶ Dual left turn lane	Region
	Northbound and Southbound	▶ 1 additional through lane (HOV) ▶ Auxiliary right turn lane	
Britannia Road & Eighth Line	Westbound	▶ Auxiliary right turn lane	Region / Town / MP4 Developers
Arterial-to-Collector Intersections			
Britannia Road & Collector P	Eastbound and Westbound	▶ Shared right turn movement ▶ Auxiliary left turn lane	MP4 Developers
	Northbound and Southbound	▶ 1 Shared through/right turn lane ▶ Auxiliary left turn lane	
Britannia Road & Collector M	Eastbound and Westbound	▶ Shared right turn movement ▶ Auxiliary left turn lane	MP4 Developers
	Northbound and Southbound	▶ 1 Shared through/right turn lane ▶ Auxiliary left turn lane	
Trafalgar Road & Collector M	Northbound and Southbound	▶ 1 additional through lane (HOV)	Region
	Northbound	▶ Shared right turn movement	MP4 Developers
	Southbound	▶ Auxiliary left turn lane	
	Westbound	▶ Single lane with shared left/right	

Intersection	Approach	Modification	Responsibility
		movements	
Collector-to-Collector Intersections			
Local Street A / Collector P & Collector M	All directions	▶ Single lane approach (shared all movements)	MP4 Developers
Street L / Collector M	Eastbound	▶ Single lane with shared left/right movements	
	Northbound	▶ 1 Shared through/left turn lane	
	Southbound	▶ 1 Shared through/right turn lane	

For the 2041 horizon year, the full build-out improvements identified in the MP4TC, along with associated improvements related to the Agerton developments, have been incorporated into both the future background and future total traffic scenarios. The 2041 lane configuration modifications and responsibilities are summarized in **Table 7-2** and illustrated in **Figure 7-4**.

Table 7-2 2041 Future Lane Configuration Modification and Responsibility

Intersection	Approach	Modification	Responsibility
Existing Intersections			
Trafalgar Road & Britannia Road	Northbound and Southbound	▶ Dual left-turn lanes	Region

Figure 7-3 2031 Future Total Lane Configuration

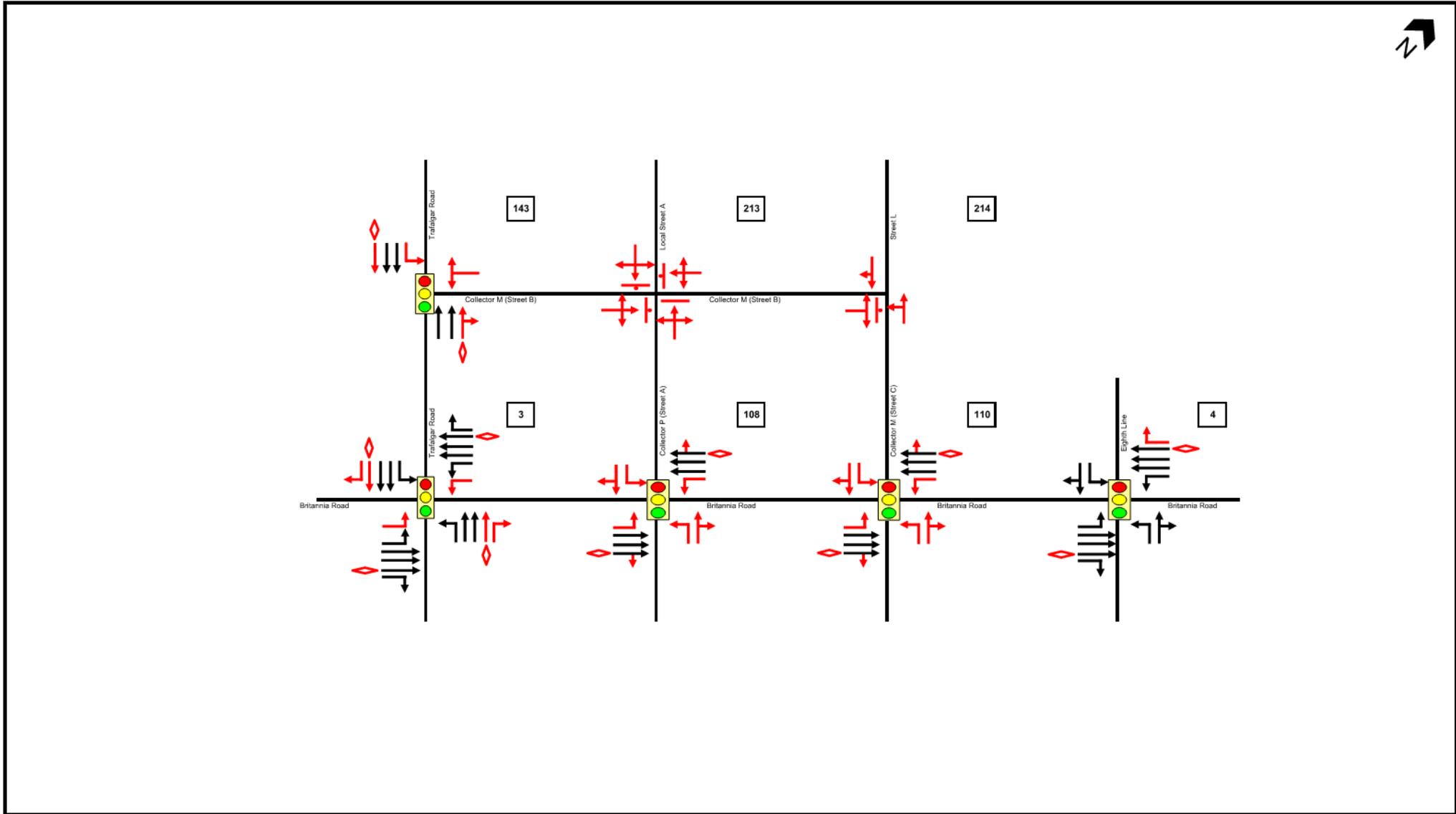
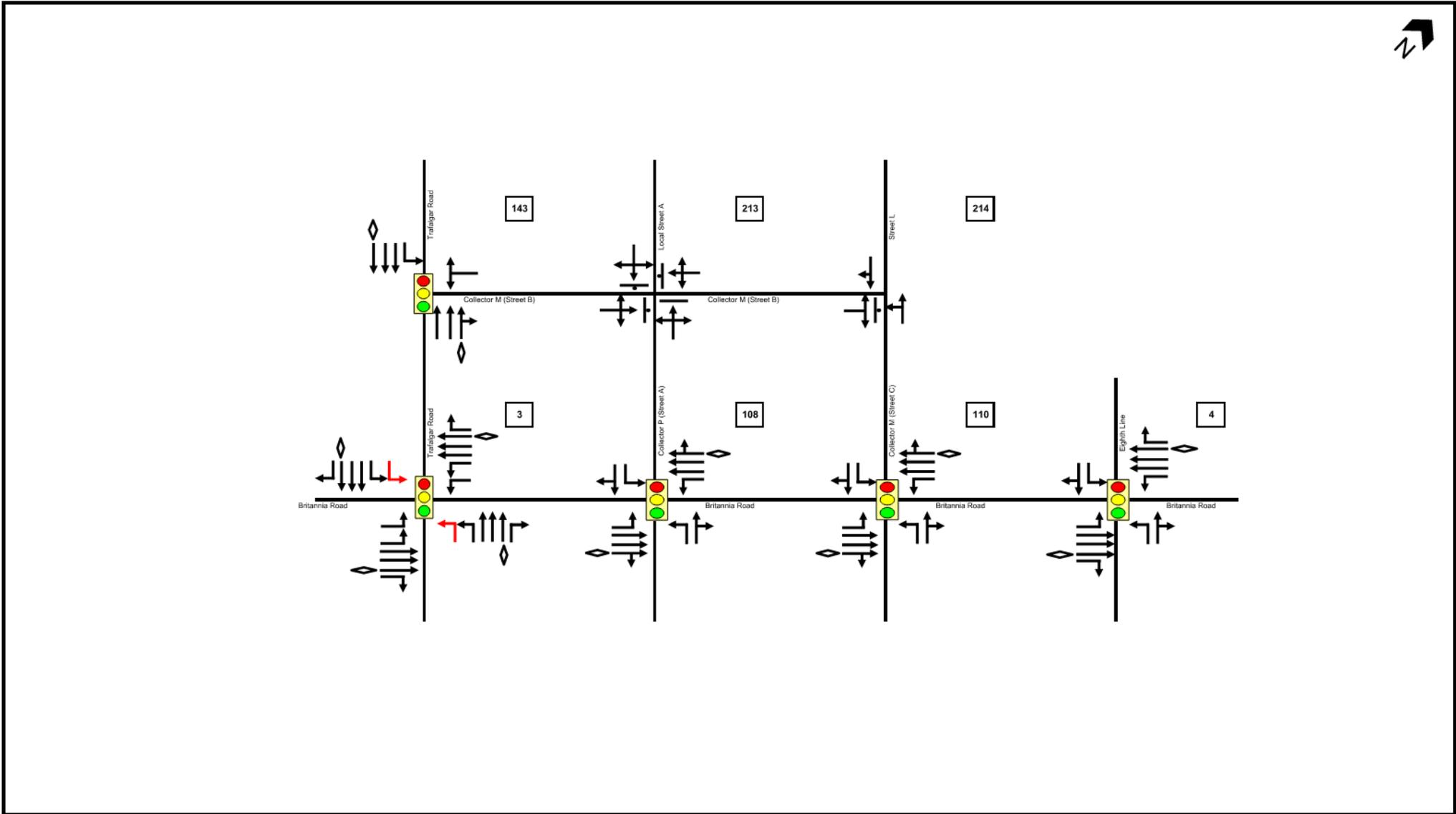


Figure 7-4 2041 Future Total Lane Configuration



8 TRAFFIC CAPACITY ANALYSIS

The capacity analysis identifies how well the existing and proposed intersections are operating and how they are expected to operate in the future. The analysis contained in this report utilized the Highway Capacity Manual (HCM) 2000 techniques within the Synchro Version 11 Software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement.

The analysis includes identification of all intersections and for all movements; v/c ratios, LOS indicators and 95th percentile queue lengths. 'Critical' intersections and movements, as defined by Halton Region, include:

Signalized Intersections

- ▶ v/c ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;
- ▶ v/c ratios for exclusive turning movements increased to 0.95 or above; or
- ▶ queues for an individual movement are projected to exceed available turning lane storage.

Unsignalized Intersections

- ▶ LOS, based on average delay per vehicle, on individual movements exceeds LOS 'D'; or
- ▶ The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

The following tables summarize the capacity analysis results for the study intersections during the weekday AM and PM peak hours under baseline, future background and future total traffic conditions. Detailed Synchro reports are attached in **Appendix I**, **Appendix J** and **Appendix K** respectively.

8.1 Baseline Conditions

Under baseline 2025 conditions, some assumptions were made based on the signal timing plans (STP) received from the Region. The details of these assumptions and any related modifications are presented in **Table 8-1**. Existing Signal Timing Plans are provided in **Appendix E**. It should be noted that calibrations applied to existing intersections by the Trafalgar TMP (such as lost time adjustments) have also been applied to the analysis to remain consistent with prior analysis efforts of the Trafalgar TMP.

An excerpt of the Trafalgar TMP calibrations is attached in **Appendix E** and summarized below for each intersection to calibrate the existing baseline conditions:

► **Trafalgar Road and Britannia Road**

- Lost time adjustment of -1.0 seconds for protected/permitted left-turn movements and -2.0 seconds for through or right-turn movements in the PM peak hour; and
- Phasing splits were optimized in the peak hour

Existing Peak Hour Factors (PHF) from the TMC data was applied to the baseline analysis.

The capacity results for study intersections during the weekday AM and PM peak hours under baseline traffic conditions are summarized in **Appendix I**.

Table 8-1 Baseline Signal Timing Interpretation and Modifications

Intersection	AM Peak Hour	PM Peak Hour
All	"Max" timings assumed to be maximum split timings and not maximum green time. Max 1 and Max 2 were used for the AM and PM peak periods accordingly.	
	If a vehicle extension was not identified for a particular phase, a default value of 3 seconds was implemented.	
Trafalgar Road & Britannia Road	Assumed a 104-second cycle length.	Assumed a 130-second cycle length.
	Modified the "Flash don't Walk" times to 26 seconds for NB/SB phases (phases 2 and 6) and 29 seconds for EB/WB phases (phases 4 and 8).	
	Added 4 seconds to the total split time for the southbound through phase (phase 6) to have a total split time of 45 seconds.	-
	-	Added 14 seconds to the total split time for the northbound through phase (phase 2) to have a total split time of 64 seconds.
	-	Added 15 seconds to the total split time for the westbound through phase (phase 8) to have a total split time of 55 seconds.
	Total split for eastbound movement (phase 4) less than the minimum split warning.	
Britannia Road & Eighth Line	Assumed a 100-second cycle length.	

Table 8-2 Baseline Capacity Analysis Summary

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Trafalgar Road & Britannia Road (signalized)	<i>Overall</i>	<i>0.54</i>	<i>25</i>	<i>C</i>	<i>0.61</i>	<i>28</i>	<i>C</i>
	EBL	0.20	31	C	0.45	45	D
	EBT	0.42	32	C	0.40	40	D
	EBR	0.25	31	C	0.13	39	D
	WBL	0.43	24	C	0.40	30	C
	WBT	0.16	22	C	0.36	30	C
	WBR	0.03	21	C	0.04	28	C
	NBL	0.43	15	B	0.70	19	B
	NBTR	0.60	24	C	0.63	23	C
	SBL	0.26	15	B	0.31	19	B
	SBTR	0.56	24	C	0.45	26	C
Eighth Line & Britannia Road (signalized)	<i>Overall</i>	<i>0.26</i>	<i>8</i>	<i>A</i>	<i>0.24</i>	<i>11</i>	<i>B</i>
	EBL	0.03	6	A	0.04	4	A
	EBT	0.29	7	A	0.11	4	A
	EBR	0.00	6	A	0.00	4	A
	WBL	0.03	6	A	0.02	4	A
	WBTR	0.17	7	A	0.21	5	A
	NBL	0.03	13	B	0.10	35	C
	NBTR	0.15	13	B	0.37	37	D
	SBL	0.17	14	B	0.19	36	D
	SBTR	0.20	14	B	0.29	36	D

Under baseline conditions, all study intersections are generally operating well overall, with acceptable delays and capacity during both the weekday AM and PM peak hours.

8.2 2031 Future Background Conditions

In accordance with the MP4TC RNA study, adjustments to the signal timing plans were implemented for the 2031 horizon year to accommodate the additional traffic generated by the MP4 development in the Phase 1 scenario. For analysis purposes, these modifications were incorporated into the future background scenario to address the increased traffic volumes across

the MP4TC area. A summary of these adjustments is provided in **Table 8-3**.

Table 8-3 2031 Future Background Signal Timing Assumptions and Modifications

Intersection	AM Peak Hour	PM Peak Hour
All	It is noted that several intersections have additional lanes added under future conditions. Therefore, additional phases have been added to the signal timing plans accordingly.	
Trafalgar Road & Britannia Road	Increased cycle length to 140 seconds with optimized splits.	
Britannia Road & Eighth Line	Increased cycle length to 140 seconds with optimized splits.	

HOV / Bus lanes are planned for implementation in 2031, contingent upon the widening of Trafalgar Road and Britannia Road to three lanes in each direction. To simulate the impact of the HOV lane in the SYNCHRO model, a lane utilization factor of 0.80 was applied to through movements on these roads.

For 2031 future background scenario, the intersections of Trafalgar Road at Britannia Road and Eighth Line at Britannia Road were analyzed in SYNCHRO suite using the future lane configurations outlined in **Session 7.3** and **Table 7-1**. The capacity results for study intersections during the weekday AM and PM peak hours are summarized in **Table 8-4**.

Table 8-4 2031 Future Background Capacity Analysis Summary

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Trafalgar Road & Britannia Road (Signalized)	<i>Overall</i>	<i>0.62</i>	<i>34</i>	<i>C</i>	0.87	<i>44</i>	<i>D</i>
	EBL	0.63	63	E	0.88	70	E
	EBT	0.57	47	D	0.48	36	D
	EBR	0.43	45	D	0.15	31	C
	WBL	0.45	78	E	0.48	86	F
	WBT	0.56	42	D	0.74	34	C
	WBR	0.14	65	E	0.08	28	C
	NBL	0.61	42	D	0.92	75	E
	NBT	0.47	11	B	0.81	26	C
	NBR	0.09	1	A	0.15	4	A
	SBL	0.43	23	C	0.81	56	E
	SBT	0.57	30	C	0.74	50	D

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
	SBR	0.41	35	D	0.31	85	F
Eighth Line & Britannia Road (Signalized)	<i>Overall</i>	<i>0.53</i>	<i>29</i>	<i>C</i>	<i>0.69</i>	<i>32</i>	<i>C</i>
	EBL	0.24	14	B	0.57	26	C
	EBT	0.31	17	B	0.19	7	A
	EBR	0.01	12	B	0.01	12	B
	WBL	0.04	20	B	0.04	22	C
	WBT	0.22	21	C	0.43	28	C
	WBR	0.06	20	B	0.10	23	C
	NBL	0.22	39	D	0.19	38	D
	NBTR	0.72	50	D	0.82	57	E
	SBL	0.63	42	D	0.81	67	E
	SBTR	0.81	51	D	0.61	46	D

Under 2031 future background conditions, the Eighth Line at Britannia Road is expected to operate within reserve capacity during both the AM and PM peak hours. Some individual movements are expected to experience LOS 'E' due to increased delays, though these movements remain within capacity.

The intersection of Trafalgar Road at Britannia Road is anticipated to operate with some reserve capacity. Some critical movements are identified as approaching theoretical capacity (i.e., v/c between 0.85 and 1.00). These include the eastbound left-turn and northbound left-turn movements during the PM peak hour, with v/c ratio of 0.88 and 0.92 respectively.

8.3 2031 Future Total Conditions

Under the 2031 future total traffic conditions, no additional adjustment was made to the signal timing plans compared to future background scenario.

The capacity results for existing arterial, arterial-to-collector, and collector-to-collector intersections during the weekday AM and PM peak hours under 2031 future total traffic conditions are summarized in **Table 8-5**.

Table 8-5 2031 Future Total Capacity Analysis Summary

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Existing Arterial Intersections							
Trafalgar Road & Britannia Road (Signalized)	<i>Overall</i>	<i>0.65</i>	<i>37</i>	<i>D</i>	<i>0.89</i>	<i>46</i>	<i>D</i>
	EBL	0.63	63	E	0.88	70	E
	EBT	0.59	46	D	0.56	37	D
	EBR	0.45	44	D	0.15	31	C
	WBL	0.52	76	E	0.56	89	F
	WBT	0.63	40	D	0.81	36	D
	WBR	0.19	42	D	0.09	11	B
	NBL	0.67	50	D	0.93	77	E
	NBT	0.49	12	B	0.84	27	C
	NBR	0.10	1	A	0.19	4	A
	SBL	0.48	30	C	0.87	66	E
	SBT	0.61	37	D	0.76	54	D
SBR	0.44	49	D	0.31	94	F	
Britannia Road & Eighth Line (Signalized)	<i>Overall</i>	<i>0.55</i>	<i>30</i>	<i>C</i>	<i>0.72</i>	<i>33</i>	<i>C</i>
	EBL	0.28	14	B	0.60	27	C
	EBT	0.33	17	B	0.20	9	A
	EBR	0.03	42	D	0.02	20	B
	WBL	0.04	20	B	0.04	23	C
	WBT	0.23	22	C	0.45	29	C
	WBR	0.06	20	B	0.11	24	C
	NBL	0.39	43	D	0.33	40	D
	NBTR	0.72	50	D	0.82	56	E
	SBL	0.63	42	D	0.81	68	E
	SBTR	0.82	52	D	0.64	47	D
Arterial-to-Collector Intersections							
Collector P & Britannia Road (Signalized)	<i>Overall</i>	<i>0.56</i>	<i>17</i>	<i>B</i>	<i>0.78</i>	<i>15</i>	<i>B</i>
	EBL	0.15	3	A	0.78	31	C
	EBTR	0.32	3	A	0.38	4	A

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
	WBL	0.50	15	B	0.47	13	B
	WBTR	0.27	7	A	0.37	4	A
	NBL	0.73	61	E	0.56	47	D
	NBTR	0.44	47	D	0.53	46	D
	SBL	0.37	61	E	0.43	56	E
	SBTR	0.59	65	E	0.75	69	E
Collector M & Britannia Road (Signalized)	<i>Overall</i>	<i>0.48</i>	<i>13</i>	<i>B</i>	<i>0.40</i>	<i>13</i>	<i>B</i>
	EBL	0.07	6	A	0.23	6	A
	EBTR	0.40	6	A	0.37	5	A
	WBL	0.08	7	A	0.09	6	A
	WBTR	0.25	7	A	0.35	14	B
	NBL	0.64	49	D	0.49	52	D
	NBTR	0.06	40	D	0.05	48	D
	SBL	0.48	67	E	0.43	67	E
	SBTR	0.08	62	E	0.21	63	E
Collector M & Trafalgar Road (Signalized)	<i>Overall</i>	<i>0.45</i>	<i>13</i>	<i>B</i>	<i>0.74</i>	<i>15</i>	<i>B</i>
	WBLR	0.51	63	E	0.20	61	E
	NBTR	0.44	14	B	0.57	16	B
	SBL	0.33	7	A	0.78	41	D
	SBT	0.41	4	A	0.41	6	A
Collector-to-Collector Intersections							
Local Street A / Collector P & Collector M	EBLTR	0.19	9	A	0.39	11	B
	WBLTR	0.33	11	B	0.22	10	B
	NBLTR	0.29	10	A	0.41	12	B
	SBLTR	0.31	10	B	0.23	10	A
Street L / Collector M	EBLR	0.09	9	A	0.14	9	A
	NBLT	0.06	7	A	0.06	6	A
	SBTR	0.03	0	A	0.02	0	A

Under 2031 future total conditions, all existing, arterial-to-collector and collector-to-collector intersections are projected to operate within reserve capacity during both AM and PM peak hours,

except for the intersection of Trafalgar Road and Britannia Road. Some individual movements experience LOS 'E' or 'F' due to longer delays but remain within capacity ($v/c < 1.00$). These delays are partly attributed to the 140-second cycle lengths implemented along regional corridors, which increase delays for dedicated turning movements and minor approach vehicles.

At Trafalgar Road and Britannia Road, consistent with 2031 future background conditions, the intersection is projected to operate with reserve capacity. However, critical movements approaching theoretical capacity (v/c between 0.85 and 1.00) include the eastbound left-turn ($v/c = 0.88$), northbound left-turn ($v/c = 0.93$), and southbound left-turn ($v/c = 0.87$) during the PM peak hour. This performance is typical for major arterial intersections during peak hours, where operations often approach theoretical capacity. Outside peak hours, traffic flow at this intersection is expected to return to manageable levels.

8.4 2041 Future Background Conditions

The previous signal modifications made under the 2031 future conditions were carried over and applied to the 2041 future background conditions.

For 2041 future background scenario, the intersections of Trafalgar Road at Britannia Road and Eighth Line at Britannia Road were analyzed in SYNCHRO suite using the future lane configurations outlined in **Session 7.3**. The capacity results for study intersections during the weekday AM and PM peak hours under 2041 future background conditions are summarized in **Table 8-6**.

Table 8-6 2041 Future Background Capacity Analysis Summary

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Trafalgar Road & Britannia Road (Signalized)	<i>Overall</i>	<i>0.84</i>	<i>48</i>	<i>D</i>	1.06	74	E
	EBL	0.91	91	F	1.23	178	F
	EBT	0.62	43	D	0.60	36	D
	EBR	0.64	46	D	0.74	44	D
	WBL	0.28	49	D	0.50	58	E
	WBT	0.61	54	D	0.86	55	E
	WBR	0.16	75	E	0.08	139	F
	NBL	0.91	87	F	1.18	174	F
	NBT	0.73	24	C	0.93	32	C
	NBR	0.10	13	B	0.15	13	B

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
	SBL	0.55	66	E	0.89	109	F
	SBT	0.89	48	D	1.07	90	F
	SBR	0.83	51	D	0.57	51	D
Eighth Line & Britannia Road (Signalized)	<i>Overall</i>	<i>0.66</i>	<i>37</i>	<i>C</i>	0.88	<i>45</i>	<i>D</i>
	EBL	0.42	13	B	0.87	67	E
	EBT	0.43	13	B	0.27	22	C
	EBR	0.02	15	B	0.01	19	B
	WBL	0.08	27	C	0.06	35	D
	WBT	0.31	29	C	0.74	48	D
	WBR	0.07	26	C	0.20	37	D
	NBL	0.24	48	D	0.21	47	D
	NBTR	0.77	65	E	0.89	74	E
	SBL	0.77	46	D	0.75	47	D
	SBTR	0.83	51	D	0.66	37	D

Under 2041 future background conditions, the intersection of Trafalgar Road at Britannia Road is anticipated to operate above theoretical capacity during PM peak hour, with v/c ratio of 1.06. Critical movements are identified exceeding capacity (v/c > 1.00), including the eastbound left-turn, northbound left-turn, and southbound through movements. Additionally, movements approaching capacity (v/c between 0.85 and 1.00) include the westbound through, northbound through, and southbound left-turn movements.

The intersection of Eighth Line and Britannia Road is projected to operate within capacity during the AM peak hour and with reserve capacity during the PM peak hour. Critical movements approaching theoretical capacity (v/c between 0.85 and 1.00) include the eastbound left-turn (v/c = 0.87) and northbound through/right-turn (v/c = 0.89) movements during the PM peak hour.

8.5 2041 Future Total Conditions

Under the 2041 future total traffic conditions, no additional adjustment was made to the signal timing plans compared to 2041 future background scenario.

The capacity results for study intersections during the weekday AM and PM peak hours under 2041 future total traffic conditions are summarized in **Table 8-7**.

Table 8-7 2041 Future Total Capacity Analysis Summary

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Existing Arterial Intersections							
Trafalgar Road & Britannia Road (Signalized)	<i>Overall</i>	0.86	47	D	1.08	75	E
	EBL	0.91	91	F	1.23	178	F
	EBT	0.67	45	D	0.68	38	D
	EBR	0.68	48	D	0.75	44	D
	WBL	0.43	47	D	0.63	88	F
	WBT	0.72	50	D	0.94	51	D
	WBR	0.21	49	D	0.09	39	D
	NBL	0.91	87	F	1.18	175	F
	NBT	0.74	24	C	0.94	34	C
	NBR	0.12	13	B	0.20	14	B
	SBL	0.56	66	E	0.98	125	F
	SBT	0.91	50	D	1.08	101	F
SBR	0.84	52	D	0.57	67	E	
Britannia Road & Eighth Line (Signalized)	<i>Overall</i>	0.68	33	C	0.90	47	D
	EBL	0.46	16	B	0.90	75	E
	EBT	0.44	16	B	0.28	22	C
	EBR	0.03	19	B	0.02	19	B
	WBL	0.08	27	C	0.07	36	D
	WBT	0.33	30	C	0.77	50	D
	WBR	0.07	26	C	0.21	38	D
	NBL	0.43	53	D	0.34	49	D
	NBTR	0.77	65	E	0.89	74	E
	SBL	0.78	47	D	0.76	47	D
	SBTR	0.85	53	D	0.68	38	D
Arterial-to-Collector Intersections							
Collector P & Britannia Road (Signalized)	<i>Overall</i>	0.57	22	C	0.69	27	C
	EBL	0.14	6	A	0.62	43	D
	EBTR	0.36	7	A	0.47	9	A

Intersection	Movement	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
	WBL	0.52	28	C	0.70	56	E
	WBTR	0.29	18	B	0.49	29	C
	NBL	0.68	57	E	0.47	40	D
	NBTR	0.42	48	D	0.40	40	D
	SBL	0.41	62	E	0.41	55	E
	SBTR	0.47	63	E	0.76	69	E
Collector M & Britannia Road (Signalized)	<i>Overall</i>	<i>0.66</i>	<i>20</i>	<i>B</i>	<i>0.83</i>	<i>15</i>	<i>B</i>
	EBL	0.06	3	A	0.21	6	A
	EBTR	0.43	5	A	0.40	4	A
	WBL	0.60	35	D	0.85	46	D
	WBTR	0.22	16	B	0.34	7	A
	NBL	0.81	57	E	0.76	68	E
	NBTR	0.49	40	D	0.35	50	D
	SBL	0.20	40	D	0.21	51	D
SBTR	0.04	38	D	0.11	49	D	
Collector M & Trafalgar Road (Signalized)	<i>Overall</i>	<i>0.63</i>	<i>12</i>	<i>B</i>	<i>0.70</i>	<i>18</i>	<i>B</i>
	WBLR	0.65	58	E	0.38	62	E
	NBTR	0.62	11	B	0.77	24	C
	SBL	0.52	15	B	0.59	34	C
	SBT	0.51	5	A	0.60	8	A
Collector-to-Collector Intersections							
Local Street A / Collector P & Collector M	EBLTR	0.18	9	A	0.39	11	B
	WBLTR	0.34	11	B	0.21	10	B
	NBLTR	0.29	10	A	0.40	12	B
	SBLTR	0.30	10	B	0.22	10	A
Street L / Collector M	EBLR	0.09	9	A	0.15	9	A
	NBLT	0.07	7	A	0.06	6	A
	SBTR	0.03	0	A	0.02	0	A

Under 2041 future total conditions, the existing intersections are anticipated to operate with critical capacity, while the arterial-to-collector and collector-to-collector intersections are

projected to operate within reserve capacity during both AM and PM peak hours. Some individual movements are expected to experience LOS 'E' due to increased delays, though these movements remain within capacity.

For Trafalgar Road at Britannia Road, consistent with 2041 future background conditions, the intersection is anticipated to operate above theoretical capacity during PM peak hour, with v/c ratio of 1.08. Critical movements are identified exceeding capacity ($v/c > 1.00$), including the eastbound left-turn, northbound left-turn, and southbound through movements. Additionally, movements approaching capacity (v/c between 0.85 and 1.00) include the westbound through, northbound through, and southbound left-turn movements.

The intersection of Eighth Line and Britannia Road is projected to operate within capacity during the AM peak hour and with reserve capacity during the PM peak hour. Critical movements approaching theoretical capacity (v/c between 0.85 and 1.00) include the eastbound left-turn ($v/c = 0.90$) and northbound through/right-turn ($v/c = 0.89$) movements during the PM peak hour.

This performance is typical for the intersection of two major arterial roads during peak hours, where operations are expected to approach theoretical capacity. Outside of peak periods, traffic flow at this intersection is anticipated to return to manageable levels.

In additions, the operation of some critical movements is primarily attributed to the inability to exclude Trafalgar site traffic from the 2051 JBPE forecasting model growth rates, as requested by the Region. This limitation stems from challenges in aligning trip distribution between the traffic models, resulting in the double counting of some Trafalgar site traffic. Consequently, this has led to an overestimation of traffic volumes for the 2041 future background and future total scenario.

9 QUEUEING ANALYSIS

As part of the traffic analysis, the 50th and 95th percentile queue lengths were derived from the Synchro HCM queueing reports for the baseline, 2031 & 2041 future background, and 2031 & 2041 future total traffic conditions. The queueing reports were prepared using Synchro version 11 software and full queueing results are attached in **Appendix I**, **Appendix J** and **Appendix K** respectively.

9.1 Existing Baseline Queues

Based on the Synchro HCM queueing reports, under baseline conditions, all intersections analyzed, Trafalgar Road & Britannia Road and Britannia Road & Eighth Line, operate within acceptable queue storage limits during both the weekday AM and PM peak hours. No critical turning movements exceed their available storage lengths at these intersections. All 50th and 95th percentile queue lengths are within the designated storage capacities, indicating that the existing infrastructure adequately accommodates the current traffic volumes.

9.2 2031 Future Background Queues

Under 2031 future background conditions, all exclusive turning movements operate within their proposed storage lengths during both AM and PM peak hours. Queue lengths remain well below capacity, indicating efficient intersection performance. **Table 9-1** summarizes the queueing results. While no storage issues are identified.

Table 9-1 2031 Future Background Queueing Analysis

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
Trafalgar Road & Britannia Road	EBL	125	32	45	73	100
	EBR	85	32	58	0	18
	WBL	90	0	30	18	28
	WBR	70	5	30	3	5
	NBL	165	13	45	53	124
	NBR	70	1	1	2	1
	SBL	140	12	33	36	70
	SBR	140	12	54	11	54

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
Britannia Road & Eighth Line	EBL	70	25	40	19	58
	EBR	70	1	4	0	1
	WBL	100	2	7	2	8
	WBR	70	0	9	1	17
	NBL	70	4	11	9	17
	SBL	70	40	51	32	55

9.3 2031 Future Total Queues

Under the 2031 future total conditions, all the exclusive turning movements operate well with sufficient storage for their queues, except for the eastbound left-turn lane in Collector P at Britannia Road and southbound left-turn lane in Trafalgar Road at Collector M during the PM peak hour. The queuing results are summarized in **Table 9-2**.

In these lanes, the 95th percentile queue exceeding the available storage length is expected to be less than five vehicles in length. These queues are expected to clear within a single signal cycle and are considered acceptable. Further monitoring by the Region should be considered with regards to the specific movements.

Table 9-2 2031 Future Total Queuing Analysis

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
Trafalgar Road & Britannia Road	EBL	125	32	45	73	100
	EBR	85	36	65	0	18
	WBL	90	26	36	23	35
	WBR	70	5	21	3	4
	NBL	165	17	49	55	126
	NBR	70	1	1	3	1
	SBL	140	15	40	42	82
	SBR	140	50	128	19	54
Britannia Road & Eighth Line	EBL	70	26	49	22	63
	EBR	70	3	8	1	1

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
	WBL	100	2	7	2	8
	WBR	70	0	9	2	18
	NBL	70	7	16	15	27
	SBL	70	40	51	32	55
Collector P & Britannia Road	EBL	60	2	4	21	86
	WBL	50	12	41	4	46
	NBL	50	31	44	15	22
	SBL	50	12	23	19	33
Collector M & Britannia Road	EBL	50	2	5	4	7
	WBL	70	2	4	4	4
	NBL	80	53	72	28	45
	SBL	25	12	24	10	22
Trafalgar Road & Collector M	WBLR	-	17	46	4	41
	SBL	60	3	12	26	73

9.4 2041 Future Background Queues

Under the 2041 future background conditions, majority of the exclusive turning movements operate with sufficient storage for their queues, except for the critical queues identified in the results summary **Table 9-3** below.

Table 9-3 2041 Future Background Queueing Analysis

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
Trafalgar Road & Britannia Road	EBL	125	42	69	120	157
	EBR	85	59	104	93	144
	WBL	90	7	13	15	21
	WBR	70	20	39	10	33
	NBL	165	68	96	93	128
	NBR	70	2	8	1	11
	SBL	140	18	29	28	49

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
	SBR	140	121	193	54	96
Britannia Road & Eighth Line	EBL	70	18	28	58	91
	EBR	70	1	1	0	0
	WBL	100	3	9	4	11
	WBR	70	0	15	14	39
	NBL	70	4	11	11	21
	SBL	120	64	81	51	76

9.5 2041 Future Total Queues

Under the 2041 future total conditions, majority of the exclusive turning movements operate with sufficient storage for their queues, except for the critical queues identified in the results summary **Table 9-4** below.

These critical queues identified are within seven vehicle lengths and are expected to be able to be cleared within a single signal cycle. Overall, the 95th percentile queues are considered acceptable and should be monitored by the Region for additional improvement opportunities.

Table 9-4 2041 Future Total Queuing Analysis

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
Trafalgar Road & Britannia Road	EBL	125	42	69	120	157
	EBR	85	66	111	94	146
	WBL	90	13	18	16	31
	WBR	70	22	42	16	10
	NBL	165	68	96	94	128
	NBR	70	2	9	2	13
	SBL	140	19	30	31	56
Britannia Road & Eighth Line	SBR	140	125	197	56	111
	EBL	70	21	36	64	106
	EBR	70	1	4	0	3
	WBL	100	3	9	4	11

Intersection	Movement	Storage (m)	Weekday AM Peak Hour		Weekday PM Peak Hour	
			50 th Percentile Queue (m)	95 th Percentile Queue (m)	50 th Percentile Queue (m)	95 th Percentile Queue (m)
	WBR	70	0	16	15	40
	NBL	70	7	16	16	30
	SBL	120	65	82	51	76
Collector P & Britannia Road	EBL	60	4	7	29	51
	WBL	50	24	45	26	66
	NBL	50	32	48	14	19
	SBL	50	12	24	19	32
Collector M & Britannia Road	EBL	50	1	6	1	18
	WBL	70	25	60	30	94
	NBL	80	74	93	47	67
	SBL	25	9	17	9	18
Trafalgar Road & Collector M	WBLR	-	25	51	12	34
	SBL	60	4	20	56	83

10 ACTIVE TRANSPORTATION

10.1 Existing Facilities

The following summary of active transportation facilities is based on a review of Halton Region's 2015 Active Transportation Master Plan (ATMP) and current infrastructure conditions within the study area.

10.1.1 Sidewalks / Pedestrian Routes

There are currently no continuous pedestrian facilities (i.e., sidewalks or designated pedestrian pathways) along Britannia Road, Trafalgar Road or Eighth Line within the study area.

10.1.2 Cycle Tracks / Bike Lanes

There are no dedicated on-road bicycle lanes or signed cycling routes currently provided along Trafalgar Road or Eighth Line within the study area.

For Britannia Road, it has recently been upgraded as an urban 6-lane cross section between Trafalgar Road and Eighth Line within the study area. It has incorporated an on-street bike lane, providing cycling connectivity.

10.1.3 Multi-use Paths (MUP)

There is no multi-use paths currently provided along Trafalgar Road or Eighth Line within the study area.

For Britannia Road, it has recently been upgraded as an urban 6-lane cross section between Trafalgar Road and Eighth Line within the study area. It has incorporated multi-use paths (MUP) on both sides of the road, providing pedestrian and cycling connectivity.

10.2 Proposed Facilities

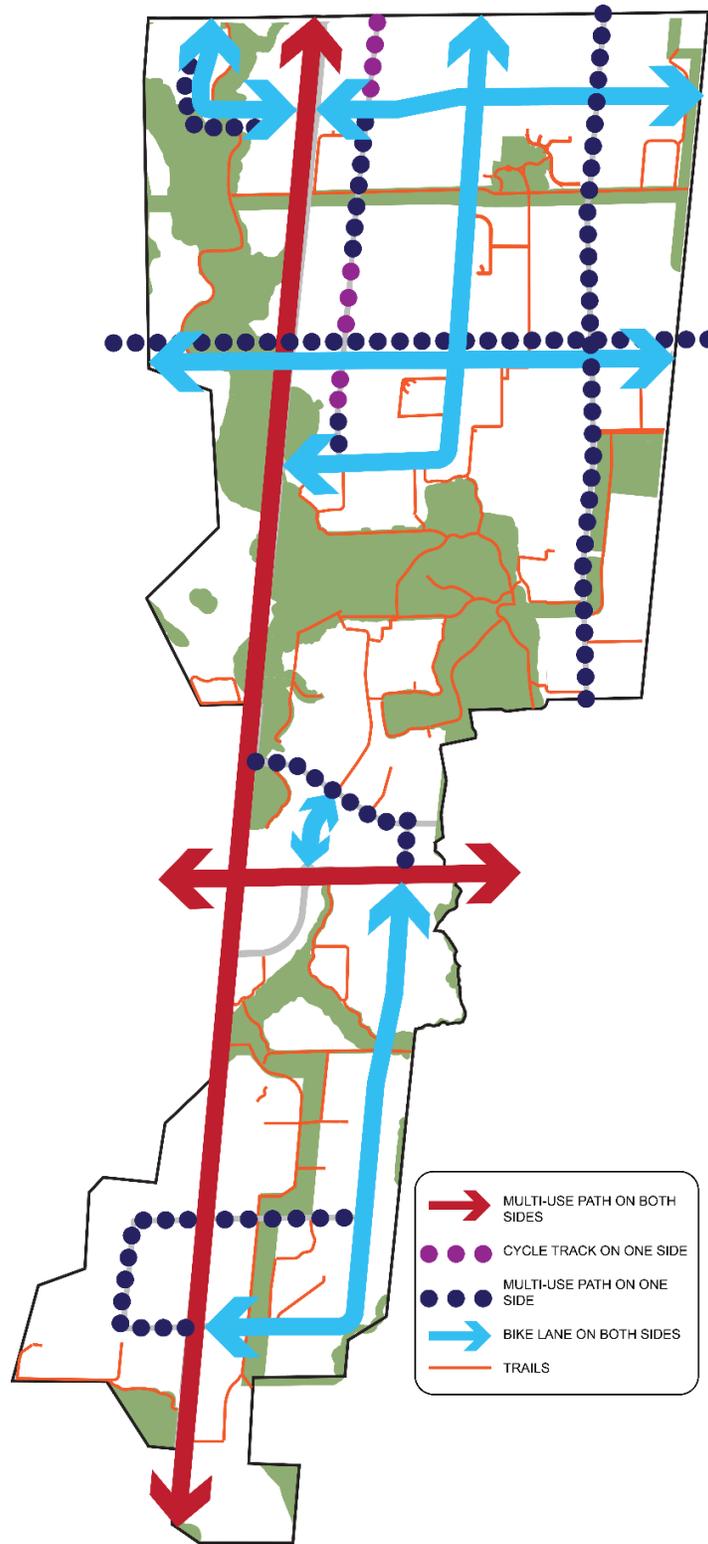
The proposed active transportation facilities within the site are designed to support internal connectivity for pedestrians and cyclists, while also linking to the broader active transportation network identified in the Trafalgar Tertiary Plan (see **Figure 10-1**).

- ▶ Collector P (24.0m ROW) will include in-boulevard bicycle lanes and sidewalks on both sides, providing direct cycling routes within the site.
- ▶ Collector M (20.0m ROW) will include a multi-use path on one side and a sidewalk on the other side of the road, facilitating shared use for both pedestrians and cyclists.

- ▶ Trafalgar Road (western boundary) are each planned to have multi-use paths on both sides, enhancing external connectivity to the surrounding network.

These facilities are planned to support walking and cycling within the site and connect to the surrounding transportation network. The proposed Active Transportation Plan for the White Squadron lands is included in **Appendix L**, providing a detailed overview of MUPs and bike lanes within the site boundary.

Figure 10-1 Active Transportation Plan



11 PARKING PLAN

11.1 On-Street Parking Plan

A conceptual on-street parking plan is conducted and shown in **Appendix M**.

The on-street parking plan is subject to refinement at the detailed design stage once residential driveways and all utilities are confirmed.

12 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations for the analysis associated with the proposed development are as follows:

- ▶ A review of the proposed subdivision draft plan design for the White Squadron lands is completed based on the requirements on ROW, road bends and horizontal curvature, intersection spacing, intersection angle, daylight triangle / rounding and minimum tangent length at intersections. It is considered that the design of the roadways is deemed acceptable.

Baseline Traffic Conditions

- ▶ All study intersections are generally operating well overall, with acceptable delays and capacity during both the weekday AM and PM peak hours.
- ▶ Based on the recommendations outlined in the Milton Transportation Master Plan (TMP) and the proposed lane configuration modifications detailed in the RNA for the MP4TC area, phased improvements have been adopted for the study intersections.

2031 Future Lane Configuration Modification and Responsibility

Intersection	Approach	Modification	Responsibility
Existing Intersections			
Trafalgar Road & Britannia Road	Eastbound and Westbound	▶ Auxiliary left turn lane	Region
	Northbound and Southbound	▶ 1 additional through lane (HOV) ▶ Auxiliary right turn lane	
Britannia Road & Eighth Line	Westbound	▶ Auxiliary right turn lane	Region / Town / MP4 Developers
Arterial-to-Collector Intersections			
Britannia Road & Collector P	Eastbound and Westbound	▶ Shared right turn movement ▶ Auxiliary left turn lane	MP4 Developers
	Northbound and Southbound	▶ 1 Shared through/right turn lane ▶ Auxiliary left turn lane	
Britannia Road & Collector M	Eastbound and Westbound	▶ Shared right turn movement ▶ Auxiliary left turn lane	MP4 Developers
	Northbound and Southbound	▶ 1 Shared through/right turn lane ▶ Auxiliary left turn lane	
Trafalgar Road &	Northbound and	▶ 1 additional through lane (HOV)	Region

Intersection	Approach	Modification	Responsibility
Collector M	Southbound		MP4 Developers
	Northbound	▶ Shared right turn movement	
	Southbound	▶ Auxiliary left turn lane	
	Westbound	▶ Single lane with shared left/right movements	
Collector-to-Collector Intersections			
Local Street A / Collector P & Collector M	All directions	▶ Single lane approach (shared all movements)	MP4 Developers
Street L / Collector M	Eastbound	▶ Single lane with shared left/right movements	
	Northbound	▶ 1 Shared through/left turn lane	
	Southbound	▶ 1 Shared through/right turn lane	

2031 Future Background Traffic Conditions

- ▶ The Eighth Line at Britannia Road is expected to operate within reserve capacity during both the AM and PM peak hours. Some individual movements are expected to experience LOS 'E' due to increased delays, though these movements remain within capacity.
- ▶ The intersection of Trafalgar Road at Britannia Road is anticipated to operate with some reserve capacity. Some critical movements are identified as approaching theoretical capacity (i.e., v/c between 0.85 and 1.00). These include the eastbound left-turn and northbound left-turn movements during the PM peak hour, with v/c ratio of 0.88 and 0.92 respectively.

2031 Future Total Traffic Conditions

- ▶ All existing, arterial-to-collector and collector-to-collector intersections are projected to operate within reserve capacity during both AM and PM peak hours, except for the intersection of Trafalgar Road and Britannia Road. Some individual movements experience LOS 'E' or 'F' due to longer delays but remain within capacity (v/c < 1.00). These delays are partly attributed to the 140-second cycle lengths implemented along regional corridors, which increase delays for dedicated turning movements and minor approach vehicles.
- ▶ This performance is typical for major arterial intersections during peak hours, where operations often approach theoretical capacity. Outside peak hours, traffic flow at this intersection is expected to return to manageable levels.

2041 Future Lane Configuration Modification and Responsibility

Intersection	Approach	Modification	Responsibility
Existing Intersections			
Trafalgar Road & Britannia Road	Northbound and Southbound	▶ Dual left-turn lanes	Region

2041 Future Background Traffic Conditions

- ▶ The intersection of Trafalgar Road at Britannia Road is anticipated to operate above theoretical capacity during PM peak hour, with v/c ratio of 1.06. Critical movements are identified exceeding capacity (v/c > 1.00), including the eastbound left-turn, northbound left-turn, and southbound through movements. Additionally, movements approaching capacity (v/c between 0.85 and 1.00) include the westbound through, northbound through, and southbound left-turn movements.
- ▶ The intersection of Eighth Line and Britannia Road is projected to operate within capacity during the AM peak hour and with reserve capacity during the PM peak hour. Critical movements approaching theoretical capacity (v/c between 0.85 and 1.00) include the eastbound left-turn (v/c = 0.87) and northbound through/right-turn (v/c = 0.89) movements during the PM peak hour.

2041 Future Total Traffic Conditions

- ▶ The existing intersections are anticipated to operate with critical capacity, while the arterial-to-collector and collector-to-collector intersections are projected to operate within reserve capacity during both AM and PM peak hours. Some individual movements are expected to experience LOS 'E' due to increased delays, though these movements remain within capacity.
- ▶ For Trafalgar Road at Britannia Road, consistent with 2041 future background conditions, the intersection is anticipated to operate above theoretical capacity during PM peak hour, with v/c ratio of 1.08. Critical movements are identified exceeding capacity (v/c > 1.00), including the eastbound left-turn, northbound left-turn, and southbound through movements. Additionally, movements approaching capacity (v/c between 0.85 and 1.00) include the westbound through, northbound through, and southbound left-turn movements.
- ▶ The intersection of Eighth Line and Britannia Road is projected to operate within capacity during the AM peak hour and with reserve capacity during the PM peak hour. Critical movements approaching theoretical capacity (v/c between 0.85 and 1.00) include the eastbound left-turn (v/c = 0.90) and northbound through/right-turn (v/c = 0.89) movements during the PM peak hour.
- ▶ This performance is typical for the intersection of two major arterial roads during peak hours, where operations are expected to approach theoretical capacity. Outside of peak periods,

traffic flow at this intersection is anticipated to return to manageable levels.

- ▶ In additions, the operation of some critical movements is primarily attributed to the inability to exclude Trafalgar site traffic from the 2051 JBPE forecasting model growth rates, as requested by the Region. This limitation stems from challenges in aligning trip distribution between the traffic models, resulting in the double counting of some Trafalgar site traffic. Consequently, this has led to an overestimation of traffic volumes for the 2041 future background and future total scenario.

Appendix A

Terms of Reference

Alex Cheng

From: Michael Dowdall
Sent: Thursday, May 1, 2025 9:12 AM
To: Loro, Darren; Sian.Younan@milton.ca
Cc: Jessica Deng; Baharak Hosseini; Alex Cheng
Subject: Trafalgar Tertiary Plan Mattamy White Squadron lands - TIS Terms of Reference
Attachments: MP4 White Squadron Concept 6 - Feb 21 25_kc.pdf

Darren/Sian,

TYLin has been retained to prepare a Transportation Impact Study (TIS) for the proposed Mattamy White Squadron lands draft plan of subdivision, located in the northeast quadrant of Trafalgar Road and Britannia Road, in the Town of Milton, Halton Region.

The proposed subdivision includes a mix of residential development, comprising townhouses, single-family homes, and a neighborhood commercial mixed-use node as shown in the preliminary concept plan dated February 21, 2025.

In accordance with the pre-consultation checklist and subsequent discussions with Town and Regional staff, the following components are to be addressed and consolidated into one comprehensive submission titled “Transportation Impact Study”:

- Traffic Impact Study
- Active Transportation and Pedestrian Routing Plan
- Parking Justification Report - On-Street Parking Plan

In order to properly scope this project, we ask that the Town & Region provide comments on the following terms of reference and confirm if there are any additional items required as part of the study.

Terms of Reference

- 1) The Study shall be prepared in accordance with Town of Milton and Halton Region’s Transportation Impact Study Guidelines.
- 2) Conduct a study area road inventory review to confirm lane assignments, traffic controls, speed limits, and surrounding land uses and general study area characteristics. The proposed study intersections consist of:
 - Trafalgar Road and Britannia
 - Britannia Road and Eighth Line
 - Trafalgar Road and Street ‘B’
 - Street ‘B’ and Street ‘A’
 - Street ‘B’ and Street ‘C’
 - Street ‘A and Britannia Road
 - Street ‘C’ and Britannia Road
- 3) Develop future background traffic estimates for any nearby and relevant developments in the immediate vicinity of the subject site. This will include our experience working on the Trafalgar RNA. Background traffic growth rates within the Study Area will also be extracted from the Trafalgar RNA as part of this study. Additionally, the Trafalgar Teritary Plan Phase 1 and Phase 2 site traffic will be included as part of the background traffic estimates.

- 4) Obtain any available information relating to potential/committed future road / intersection / other transportation infrastructure improvements in the vicinity of the subject site, beyond those proposed in the Trafalgar RNA, that could impact local traffic distribution or assignments. Their effects on traffic patterns will be accounted for in the appropriate planning horizon as specified by Town/Regional staff.
- 5) As per Town and Regional guidelines, traffic analyses will include the year of anticipated full occupancy year (full build-out) plus a five-year horizon year analysis. The proposed 2031 (build-out) and 2041 horizon years have been selected to remain consistent with the Trafalgar RNA.
- 6) Remove and replace the estimated site traffic volumes assumed in the Trafalgar RNA as per updated subdivision statistics. As such, the estimated site generated traffic will be built upon the forecasted traffic volumes provided by the Trafalgar RNA study, which in turn will become our future traffic base model. Ensure that all assumptions and methodologies are well documented within the report including supporting diagrams, excerpts, and detailed text with justification.
- 7) Estimate the weekday a.m. and p.m. peak period traffic to be generated by the proposed development using the industry-accepted, and agency-preferred data published in the Institute of Transportation Engineers, Trip Generation (11th Edition). The directional distribution of traffic approaching and departing the site will be based upon the distribution derived as part of the Trafalgar..
- 8) Create a future conditions traffic operations model to assess the traffic impacts of the proposed development after introducing the estimated site generated traffic into the future background traffic model. Report any operational deficiencies and recommend mitigating measures, if necessary, to improve traffic operations, including recommending lane configuration changes, and/or traffic control alterations.
- 9) Prepare peak-hour operational analyses to investigate and document the impacts of the proposed development on the site accesses and study area intersections using Synchro (an industry-accepted analysis software). This will include a review of turning movement delays, volume-to-capacity ratios, and vehicular queuing. Input parameters to the Synchro software will be consistent with the recommended municipal practices and guidelines.
- 10) Based on the results of the traffic analyses, recommend any improvements to the study area roadway system and traffic controls, as necessary, to accommodate future traffic volumes (be they triggered by background and/or site related trips).
- 11) A comparison of trip generation assumptions provided in the Trafalgar RNA and the currently proposed draft plan will be provided.

Thank you in advance for your attention to this matter. We look forward to your comments on the preceding scope of work and the requested information.

Regards,

Michael Dowdall

DIRECTOR, TRAFFIC

M +1 437.993.2662

TYLin

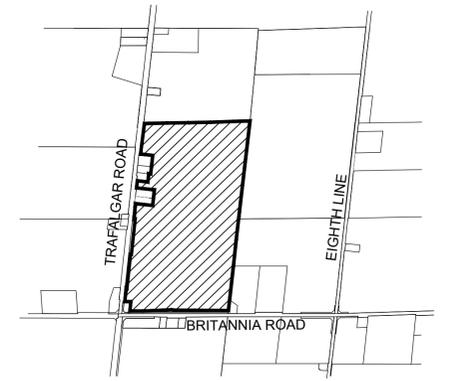
Appendix B

Site Plan

**DRAFT PLAN OF SUBDIVISION
FILE 24T -**

**PART OF LOTS 6 AND 7
CONCESSION 8, NEW SURVEY**

(GEOGRAPHIC TOWNSHIP OF TRAFALGAR)
**TOWN OF MILTON
REGIONAL MUNICIPALITY OF HALTON**



KEY MAP
N.T.S. **SUBJECT PROPERTY**

OWNER'S AUTHORIZATION

I HEREBY AUTHORIZE KORSIK URBAN PLANNING TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF MILTON FOR APPROVAL.

SIGNED _____ DATE _____
Owner Name
White Squadron Development Corporation
Street Address
City, ON XXX XXX

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED DATE May 12, 2025
Ross DenBroeder, Ontario Land Surveyor

rpe R-PE SURVEYING LTD.
ONTARIO LAND SURVEYORS
845 CHRISLEA ROAD, SUITE 7, WOODBRIDGE, ONTARIO L4L 8A3
Tel: (416) 635-5000 Fax: (416) 635-5001

ADDITIONAL INFORMATION (UNDER SECTION 51 (17) OF THE PLANNING ACT)

- A) SHOWN ON PLAN
- B) SHOWN ON PLAN
- C) SHOWN ON PLAN
- D) SHOWN ON PLAN
- E) SHOWN ON PLAN
- F) SHOWN ON PLAN
- G) SHOWN ON PLAN
- H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
- I) CLAY LOAM
- J) SHOWN ON PLAN
- K) SANITARY AND STORM SEWERS TO BE PROVIDED
- L) SHOWN ON PLAN

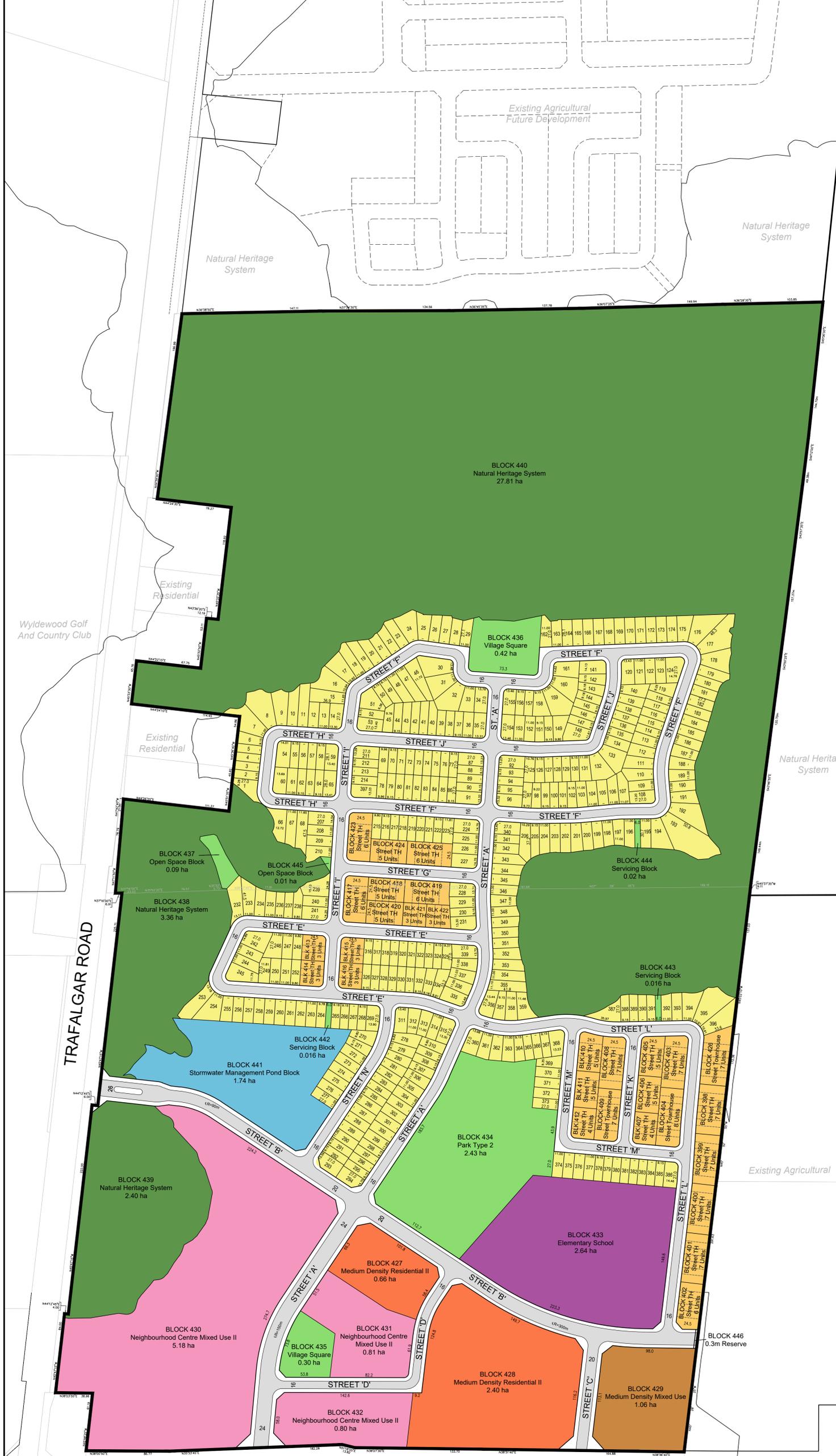
LAND USE SCHEDULE

Land Use	Lots/Blocks	Block Total	Area (ha)	Units
Single Detached	1-397	397	13.08	397
Townhouse	398-426	29	3.08	155
Medium Density Residential II	427, 428	2	3.06	
Medium Density Mixed Use	429	1	1.06	
Neighbourhood Centre Mixed Use II	430-432	3	6.79	
Elementary School	433	1	2.64	
Park Type 2	434	1	2.43	
Village Square	435, 436	2	0.72	
Open Space Block	437, 445	2	0.10	
Natural Heritage System (NHS)	438-440	3	33.57	
Stormwater Management Pond Block	441	1	1.74	
Servicing Block	442-444	3	0.05	
0.3m Reserve	446	1	0.00	
16m ROW (4,354 m)			7.07	
20m ROW (813 m)			1.71	
24m ROW (274 m)			0.69	
Total	1-446	446	77.79	552

SDE CALCULATIONS

Unit Type	Blocks	Units	SDE*
Single Detached	1-397	397	397.0
Townhouse	398-426	155	125.6
Totals		552	522.6

* SDE Factors:
Single Detached - 1.00
Townhouse - 0.81



DATE	REVISION	DWG	BY
May 28, 2025	First Submission	A	KC

NOTES:

- *Local/Local corner radii = 5m
- *Local/Collector daylight triangle = 7.5m
- *Collector/Collector daylight triangle = 10m
- *Collector/Regional Road daylight triangle = 15m
- *Pavement illustration is diagrammatic



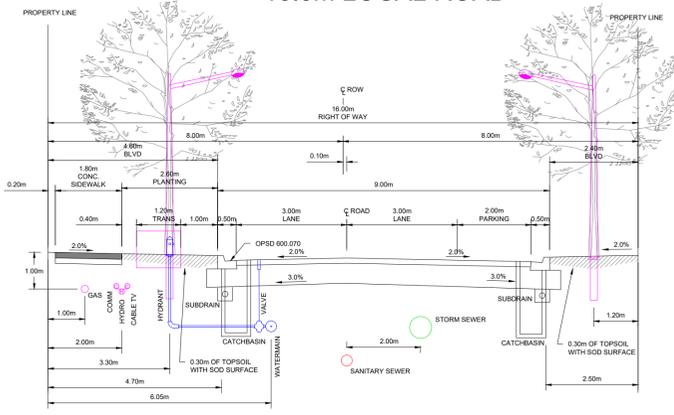
SCALE 1:2000 May 28, 2025 **A**
DRAWN BY: KC CHECKED BY:



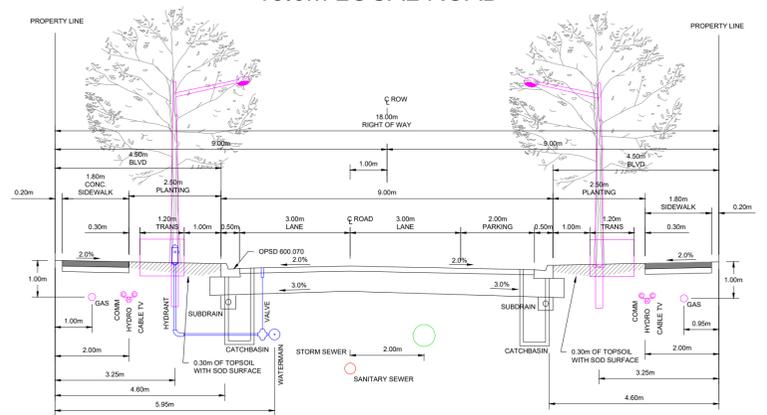
Appendix C

ROW Cross Section

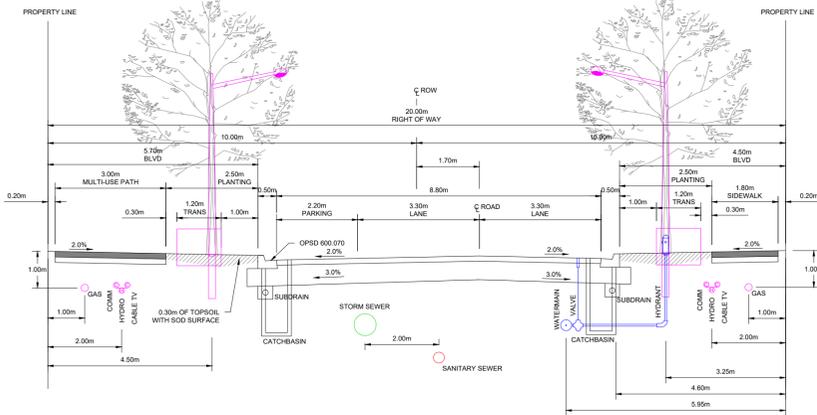
16.0m LOCAL ROAD



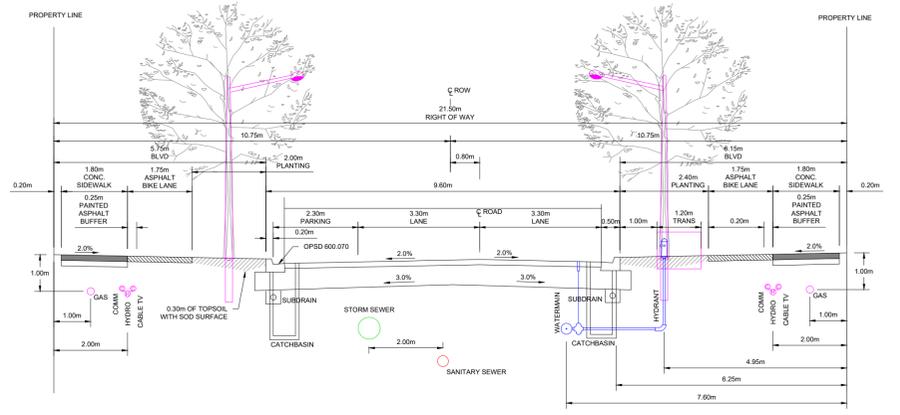
18.0m LOCAL ROAD



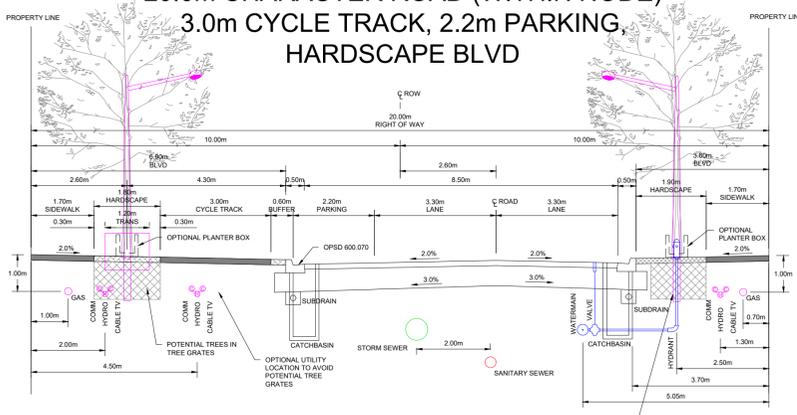
20m COLLECTOR ROAD WITH MULTI-USE PATH (MUP)



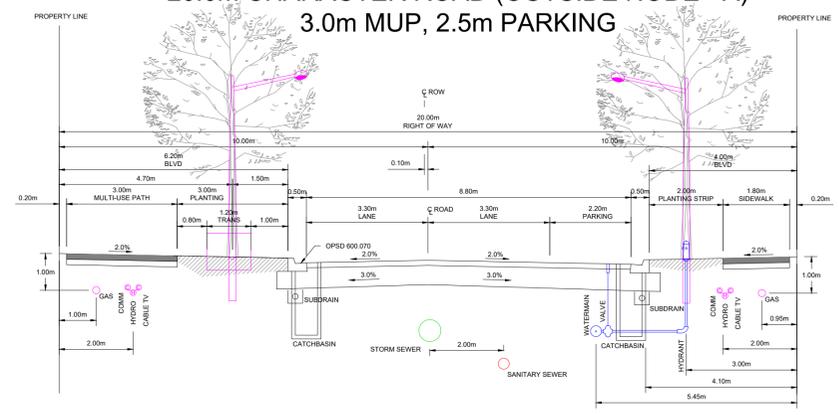
21.5m COLLECTOR ROAD



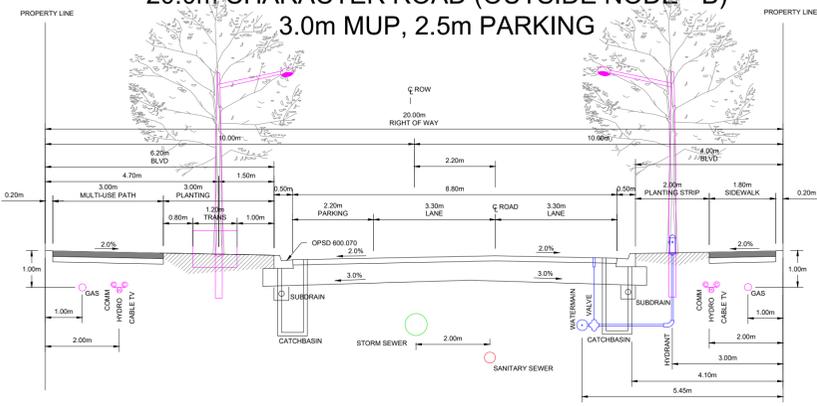
20.0m CHARACTER ROAD (WITHIN NODE)
3.0m CYCLE TRACK, 2.2m PARKING,
HARDSCAPE BLVD



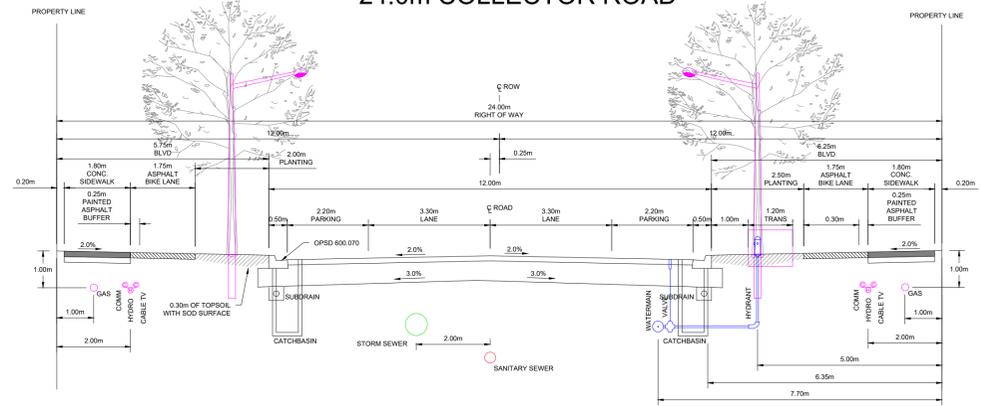
20.0m CHARACTER ROAD (OUTSIDE NODE - A)
3.0m MUP, 2.5m PARKING



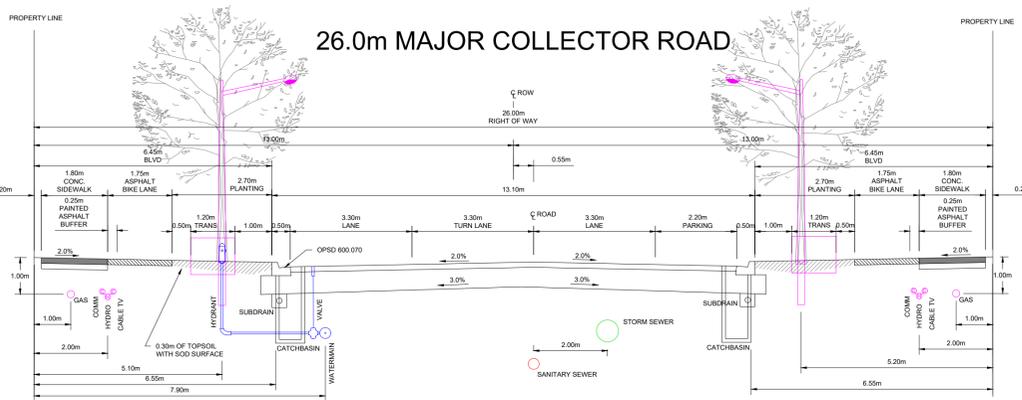
20.0m CHARACTER ROAD (OUTSIDE NODE - B)
3.0m MUP, 2.5m PARKING



24.0m COLLECTOR ROAD



26.0m MAJOR COLLECTOR ROAD



TRAFALGAR SECONDARY PLAN AREA PHASE 1 DAEFSS

LEGEND

FIGURE 2.6.1
TYPICAL ROW SECTIONS

May 2025

Appendix D

RIRO Sensitivity Test (RNA Extract)

2.2 Intersection Spacing

Proposed future intersections of collector roads along the regional roads of Derry Road, Trafalgar Road, and Britannia Road were reviewed for compliance with the Halton Region Access Management Guidelines for intersection spacing. Based on the Halton Region ROW Classification Code and Access Guidelines, full movement intersections require a minimum of 300 m of spacing between intersections while right-in right-out intersections require a minimum of 115 m. Additionally, per the Access Management Guidelines access spacing can be reduced to a minimum of 250 metres within the intensification areas (Node) identified within the Local Plan that can be substantiated through the submission of a comprehensive corridor analysis and Transportation Impact Study analyzing all possible alternatives and taking into consideration land use and community factors. The relevant sections of the guideline can be found in **Appendix B**.

All proposed intersections of collector roads to regional roads within the study area meet the Region's spacing requirements with the exception of Trafalgar Road at Street P and Britannia Road at Collector P, which have a spacing of approximately 200 m and 240 m, respectively.

The proposed collector to collector intersections were reviewed for spacing compliance with the Town of Milton Engineering and Parks Standards. The standards require all collector-to-collector intersections to be spaced a minimum of 60 m apart. All proposed collector-to-collector intersections meets the Town's spacing requirements. An excerpt of the Town's standards can be found in **Appendix C**.

It should be noted that the ultimate intersection geometrics (including lane configurations) and the exact location of the proposed Street P connections to Britannia Road and Trafalgar Road will be confirmed through the development application review process for the future subdivision.

2.2.1 Britannia Road at Trafalgar Road Intersection Spacing Justification

The spacing deficiency is due to the NHS lands to the south and east which limit the location of the intersections. The spacing for the intersections is considered acceptable given the constraint of the NHS buffered area. Also, given that Collector P services the neighbourhood centre mixed-use node east of the Trafalgar and Britannia intersection, it is important that these intersections operate as full-moves to facilitate traffic generated by the high-density residential and non-residential uses north and south of Britannia Road.

Moreover, the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads recommends a minimum 200 m intersection spacing along arterial roadways, generally only applicable in areas of intense existing development or restrictive physical controls.

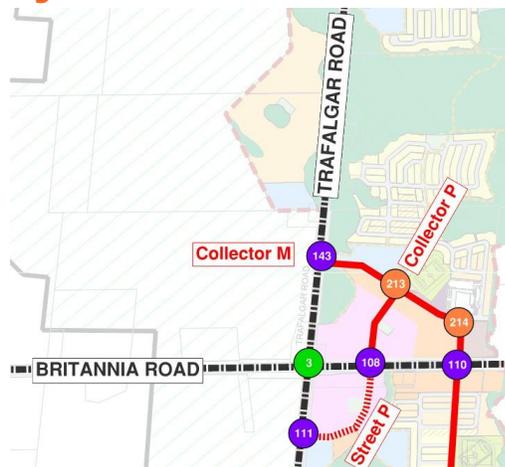
Methodology

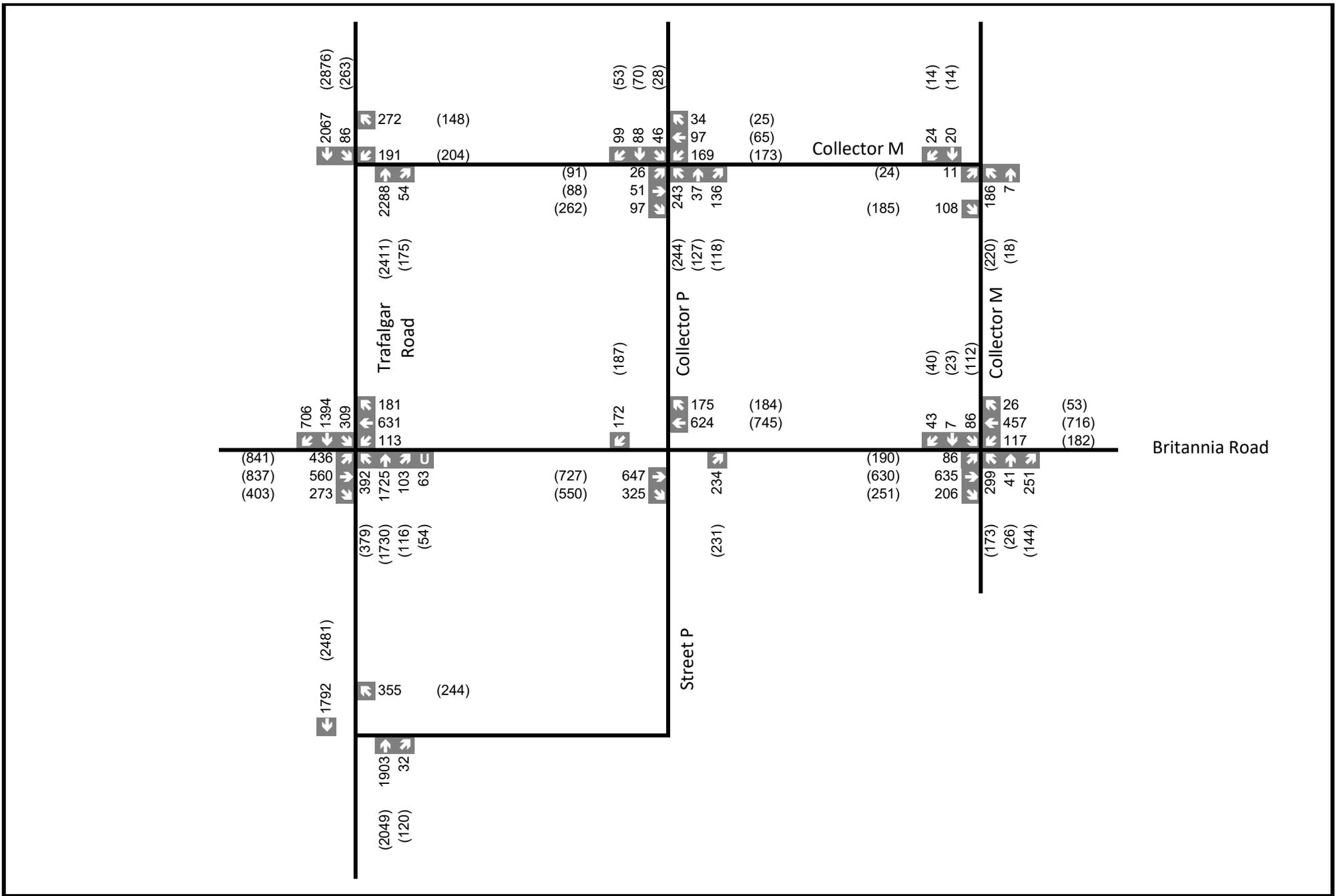
This section presents the methodology adopted for the sensitivity analysis investigating the

impacts of a RIRO configuration where left turns and minor road through movements are restricted at proposed full moves intersections. **Figure 2-2** identifies the location of the study intersections and **Figure 2-3** illustrates the 2031 future total traffic volume figures for the surrounding intersections under the RIRO configuration for the proposed Street P connections to Trafalgar Road and Britannia Road.

Intersection 108 (Britannia Road at Collector P) and Intersection 111 (Trafalgar Road at Collector P) are proposed as full-moves intersections. Restricting the left-turn and minor road through movements required a redistribution of vehicle trips across alternative paths. Engineering judgement and current RNA traffic zone distribution was applied to reflect the most convenient/logical vehicle paths for drivers to choose from.

Figure 2-2 Britannia Road & Trafalgar Road Intersection Area





Legend
 xx A.M. Peak Hour Traffic
 (xx) P.M. Peak Hour Traffic
 {xx} Weekend Peak Hour Traffic

Figure 2-3
 2031 Future Total Traffic
 Volumes: RIRO Configuration

Traffic Analysis

This sensitivity analysis presents a traffic performance table with volume to capacity ratio (v/c), delay and level of service in the morning and afternoon peak hours at the impacted study intersections.

The sensitivity analysis was conducted under 2031 future total traffic conditions, which reflects the build-out of Phase 1 only. For the sensitivity analysis, Intersections 108 and 111 were converted from full-move signalized intersection to stop-controlled right-in/right-out only. The traffic model was modified based on the methodology above and reanalyzed to verify the traffic operational conditions of the full build-out (2031 future total) scenario for the following intersections that may be impacted by this change in intersection configuration.

- ▶ Intersection 3: Trafalgar Road & Britannia Road
- ▶ Intersection 110: Collector Q/Collector M & Britannia Road
- ▶ Intersection 143: Trafalgar Road & Collector M
- ▶ Intersection 108: Street P/Collector P & Britannia Road
- ▶ Intersection 111: Trafalgar Road & Street P

The sensitivity analysis includes identification of all study intersections and for all movements; v/c ratios, delay and LOS indicators. 'Critical' intersections and movements (bolded parameters), as defined by Halton Region, include:

Signalized Intersections:

- ▶ v/c ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;
- ▶ v/c ratios for exclusive turning movements increased to 0.95 or above; or
- ▶ queues for an individual movement are projected to exceed available turning lane storage.

Unsignalized Intersections:

- ▶ LOS, based on average delay per vehicle, on individual movements exceeds LOS 'D'

Table 2-1 and **Table 2-2** summarize the capacity results comparing the analysis results of the proposed full-moves configuration and the RIRO sensitivity scenario for both the AM and PM periods, respectively.

Comparing the Full Moves scenario to the RI/RO scenario, **shaded** capacity outputs identify the increased capacity constraints predicted to negatively impact overall intersection operation and individual movements. Detailed Synchro reports are attached in **Appendix Q**.

Table 2-1 AM Peak Hour Capacity Analysis Comparison Summary

Intersection	Movement	Weekday AM Peak Hour					
		Full Moves Scenario			Right-In/Right-Out Scenario		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Intersection 3: Trafalgar Road & Britannia Road	<i>Overall</i>	0.81	47	D	1.02	90	F
	EBL	0.91	82	F	1.36	243	F
	EBT	0.45	40	D	0.43	41	D
	EBR	0.28	38	D	0.18	38	D
	WBL	0.41	51	D	0.56	76	E
	WBT	0.63	52	D	0.62	50	D
	WBR	0.16	62	E	0.11	64	E
	NBL	0.85	82	F	1.06	121	F
	NBT	0.84	30	C	1.09	85	F
	NBR	0.06	39	D	0.06	4	A
	SBL	0.42	64	E	0.99	102	F
	SBT	0.85	45	D	1.09	84	F
SBR	0.83	50	D	1.14	112	F	
Intersection 110: Collector Q/Collector M & Britannia Road	<i>Overall</i>	0.49	21	C	0.51	21	C
	EBL	0.07	3	A	0.17	5	A
	EBTR	0.28	4	A	0.30	4	A
	WBL	0.35	18	B	0.37	14	B
	WBTR	0.17	14	B	0.17	9	A
	NBL	0.81	59	E	0.79	55	E
	NBTR	0.29	38	D	0.30	40	D
	SBL	0.22	40	D	0.67	71	E
	SBTR	0.04	38	D	0.06	55	D
Intersection 143: Trafalgar Road & Collector M	<i>Overall</i>	0.73	15	B	0.93	46	D
	WBLR	0.74	60	E	0.86	61	E
	NBTR	0.73	15	B	0.98	67	E
	SBL	0.54	21	C	0.53	48	D
	SBT	0.61	8	A	0.74	18	B

Intersection	Movement	Weekday AM Peak Hour					
		Full Moves Scenario			Right-In/Right-Out Scenario		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Street P/Collector P & Britannia Road <i>(RI/RO conversion)</i>	<i>Overall</i>	0.42	23	C	-	-	-
	EBL	0.12	6	A	-	-	-
	EBTR	0.24	7	A	0.27	0	A
	WBL	0.33	19	B	-	-	-
	WBTR	0.24	16	B	0.18	0	A
	NBL	0.68	56	E	-	-	-
	NBTR	0.21	44	D	0.24	10	A
	SBL	0.41	62	E	-	-	-
	SBTR	0.51	63	E	0.25	12	B
Intersection 111: Trafalgar Road & Street P <i>(RI/RO conversion)</i>	<i>Overall</i>	0.57	8	A	-	2	A
	WBL	0.35	40	D	-	-	-
	WBR	0.70	48	D	0.86	49	A
	NBTR	0.55	10	A	0.45	0	A
	SBL	0.54	18	B	-	-	-
	SBT	0.49	1	A	0.35	0	A

Table 2-2 PM Peak Hour Capacity Analysis Comparison Summary

Intersection	Movement	Weekday PM Peak Hour					
		Full Moves Scenario			Right-In/Right-Out Scenario		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Intersection 3: Trafalgar Road & Britannia Road	<i>Overall</i>	1.07	85	F	1.29	167	F
	EBL	1.34	223	F	1.74	403	F
	EBT	0.53	38	D	0.57	40	D
	EBR	0.60	41	D	0.52	40	D
	WBL	0.51	62	E	0.52	52	D
	WBT	0.69	47	D	0.66	59	E
	WBR	0.07	65	E	0.06	144	F
	NBL	1.31	239	F	1.51	304	F

Intersection	Movement	Weekday PM Peak Hour					
		Full Moves Scenario			Right-In/Right-Out Scenario		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
	NBT	0.91	25	C	1.23	173	F
	NBR	0.07	9	A	0.07	121	F
	SBL	0.83	76	E	1.58	319	F
	SBT	1.15	118	F	1.26	154	F
	SBR	0.84	61	E	1.02	68	E
Intersection 110: Collector Q/Collector M & Britannia Road	<i>Overall</i>	<i>0.53</i>	<i>14</i>	<i>B</i>	<i>0.59</i>	<i>25</i>	<i>C</i>
	EBL	0.15	4	A	0.47	19	B
	EBTR	0.26	3	A	0.28	12	B
	WBL	0.48	12	B	0.52	28	C
	WBTR	0.23	6	A	0.24	16	B
	NBL	0.75	67	E	0.72	63	E
	NBTR	0.18	47	D	0.16	47	D
	0.24	51	D	0.70	72	E	0.24
	0.10	49	D	0.13	54	D	0.10
Intersection 143: Trafalgar Road & Collector M	<i>Overall</i>	<i>0.83</i>	<i>18</i>	<i>B</i>	1.02	59	E
	WBLR	0.43	63	E	0.89	75	E
	NBTR	0.89	21	C	1.08	97	F
	SBL	0.61	30	C	0.90	88	F
	SBT	0.77	11	B	0.91	21	C
Street P/Collector P & Britannia Road (RI/RO conversion)	<i>Overall</i>	<i>0.54</i>	<i>26</i>	<i>C</i>	-	-	-
	EBL	0.47	25	C	-	-	-
	EBTR	0.32	10	A	0.17	0	A
	WBL	0.41	29	C	-	-	-
	WBTR	0.34	23	C	0.20	0	A
	NBL	0.48	37	D	-	-	-
	NBTR	0.39	36	D	0.24	10	A
	SBL	0.41	55	D	-	-	-
	SBTR	0.77	69	E	0.27	12	B

Intersection	Movement	Weekday PM Peak Hour					
		Full Moves Scenario			Right-In/Right-Out Scenario		
		v/c	Delay (s)	LOS	v/c	Delay (s)	LOS
Intersection 111: Trafalgar Road & Street P <i>(RI/RO conversion)</i>	Overall	0.70	10	B	-	-	-
	WBL	0.46	62	E	-	-	-
	WBR	0.07	79	E	0.68	34	D
	NBTR	0.68	4	A	0.48	0	A
	SBL	0.69	36	D	-	-	-
	SBT	0.65	10	A	0.49	0	A

Under 2031 future total AM and PM peak hour traffic conditions, compared to the Full Moves scenario, the RI/RO scenario overall v/c ratios at the intersections of Trafalgar Road at Britannia Road and Trafalgar Road at Collector M are predicted to increase significantly, with several movements reporting v/c's above 1.0 and critical delay.

Under both scenarios (full moves and RI/RO) the forecasted 95th percentile queue lengths at the intersections of Trafalgar Road at Street P and Street P/Collector P at Britannia Road are not expected to spillback to the intersection of Trafalgar Road at Britannia Road.

Intersection 3: Trafalgar Road & Britannia Road

During the AM peak hour, the RI/RO scenario predicted an overall v/c ratio of 1.02, an increase 0.21, and higher delays resulting in a worsened operating condition with a decreased LOS D to F. The sensitivity analysis results identified further operational issues with the EBL, NBL, NBT, SBL, SBT and SBR movements.

During the PM peak hour, the RI/RO scenario predicted an overall v/c ratio of 1.29, an increase 0.22, and delays increasing to 167sec. from 85sec. Like the AM peak hour, the sensitivity analysis results identified further operational issues with the EBL, NBL, NBT, SBL, SBT and SBR movements.

Intersection 143: Trafalgar Road & Collector M

During the AM peak hour, the RI/RO scenario predicted an overall v/c ratio of 0.93, an increase 0.20, and delays of 46sec an increase of 31sec. The sensitivity analysis results identified further operational issues with the NBTR movement with predicted increased v/c ratio and delay, and decreased LOS.

During the AM peak hour, the RI/RO scenario predicted an overall v/c ratio of 1.02, an increase 0.19, and higher delays resulting in a worsened operating condition with a decreased LOS B to E. The sensitivity analysis results identified further operational issues with the WBLR and NBTR movements predicted to experience increased v/c ratio and delay, and decreased LOS.

Intersection 110: Collector Q/Collector M & Britannia Road

During the AM and PM peak hours, the full moves configuration predicted capacity constraint in the NBL movement, while the sensitivity analysis of the RIRO configuration demonstrates worsening performance in the NBL and SBL movements.

Intersection 108: Street P/Collector P & Britannia Road and Intersection 111: Trafalgar Road & Street P

As expected, the sensitivity analysis of a restricted RI/RO configuration results in improved performance at this intersection due to the restricted movements when compared to a full-move intersection.

The sensitivity analysis demonstrates that a restricted right-in/right-out configuration for Intersections 108 and 111 results in worsening performance at the key intersection of Trafalgar Road at Britannia Road and Trafalgar Road at Collector M. Although some benefits were shown at the RI/RO intersections, overall, the traffic performance in the area is more favourable when full-move intersections are provided.

Left-turn restrictions at Intersection 108 and 111 is expected to have a negative impact on traffic flow. Prohibiting left-turns is expected to increase U-turn maneuvers at downstream full moves intersections and potentially create weaving and merging conflicts as drivers attempt to cross three lanes of traffic to turn left at the nearest full moves intersection.

The restricted right-in/right-out configuration is expected to be detriment to drivers accessing the individual traffic zones. Specifically, the lands on the southeast quadrant of Trafalgar Road and Britannia Road as these lands do not propose any public roads to the east and south due to the environmental constraints. Site circulation to/from these lands would be significantly degraded with the implementation of right-in/right-out intersections, impacting the economic viability of the development lands and proposed road grid network.

Based on the results of this sensitivity analysis, it is recommended that full-move intersections remain as proposed in the RNA for Intersection 108 on Britannia Road and Intersection 111 on Trafalgar Road.

2.3 Environmental Assessment Requirements

The Government of Ontario ("Province") proposed to revoke the Municipal Class Environmental Assessment (MCEA) for lower impact projects and to introduce a streamlined environmental assessment (EA) process for projects that carry a higher risk with the Municipal Project Assessment Process (MPAP), under a Project List approach. Worth noting, existing MCEA regulations still apply to this project, and as such, will be elaborated on. The general process is identified in **Figure 2-4** below. It should be noted that Phase 1 is not elaborated on within this section of the report, as

Appendix E

Existing Traffic Data



Date: 29-May-2020

Intersection: Britannia Rd @ 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				
Direction	SBLT	NB	WBLT	EB	NBLT	SB		WB				
Min Green	7	25	7	15	7	25		15				
Veh Ext.	3.0	5.0	3.0	5.0	3.0	5.0		5.0				
Yellow	3	5	3	4	3	5		4				
Red	1	2	1	2	1	2		2				
Walk		7		7		7		7				
Don't Walk		30		33		15		18				
Max 1	15	41	11	37	11	41		48				
Max 2	11	50	15	40	25	50		40				
Max 3	11	40	11	28	11	40		39				
Max 4												
Veh Recall		x				x						
Ped Recall		x				x						
Notes:	Sync Reference 3:15 Max 1 6:00-9:00 Max 2 15:00-19:00 Max 3 9:00-15:00											



Date: 9-Apr-2020

Intersection: Britannia Rd @ Eighth Line

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		EB		SB		WB		NB				
Min Green		20		15		20		15				
Veh Ext.		3.0		3.0		3.0		3.0				
Yellow		4.6		4.2		4.6		4.2				
Red		2.2		1.5		2.2		1.5				
Walk												
Don't Walk												
Max 1		75		25		75		25				
Max 2		45		25		45		25				
Max 3												
Veh Recall												
Ped Recall												
Notes:	Max 1 (6:00-9:00, 15:30-19:00) Max 2 (9:00,15:30, 19:00-6:00) Set Sync Reference to 3:15											

2.4 Model Calibration

The traffic models were calibrated according to the Region’s TIS Guidelines and using the existing traffic data. Peak hour factors (PHF) were calculated based on the 15-minute volume breakdown of existing TMCs and are summarized in **Table 2-3**. Saturation flow rates and lane widths were set to the Synchro defaults of 1,900 vehicles per hour and 3.7 metres, respectively, as no specific values were provided in the Region’s guidelines.

Table 2-3: Modeled Intersection Peak Hour Factors

No.	Intersection	Intersection Control	Peak Hours	
			a.m.	p.m.
1	Trafalgar Road and Highway 401 Westbound Off-Ramp	Signalized	0.94	0.93
2	Trafalgar Road and Highway 401 Eastbound Off-Ramp	Signalized	0.97	0.89
3	Trafalgar Road and Derry Road	Signalized	0.98	0.95
4	Eighth Line and Derry Road	Two-way-stop-controlled	0.96	0.97
5	Trafalgar Road and Britannia Road	Signalized	0.97	0.97
6	Eighth Line and Britannia Road	Two-way-stop-controlled	0.95	0.96
7	Trafalgar Road and E Lower Base Line	Signalized	0.99	0.94

After applying the calculated parameters noted above to the base model, three out of the seven analyzed intersections were either operating over capacity overall or had several movements operating over capacity based on the Region’s critical intersection criteria, which is:

- V/C ratios of 0.85 or above for overall intersection operations, through movements, or shared through/turning movements;
- V/C ratios of 0.95 or above for exclusive movements; or
- Queues for an individual movement are projected to exceed available turning lane storage.

The following measures were implemented at the signalized intersection to calibrate the existing traffic models:

- Trafalgar Road and Derry Road:
 - Assumed to be semi-actuated with minimum recall on Derry Road;
 - Lost time adjustment of -1.0 seconds for protected/permitted left-turn movements and -2.0 seconds for through or right-turn movements for both peak hours; and
 - Phasing splits were optimized for both peak hours.
- Trafalgar Road and Britannia Road:
 - Lost time adjustment of -1.0 seconds for protected/permitted left-turn movements and -2.0 seconds for through or right-turn movements in the p.m. peak hour; and
 - Phasing splits were optimized in the peak hour.
- Trafalgar Road and E Lower Base Line:
 - Only southbound and westbound left-turn phases are included in the provided signal timing plan. However, an examination of Google Maps street view demonstrates a northbound left-turn signal head in operation. Therefore, northbound left-turn phases were coded into the signal timing plan for both peak hours;
 - The timing plan specifies Max 2 during the p.m. peak period (3:00 – 7:00 p.m.), which does not include left-turn phases. With this timing plan the southbound left-turn movement is significantly over capacity. Therefore, we have assumed the timing plan follows Max 1 in the p.m. peak hour with the addition of the northbound left-turn phase (same as the a.m. peak hour);
 - Lost time adjustment of -1.0 seconds for protected/permitted left-turn movements and -2.0 seconds for through or right-turn movements for both peak hours; and
 - Phasing splits were optimized for both peak hours.

The additional calibration measures such as optimizing signal timing plans and implementing lost time adjustments used to calibrate the existing traffic models are described in the following subsections.

2.4.1 Optimizing Signal Timing Plans

When the provided signal timing plans were combined with the existing traffic volumes in Synchro, there were several movements at most of the intersections that were operating over capacity. This is not possible under existing conditions as this would mean that some vehicles could not clear the intersection, but all the vehicles counted have done so after they clear the intersection. The Region advised that they regularly review and update their signal timing plans to accommodate the most current traffic volumes, and that optimizing signal timing plans under existing conditions would be acceptable to calibrate the traffic model for a Secondary Plan level study. More detailed studies should conform to the current version of the Regional Synchro Guidelines.

2.4.2 Lost Time Adjustment

Total lost time represents the time that is not usable by vehicles for a signal phase. It is the sum of the start-up lost time at the beginning of each green period and a portion of each clearance interval (yellow plus all-red time). Start-up lost time occurs at the beginning of the cycle when the traffic signal changes from red to green; it is the time that elapses between the signal changing and the queued vehicles moving through the intersection. The extension of effective green is the time that vehicles continue to pass through the intersection after the yellow interval begins. Total lost time is calculated via the following formula:

$$\text{Total Lost Time} = \text{Yellow plus All Red Time} + \text{Start Up Lost Time} - \text{Extension of Effective Green}$$

It is typical driver behaviour in the GTA to treat a portion or even all of the yellow time as green time, entering the intersection during the yellow interval, which impacts the intersection capacity. The Lost Time Adjustment (LTA) parameter in Synchro, defined as the following formula, is used in estimating the overall capacity of the intersection:

$$\text{Lost Time Adjustment} = \text{Start Up Lost Time} - \text{Extension of Effective Green}$$

The default start-up lost time and extension of effective green time are both 2.0 seconds according to the Highway Capacity Manual (HCM). This explains the default LTA of zero seconds.

Recognizing that the extension of effective green is increased when motorists enter the intersection during the yellow time, several municipalities, including York Region, Niagara Region, City of Mississauga and City of Toronto, recognize these driver behaviours and include recommendations for applying LTA to reflect these conditions within their TIS guidelines. Although this driver behaviour is not limited to only locations or time periods that experience traffic congestion, in the interest of providing a more conservative analysis, LTA was only applied to the three critical intersections based on the Region's criteria.

Also, as the length of clearance interval (yellow plus all-red time) increases for a phase, the extension of effective green time increases. However, as a rule of thumb, the maximum extension of effective green does not exceed the yellow interval time.

Therefore, a lost time adjustment of -1.0 second was applied to left-turn movements and -2.0 seconds for through movements at these intersections, considering the typical yellow interval of 3.0 seconds for a left-turn phase and 4.0 seconds for a through movement phase.

As a reference, the following are some guidelines from other municipalities and regions:

- York Region: Reasonable adjustment values of less than three seconds are permitted for critical movements (Source: Section 1.12 Software and Input Parameters, page 18, York Region Transportation Mobility Plan Guidelines for Development Applications, November 2016).
- City of Toronto: -1.0 second is the default LTA for all movements for peak period analysis (Source: Section 5.2.11 Lost Time Adjust, page 120, City of Toronto Guidelines for Using Synchro 9, March 2016).



Turning Movement Count (3 . BRITANNIA RD & TRAFALGAR RD)

Start Time	N Approach TRAFALGAR RD						E Approach BRITANNIA RD					S Approach TRAFALGAR RD					W Approach BRITANNIA RD					Int. Total (15 min)	Int. Total (1 hr)			
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N			UTurn W:W	Peds W:	Approach Total
06:00:00	5	106	5	0	0	116	8	11	7	0	0	26	4	52	4	0	0	60	27	28	7	0	0	62	264	
06:15:00	5	133	8	0	0	146	11	23	9	0	0	43	2	61	7	0	0	70	41	35	14	0	0	90	349	
06:30:00	7	163	9	0	0	179	10	28	14	0	0	52	17	71	18	0	0	106	66	38	12	0	0	116	453	
06:45:00	6	151	10	0	0	167	13	43	22	0	0	78	9	79	17	0	0	105	59	46	9	0	0	114	464	1530
07:00:00	4	129	4	0	0	137	8	38	19	0	0	65	17	105	27	0	0	149	51	56	10	0	0	117	468	1734
07:15:00	6	161	12	0	0	179	13	53	26	0	0	92	17	155	25	0	0	197	71	96	9	0	0	176	644	2029
07:30:00	8	196	16	0	0	220	7	68	36	0	0	111	43	161	26	0	0	230	63	89	12	0	0	164	725	2301
07:45:00	2	159	21	0	0	182	15	63	26	0	0	104	42	123	38	0	0	203	72	120	8	0	0	200	689	2526
08:00:00	5	143	22	0	0	170	14	56	34	0	0	104	42	166	40	0	0	248	70	121	13	0	0	204	726	2784
08:15:00	6	178	11	0	0	195	18	62	29	0	0	109	33	114	27	0	0	174	52	98	8	0	0	158	636	2776
08:30:00	6	160	17	0	0	183	12	78	37	0	0	127	23	150	40	0	0	213	72	76	7	0	0	155	678	2729
08:45:00	7	137	3	0	0	147	13	68	36	0	0	117	30	159	46	0	0	235	52	81	10	0	0	143	642	2682
BREAK																										
16:00:00	15	129	16	0	0	160	31	134	32	0	0	197	25	164	49	0	0	238	50	72	13	0	0	135	730	
16:15:00	14	148	10	0	0	172	29	152	34	0	0	215	31	225	79	0	0	335	57	99	13	0	0	169	891	
16:30:00	8	132	14	0	0	154	19	141	28	0	0	188	30	183	65	0	0	278	39	74	10	0	0	123	743	
16:45:00	11	123	20	0	0	154	8	122	23	0	0	153	25	185	76	0	0	286	52	104	10	0	0	166	759	3123
17:00:00	11	110	14	0	0	135	21	124	29	0	0	174	38	245	84	1	0	368	43	99	17	0	0	159	836	3229
17:15:00	18	157	11	0	0	186	17	145	40	0	0	202	44	207	79	0	0	330	46	92	21	1	0	160	878	3216
17:30:00	7	132	22	0	0	161	17	145	26	0	0	188	49	190	77	0	0	316	53	92	15	0	0	160	825	3298
17:45:00	13	123	18	0	0	154	16	114	28	0	0	158	36	203	55	0	0	294	34	89	8	0	0	131	737	3276
18:00:00	13	133	18	0	0	164	16	94	24	0	0	134	34	167	81	0	0	282	44	72	11	0	0	127	707	3147
18:15:00	8	130	20	0	0	158	13	97	18	0	0	128	31	139	65	0	0	235	32	80	11	0	0	123	644	2913
18:30:00	6	146	20	0	0	172	18	94	21	0	0	133	30	147	57	0	0	234	36	58	9	0	0	103	642	2730
18:45:00	8	91	12	0	0	111	7	79	15	0	0	101	22	133	69	0	0	224	48	65	8	0	0	121	557	2550
Grand Total	199	3370	333	0	0	3902	354	2032	613	0	0	2999	674	3584	1151	1	0	5410	1230	1880	265	1	0	3376	15687	-
Approach%	5.1%	86.4%	8.5%	0%		-	11.8%	67.8%	20.4%	0%		-	12.5%	66.2%	21.3%	0%		-	36.4%	55.7%	7.8%	0%		-	-	-
Totals %	1.3%	21.5%	2.1%	0%		24.9%	2.3%	13%	3.9%	0%		19.1%	4.3%	22.8%	7.3%	0%		34.5%	7.8%	12%	1.7%	0%		21.5%	-	-
Heavy	30	251	7	0		-	6	77	3	0		-	10	230	45	0		-	50	58	29	0		-	-	-
Heavy %	15.1%	7.4%	2.1%	0%		-	1.7%	3.8%	0.5%	0%		-	1.5%	6.4%	3.9%	0%		-	4.1%	3.1%	10.9%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 07:15 AM - 08:15 AM Weather: Overcast Clouds (12.27 °C)

Start Time	N Approach TRAFALGAR RD						E Approach BRITANNIA RD						S Approach TRAFALGAR RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:15:00	6	161	12	0	0	179	13	53	26	0	0	92	17	155	25	0	0	197	71	96	9	0	0	176	644
07:30:00	8	196	16	0	0	220	7	68	36	0	0	111	43	161	26	0	0	230	63	89	12	0	0	164	725
07:45:00	2	159	21	0	0	182	15	63	26	0	0	104	42	123	38	0	0	203	72	120	8	0	0	200	689
08:00:00	5	143	22	0	0	170	14	56	34	0	0	104	42	166	40	0	0	248	70	121	13	0	0	204	726
Grand Total	21	659	71	0	0	751	49	240	122	0	0	411	144	605	129	0	0	878	276	426	42	0	0	744	2784
Approach%	2.8%	87.7%	9.5%	0%	-	-	11.9%	58.4%	29.7%	0%	-	-	16.4%	68.9%	14.7%	0%	-	-	37.1%	57.3%	5.6%	0%	-	-	-
Totals %	0.8%	23.7%	2.6%	0%	27%	27%	1.8%	8.6%	4.4%	0%	14.8%	14.8%	5.2%	21.7%	4.6%	0%	31.5%	31.5%	9.9%	15.3%	1.5%	0%	26.7%	26.7%	-
PHF	0.66	0.84	0.81	0	0.85	0.85	0.82	0.88	0.85	0	0.93	0.93	0.84	0.91	0.81	0	0.89	0.89	0.96	0.88	0.81	0	0.91	0.91	-
Heavy	8	69	3	0	80	80	1	23	0	0	24	24	2	75	9	0	86	86	24	20	4	0	48	48	-
Heavy %	38.1%	10.5%	4.2%	0%	10.7%	10.7%	2%	9.6%	0%	0%	5.8%	5.8%	1.4%	12.4%	7%	0%	9.8%	9.8%	8.7%	4.7%	9.5%	0%	6.5%	6.5%	-
Lights	13	590	68	0	671	671	48	217	122	0	387	387	142	530	120	0	792	792	252	406	38	0	696	696	-
Lights %	61.9%	89.5%	95.8%	0%	89.3%	89.3%	98%	90.4%	100%	0%	94.2%	94.2%	98.6%	87.6%	93%	0%	90.2%	90.2%	91.3%	95.3%	90.5%	0%	93.5%	93.5%	-
Single-Unit Trucks	4	47	2	0	53	53	1	18	0	0	19	19	2	57	8	0	67	67	15	18	4	0	37	37	-
Single-Unit Trucks %	19%	7.1%	2.8%	0%	7.1%	7.1%	2%	7.5%	0%	0%	4.6%	4.6%	1.4%	9.4%	6.2%	0%	7.6%	7.6%	5.4%	4.2%	9.5%	0%	5%	5%	-
Buses	0	1	1	0	2	2	0	2	0	0	2	2	0	1	1	0	2	2	2	0	0	0	2	2	-
Buses %	0%	0.2%	1.4%	0%	0.3%	0.3%	0%	0.8%	0%	0%	0.5%	0.5%	0%	0.2%	0.8%	0%	0.2%	0.2%	0.7%	0%	0%	0%	0.3%	0.3%	-
Articulated Trucks	4	21	0	0	25	25	0	3	0	0	3	3	0	17	0	0	17	17	7	2	0	0	9	9	-
Articulated Trucks %	19%	3.2%	0%	0%	3.3%	3.3%	0%	1.3%	0%	0%	0.7%	0.7%	0%	2.8%	0%	0%	1.9%	1.9%	2.5%	0.5%	0%	0%	1.2%	1.2%	-
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	-
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%	-

PHF = 0.96

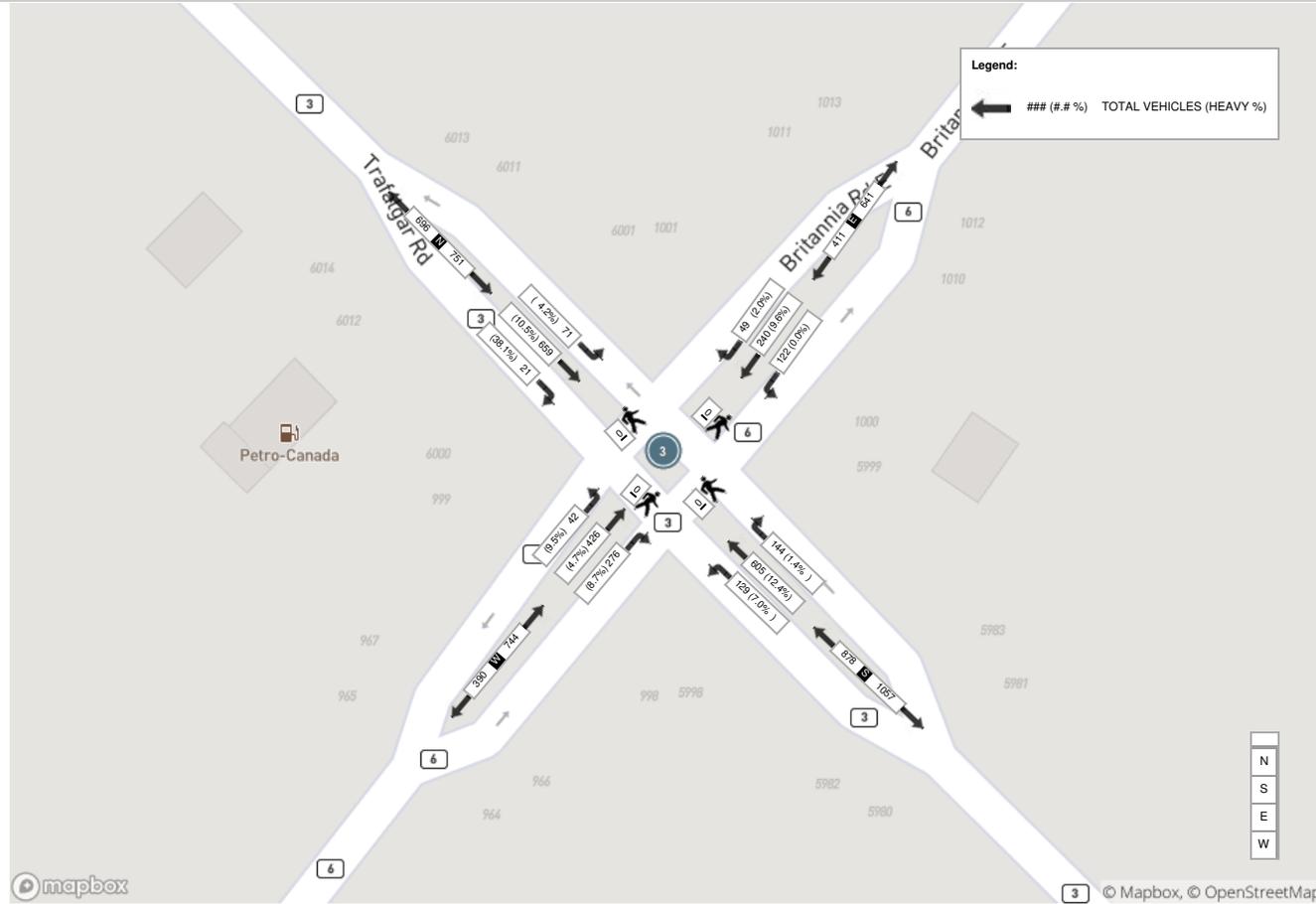


Peak Hour: 04:45 PM - 05:45 PM Weather: Scattered Clouds (16.94 °C)

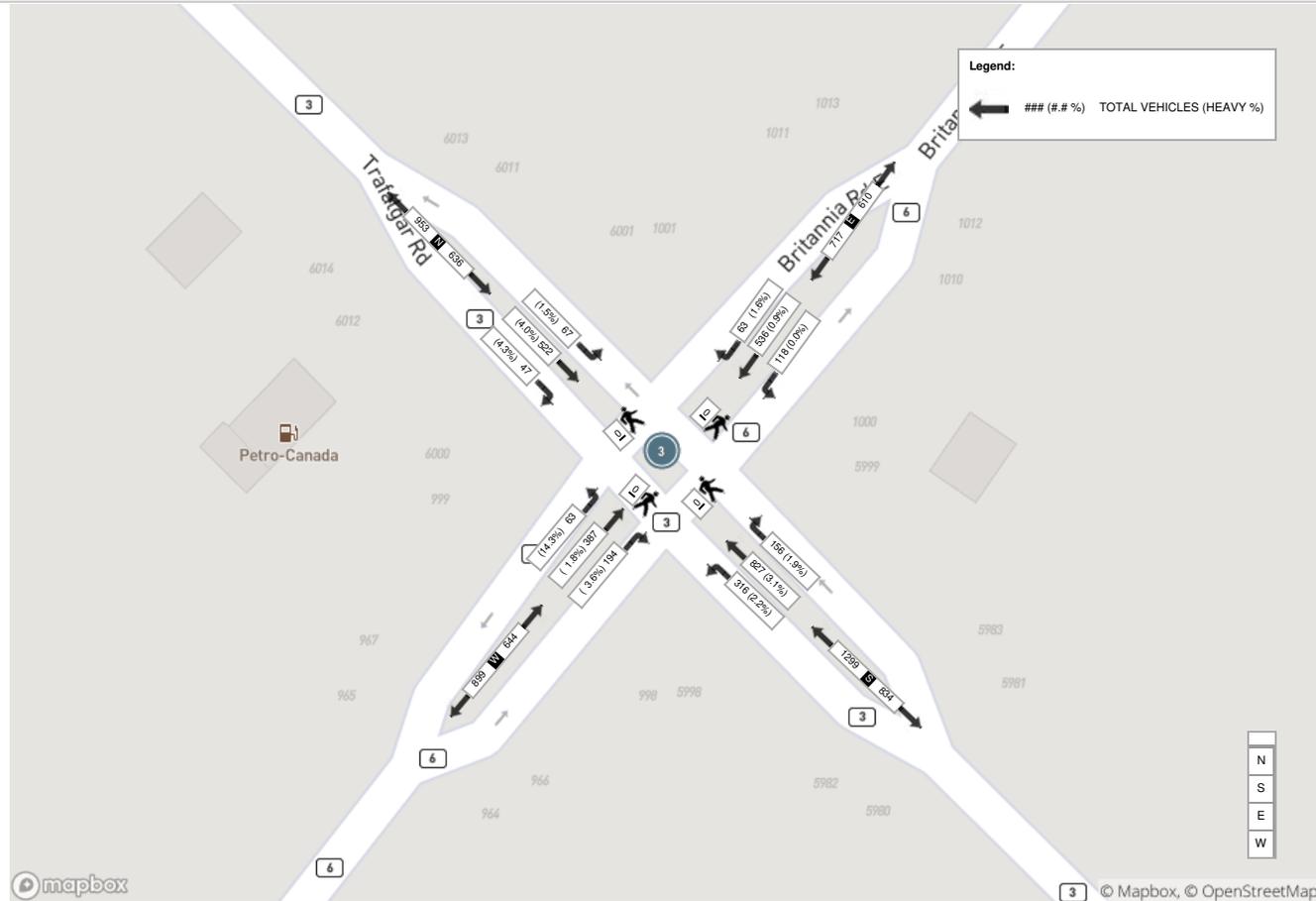
Start Time	N Approach TRAFALGAR RD						E Approach BRITANNIA RD						S Approach TRAFALGAR RD						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
16:45:00	11	123	20	0	0	154	8	122	23	0	0	153	25	185	76	0	0	286	52	104	10	0	0	166	759
17:00:00	11	110	14	0	0	135	21	124	29	0	0	174	38	245	84	1	0	368	43	99	17	0	0	159	836
17:15:00	18	157	11	0	0	186	17	145	40	0	0	202	44	207	79	0	0	330	46	92	21	1	0	160	878
17:30:00	7	132	22	0	0	161	17	145	26	0	0	188	49	190	77	0	0	316	53	92	15	0	0	160	825
Grand Total	47	522	67	0	0	636	63	536	118	0	0	717	156	827	316	1	0	1300	194	387	63	1	0	645	3298
Approach%	7.4%	82.1%	10.5%	0%		-	8.8%	74.8%	16.5%	0%		-	12%	63.6%	24.3%	0.1%		-	30.1%	60%	9.8%	0.2%		-	-
Totals %	1.4%	15.8%	2%	0%		19.3%	1.9%	16.3%	3.6%	0%		21.7%	4.7%	25.1%	9.6%	0%		39.4%	5.9%	11.7%	1.9%	0%		19.6%	-
PHF	0.65	0.83	0.76	0		0.85	0.75	0.92	0.74	0		0.89	0.8	0.84	0.94	0.25		0.88	0.92	0.93	0.75	0.25		0.97	-
Heavy	2	21	1	0		24	1	5	0	0		6	3	26	7	0		36	7	7	9	0		23	-
Heavy %	4.3%	4%	1.5%	0%		3.8%	1.6%	0.9%	0%	0%		0.8%	1.9%	3.1%	2.2%	0%		2.8%	3.6%	1.8%	14.3%	0%		3.6%	-
Lights	45	499	66	0		610	62	531	118	0		711	153	801	309	1		1264	187	380	54	1		622	-
Lights %	95.7%	95.6%	98.5%	0%		95.9%	98.4%	99.1%	100%	0%		99.2%	98.1%	96.9%	97.8%	100%		97.2%	96.4%	98.2%	85.7%	100%		96.4%	-
Single-Unit Trucks	0	15	1	0		16	0	3	0	0		3	2	21	5	0		28	4	6	4	0		14	-
Single-Unit Trucks %	0%	2.9%	1.5%	0%		2.5%	0%	0.6%	0%	0%		0.4%	1.3%	2.5%	1.6%	0%		2.2%	2.1%	1.6%	6.3%	0%		2.2%	-
Buses	0	2	0	0		2	0	1	0	0		1	1	0	1	0		2	2	0	0	0		2	-
Buses %	0%	0.4%	0%	0%		0.3%	0%	0.2%	0%	0%		0.1%	0.6%	0%	0.3%	0%		0.2%	1%	0%	0%	0%		0.3%	-
Articulated Trucks	2	4	0	0		6	1	1	0	0		2	0	5	1	0		6	1	1	5	0		7	-
Articulated Trucks %	4.3%	0.8%	0%	0%		0.9%	1.6%	0.2%	0%	0%		0.3%	0%	0.6%	0.3%	0%		0.5%	0.5%	0.3%	7.9%	0%		1.1%	-
Bicycles on Road	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Bicycles on Road %	0%	0.4%	0%	0%		0.3%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-

PHF = 0.94

Peak Hour: 07:15 AM - 08:15 AM Weather: Overcast Clouds (12.27 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Scattered Clouds (16.94 °C)





Turning Movement Count (6 . BRITANNIA RD & EIGHTH LINE)

Start Time	N Approach EIGHTH LINE						E Approach BRITANNIA RD						S Approach EIGHTH LINE						W Approach BRITANNIA RD						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	UTurn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	UTurn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	UTurn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	UTurn W:W	Peds W:	Approach Total			
06:00:00	5	3	1	0	0	9	2	11	0	0	0	13	0	1	1	0	0	2	0	21	4	0	0	25	49		
06:15:00	5	12	0	0	0	17	3	38	2	0	0	43	1	0	0	0	0	1	1	34	3	0	0	38	99		
06:30:00	4	11	3	0	0	18	4	44	2	0	0	50	0	3	0	0	0	3	1	53	2	0	0	56	127		
06:45:00	8	7	1	0	0	16	4	31	2	0	0	37	1	2	0	0	0	3	0	65	1	0	0	66	122	397	
07:00:00	11	5	3	0	0	19	2	45	1	0	0	48	1	2	1	0	0	4	2	55	4	0	0	61	132	480	
07:15:00	7	10	8	0	0	25	1	59	4	0	0	64	1	5	6	0	0	12	1	72	4	0	0	77	178	559	
07:30:00	10	18	13	0	0	41	4	67	3	0	0	74	7	9	3	0	0	19	0	124	5	0	0	129	263	695	
07:45:00	15	20	22	0	0	57	8	67	1	0	0	76	18	9	2	0	0	29	0	110	3	0	0	113	275	848	
08:00:00	15	14	16	0	0	45	8	83	4	0	0	95	15	15	1	0	0	31	1	109	6	0	0	116	287	1003	
08:15:00	18	9	10	0	0	37	6	91	4	0	0	101	11	9	0	0	0	20	0	125	2	0	0	127	285	1110	
08:30:00	11	15	7	0	0	33	9	80	2	0	0	91	15	14	3	0	0	32	0	121	3	0	0	124	280	1127	
08:45:00	13	21	9	0	0	43	5	83	0	0	0	88	2	9	2	0	0	13	0	93	8	0	0	101	245	1097	
BREAK																											
11:00:00	2	1	1	0	0	4	3	44	3	0	0	50	3	3	0	0	0	6	1	39	1	0	0	41	101		
11:15:00	3	3	1	0	0	7	0	53	1	0	0	54	0	3	5	0	0	8	1	26	0	0	0	27	96		
11:30:00	0	0	0	0	0	0	2	33	2	0	0	37	2	1	0	0	0	3	1	43	2	0	0	46	86		
11:45:00	5	1	4	0	0	10	5	48	2	0	0	55	0	1	2	0	0	3	1	51	0	0	0	52	120	403	
12:00:00	1	4	3	0	0	8	6	38	2	0	0	46	3	3	0	0	0	6	1	49	2	0	0	52	112	414	
12:15:00	3	5	2	0	0	10	3	48	1	0	0	52	0	5	1	0	0	6	1	51	0	0	0	52	120	438	
12:30:00	5	4	4	0	0	13	4	48	0	0	0	52	2	1	0	0	0	3	1	50	2	0	0	53	121	473	
12:45:00	3	5	3	0	0	11	3	59	0	0	0	62	0	4	0	0	0	4	1	45	3	0	0	49	126	479	
BREAK																											
16:00:00	6	6	5	0	0	17	4	99	3	0	0	106	12	13	2	0	0	27	0	81	1	0	0	82	232		
16:15:00	11	7	5	0	0	23	4	127	3	0	0	134	13	12	7	0	0	32	3	72	5	0	0	80	269		
16:30:00	18	10	7	0	0	35	3	134	1	0	0	138	8	13	2	0	0	23	1	89	3	0	0	93	289		
16:45:00	18	5	4	0	0	27	2	117	1	0	0	120	16	18	7	0	0	41	1	85	7	0	0	93	281	1071	
17:00:00	19	15	12	0	0	46	3	128	4	0	0	135	9	19	4	0	0	32	0	88	4	0	0	92	305	1144	
17:15:00	17	14	8	0	0	39	4	137	6	0	0	147	11	17	7	0	0	35	0	104	3	0	0	107	328	1203	
17:30:00	18	14	10	0	0	42	4	123	2	0	0	129	12	23	2	0	0	37	1	80	4	0	0	85	293	1207	
17:45:00	13	10	5	0	0	28	11	123	1	0	0	135	12	16	5	0	0	33	0	101	5	0	0	106	302	1228	
18:00:00	8	2	8	0	0	18	1	104	3	0	0	108	3	3	3	0	0	9	0	70	3	0	0	73	208	1131	
18:15:00	11	1	4	0	0	16	2	90	1	0	0	93	3	8	0	0	0	11	1	72	4	0	0	77	197	1000	
18:30:00	5	1	4	0	0	10	3	84	1	0	0	88	0	8	0	0	0	8	0	49	2	0	0	51	157	864	
18:45:00	5	2	2	0	0	9	2	86	2	0	0	90	4	2	1	0	0	7	0	59	3	0	0	62	168	730	
Grand Total	293	255	185	0	0	733	125	2422	64	0	0	2611	185	251	67	0	0	503	21	2286	99	0	0	2406	6253	-	
Approach%	40%	34.8%	25.2%	0%	-	-	4.8%	92.8%	2.5%	0%	-	-	36.8%	49.9%	13.3%	0%	-	-	0.9%	95%	4.1%	0%	-	-	-	-	
Totals %	4.7%	4.1%	3%	0%	-	11.7%	2%	38.7%	1%	0%	-	41.8%	3%	4%	1.1%	0%	-	8%	0.3%	36.6%	1.6%	0%	-	38.5%	-	-	
Heavy	2	4	0	0	-	-	1	42	0	0	-	-	3	3	6	0	-	-	3	37	1	0	-	-	-	-	
Heavy %	0.7%	1.6%	0%	0%	-	-	0.8%	1.7%	0%	0%	-	-	1.6%	1.2%	9%	0%	-	-	14.3%	1.6%	1%	0%	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (3.3 °C)

Start Time	N Approach EIGHTH LINE						E Approach BRITANNIA RD						S Approach EIGHTH LINE						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
07:45:00	15	20	22	0	0	57	8	67	1	0	0	76	18	9	2	0	0	29	0	110	3	0	0	113	275
08:00:00	15	14	16	0	0	45	8	83	4	0	0	95	15	15	1	0	0	31	1	109	6	0	0	116	287
08:15:00	18	9	10	0	0	37	6	91	4	0	0	101	11	9	0	0	0	20	0	125	2	0	0	127	285
08:30:00	11	15	7	0	0	33	9	80	2	0	0	91	15	14	3	0	0	32	0	121	3	0	0	124	280
Grand Total	59	58	55	0	0	172	31	321	11	0	0	363	59	47	6	0	0	112	1	465	14	0	0	480	1127
Approach%	34.3%	33.7%	32%	0%		-	8.5%	88.4%	3%	0%		-	52.7%	42%	5.4%	0%	-	0.2%	96.9%	2.9%	0%		-	-	
Totals %	5.2%	5.1%	4.9%	0%		15.3%	2.8%	28.5%	1%	0%		32.2%	5.2%	4.2%	0.5%	0%	9.9%	0.1%	41.3%	1.2%	0%		42.6%	-	
PHF	0.82	0.73	0.63	0		0.75	0.86	0.88	0.69	0		0.9	0.82	0.78	0.5	0	0.88	0.25	0.93	0.58	0		0.94	-	
Heavy	0	1	0	0		1	0	10	0	0		10	1	0	2	0	3	0	7	0	0		7	-	
Heavy %	0%	1.7%	0%	0%		0.6%	0%	3.1%	0%	0%		2.8%	1.7%	0%	33.3%	0%	2.7%	0%	1.5%	0%	0%		1.5%	-	
Lights	59	57	55	0		171	31	311	11	0		353	58	47	4	0	109	1	458	14	0		473	-	
Lights %	100%	98.3%	100%	0%		99.4%	100%	96.9%	100%	0%		97.2%	98.3%	100%	66.7%	0%	97.3%	100%	98.5%	100%	0%		98.5%	-	
Single-Unit Trucks	0	0	0	0		0	0	7	0	0		7	1	0	0	0	1	0	3	0	0		3	-	
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	2.2%	0%	0%		1.9%	1.7%	0%	0%	0%	0.9%	0%	0.6%	0%	0%		0.6%	-	
Buses	0	1	0	0		1	0	0	0	0		0	0	0	2	0	2	0	1	0	0		1	-	
Buses %	0%	1.7%	0%	0%		0.6%	0%	0%	0%	0%		0%	0%	0%	33.3%	0%	1.8%	0%	0.2%	0%	0%		0.2%	-	
Articulated Trucks	0	0	0	0		0	0	3	0	0		3	0	0	0	0	0	0	3	0	0		3	-	
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.9%	0%	0%		0.8%	0%	0%	0%	0%	0%	0%	0.6%	0%	0%		0.6%	-	



Peak Hour: 12:00 PM - 01:00 PM Weather: Overcast Clouds (4.24 °C)

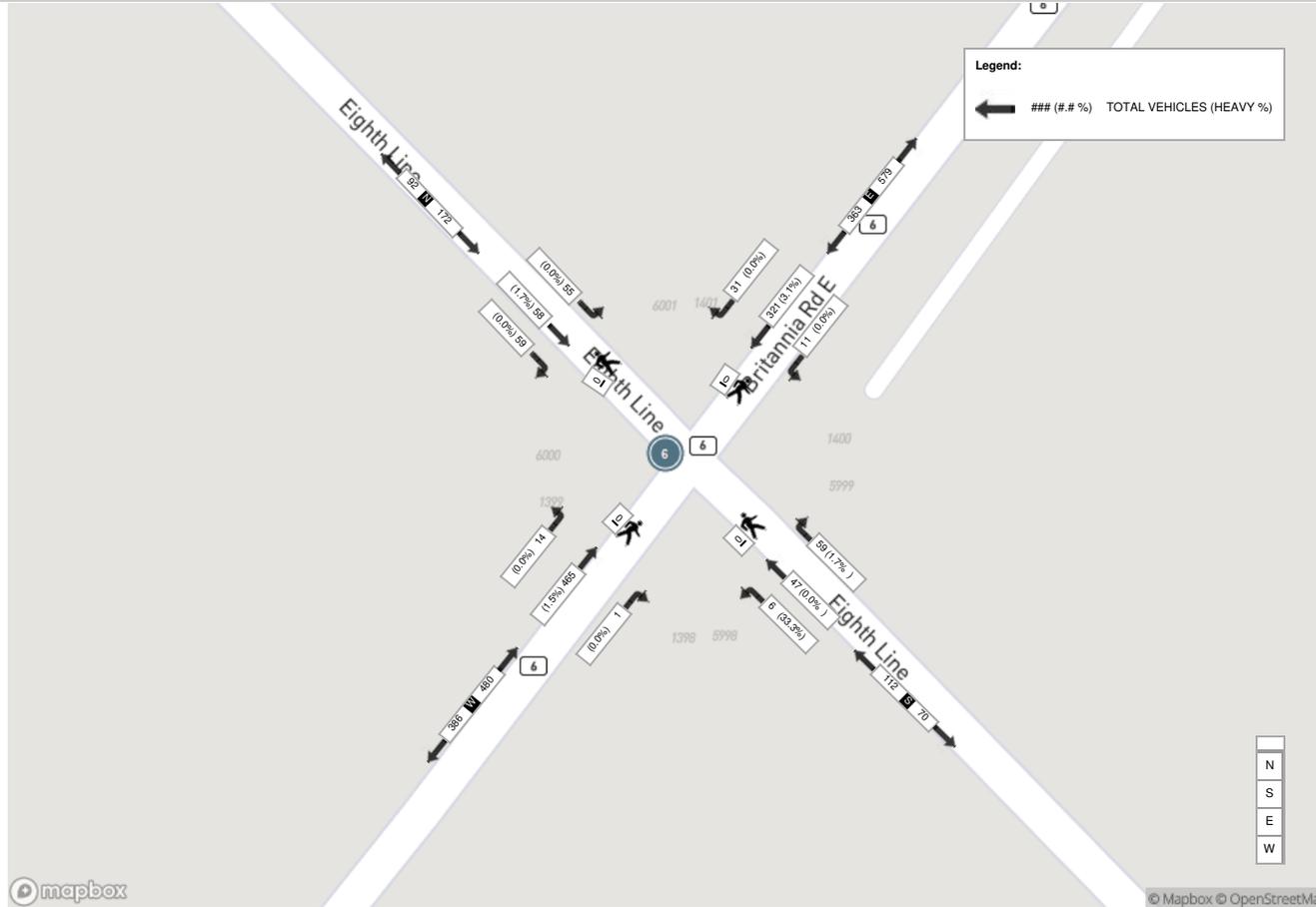
Start Time	N Approach EIGHTH LINE						E Approach BRITANNIA RD						S Approach EIGHTH LINE						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
12:00:00	1	4	3	0	0	8	6	38	2	0	0	46	3	3	0	0	0	6	1	49	2	0	0	52	112
12:15:00	3	5	2	0	0	10	3	48	1	0	0	52	0	5	1	0	0	6	1	51	0	0	0	52	120
12:30:00	5	4	4	0	0	13	4	48	0	0	0	52	2	1	0	0	0	3	1	50	2	0	0	53	121
12:45:00	3	5	3	0	0	11	3	59	0	0	0	62	0	4	0	0	0	4	1	45	3	0	0	49	126
Grand Total	12	18	12	0	0	42	16	193	3	0	0	212	5	13	1	0	0	19	4	195	7	0	0	206	479
Approach%	28.6%	42.9%	28.6%	0%		-	7.5%	91%	1.4%	0%		-	26.3%	68.4%	5.3%	0%		-	1.9%	94.7%	3.4%	0%		-	-
Totals %	2.5%	3.8%	2.5%	0%		8.8%	3.3%	40.3%	0.6%	0%		44.3%	1%	2.7%	0.2%	0%		4%	0.8%	40.7%	1.5%	0%		43%	-
PHF	0.6	0.9	0.75	0		0.81	0.67	0.82	0.38	0		0.85	0.42	0.65	0.25	0		0.79	1	0.96	0.58	0		0.97	-
Heavy	0	0	0	0		0	0	5	0	0		5	0	0	1	0		1	1	6	0	0		7	-
Heavy %	0%	0%	0%	0%		0%	0%	2.6%	0%	0%		2.4%	0%	0%	100%	0%		5.3%	25%	3.1%	0%	0%		3.4%	-
Lights	12	18	12	0		42	16	188	3	0		207	5	13	0	0		18	3	189	7	0		199	-
Lights %	100%	100%	100%	0%		100%	100%	97.4%	100%	0%		97.6%	100%	100%	0%	0%		94.7%	75%	96.9%	100%	0%		96.6%	-
Single-Unit Trucks	0	0	0	0		0	0	3	0	0		3	0	0	1	0		1	1	4	0	0		5	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		1.4%	0%	0%	100%	0%		5.3%	25%	2.1%	0%	0%		2.4%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-
Articulated Trucks	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	2	0	0		2	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	1%	0%	0%		0.9%	0%	0%	0%	0%		0%	0%	1%	0%	0%		1%	-



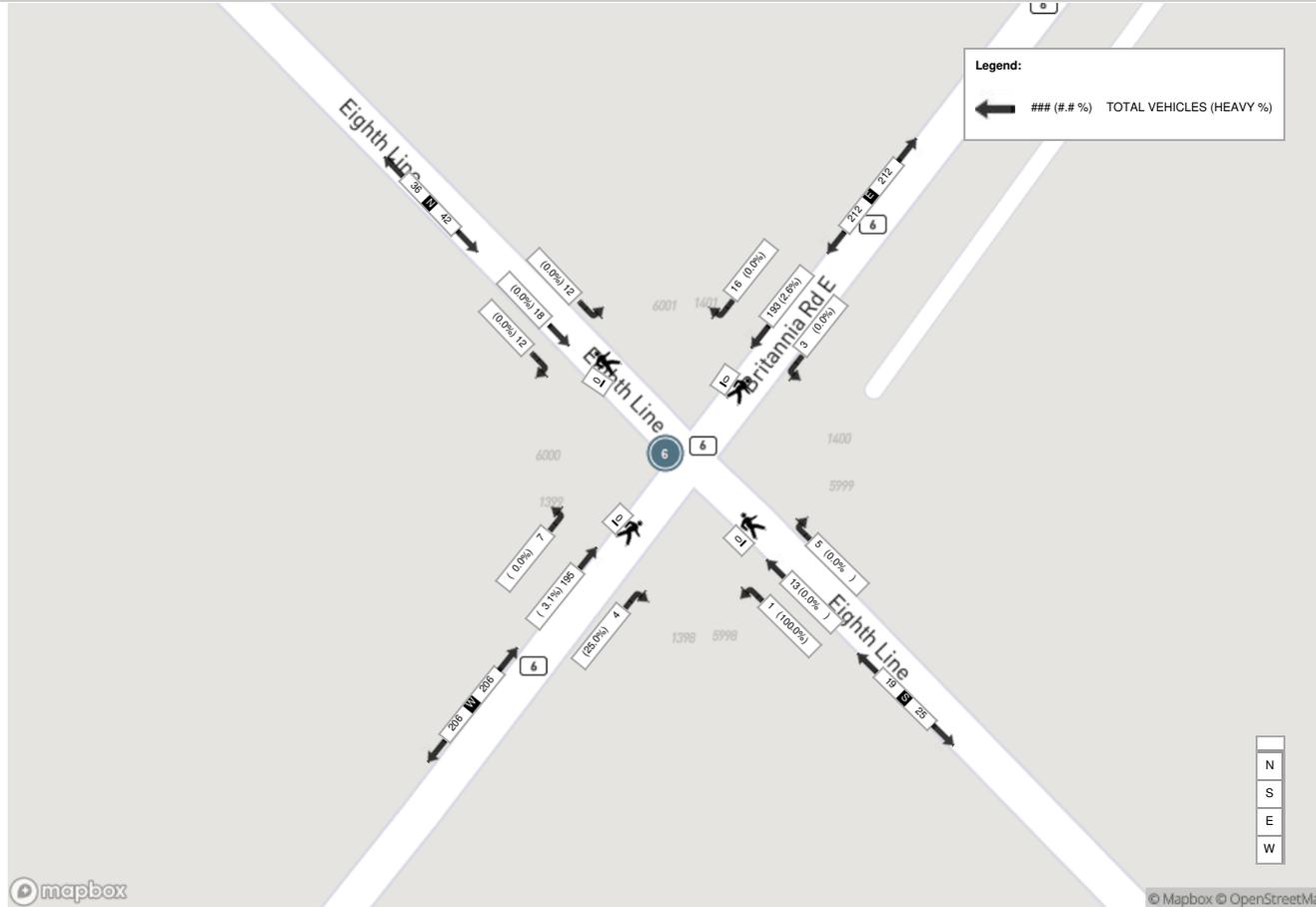
Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (4.09 °C)

Start Time	N Approach EIGHTH LINE						E Approach BRITANNIA RD						S Approach EIGHTH LINE						W Approach BRITANNIA RD						Int. Total (15 min)
	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	Right	Thru	Left	UTurn	Peds	Approach Total	
17:00:00	19	15	12	0	0	46	3	128	4	0	0	135	9	19	4	0	0	32	0	88	4	0	0	92	305
17:15:00	17	14	8	0	0	39	4	137	6	0	0	147	11	17	7	0	0	35	0	104	3	0	0	107	328
17:30:00	18	14	10	0	0	42	4	123	2	0	0	129	12	23	2	0	0	37	1	80	4	0	0	85	293
17:45:00	13	10	5	0	0	28	11	123	1	0	0	135	12	16	5	0	0	33	0	101	5	0	0	106	302
Grand Total	67	53	35	0	0	155	22	511	13	0	0	546	44	75	18	0	0	137	1	373	16	0	0	390	1228
Approach%	43.2%	34.2%	22.6%	0%		-	4%	93.6%	2.4%	0%		-	32.1%	54.7%	13.1%	0%		-	0.3%	95.6%	4.1%	0%		-	-
Totals %	5.5%	4.3%	2.9%	0%		12.6%	1.8%	41.6%	1.1%	0%		44.5%	3.6%	6.1%	1.5%	0%		11.2%	0.1%	30.4%	1.3%	0%		31.8%	-
PHF	0.88	0.88	0.73	0		0.84	0.5	0.93	0.54	0		0.93	0.92	0.82	0.64	0		0.93	0.25	0.9	0.8	0		0.91	-
Heavy	0	0	0	0		0	0	2	0	0		2	0	0	0	0		0	0	4	0	0		4	-
Heavy %	0%	0%	0%	0%		0%	0%	0.4%	0%	0%		0.4%	0%	0%	0%	0%		0%	0%	1.1%	0%	0%		1%	-
Lights	67	53	35	0		155	22	509	13	0		544	44	75	18	0		137	1	369	16	0		386	-
Lights %	100%	100%	100%	0%		100%	100%	99.6%	100%	0%		99.6%	100%	100%	100%	0%		100%	100%	98.9%	100%	0%		99%	-
Single-Unit Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	3	0	0		3	-
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.8%	-
Buses	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	-
Buses %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.3%	-
Articulated Trucks	0	0	0	0		0	0	1	0	0		1	0	0	0	0		0	0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	0.2%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	-

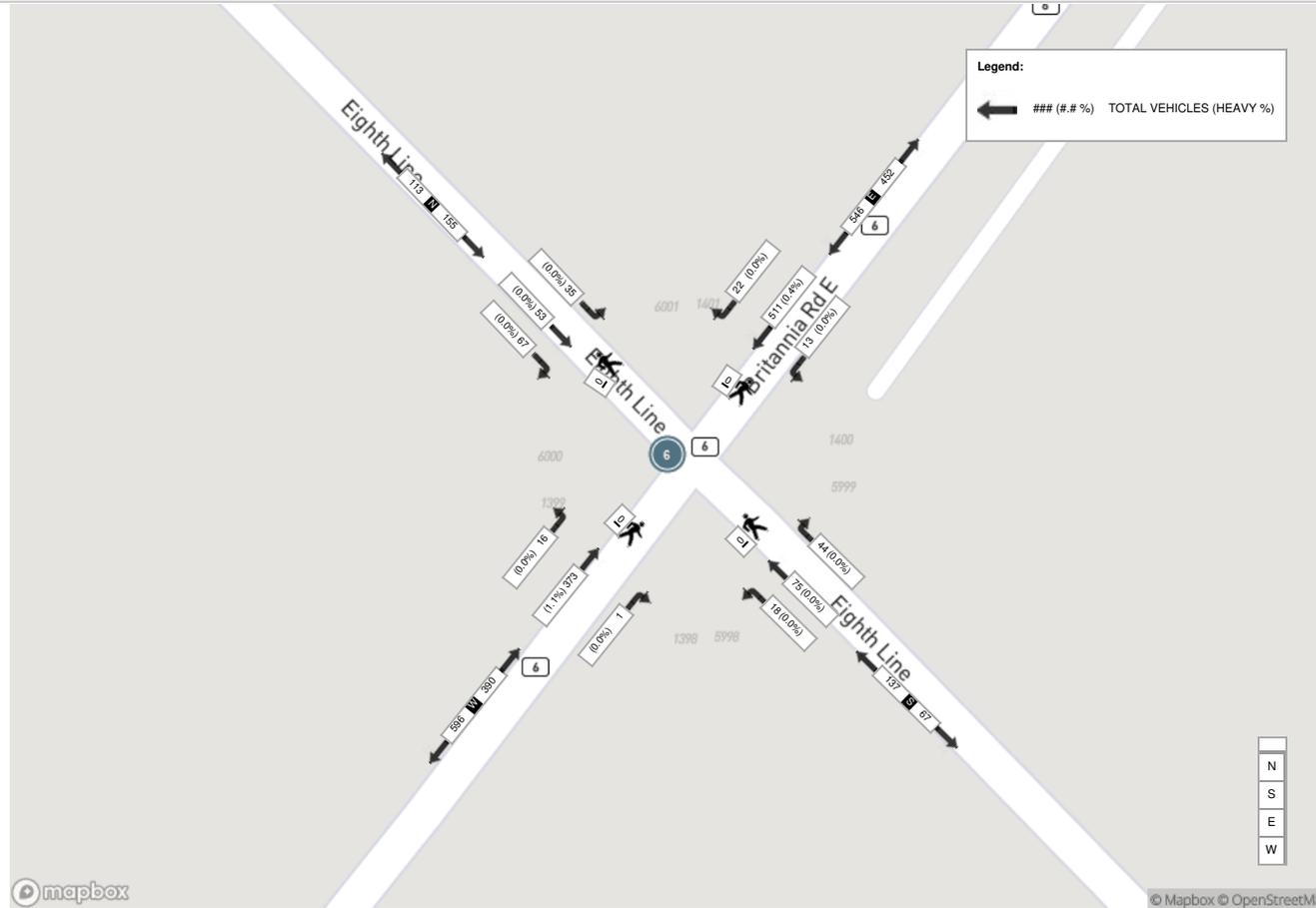
Peak Hour: 07:45 AM - 08:45 AM Weather: Overcast Clouds (3.3 °C)



Peak Hour: 12:00 PM - 01:00 PM Weather: Overcast Clouds (4.24 °C)



Peak Hour: 05:00 PM - 06:00 PM Weather: Overcast Clouds (4.09 °C)



Appendix F

Excerpts from Halton Region Access Management Guideline and Halton TMP

Rural/Natural Heritage System (R)

Rural lands are designated areas for agriculture and protection of infrastructure that supports farming and Natural Heritage Areas (NHS) are lands designated for natural area conservation. In planning for new urban areas, the Region is seeking to minimize development of prime agricultural lands. Regional Roads in Rural/NHS lands should respect the rural character of the area.

Corridors (C)

Corridors are urban growth areas identified along major roads, arterials or higher order corridors that have the potential to provide a focus for higher density mixed-use development and employment use consistent with planned transit service levels. The design and physical appearance of corridors contribute directly to livability and economic success and therefore should offer a positive community environment and convenient access for residents and businesses to a variety of goods and services.

Corridors will generally vary in use along their length and their design needs to reflect the change in surroundings. Over time, corridors could include a mix of uses such as: sidewalk-fronting shops or businesses, offices, civic uses appropriately scaled and designed public spaces and a broad mix of residential forms and densities. Corridors that travel through employment lands are to provide for development of quality business environment and include a range of offices, industrial-type buildings and services supporting employment such as business related retail and restaurants located in buildings with doors and windows that front the street.

Node (N)

Nodes are defined as compact, transit-oriented, pedestrian/cyclist friendly and mixed use/residential neighbourhood centers that are areas of more intensive urban uses within a community. They provide area residents with a hub to meet a variety of daily needs (goods and services) and serve as a social focus for the community and as concentrations of office employment uses. Nodes are generally located at the intersections of major corridors within the identified intensification areas and extend approximately 200-400 metres from the intersection.

Halton Region's access spacing guidelines are further refined by providing spacing for cross-section type as identified in the Region's Right-of-Way guidelines. **Please see Appendix B for the individual cross-sections by Rural/NHS (R), Corridor (C) and Node (N).**

Table 1 outlines the minimum spacing requirements for access and road connections to Regional roads. As speed limits increase, greater minimum distance is required between access locations. Access spacing can be reduced to a minimum of 250 metres within the intensification areas (Node) identified within the Regional Official Plan that can be substantiated through the submission of a comprehensive corridor analysis and Transportation Impact Study analyzing all possible alternatives and taking into consideration land use and community factors. Access spacing is measured stop bar to stop bar.

Table 1 – Minimum Access Spacing

TYPE*	Full Movement Access (m)	Right in/out Access (m)
R1	400	115
R2	400	115
C1	400	115
C2	300	115
C3	300	115
C4	300	115
C5	300	115
N1	250	115
N2	250	115

3.4 SIGHT DISTANCE REQUIREMENTS

A safe sight distance is the distance needed by a driver on a Major Arterial, or a driver exiting a driveway or street to verify that the road is clear and to avoid conflicts with other vehicles.

Adequate sight distance must be provided for both movements into and out of an access with a minimum of hazard and disruption to traffic. Sight distance requirements must be considered both for vehicles approaching the access and departing from the stopped position at the access.

The sight distances should be designed to enable existing vehicles:

- Upon turning left or right, to accelerate to the operating speed of the street without causing approaching vehicles to reduce speed by more than 15km/h; and
- Upon turning left, to clear the near half of the street without conflicting with vehicles approaching from the left.

The operating characteristics (driver eye elevation, visibility of the vehicle, and vehicle acceleration characteristics) of both trucks and passenger vehicles should be considered if both vehicle types are anticipated to utilize the access.

3.5 DRIVEWAY AND SITE CONFIGURATION

Driveway location and design affects the ability of a driver to safely and easily enter and exit a site. Road classification, right-of-way, design speed, design hour volumes, and land use influence driveway location and design. For driveways to be permitted along major Regional roads, the design of the proposed driveways should be feasible to minimize interference with the mobility of the through traffic by designing the driveway to provide desirable:

- Driveway width – See Section 5.4 -Table 2
- Driveway radii – See Section 5.4 – Table 3
- Clear throat conditions

Appendix G

Background Development Trip Generation

Report for TAZ:

31FB (RNA Assumed)

Mode Split Reduction:

28%

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing ITE LUC 210 1472 Units	Trip Generation Equation or Average Rate	T = 0.71(X) +4.8			Ln(T) = 0.96Ln(X) +0.2		
	Directional Split	25%	75%	-	63%	37%	-
	Gross Trips	272	812	1,084	917	538	1,455
	Mode Split Reduction (28%)	-77	-227	-304	-256	-151	-407
	Net Trips	195	585	780	661	387	1,048
Multi-family Housing (Low-rise) ITE LUC 220 1361 Units	Trip Generation Equation or Average Rate	Ln(T) = 0.95Ln(X) -0.51			Ln(T) = 0.89Ln(X) -0.02		
	Directional Split	23%	77%	-	63%	37%	-
	Gross Trips	146	487	633	480	282	762
	Mode Split Reduction (28%)	-40	-136	-176	-135	-78	-213
	Net Trips	106	351	457	345	204	549
Multi-family Housing (Mid-rise) ITE LUC 221 431 Units	Trip Generation Equation or Average Rate	Ln(T) = 0.98Ln(X) -0.98			Ln(T) = 0.96Ln(X) -0.63		
	Directional Split	26%	74%	-	61%	39%	-
	Gross Trips	39	110	149	118	79	197
	Mode Split Reduction (28%)	-11	-30	-41	-33	-23	-56
	Net Trips	28	80	108	85	56	141
Multi-family Housing (High-rise) ITE LUC 222 6978 Units	Trip Generation Equation or Average Rate	T = 0.28(X) +12.86			T = 0.34(X) +8.56		
	Directional Split	24%	76%	-	61%	39%	-
	Gross Trips	505	1,601	2,106	1,509	966	2,475
	Mode Split Reduction (28%)	-141	-448	-589	-423	-270	-693
	Net Trips	364	1,153	1,517	1,086	696	1,782
Total Residential 10242 Units	Net Trips	693	2,169	2,862	2,177	1,343	3,520
Shopping Center ITE LUC 820 215000 sq.ft. GFA	Trip Generation Equation or Average Rate	0.94			Ln(T) = 0.74Ln(X) +2.89		
	Directional Split	62%	38%	-	48%	52%	-
	Gross Trips	125	77	202	618	671	1,289
	Mode Split Reduction (28%)	-36	-22	-58	-172	-187	-359
	Pass-by (34% PM)	0	0	0	-162	-162	-324
	Net Trips	89	55	144	284	322	606
Elementary School ITE LUC 520 2175 Students	Trip Generation Equation or Average Rate	0.67			0.17		
	Directional Split	54%	46%	-	48%	52%	-
	Gross Trips	786	672	1,458	177	192	369
	Mode Split Reduction (28%)	-219	-189	-408	-51	-54	-105
	Net Trips	567	483	1,050	126	138	264
High School ITE LUC 530 1500 Students	Trip Generation Equation or Average Rate	0.52			0.14		
	Directional Split	67%	33%	-	48%	52%	-
	Gross Trips	523	257	780	101	109	210
	Mode Split Reduction (28%)	-146	-72	-218	-28	-31	-59
	Net Trips	377	185	562	73	78	151
District Park ITE LUC 411 15 Acres	Trip Generation Equation or Average Rate	0.02			T = 0.06(X) +22.6		
	Directional Split	-	-	-	-	-	-
	Gross Trips	0	0	0	13	11	24
	Mode Split Reduction (28%)	0	0	0	0	0	0
	Net Trips	0	0	0	13	11	24
Total Non-Residential	Net Trips	1,033	723	1,756	496	549	1,045
Total Trips	Net Trips	1,726	2,892	4,618	2,673	1,892	4,565

Report for TAZ:

41FB (RNA Assumed)

Mode Split Reduction:

28%

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing ITE LUC 210 2708 Units	Trip Generation Equation or Average Rate	T = 0.71(X) +4.8			Ln(T) = 0.96Ln(X) +0.2		
	Directional Split	25%	75%	-	63%	37%	-
	Gross Trips	500	1,501	2,001	1,692	993	2,685
	Mode Split Reduction (28%)	-141	-419	-560	-472	-278	-750
	Net Trips	359	1,082	1,441	1,220	715	1,935
Multi-family Housing (Low-rise) ITE LUC 220 3054 Units	Trip Generation Equation or Average Rate	Ln(T) = 0.95Ln(X) -0.51			Ln(T) = 0.89Ln(X) -0.02		
	Directional Split	23%	77%	-	63%	37%	-
	Gross Trips	326	1,087	1,413	1,066	627	1,693
	Mode Split Reduction (28%)	-90	-303	-393	-300	-176	-476
	Net Trips	236	784	1,020	766	451	1,217
Multi-family Housing (Mid-rise) ITE LUC 221 922 Units	Trip Generation Equation or Average Rate	Ln(T) = 0.98Ln(X) -0.98			Ln(T) = 0.96Ln(X) -0.63		
	Directional Split	26%	74%	-	61%	39%	-
	Gross Trips	83	232	315	251	162	413
	Mode Split Reduction (28%)	-24	-65	-89	-70	-47	-117
	Net Trips	59	167	226	181	115	296
Multi-family Housing (High-rise) ITE LUC 222 11404 Units	Trip Generation Equation or Average Rate	T = 0.28(X) +12.86			T = 0.34(X) +8.56		
	Directional Split	24%	76%	-	61%	39%	-
	Gross Trips	818	2,590	3,408	2,453	1,571	4,024
	Mode Split Reduction (28%)	-228	-724	-952	-688	-439	-1,127
	Net Trips	590	1,866	2,456	1,765	1,132	2,897
Total Residential 18088 Units	Net Trips	1,244	3,899	5,143	3,932	2,413	6,345
Shopping Center ITE LUC 820 365000 sq.ft. GFA	Trip Generation Equation or Average Rate	0.94			Ln(T) = 0.74Ln(X) +2.89		
	Directional Split	62%	38%	-	48%	52%	-
	Gross Trips	212	130	342	1,074	1,164	2,238
	Mode Split Reduction (28%)	-60	-36	-96	-301	-325	-626
	Pass-by (34% PM)	0	0	0	-280	-280	-560
	Net Trips	152	94	246	493	559	1,052
Elementary School ITE LUC 520 4350 Students	Trip Generation Equation or Average Rate	0.67			0.17		
	Directional Split	54%	46%	-	48%	52%	-
	Gross Trips	1,572	1,344	2,916	354	384	738
	Mode Split Reduction (28%)	-438	-378	-816	-102	-108	-210
	Net Trips	1,134	966	2,100	252	276	528
High School ITE LUC 530 1500 Students	Trip Generation Equation or Average Rate	0.52			0.14		
	Directional Split	67%	33%	-	48%	52%	-
	Gross Trips	523	257	780	101	109	210
	Mode Split Reduction (28%)	-146	-72	-218	-28	-31	-59
	Net Trips	377	185	562	73	78	151
District Park ITE LUC 411 30 Acres	Trip Generation Equation or Average Rate	0.02			T = 0.06(X) +22.6		
	Directional Split	-	-	-	-	-	-
	Gross Trips	0	0	0	26	22	48
	Mode Split Reduction (28%)	0	0	0	0	0	0
	Net Trips	0	0	0	26	22	48
Total Non-Residential	Net Trips	1,663	1,245	2,908	844	935	1,779
Total Trips	Net Trips	2,907	5,144	8,051	4,776	3,348	8,124

Report for TAZ:

Frontenac Lands

Mode Split Reduction:

28%

Land Use	Parameter	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Single-Family Detached Housing ITE LUC 210 435 Units	Trip Generation Equation or Average Rate	Ln(T) = 0.91Ln(X) + 0.12			Ln(T) = 0.94Ln(X) + 0.27		
	Directional Split	25%	75%	-	63%	37%	-
	Gross Trips	82	244	326	271	161	432
	Mode Split Reduction (28%)	-23	-68	-91	-76	-46	-122
	Net Trips	59	176	235	195	115	310
Multi-family Housing (Low-rise) ITE LUC 220 855 Units	Trip Generation Equation or Average Rate	T = 0.31(X) + 22.85			T = 0.43(X) + 20.55		
	Directional Split	24%	76%	-	63%	37%	-
	Gross Trips	97	305	402	309	181	490
	Mode Split Reduction (28%)	-26	-86	-112	-87	-50	-137
	Net Trips	71	219	290	222	131	353
Multi-family Housing (Mid-rise) ITE LUC 221 356 Units	Trip Generation Equation or Average Rate	T = 0.44(X) - 11.61			T = 0.39(X) + 0.34		
	Directional Split	23%	77%	-	61%	39%	-
	Gross Trips	30	104	134	84	55	139
	Mode Split Reduction (28%)	-8	-29	-37	-24	-15	-39
	Net Trips	22	75	97	60	40	100
Multi-family Housing (High-rise) ITE LUC 222 701 Units	Trip Generation Equation or Average Rate	T = 0.22(X) + 18.85			T = 0.26(X) + 23.12		
	Directional Split	26%	74%	-	62%	38%	-
	Gross Trips	45	128	173	127	78	205
	Mode Split Reduction (28%)	-13	-36	-49	-36	-22	-58
	Net Trips	32	92	124	91	56	147
Total Residential 2,347 Units	Net Trips	184	562	746	568	342	910
Shopping Center ITE LUC 820 116,000 sq.ft. GFA	Trip Generation Equation or Average Rate	0.84			Ln(T) = 0.72Ln(X) + 3.02		
	Directional Split	62%	38%	-	48%	52%	-
	Gross Trips	125	77	202	301	327	628
	Mode Split Reduction (28%)	-35	-22	-57	-84	-92	-176
	Pass-by (34% PM)	0	0	0	-74	-74	-148
	Net Trips	90	55	145	143	161	304
Elementary School ITE LUC 520 725 Students	Trip Generation Equation or Average Rate	0.74			0.16		
	Directional Split	54%	46%	-	46%	54%	-
	Gross Trips	290	247	537	53	63	116
	Mode Split Reduction (28%)	-81	-69	-150	-15	-18	-33
	Net Trips	209	178	387	38	45	83
Total Non-Residential	Net Trips	299	233	532	181	206	387
Total Trips	Net Trips	483	795	1,278	749	548	1,297

Appendix H

Trip Distribution Calculation

4.2 Trip Distribution

Trip distribution for the Trafalgar Corridor development area for the 2031 horizon year was estimated using the origin-destination matrices from the Region’s 2031 model run with the proposed densities outlined previously. Trip assignment was subsequently estimated for each TAZ based on potential access locations and the route providing the shortest travel time. The external trip distribution for the Trafalgar Corridor for Scenario A and Scenario B is summarized in **Table 4-7**.

Table 4-7: External Trip Distribution Summary

Location	Scenario A				Scenario B			
	AM Peak Period		PM Peak Period		AM Peak Period		PM Peak Period	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
Brampton-Caledon	2.80%	2.90%	2.90%	2.80%	2.60%	2.70%	2.70%	2.60%
York	3.50%	0.50%	0.50%	3.50%	3.70%	0.60%	0.60%	3.70%
Halton Hills	6.30%	13.20%	13.20%	6.30%	6.00%	13.40%	13.40%	6.00%
Oakville	5.90%	8.00%	8.00%	5.90%	6.30%	7.80%	7.80%	6.30%
Burlington South	3.90%	5.10%	5.10%	3.90%	3.70%	5.00%	5.00%	3.70%
Burlington North	0.90%	0.70%	0.70%	0.90%	0.70%	0.60%	0.60%	0.70%
Mississauga North-West	1.20%	1.70%	1.70%	1.20%	1.20%	1.60%	1.60%	1.20%
Mississauga Central-West	3.70%	2.90%	2.90%	3.70%	4.00%	2.80%	2.80%	4.00%
Mississauga South-West	0.80%	0.50%	0.50%	0.80%	0.80%	0.60%	0.60%	0.80%
Mississauga North-East	2.30%	2.20%	2.20%	2.30%	2.20%	2.30%	2.30%	2.20%
Mississauga Central-East	2.30%	1.40%	1.40%	2.30%	1.70%	1.60%	1.60%	1.70%
Mississauga South-East	0.20%	1.10%	1.10%	0.20%	0.00%	0.90%	0.90%	0.00%
Toronto South	1.60%	0.80%	0.80%	1.60%	1.40%	0.80%	0.80%	1.40%
Toronto North	1.00%	1.60%	1.60%	1.00%	0.80%	1.60%	1.60%	0.80%
Hamilton South	10.90%	1.60%	1.60%	10.90%	9.50%	1.60%	1.60%	9.50%
Hamilton North	4.30%	4.90%	4.90%	4.30%	3.60%	4.90%	4.90%	3.60%
Milton Downtown	17.00%	24.30%	24.30%	17.00%	18.50%	24.60%	24.60%	18.50%
Milton South	18.30%	14.60%	14.60%	18.30%	18.60%	14.50%	14.50%	18.60%
Milton North-West	13.10%	11.90%	11.90%	13.10%	14.80%	11.80%	11.80%	14.80%
Durham	0.00%	0.40%	0.40%	0.00%	0.00%	0.40%	0.40%	0.00%
Total	100%	100%	100%	100%	100%	100%	100%	100%

The external trip distribution obtained from the Region’s EMME model illustrates that most of the trips inbound and outbound are contained within Milton, with the rest heavily destined to or originating from various municipalities within Halton Region.

The Region’s EMME model was also used to extract the trip distribution between the zones within the Trafalgar Corridor. The interzonal and intrazonal trip distribution for the Trafalgar Corridor for Scenario A and Scenario B is summarized in **Table 4-8**.

Location	General Direction	Scenario A - Agerton Go Station			
		AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
Brampton-Caledon	NE	2.80%	2.90%	2.90%	2.80%
York	E	3.50%	0.50%	0.50%	3.50%
Halton Hills	N	6.30%	13.20%	13.20%	6.30%
Oakville	S	5.90%	8.00%	8.00%	5.90%
Burlington South	SW	3.90%	5.10%	5.10%	3.90%
Burlington North	SW	0.90%	0.70%	0.70%	0.90%
Mississauga North-West	E	1.20%	1.70%	1.70%	1.20%
Mississauga Central-West	E	3.70%	2.90%	2.90%	3.70%
Mississauga South-West	SE	0.80%	0.50%	0.50%	0.80%
Mississauga North-East	E	2.30%	2.20%	2.20%	2.30%
Mississauga Central-East	E	2.30%	1.40%	1.40%	2.30%
Mississauga South-East	SE	0.20%	1.10%	1.10%	0.20%
Toronto South	SE	1.60%	0.80%	0.80%	1.60%
Toronto North	E	1.00%	1.60%	1.60%	1.00%
Hamilton South	SW	10.90%	1.60%	1.60%	10.90%
Hamilton North	SW	4.30%	4.90%	4.90%	4.30%
Milton Downtown	NW	17.00%	24.30%	24.30%	17.00%
Milton South	W	18.30%	14.60%	14.60%	18.30%
Milton North-West	NW	13.10%	11.90%	11.90%	13.10%
Durham	NE	0.00%	0.40%	0.40%	0.00%
Total		100.00%	100.30%	100.30%	100.00%

0.033% Modification to apply to all movements to account for rounding errors in TMP Summary table (100.30% total previously)

Direction		AM Peak Hour		PM Peak Hour	
		Inbound	Outbound	Inbound	Outbound
N	via Trafalgar NB	6.30%	13.17%	13.17%	6.30%
	via Hwy 401	15.44%	13.58%	13.58%	15.44%
S	via Trafalgar SB	15.28%	14.47%	14.47%	15.28%
E	via Derry EB	5.25%	4.12%	4.12%	5.25%
	via Britannia EB	8.45%	6.52%	6.52%	8.45%
	via LBL EB	5.39%	4.12%	4.12%	5.39%
W	via Derry WB	13.60%	15.26%	15.26%	13.60%
	via Britannia WB	28.53%	26.87%	26.87%	28.53%
	via LBL WB	1.77%	1.91%	1.91%	1.77%
Total		100%	100%	100%	100%

Overall Directional Distribution

	AM IN	AM OUT	PM IN	PM OUT
N	21.74%	26.74%	26.74%	21.74%
S	15.28%	14.47%	14.47%	15.28%
E	19.09%	14.75%	14.75%	19.09%
W	43.89%	44.04%	44.04%	43.89%
Total	100.00%	100.00%	100.00%	100.00%

		AM (IN)	AM (OUT)	PM (IN)	PM (OUT)
1	Trafalgar Road to/from north	21.74%	26.74%	26.74%	21.74%
2	Eighth Line to/from north	0.00%	0.00%	0.00%	0.00%
3	Derry Road to/from east	5.25%	4.12%	4.12%	5.25%
4	Britannia Road to/from east	8.45%	6.52%	6.52%	8.45%
5	Lower Baseline to/from east	5.39%	4.12%	4.12%	5.39%
6	Trafalgar Road to/from south	15.28%	14.47%	14.47%	15.28%
7	Lower Baseline to/from west	1.77%	1.91%	1.91%	1.77%
8	Britannia Road to/from west	28.53%	26.87%	26.87%	28.53%
9	Derry Road to/from west	13.60%	15.26%	15.26%	13.60%
	Total	100.00%	100.00%	100.00%	100.00%

Appendix I

Baseline SYNCHRO Capacity and Queuing Analysis Reports

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

Baseline AM Peak Hour
07/08/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	468	288	127	264	51	135	664	150	74	723	22
Future Volume (vph)	44	468	288	127	264	51	135	664	150	74	723	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	215.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	30.0			30.0			50.0			50.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.972			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1706	5142	1601	1825	4995	1633	1772	3382	0	1789	3435	0
Flt Permitted	0.574			0.350			0.261			0.235		
Satd. Flow (perm)	1031	5142	1601	672	4995	1633	487	3382	0	443	3435	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			274			84		28			3	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		77.0			86.0			3180.7			2992.0	
Travel Time (s)		4.6			5.2			190.8			179.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	7%	2%	2%	0%	5%	0%	3%	6%	0%	2%	6%	0%
Adj. Flow (vph)	46	493	303	134	278	54	142	699	158	78	761	23
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	493	303	134	278	54	142	857	0	78	784	0
Enter Blocked Intersection	No	No	No	No	No							
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex								
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

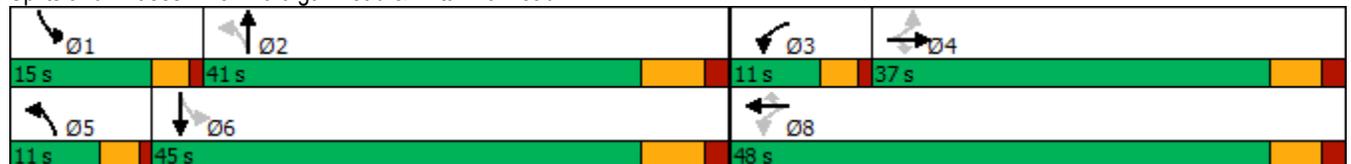
Baseline AM Peak Hour
07/08/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0		7.0	25.0	
Minimum Split (s)	42.0	42.0	42.0	11.0	42.0	42.0	11.0	40.0		11.0	40.0	
Total Split (s)	37.0	37.0	37.0	11.0	48.0	48.0	11.0	41.0		15.0	45.0	
Total Split (%)	35.6%	35.6%	35.6%	10.6%	46.2%	46.2%	10.6%	39.4%		14.4%	43.3%	
Maximum Green (s)	31.0	31.0	31.0	7.0	42.0	42.0	7.0	34.0		11.0	38.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0		4.0	7.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Recall Mode	None	Max		None	Max							
Walk Time (s)	7.0	7.0	7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)	29.0	29.0	29.0		29.0	29.0		26.0			26.0	
Pedestrian Calls (#/hr)	0	0	0		0	0		0			0	
Act Effct Green (s)	21.8	21.8	21.8	34.9	32.9	32.9	48.2	39.6		49.1	38.1	
Actuated g/C Ratio	0.23	0.23	0.23	0.37	0.35	0.35	0.51	0.42		0.52	0.40	
v/c Ratio	0.19	0.42	0.52	0.40	0.16	0.09	0.42	0.60		0.23	0.57	
Control Delay	30.8	31.9	8.7	24.0	21.4	2.0	16.1	25.0		13.3	24.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	30.8	31.9	8.7	24.0	21.4	2.0	16.1	25.0		13.3	24.8	
LOS	C	C	A	C	C	A	B	C		B	C	
Approach Delay		23.5			19.9			23.8			23.8	
Approach LOS		C			B			C			C	

Intersection Summary

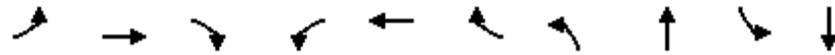
Area Type: Other
 Cycle Length: 104
 Actuated Cycle Length: 95.1
 Natural Cycle: 105
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 23.1
 Intersection LOS: C
 Intersection Capacity Utilization 73.1%
 ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

Baseline AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	493	303	134	278	54	142	857	78	784
v/c Ratio	0.19	0.42	0.52	0.40	0.16	0.09	0.42	0.60	0.23	0.57
Control Delay	30.8	31.9	8.7	24.0	21.4	2.0	16.1	25.0	13.3	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.8	31.9	8.7	24.0	21.4	2.0	16.1	25.0	13.3	24.8
Queue Length 50th (m)	6.8	28.2	4.2	16.5	12.7	0.0	11.9	62.5	6.3	56.8
Queue Length 95th (m)	15.9	37.7	24.2	28.7	18.6	3.5	25.8	100.0	15.6	87.2
Internal Link Dist (m)		53.0			62.0			3156.7		2968.0
Turn Bay Length (m)	120.0			215.0			100.0		100.0	
Base Capacity (vph)	337	1681	708	331	2213	770	341	1425	399	1379
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	0.14	0.29	0.43	0.40	0.13	0.07	0.42	0.60	0.20	0.57

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: Trafalgar Road & Britannia Road

Baseline AM Peak Hour
07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↑↑		↘	↑↑	
Traffic Volume (vph)	44	468	288	127	264	51	135	664	150	74	723	22
Future Volume (vph)	44	468	288	127	264	51	135	664	150	74	723	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0		4.0	7.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1706	5142	1601	1825	4995	1633	1772	3384		1789	3434	
Flt Permitted	0.57	1.00	1.00	0.35	1.00	1.00	0.26	1.00		0.24	1.00	
Satd. Flow (perm)	1031	5142	1601	673	4995	1633	486	3384		443	3434	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	46	493	303	134	278	54	142	699	158	78	761	23
RTOR Reduction (vph)	0	0	211	0	0	35	0	16	0	0	2	0
Lane Group Flow (vph)	46	493	92	134	278	19	142	841	0	78	782	0
Heavy Vehicles (%)	7%	2%	2%	0%	5%	0%	3%	6%	0%	2%	6%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	21.9	21.9	21.9	32.9	32.9	32.9	46.6	39.6		45.4	39.0	
Effective Green, g (s)	21.9	21.9	21.9	32.9	32.9	32.9	46.6	39.6		45.4	39.0	
Actuated g/C Ratio	0.23	0.23	0.23	0.34	0.34	0.34	0.49	0.41		0.47	0.41	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	235	1174	365	314	1713	560	330	1397		299	1396	
v/s Ratio Prot		0.10		c0.03	0.06		c0.03	c0.25		0.02	0.23	
v/s Ratio Perm	0.04		0.06	c0.11		0.01	0.18			0.11		
v/c Ratio	0.20	0.42	0.25	0.43	0.16	0.03	0.43	0.60		0.26	0.56	
Uniform Delay, d1	29.9	31.6	30.3	22.6	21.9	20.9	14.5	22.0		14.7	21.9	
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	0.9	0.5	0.8	0.9	0.1	0.1	0.9	1.9		0.5	1.6	
Delay (s)	30.7	32.1	31.0	23.5	22.0	21.0	15.4	23.9		15.1	23.5	
Level of Service	C	C	C	C	C	C	B	C		B	C	
Approach Delay (s)		31.6			22.3			22.7			22.7	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	21.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

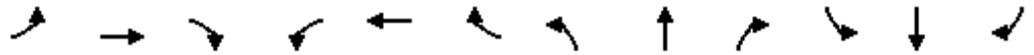
Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

Baseline AM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	14	688	1	11	383	31	6	47	59	55	58	59
Future Volume (vph)	14	688	1	11	383	31	6	47	59	55	58	59
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	40.0		0.0	30.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.989			0.917				0.923
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	5142	1633	1825	5002	0	1362	1742	0	1825	1756	0
Flt Permitted	0.496			0.373			0.679			0.687		
Satd. Flow (perm)	953	5142	1633	717	5002	0	973	1742	0	1320	1756	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29		29			56				48
Link Speed (k/h)		60			60			70				70
Link Distance (m)		1235.9			603.0			3158.3				2985.9
Travel Time (s)		74.2			36.2			162.4				153.6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.94
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Adj. Flow (vph)	14	702	1	11	391	32	6	48	60	56	59	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	702	1	11	423	0	6	108	0	56	122	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

Baseline AM Peak Hour
07/08/2025

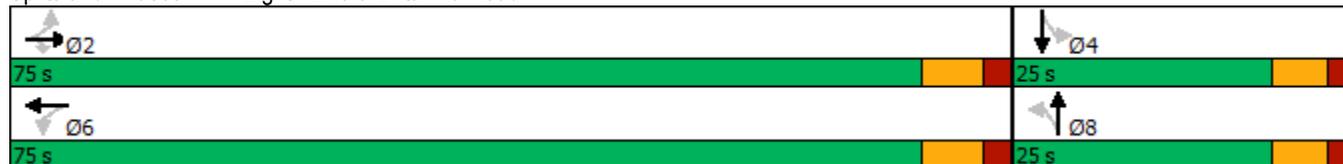


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	26.8	26.8	26.8	26.8	26.8		20.7	20.7		20.7	20.7	
Total Split (s)	75.0	75.0	75.0	75.0	75.0		25.0	25.0		25.0	25.0	
Total Split (%)	75.0%	75.0%	75.0%	75.0%	75.0%		25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	68.2	68.2	68.2	68.2	68.2		19.3	19.3		19.3	19.3	
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6		4.2	4.2		4.2	4.2	
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	None		None	None	
Act Effct Green (s)	23.3	23.3	23.3	23.3	23.3		15.8	15.8		15.8	15.8	
Actuated g/C Ratio	0.54	0.54	0.54	0.54	0.54		0.36	0.36		0.36	0.36	
v/c Ratio	0.03	0.25	0.00	0.03	0.16		0.02	0.16		0.12	0.18	
Control Delay	8.4	8.6	0.0	8.5	7.7		11.5	7.6		12.5	8.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	8.4	8.6	0.0	8.5	7.7		11.5	7.6		12.5	8.9	
LOS	A	A	A	A	A		B	A		B	A	
Approach Delay		8.6			7.7			7.8			10.1	
Approach LOS		A			A			A			B	

Intersection Summary

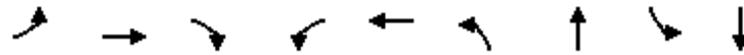
Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	43.4
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.25
Intersection Signal Delay:	8.5
Intersection LOS:	A
Intersection Capacity Utilization:	61.9%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

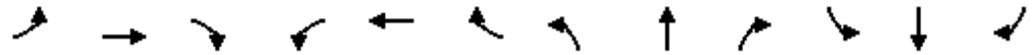
Baseline AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	14	702	1	11	423	6	108	56	122
v/c Ratio	0.03	0.25	0.00	0.03	0.16	0.02	0.16	0.12	0.18
Control Delay	8.4	8.6	0.0	8.5	7.7	11.5	7.6	12.5	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	8.6	0.0	8.5	7.7	11.5	7.6	12.5	8.9
Queue Length 50th (m)	0.7	13.5	0.0	0.5	7.1	0.4	3.0	3.3	4.3
Queue Length 95th (m)	3.0	19.9	0.0	2.6	11.7	2.2	10.9	9.3	13.0
Internal Link Dist (m)	1211.9			579.0			3134.3	2961.9	
Turn Bay Length (m)	50.0			50.0		40.0		30.0	
Base Capacity (vph)	953	5142	1633	717	5002	456	847	619	848
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.14	0.00	0.02	0.08	0.01	0.13	0.09	0.14
Intersection Summary									

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

Baseline AM Peak Hour
07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑		↘	↗		↘	↗	
Traffic Volume (vph)	14	688	1	11	383	31	6	47	59	55	58	59
Future Volume (vph)	14	688	1	11	383	31	6	47	59	55	58	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8		5.7	5.7		5.7	5.7	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	5142	1633	1825	5000		1362	1742		1825	1755	
Flt Permitted	0.50	1.00	1.00	0.37	1.00		0.68	1.00		0.69	1.00	
Satd. Flow (perm)	953	5142	1633	717	5000		973	1742		1320	1755	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.94
Adj. Flow (vph)	14	702	1	11	391	32	6	48	60	56	59	63
RTOR Reduction (vph)	0	0	1	0	15	0	0	42	0	0	36	0
Lane Group Flow (vph)	14	702	0	11	408	0	6	66	0	56	86	0
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	21.1	21.1	21.1	21.1	21.1		11.0	11.0		11.0	11.0	
Effective Green, g (s)	21.1	21.1	21.1	21.1	21.1		11.0	11.0		11.0	11.0	
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47		0.25	0.25		0.25	0.25	
Clearance Time (s)	6.8	6.8	6.8	6.8	6.8		5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	450	2432	772	339	2365		239	429		325	432	
v/s Ratio Prot		c0.14			0.08			0.04			c0.05	
v/s Ratio Perm	0.01		0.00	0.02			0.01			0.04		
v/c Ratio	0.03	0.29	0.00	0.03	0.17		0.03	0.15		0.17	0.20	
Uniform Delay, d1	6.3	7.2	6.2	6.3	6.7		12.7	13.2		13.2	13.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.1	0.0	0.0	0.0		0.0	0.2		0.3	0.2	
Delay (s)	6.3	7.2	6.2	6.3	6.8		12.8	13.3		13.5	13.5	
Level of Service	A	A	A	A	A		B	B		B	B	
Approach Delay (s)		7.2			6.8			13.3			13.5	
Approach LOS		A			A			B			B	

Intersection Summary		
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.26	A
Actuated Cycle Length (s)	44.6	Sum of lost time (s)
Intersection Capacity Utilization	61.9%	12.5
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		B

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

Baseline PM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	66	425	202	123	588	66	329	907	163	70	573	49
Future Volume (vph)	66	425	202	123	588	66	329	907	163	70	573	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	215.0		0.0	100.0		0.0	100.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	30.0			30.0			50.0			50.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850		0.977			0.988	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	5142	1617	1825	5193	1601	1772	3507	0	1772	3470	0
Flt Permitted	0.406			0.336			0.291			0.188		
Satd. Flow (perm)	750	5142	1617	645	5193	1601	543	3507	0	351	3470	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			213			101		21			8	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		77.0			86.0			3180.7			2992.0	
Travel Time (s)		4.6			5.2			190.8			179.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	4%	2%	1%	0%	1%	2%	3%	2%	0%	3%	4%	3%
Adj. Flow (vph)	69	447	213	129	619	69	346	955	172	74	603	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	447	213	129	619	69	346	1127	0	74	655	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

Baseline PM Peak Hour
07/08/2025

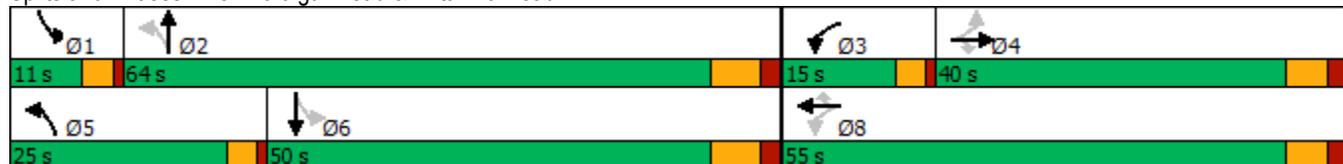


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4		4	8		8	2			6		
Detector Phase	4	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	15.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0		7.0	25.0	
Minimum Split (s)	42.0	42.0	42.0	11.0	42.0	42.0	11.0	40.0		11.0	40.0	
Total Split (s)	40.0	40.0	40.0	15.0	55.0	55.0	25.0	64.0		11.0	50.0	
Total Split (%)	30.8%	30.8%	30.8%	11.5%	42.3%	42.3%	19.2%	49.2%		8.5%	38.5%	
Maximum Green (s)	34.0	34.0	34.0	11.0	49.0	49.0	21.0	57.0		7.0	43.0	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0		3.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0		1.0	2.0	
Lost Time Adjust (s)	-1.0	-2.0	0.0	-1.0	-2.0	0.0	-1.0	-2.0		-1.0	-2.0	
Total Lost Time (s)	5.0	4.0	6.0	3.0	4.0	6.0	3.0	5.0		3.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			Yes	Yes		Yes	Yes	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Recall Mode	None	Max		None	Max							
Walk Time (s)	7.0	7.0	7.0		7.0	7.0		7.0			7.0	
Flash Dont Walk (s)	29.0	29.0	29.0		29.0	29.0		26.0			26.0	
Pedestrian Calls (#/hr)	0	0	0		0	0		0			0	
Act Effct Green (s)	23.8	24.8	22.8	39.9	38.9	36.9	70.3	59.8		58.1	48.0	
Actuated g/C Ratio	0.20	0.21	0.20	0.34	0.33	0.32	0.60	0.51		0.50	0.41	
v/c Ratio	0.45	0.41	0.44	0.39	0.36	0.12	0.68	0.62		0.27	0.46	
Control Delay	51.0	40.4	7.9	30.4	29.6	2.3	19.7	23.5		15.0	27.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	51.0	40.4	7.9	30.4	29.6	2.3	19.7	23.5		15.0	27.5	
LOS	D	D	A	C	C	A	B	C		B	C	
Approach Delay		31.9			27.5			22.6			26.3	
Approach LOS		C			C			C			C	

Intersection Summary

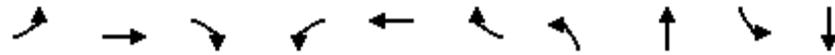
Area Type:	Other
Cycle Length:	130
Actuated Cycle Length:	116.3
Natural Cycle:	105
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.68
Intersection Signal Delay:	26.2
Intersection LOS:	C
Intersection Capacity Utilization:	78.2%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

Baseline PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	69	447	213	129	619	69	346	1127	74	655
v/c Ratio	0.45	0.41	0.44	0.39	0.36	0.12	0.68	0.62	0.27	0.46
Control Delay	51.0	40.4	7.9	30.4	29.6	2.3	19.7	23.5	15.0	27.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.0	40.4	7.9	30.4	29.6	2.3	19.7	23.5	15.0	27.5
Queue Length 50th (m)	14.3	33.2	0.0	21.1	39.6	0.0	35.8	94.7	6.4	54.8
Queue Length 95th (m)	28.7	43.3	18.5	35.0	49.5	4.2	67.3	142.3	15.8	88.7
Internal Link Dist (m)		53.0			62.0			3156.7		2968.0
Turn Bay Length (m)	120.0			215.0			100.0		100.0	
Base Capacity (vph)	227	1607	627	344	2299	739	563	1814	273	1436
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	0.30	0.28	0.34	0.38	0.27	0.09	0.61	0.62	0.27	0.46

Intersection Summary

HCM Signalized Intersection Capacity Analysis

3: Trafalgar Road & Britannia Road

Baseline PM Peak Hour
07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↑↑		↘	↑↑	
Traffic Volume (vph)	66	425	202	123	588	66	329	907	163	70	573	49
Future Volume (vph)	66	425	202	123	588	66	329	907	163	70	573	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0	6.0	3.0	4.0	6.0	3.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	5142	1617	1825	5193	1601	1772	3507		1772	3471	
Flt Permitted	0.41	1.00	1.00	0.34	1.00	1.00	0.29	1.00		0.19	1.00	
Satd. Flow (perm)	751	5142	1617	646	5193	1601	542	3507		350	3471	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	69	447	213	129	619	69	346	955	172	74	603	52
RTOR Reduction (vph)	0	0	171	0	0	47	0	10	0	0	5	0
Lane Group Flow (vph)	69	447	42	129	619	22	346	1117	0	74	650	0
Heavy Vehicles (%)	4%	2%	1%	0%	1%	2%	3%	2%	0%	3%	4%	3%
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)	22.9	22.9	22.9	36.9	36.9	36.9	67.2	57.8		52.3	46.9	
Effective Green, g (s)	23.9	24.9	22.9	37.9	38.9	36.9	68.2	59.8		54.3	48.9	
Actuated g/C Ratio	0.20	0.21	0.20	0.32	0.33	0.32	0.58	0.51		0.46	0.42	
Clearance Time (s)	6.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0		4.0	7.0	
Vehicle Extension (s)	5.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0		3.0	5.0	
Lane Grp Cap (vph)	153	1093	316	319	1725	504	497	1790		240	1449	
v/s Ratio Prot		0.09		c0.04	0.12		c0.10	0.32		0.02	0.19	
v/s Ratio Perm	c0.09		0.03	0.09		0.01	c0.30			0.13		
v/c Ratio	0.45	0.41	0.13	0.40	0.36	0.04	0.70	0.62		0.31	0.45	
Uniform Delay, d1	40.8	39.8	38.9	29.2	29.6	27.8	14.3	20.6		18.3	24.4	
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	4.4	0.5	0.4	0.8	0.3	0.1	4.2	1.7		0.7	1.0	
Delay (s)	45.2	40.3	39.3	30.0	29.9	27.9	18.5	22.2		19.1	25.4	
Level of Service	D	D	D	C	C	C	B	C		B	C	
Approach Delay (s)		40.5			29.8			21.3			24.8	
Approach LOS		D			C			C			C	

Intersection Summary

HCM 2000 Control Delay	27.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	117.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

Baseline PM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	16	394	1	13	697	22	18	75	44	35	53	67
Future Volume (vph)	16	394	1	13	697	22	18	75	44	35	53	67
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	40.0		0.0	30.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	2.5			2.5			2.5			2.5		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.995			0.944			0.916	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	5142	1633	1825	5168	0	1825	1814	0	1825	1760	0
Flt Permitted	0.350			0.498			0.656			0.656		
Satd. Flow (perm)	672	5142	1633	957	5168	0	1260	1814	0	1260	1760	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29		10			26			57	
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		1235.9			603.0			3158.3			2985.9	
Travel Time (s)		74.2			36.2			162.4			153.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	17	419	1	14	741	23	19	80	47	37	56	71
Shared Lane Traffic (%)												
Lane Group Flow (vph)	17	419	1	14	764	0	19	127	0	37	127	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

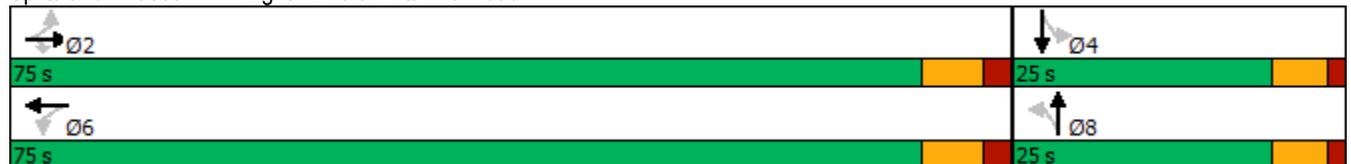
Baseline PM Peak Hour
07/08/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6			8			4		
Detector Phase	2	2	2	6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	26.8	26.8	26.8	26.8	26.8		20.7	20.7		20.7	20.7	
Total Split (s)	75.0	75.0	75.0	75.0	75.0		25.0	25.0		25.0	25.0	
Total Split (%)	75.0%	75.0%	75.0%	75.0%	75.0%		25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	68.2	68.2	68.2	68.2	68.2		19.3	19.3		19.3	19.3	
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6		4.2	4.2		4.2	4.2	
All-Red Time (s)	2.2	2.2	2.2	2.2	2.2		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.8	6.8	6.8	6.8	6.8		5.7	5.7		5.7	5.7	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max	Max	Max	Max		None	None		None	None	
Act Effct Green (s)	68.2	68.2	68.2	68.2	68.2		15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71		0.16	0.16		0.16	0.16	
v/c Ratio	0.04	0.11	0.00	0.02	0.21		0.10	0.41		0.19	0.39	
Control Delay	4.3	4.4	0.0	4.2	4.7		36.1	33.4		37.8	24.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.3	4.4	0.0	4.2	4.7		36.1	33.4		37.8	24.7	
LOS	A	A	A	A	A		D	C		D	C	
Approach Delay		4.4			4.7			33.7			27.7	
Approach LOS		A			A			C			C	

Intersection Summary

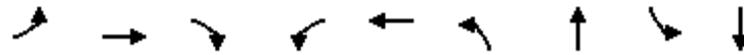
Area Type:	Other
Cycle Length:	100
Actuated Cycle Length:	95.7
Natural Cycle:	50
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.41
Intersection Signal Delay:	9.9
Intersection LOS:	A
Intersection Capacity Utilization:	61.9%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

Baseline PM Peak Hour
07/08/2025

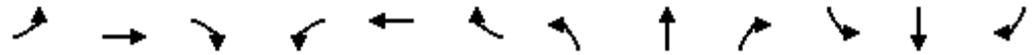


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	17	419	1	14	764	19	127	37	127
v/c Ratio	0.04	0.11	0.00	0.02	0.21	0.10	0.41	0.19	0.39
Control Delay	4.3	4.4	0.0	4.2	4.7	36.1	33.4	37.8	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.3	4.4	0.0	4.2	4.7	36.1	33.4	37.8	24.7
Queue Length 50th (m)	0.8	7.5	0.0	0.7	14.7	3.1	16.9	6.0	11.5
Queue Length 95th (m)	2.6	10.6	0.0	2.3	19.0	9.4	33.9	14.9	28.0
Internal Link Dist (m)	1211.9			579.0		3134.3		2961.9	
Turn Bay Length (m)	50.0			50.0		40.0		30.0	
Base Capacity (vph)	478	3662	1171	682	3684	254	386	254	400
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.11	0.00	0.02	0.21	0.07	0.33	0.15	0.32

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

Baseline PM Peak Hour
07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑		↘	↗		↘	↗	
Traffic Volume (vph)	16	394	1	13	697	22	18	75	44	35	53	67
Future Volume (vph)	16	394	1	13	697	22	18	75	44	35	53	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.8	6.8	6.8	6.8	6.8		5.7	5.7		5.7	5.7	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.94		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	5142	1633	1825	5171		1825	1814		1825	1760	
Flt Permitted	0.35	1.00	1.00	0.50	1.00		0.66	1.00		0.66	1.00	
Satd. Flow (perm)	673	5142	1633	957	5171		1261	1814		1261	1760	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	17	419	1	14	741	23	19	80	47	37	56	71
RTOR Reduction (vph)	0	0	0	0	3	0	0	22	0	0	48	0
Lane Group Flow (vph)	17	419	1	14	761	0	19	105	0	37	79	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8				4
Permitted Phases	2		2	6			8			4		
Actuated Green, G (s)	68.2	68.2	68.2	68.2	68.2		15.0	15.0		15.0	15.0	
Effective Green, g (s)	68.2	68.2	68.2	68.2	68.2		15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.71		0.16	0.16		0.16	0.16	
Clearance Time (s)	6.8	6.8	6.8	6.8	6.8		5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	479	3664	1163	682	3685		197	284		197	275	
v/s Ratio Prot		0.08			c0.15			c0.06			0.04	
v/s Ratio Perm	0.03		0.00	0.01			0.02			0.03		
v/c Ratio	0.04	0.11	0.00	0.02	0.21		0.10	0.37		0.19	0.29	
Uniform Delay, d1	4.1	4.3	4.0	4.0	4.6		34.5	36.1		35.1	35.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1	0.0	0.1	0.1		0.2	0.8		0.5	0.6	
Delay (s)	4.2	4.4	4.0	4.1	4.8		34.8	36.9		35.5	36.2	
Level of Service	A	A	A	A	A		C	D		D	D	
Approach Delay (s)		4.4			4.7			36.7			36.1	
Approach LOS		A			A			D			D	

Intersection Summary		
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.24	
Actuated Cycle Length (s)	95.7	Sum of lost time (s) 12.5
Intersection Capacity Utilization	61.9%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

Appendix J

Future Background SYNCHRO Capacity and Queuing Analysis Reports

2031 Future Background

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

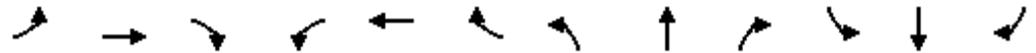
Future Background 2031_AM
06/10/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	657	301	133	566	169	159	994	152	124	1165	509
Future Volume (vph)	226	657	301	133	566	169	159	994	152	124	1165	509
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Fr _t			0.850			0.850			0.850			0.850
Fl _t Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	4520	1601	3541	4391	1633	1772	4350	1633	1789	4350	1633
Fl _t Permitted	0.950			0.950			0.124			0.186		
Satd. Flow (perm)	3309	4520	1601	3541	4391	1633	231	4350	1633	350	4350	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			167			151			152			362
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	2%	2%	0%	5%	0%	3%	6%	0%	2%	6%	0%
Adj. Flow (vph)	226	657	301	133	566	169	159	994	152	124	1165	509
Shared Lane Traffic (%)												
Lane Group Flow (vph)	226	657	301	133	566	169	159	994	152	124	1165	509
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right									
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex											
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Queues
3: Trafalgar Road & Britannia Road

Future Background 2031_AM
06/10/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	226	657	301	133	566	169	159	994	152	124	1165	509
v/c Ratio	0.63	0.57	0.57	0.45	0.56	0.35	0.60	0.47	0.17	0.42	0.57	0.53
Control Delay	67.8	47.1	23.0	81.4	42.4	14.0	40.8	11.2	0.6	22.2	31.2	13.1
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	67.8	47.1	23.0	81.4	42.4	14.0	40.8	11.2	0.6	22.2	31.2	13.1
Queue Length 50th (m)	31.2	66.2	31.6	0.0	65.0	4.2	12.4	29.7	0.1	12.0	101.5	11.9
Queue Length 95th (m)	44.4	76.3	57.5	29.3	62.5	29.2	44.6	39.0	0.4	32.3	140.5	53.4
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	401	1307	581	429	1254	574	269	2119	873	294	2056	963
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.50	0.52	0.31	0.45	0.29	0.59	0.47	0.17	0.42	0.57	0.53

Intersection Summary

HCM Signalized Intersection Capacity Analysis
3: Trafalgar Road & Britannia Road

Future Background 2031_AM
06/10/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  		 	  			  			  		
Traffic Volume (vph)	226	657	301	133	566	169	159	994	152	124	1165	509	
Future Volume (vph)	226	657	301	133	566	169	159	994	152	124	1165	509	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	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)	3309	4520	1601	3541	4391	1633	1772	4350	1633	1789	4350	1633	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.12	1.00	1.00	0.19	1.00	1.00	
Satd. Flow (perm)	3309	4520	1601	3541	4391	1633	232	4350	1633	351	4350	1633	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	226	657	301	133	566	169	159	994	152	124	1165	509	
RTOR Reduction (vph)	0	0	125	0	0	116	0	0	78	0	0	191	
Lane Group Flow (vph)	226	657	176	133	566	53	159	994	74	124	1165	318	
Heavy Vehicles (%)	7%	2%	2%	0%	5%	0%	3%	6%	0%	2%	6%	0%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8	2		2	6		6	
Actuated Green, G (s)	14.2	33.6	33.6	10.6	30.0	30.0	76.8	66.1	66.1	72.8	64.1	64.1	
Effective Green, g (s)	15.2	35.6	35.6	11.6	32.0	32.0	78.8	68.1	68.1	74.8	66.1	66.1	
Actuated g/C Ratio	0.11	0.25	0.25	0.08	0.23	0.23	0.56	0.49	0.49	0.53	0.47	0.47	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	359	1149	407	293	1003	373	259	2115	794	287	2053	771	
v/s Ratio Prot	c0.07	c0.15		0.04	0.13		c0.05	0.23		0.03	0.27		
v/s Ratio Perm			0.11			0.03	c0.29		0.05	0.20		0.19	
v/c Ratio	0.63	0.57	0.43	0.45	0.56	0.14	0.61	0.47	0.09	0.43	0.57	0.41	
Uniform Delay, d1	59.7	45.5	43.7	61.2	47.8	43.0	18.4	23.9	19.3	17.3	26.6	24.2	
Progression Factor	1.00	1.00	1.00	1.26	0.85	1.50	2.06	0.42	0.05	1.24	1.07	1.38	
Incremental Delay, d2	3.4	1.1	1.5	1.1	1.2	0.4	4.2	0.7	0.2	1.0	1.1	1.6	
Delay (s)	63.1	46.7	45.3	78.1	41.8	64.7	42.2	10.7	1.2	22.5	29.6	35.1	
Level of Service	E	D	D	E	D	E	D	B	A	C	C	D	
Approach Delay (s)		49.5			51.8			13.4			30.6		
Approach LOS		D			D			B			C		
Intersection Summary													
HCM 2000 Control Delay			34.2									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.62										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			64.4%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

Future Background 2031_AM
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	128	846	22	11	468	100	16	150	59	201	261	219
Future Volume (vph)	128	846	22	11	468	100	16	150	59	201	261	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	70.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.958				0.932
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1830	0	1825	1771	0
Flt Permitted	0.396			0.285			0.351			0.254		
Satd. Flow (perm)	761	4520	1633	548	4433	1633	503	1830	0	488	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			68			115		15				44
Link Speed (k/h)		60			60			70				70
Link Distance (m)		764.9			603.0			3158.3				619.6
Travel Time (s)		45.9			36.2			162.4				31.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Adj. Flow (vph)	128	846	22	11	468	100	16	150	59	201	261	219
Shared Lane Traffic (%)												
Lane Group Flow (vph)	128	846	22	11	468	100	16	209	0	201	480	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1		2
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left		Thru
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1		30.5
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1		1.8
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt		NA
Protected Phases	5	2			6			8		7		4

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

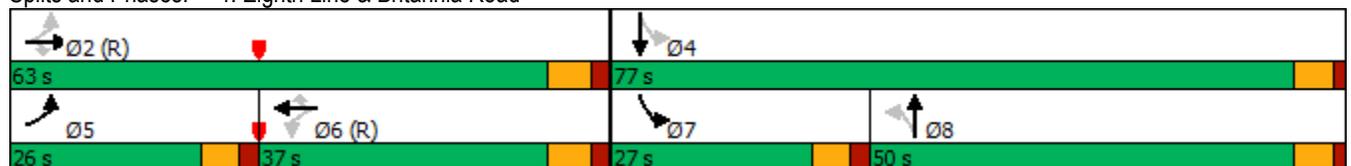
Future Background 2031_AM
06/10/2025

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0		5.0	15.0	
Minimum Split (s)	11.0	26.8	26.8	26.8	26.8	26.8	20.7	20.7		11.0	20.7	
Total Split (s)	26.0	63.0	63.0	37.0	37.0	37.0	50.0	50.0		27.0	77.0	
Total Split (%)	18.6%	45.0%	45.0%	26.4%	26.4%	26.4%	35.7%	35.7%		19.3%	55.0%	
Maximum Green (s)	20.0	56.2	56.2	30.2	30.2	30.2	44.3	44.3		21.0	71.3	
Yellow Time (s)	4.0	4.6	4.6	4.6	4.6	4.6	4.2	4.2		4.0	4.2	
All-Red Time (s)	2.0	2.2	2.2	2.2	2.2	2.2	1.5	1.5		2.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lead/Lag	Lead			Lag			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	84.2	83.4	83.4	67.4	67.4	67.4	20.8	20.8		43.8	44.1	
Actuated g/C Ratio	0.60	0.60	0.60	0.48	0.48	0.48	0.15	0.15		0.31	0.32	
v/c Ratio	0.24	0.31	0.02	0.04	0.22	0.12	0.22	0.74		0.63	0.82	
Control Delay	16.0	18.3	3.5	25.3	23.1	3.6	42.8	52.8		44.7	49.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.0	18.3	3.5	25.3	23.1	3.6	42.8	52.8		44.7	49.8	
LOS	B	B	A	C	C	A	D	D		D	D	
Approach Delay	17.7				19.8		52.1				48.3	
Approach LOS	B				B		D				D	

Intersection Summary

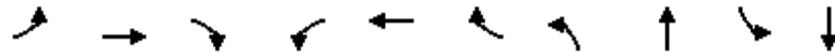
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 29.7
 Intersection LOS: C
 Intersection Capacity Utilization 93.8%
 ICU Level of Service F
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

Future Background 2031_AM
06/10/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	128	846	22	11	468	100	16	209	201	480
v/c Ratio	0.24	0.31	0.02	0.04	0.22	0.12	0.22	0.74	0.63	0.82
Control Delay	16.0	18.3	3.5	25.3	23.1	3.6	42.8	52.8	44.7	49.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	18.3	3.5	25.3	23.1	3.6	42.8	52.8	44.7	49.8
Queue Length 50th (m)	24.5	75.3	0.4	1.6	30.5	0.0	3.8	52.1	39.4	106.6
Queue Length 95th (m)	39.9	84.0	3.7	6.4	47.8	8.8	10.6	74.4	51.0	129.5
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		70.0	
Base Capacity (vph)	609	2691	999	263	2134	846	159	589	353	923
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	0.21	0.31	0.02	0.04	0.22	0.12	0.10	0.35	0.57	0.52

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

Future Background 2031_AM
06/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	128	846	22	11	468	100	16	150	59	201	261	219
Future Volume (vph)	128	846	22	11	468	100	16	150	59	201	261	219
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1829		1825	1770	
Flt Permitted	0.40	1.00	1.00	0.29	1.00	1.00	0.35	1.00		0.25	1.00	
Satd. Flow (perm)	760	4520	1633	548	4433	1633	503	1829		487	1770	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	128	846	22	11	468	100	16	150	59	201	261	219
RTOR Reduction (vph)	0	0	9	0	0	52	0	13	0	0	30	0
Lane Group Flow (vph)	128	846	13	11	468	48	16	196	0	201	450	0
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	83.4	83.4	83.4	67.5	67.5	67.5	20.8	20.8		44.1	44.1	
Effective Green, g (s)	83.4	83.4	83.4	67.5	67.5	67.5	20.8	20.8		44.1	44.1	
Actuated g/C Ratio	0.60	0.60	0.60	0.48	0.48	0.48	0.15	0.15		0.32	0.32	
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	528	2692	972	264	2137	787	74	271		318	557	
v/s Ratio Prot	0.02	c0.19			0.11			0.11		0.08	c0.25	
v/s Ratio Perm	0.13		0.01	0.02		0.03	0.03			0.12		
v/c Ratio	0.24	0.31	0.01	0.04	0.22	0.06	0.22	0.72		0.63	0.81	
Uniform Delay, d1	12.6	14.1	11.5	19.2	21.0	19.3	52.4	56.9		38.0	44.1	
Progression Factor	1.09	1.19	1.00	1.00	1.00	1.00	0.72	0.72		0.99	0.97	
Incremental Delay, d2	0.2	0.3	0.0	0.3	0.2	0.1	1.5	9.1		4.1	8.4	
Delay (s)	14.0	17.1	11.6	19.5	21.2	19.5	39.0	49.9		41.7	51.1	
Level of Service	B	B	B	B	C	B	D	D		D	D	
Approach Delay (s)		16.6			20.9			49.1			48.3	
Approach LOS		B			C			D			D	

Intersection Summary		
HCM 2000 Control Delay	29.2	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.53	
Actuated Cycle Length (s)	140.0	Sum of lost time (s) 24.5
Intersection Capacity Utilization	93.8%	ICU Level of Service F
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

Future Background 2031_PM
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  			  	
Traffic Volume (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
Future Volume (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3404	4520	1617	3541	4565	1601	1772	4520	1633	1772	4433	1585
Flt Permitted	0.950			0.950			0.099			0.102		
Satd. Flow (perm)	3404	4520	1617	3541	4565	1601	185	4520	1633	190	4433	1585
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			239			156			121			334
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	1%	0%	1%	2%	3%	2%	0%	3%	4%	3%
Adj. Flow (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
Shared Lane Traffic (%)												
Lane Group Flow (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

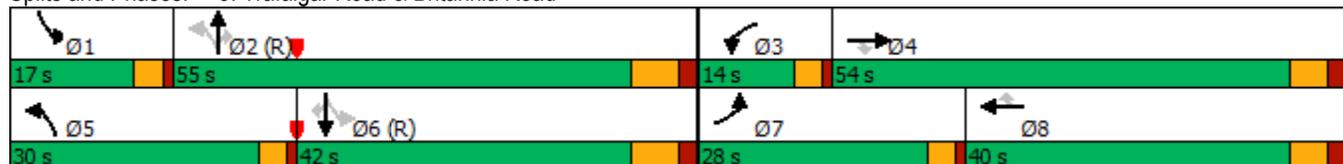


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	41.0	41.0	11.0	41.0	41.0
Total Split (s)	28.0	54.0	54.0	14.0	40.0	40.0	30.0	55.0	55.0	17.0	42.0	42.0
Total Split (%)	20.0%	38.6%	38.6%	10.0%	28.6%	28.6%	21.4%	39.3%	39.3%	12.1%	30.0%	30.0%
Maximum Green (s)	24.0	48.0	48.0	10.0	34.0	34.0	26.0	48.0	48.0	13.0	35.0	35.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	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)	24.4	49.4	49.4	10.3	35.3	35.3	70.2	52.0	52.0	55.3	40.1	40.1
Actuated g/C Ratio	0.17	0.35	0.35	0.07	0.25	0.25	0.50	0.37	0.37	0.40	0.29	0.29
v/c Ratio	0.88	0.48	0.33	0.48	0.74	0.25	0.91	0.81	0.25	0.80	0.74	0.55
Control Delay	73.0	36.4	4.9	90.3	34.7	3.6	71.6	26.7	1.9	62.0	51.4	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	36.4	4.9	90.3	34.7	3.6	71.6	26.7	1.9	62.0	51.4	17.6
LOS	E	D	A	F	C	A	E	C	A	E	D	B
Approach Delay		44.0			37.2			32.8			44.1	
Approach LOS		D			D			C			D	

Intersection Summary

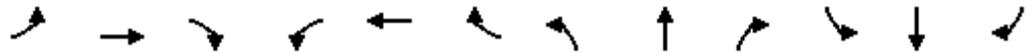
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 39.3
 Intersection LOS: D
 Intersection Capacity Utilization 85.5%
 ICU Level of Service E
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

Future Background 2031_PM
06/10/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
v/c Ratio	0.88	0.48	0.33	0.48	0.74	0.25	0.91	0.81	0.25	0.80	0.74	0.55
Control Delay	73.0	36.4	4.9	90.3	34.7	3.6	71.6	26.7	1.9	62.0	51.4	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	36.4	4.9	90.3	34.7	3.6	71.6	26.7	1.9	62.0	51.4	17.6
Queue Length 50th (m)	72.9	68.2	0.0	17.5	99.8	2.1	52.6	159.7	1.7	35.5	85.5	10.6
Queue Length 95th (m)	#99.5	82.8	17.3	27.7	119.0	4.6	#123.9	124.9	0.3	#69.4	118.1	53.8
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	607	1620	733	278	1173	527	399	1678	682	234	1269	692
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	0.86	0.47	0.33	0.45	0.73	0.25	0.86	0.81	0.25	0.76	0.74	0.55

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: Trafalgar Road & Britannia Road

Future Background 2031_PM
06/10/2025

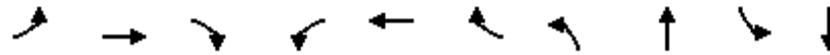
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		 	  			  		 	  	
Traffic Volume (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
Future Volume (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	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)	3404	4520	1617	3541	4565	1601	1772	4520	1633	1772	4433	1585
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.10	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	3404	4520	1617	3541	4565	1601	184	4520	1633	191	4433	1585
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	521	767	239	125	855	132	345	1359	168	179	941	378
RTOR Reduction (vph)	0	0	155	0	0	99	0	0	76	0	0	238
Lane Group Flow (vph)	521	767	84	125	855	33	345	1359	92	179	941	140
Heavy Vehicles (%)	4%	2%	1%	0%	1%	2%	3%	2%	0%	3%	4%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2		2	6		6
Actuated Green, G (s)	23.4	47.4	47.4	9.3	33.3	33.3	66.3	50.0	50.0	50.4	38.1	38.1
Effective Green, g (s)	24.4	49.4	49.4	10.3	35.3	35.3	67.3	52.0	52.0	52.4	40.1	40.1
Actuated g/C Ratio	0.17	0.35	0.35	0.07	0.25	0.25	0.48	0.37	0.37	0.37	0.29	0.29
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	593	1594	570	260	1151	403	374	1678	606	221	1269	453
v/s Ratio Prot	c0.15	0.17		0.04	c0.19		c0.17	0.30		0.08	0.21	
v/s Ratio Perm			0.05			0.02	c0.28		0.06	0.23		0.09
v/c Ratio	0.88	0.48	0.15	0.48	0.74	0.08	0.92	0.81	0.15	0.81	0.74	0.31
Uniform Delay, d1	56.4	35.3	30.9	62.3	48.2	40.0	41.5	39.6	29.3	33.6	45.3	39.1
Progression Factor	1.00	1.00	1.00	1.35	0.63	0.71	1.15	0.56	0.10	1.13	1.03	2.12
Incremental Delay, d2	13.9	0.5	0.3	1.3	3.0	0.2	27.1	4.2	0.5	18.4	3.7	1.7
Delay (s)	70.2	35.8	31.2	85.7	33.5	28.4	74.8	26.3	3.5	56.4	50.2	84.6
Level of Service	E	D	C	F	C	C	E	C	A	E	D	F
Approach Delay (s)		46.8			38.7			33.2			59.6	
Approach LOS		D			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			44.3									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			140.0									Sum of lost time (s) 15.0
Intersection Capacity Utilization			85.5%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

Future Background 2031_PM
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	212	493	19	13	858	163	37	308	44	152	200	182
Future Volume (vph)	212	493	19	13	858	163	37	308	44	152	200	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	70.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.981				0.929
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1885	0	1825	1785	0
Flt Permitted	0.204			0.431			0.438			0.160		
Satd. Flow (perm)	392	4520	1633	828	4565	1633	841	1885	0	307	1785	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			68			161		6				42
Link Speed (k/h)		60			60			70				70
Link Distance (m)		764.9			603.0			3158.3				619.6
Travel Time (s)		45.9			36.2			162.4				31.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	212	493	19	13	858	163	37	308	44	152	200	182
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	493	19	13	858	163	37	352	0	152	382	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	

Queues
4: Eighth Line & Britannia Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	212	493	19	13	858	163	37	352	152	382
v/c Ratio	0.56	0.19	0.02	0.04	0.43	0.20	0.20	0.82	0.82	0.63
Control Delay	28.6	7.8	0.5	29.0	29.8	5.4	37.0	59.3	72.1	43.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	7.8	0.5	29.0	29.8	5.4	37.0	59.3	72.1	43.2
Queue Length 50th (m)	18.5	6.2	0.0	2.0	66.0	0.3	8.9	94.0	31.9	82.8
Queue Length 95th (m)	57.3	30.2	0.8	7.8	100.0	16.1	m16.7	127.0	#54.5	106.0
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		70.0	
Base Capacity (vph)	466	2642	983	364	2009	808	290	654	186	817
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	0.45	0.19	0.02	0.04	0.43	0.20	0.13	0.54	0.82	0.47

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis

4: Eighth Line & Britannia Road

Future Background 2031_PM
06/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	212	493	19	13	858	163	37	308	44	152	200	182
Future Volume (vph)	212	493	19	13	858	163	37	308	44	152	200	182
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.98		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1885		1825	1784	
Flt Permitted	0.20	1.00	1.00	0.43	1.00	1.00	0.44	1.00		0.16	1.00	
Satd. Flow (perm)	392	4520	1633	828	4565	1633	842	1885		308	1784	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	212	493	19	13	858	163	37	308	44	152	200	182
RTOR Reduction (vph)	0	0	8	0	0	90	0	5	0	0	28	0
Lane Group Flow (vph)	212	493	11	13	858	73	37	347	0	152	354	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	81.9	81.9	81.9	61.7	61.7	61.7	31.6	31.6		45.6	45.6	
Effective Green, g (s)	81.9	81.9	81.9	61.7	61.7	61.7	31.6	31.6		45.6	45.6	
Actuated g/C Ratio	0.59	0.59	0.59	0.44	0.44	0.44	0.23	0.23		0.33	0.33	
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	374	2644	955	364	2011	719	190	425		187	581	
v/s Ratio Prot	c0.06	0.11			0.19			0.18		0.05	c0.20	
v/s Ratio Perm	c0.27		0.01	0.02		0.04	0.04			c0.22		
v/c Ratio	0.57	0.19	0.01	0.04	0.43	0.10	0.19	0.82		0.81	0.61	
Uniform Delay, d1	15.7	13.5	12.1	22.2	27.0	22.9	43.9	51.5		39.1	39.7	
Progression Factor	1.56	0.53	1.00	1.00	1.00	1.00	0.84	0.89		1.14	1.11	
Incremental Delay, d2	1.9	0.1	0.0	0.2	0.7	0.3	0.5	10.9		22.9	1.8	
Delay (s)	26.3	7.3	12.2	22.4	27.6	23.2	37.5	56.8		67.3	46.0	
Level of Service	C	A	B	C	C	C	D	E		E	D	
Approach Delay (s)		13.0			26.9			54.9			52.1	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

2041 Future Background

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2041 FB AM Peak Hour
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  		 	  		  		
Traffic Volume (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
Future Volume (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			276			156			117			207
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	2%	4%	0%	7%	0%	7%	8%	0%	4%	8%	0%
Adj. Flow (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

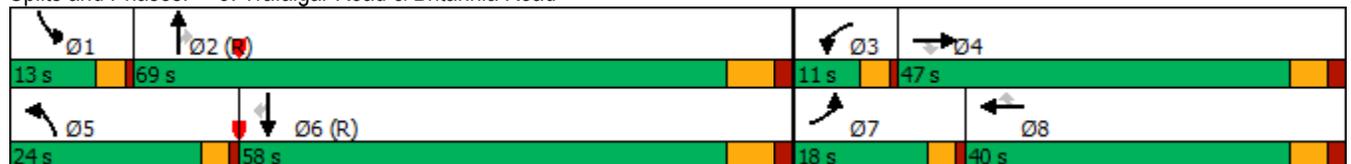
2041 FB AM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	41.0	41.0	11.0	41.0	41.0
Total Split (s)	18.0	47.0	47.0	11.0	40.0	40.0	24.0	69.0	69.0	13.0	58.0	58.0
Total Split (%)	12.9%	33.6%	33.6%	7.9%	28.6%	28.6%	17.1%	49.3%	49.3%	9.3%	41.4%	41.4%
Maximum Green (s)	14.0	41.0	41.0	7.0	34.0	34.0	20.0	62.0	62.0	9.0	51.0	51.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	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)	15.0	43.3	43.3	8.0	34.1	34.1	21.0	66.1	66.1	9.7	54.9	54.9
Actuated g/C Ratio	0.11	0.31	0.31	0.06	0.24	0.24	0.15	0.47	0.47	0.07	0.39	0.39
v/c Ratio	0.91	0.62	0.74	0.23	0.62	0.35	0.91	0.72	0.17	0.54	0.87	0.85
Control Delay	93.7	43.6	26.3	49.8	56.3	18.5	88.9	24.0	3.9	72.0	46.8	38.1
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	93.7	43.6	26.3	49.8	56.3	18.5	88.9	24.0	3.9	72.0	46.8	38.1
LOS	F	D	C	D	E	B	F	C	A	E	D	D
Approach Delay		47.3			48.1			36.9			45.7	
Approach LOS		D			D			D			D	

Intersection Summary

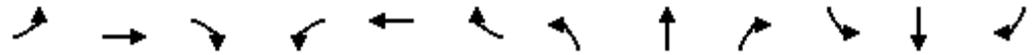
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 90 (64%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 43.7
 Intersection LOS: D
 Intersection Capacity Utilization 77.8%
 ICU Level of Service D
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

2041 FB AM Peak Hour
06/10/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
v/c Ratio	0.91	0.62	0.74	0.23	0.62	0.35	0.91	0.72	0.17	0.54	0.87	0.85
Control Delay	93.7	43.6	26.3	49.8	56.3	18.5	88.9	24.0	3.9	72.0	46.8	38.1
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	93.7	43.6	26.3	49.8	56.3	18.5	88.9	24.0	3.9	72.0	46.8	38.1
Queue Length 50th (m)	42.0	85.3	58.4	6.5	67.5	19.4	67.6	91.7	1.7	18.0	158.5	120.7
Queue Length 95th (m)	#68.4	102.3	103.1	m13.0	84.7	38.4	#95.9	104.8	7.6	28.9	182.9	#192.3
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	321	1398	676	202	1108	535	496	2016	833	243	1673	765
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	0.91	0.62	0.74	0.23	0.59	0.34	0.91	0.72	0.17	0.53	0.87	0.85

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Trafalgar Road & Britannia Road

2041 FB AM Peak Hour
06/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↑	↗	↖↗	↑↑↑	↗	↖↗	↑↑↑	↗	↖↗	↑↑↑	↗
Traffic Volume (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
Future Volume (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	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)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Flt Permitted	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 (perm)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	293	863	501	46	651	182	452	1461	141	129	1462	648
RTOR Reduction (vph)	0	0	191	0	0	117	0	0	62	0	0	127
Lane Group Flow (vph)	293	863	310	46	651	65	452	1461	79	129	1462	521
Heavy Vehicles (%)	18%	2%	4%	0%	7%	0%	7%	8%	0%	4%	8%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	14.0	41.3	41.3	5.6	32.9	32.9	20.0	63.4	63.4	8.7	52.1	52.1
Effective Green, g (s)	15.0	43.3	43.3	6.6	34.9	34.9	21.0	65.4	65.4	9.7	54.1	54.1
Actuated g/C Ratio	0.11	0.31	0.31	0.05	0.25	0.25	0.15	0.47	0.47	0.07	0.39	0.39
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	321	1397	485	166	1074	407	496	1994	762	235	1649	631
v/s Ratio Prot	c0.10	0.19		0.01	0.15		c0.14	0.34		0.04	c0.34	
v/s Ratio Perm			c0.20			0.04			0.05			0.32
v/c Ratio	0.91	0.62	0.64	0.28	0.61	0.16	0.91	0.73	0.10	0.55	0.89	0.83
Uniform Delay, d1	61.9	41.3	41.6	64.4	46.5	41.1	58.6	30.2	20.9	63.0	40.1	38.7
Progression Factor	1.00	1.00	1.00	0.75	1.14	1.82	1.14	0.72	0.62	1.00	1.00	1.00
Incremental Delay, d2	28.9	1.2	3.8	0.9	1.4	0.4	20.2	2.3	0.3	2.6	7.4	11.7
Delay (s)	90.8	42.5	45.5	48.9	54.4	75.3	87.0	24.0	13.2	65.6	47.5	50.5
Level of Service	F	D	D	D	D	E	F	C	B	E	D	D
Approach Delay (s)		51.9			58.4			37.1			49.4	
Approach LOS		D			E			D			D	

Intersection Summary

HCM 2000 Control Delay	47.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2041 FB AM Peak Hour
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	190	1056	28	13	559	118	18	162	78	298	309	265
Future Volume (vph)	190	1056	28	13	559	118	18	162	78	298	309	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	120.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.951				0.931
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1815	0	1825	1770	0
Flt Permitted	0.325			0.222			0.322			0.222		
Satd. Flow (perm)	624	4520	1633	426	4433	1633	462	1815	0	426	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			68			118		17				46
Link Speed (k/h)		60			60			70				70
Link Distance (m)		764.9			603.0			3158.3				619.6
Travel Time (s)		45.9			36.2			162.4				31.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Adj. Flow (vph)	190	1056	28	13	559	118	18	162	78	298	309	265
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	1056	28	13	559	118	18	240	0	298	574	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7		4

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2041 FB AM Peak Hour
06/10/2025

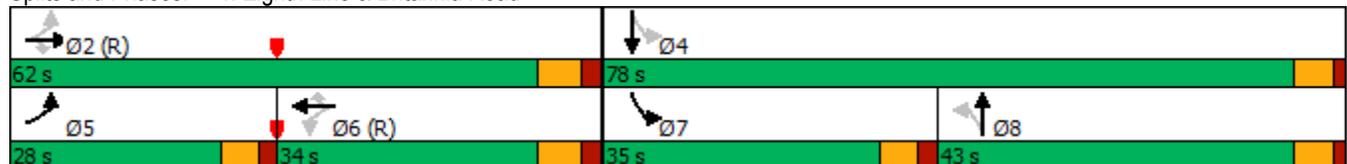


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0		5.0	15.0	
Minimum Split (s)	11.0	26.8	26.8	26.8	26.8	26.8	20.7	20.7		11.0	20.7	
Total Split (s)	28.0	62.0	62.0	34.0	34.0	34.0	43.0	43.0		35.0	78.0	
Total Split (%)	20.0%	44.3%	44.3%	24.3%	24.3%	24.3%	30.7%	30.7%		25.0%	55.7%	
Maximum Green (s)	22.0	55.2	55.2	27.2	27.2	27.2	37.3	37.3		29.0	72.3	
Yellow Time (s)	4.0	4.6	4.6	4.6	4.6	4.6	4.2	4.2		4.0	4.2	
All-Red Time (s)	2.0	2.2	2.2	2.2	2.2	2.2	1.5	1.5		2.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lead/Lag	Lead			Lag			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	76.4	75.6	75.6	56.3	56.3	56.3	22.8	22.8		51.6	51.9	
Actuated g/C Ratio	0.55	0.54	0.54	0.40	0.40	0.40	0.16	0.16		0.37	0.37	
v/c Ratio	0.42	0.43	0.03	0.08	0.31	0.16	0.24	0.78		0.77	0.84	
Control Delay	15.6	14.4	0.5	35.5	31.8	6.7	52.3	66.2		47.7	49.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.6	14.4	0.5	35.5	31.8	6.7	52.3	66.2		47.7	49.7	
LOS	B	B	A	D	C	A	D	E		D	D	
Approach Delay		14.3			27.6			65.2			49.0	
Approach LOS		B			C			E			D	

Intersection Summary

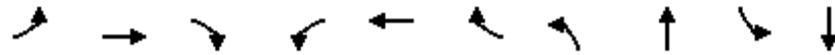
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84
 Intersection Signal Delay: 31.3 Intersection LOS: C
 Intersection Capacity Utilization 102.9% ICU Level of Service G
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

2041 FB AM Peak Hour
06/10/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	190	1056	28	13	559	118	18	240	298	574
v/c Ratio	0.42	0.43	0.03	0.08	0.31	0.16	0.24	0.78	0.77	0.84
Control Delay	15.6	14.4	0.5	35.5	31.8	6.7	52.3	66.2	47.7	49.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	14.4	0.5	35.5	31.8	6.7	52.3	66.2	47.7	49.7
Queue Length 50th (m)	17.2	43.5	0.2	2.2	43.5	0.0	4.0	55.3	63.6	136.9
Queue Length 95th (m)	27.8	52.8	0.7	8.8	68.4	15.0	10.1	76.6	80.7	165.2
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		120.0	
Base Capacity (vph)	529	2441	913	171	1782	727	123	496	446	936
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	0.36	0.43	0.03	0.08	0.31	0.16	0.15	0.48	0.67	0.61

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

2041 FB AM Peak Hour
06/10/2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	1056	28	13	559	118	18	162	78	298	309	265
Future Volume (vph)	190	1056	28	13	559	118	18	162	78	298	309	265
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1816		1825	1769	
Flt Permitted	0.32	1.00	1.00	0.22	1.00	1.00	0.32	1.00		0.22	1.00	
Satd. Flow (perm)	623	4520	1633	427	4433	1633	461	1816		426	1769	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	190	1056	28	13	559	118	18	162	78	298	309	265
RTOR Reduction (vph)	0	0	13	0	0	71	0	14	0	0	29	0
Lane Group Flow (vph)	190	1056	15	13	559	47	18	226	0	298	545	0
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	75.6	75.6	75.6	56.2	56.2	56.2	22.8	22.8		51.9	51.9	
Effective Green, g (s)	75.6	75.6	75.6	56.2	56.2	56.2	22.8	22.8		51.9	51.9	
Actuated g/C Ratio	0.54	0.54	0.54	0.40	0.40	0.40	0.16	0.16		0.37	0.37	
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	451	2440	881	171	1779	655	75	295		388	655	
v/s Ratio Prot	0.04	c0.23			0.13			0.12		0.13	c0.31	
v/s Ratio Perm	0.19		0.01	0.03		0.03	0.04			0.16		
v/c Ratio	0.42	0.43	0.02	0.08	0.31	0.07	0.24	0.77		0.77	0.83	
Uniform Delay, d1	17.2	19.3	15.0	25.9	28.7	25.8	51.1	56.0		34.7	40.1	
Progression Factor	0.71	0.67	1.00	1.00	1.00	1.00	0.91	0.96		1.06	1.06	
Incremental Delay, d2	0.6	0.5	0.0	0.9	0.5	0.2	1.6	11.1		8.8	8.9	
Delay (s)	12.8	13.4	15.0	26.7	29.2	26.0	48.3	64.7		45.5	51.2	
Level of Service	B	B	B	C	C	C	D	E		D	D	
Approach Delay (s)		13.3			28.6			63.5			49.3	
Approach LOS		B			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			31.0									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			140.0							24.5		
Intersection Capacity Utilization			102.9%									ICU Level of Service G
Analysis Period (min)			15									
c Critical Lane Group												

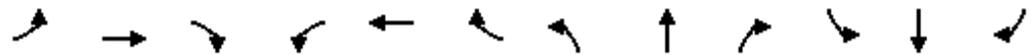
Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2041 FB PM Peak Hour
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  		 	  		 	  	
Traffic Volume (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471
Future Volume (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			247			156			117			313
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	2%	1%	0%	1%	2%	4%	3%	0%	7%	5%	17%
Adj. Flow (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471
Shared Lane Traffic (%)												
Lane Group Flow (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2041 FB PM Peak Hour
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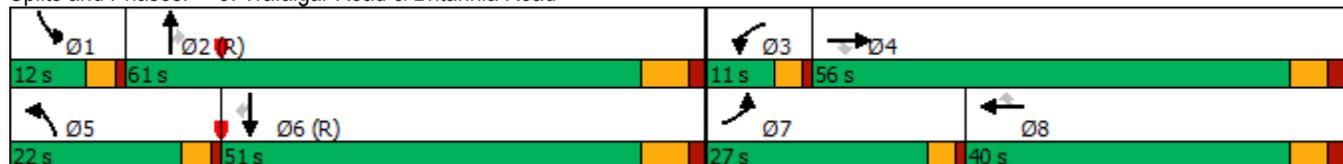


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	41.0	41.0	11.0	41.0	41.0
Total Split (s)	27.0	56.0	56.0	11.0	40.0	40.0	22.0	61.0	61.0	12.0	51.0	51.0
Total Split (%)	19.3%	40.0%	40.0%	7.9%	28.6%	28.6%	15.7%	43.6%	43.6%	8.6%	36.4%	36.4%
Maximum Green (s)	23.0	50.0	50.0	7.0	34.0	34.0	18.0	54.0	54.0	8.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	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)	24.0	52.0	52.0	8.0	36.0	36.0	19.0	56.0	56.0	9.0	46.0	46.0
Actuated g/C Ratio	0.17	0.37	0.37	0.06	0.26	0.26	0.14	0.40	0.40	0.06	0.33	0.33
v/c Ratio	1.23	0.60	0.79	0.50	0.86	0.24	1.18	0.93	0.24	0.89	1.07	0.71
Control Delay	166.9	37.4	31.3	65.0	56.4	11.9	160.7	33.0	5.3	111.9	88.1	21.1
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	166.9	37.4	31.3	65.0	56.4	11.9	160.7	33.0	5.3	111.9	88.1	21.1
LOS	F	D	C	E	E	B	F	C	A	F	F	C
Approach Delay		74.3			52.5			60.3			75.9	
Approach LOS		E			D			E			E	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 90 (64%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.23
 Intersection Signal Delay: 67.3
 Intersection LOS: E
 Intersection Capacity Utilization 98.6%
 ICU Level of Service F
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

2041 FB PM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471
v/c Ratio	1.23	0.60	0.79	0.50	0.86	0.24	1.18	0.93	0.24	0.89	1.07	0.71
Control Delay	166.9	37.4	31.3	65.0	56.4	11.9	160.7	33.0	5.3	111.9	88.1	21.1
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	166.9	37.4	31.3	65.0	56.4	11.9	160.7	33.0	5.3	111.9	88.1	21.1
Queue Length 50th (m)	~119.3	93.1	92.2	14.5	115.3	9.3	~92.9	136.3	0.1	27.4	~192.9	53.6
Queue Length 95th (m)	#156.9	110.1	144.0	20.7	136.1	32.4	#127.4	#189.8	10.4	#49.0	#227.9	95.5
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	551	1678	755	202	1173	527	461	1790	723	212	1442	668
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.23	0.60	0.79	0.50	0.86	0.24	1.18	0.93	0.24	0.89	1.07	0.71

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
3: Trafalgar Road & Britannia Road

2041 FB PM Peak Hour
06/10/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  		 	  		 	  		  			
Traffic Volume (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471	
Future Volume (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	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)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396	
Flt Permitted	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 (perm)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	679	1004	600	101	1013	129	545	1656	170	189	1549	471	
RTOR Reduction (vph)	0	0	155	0	0	96	0	0	70	0	0	210	
Lane Group Flow (vph)	679	1004	445	101	1013	33	545	1656	100	189	1549	261	
Heavy Vehicles (%)	10%	2%	1%	0%	1%	2%	4%	3%	0%	7%	5%	17%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8			2			6	
Actuated Green, G (s)	23.0	50.0	50.0	7.0	34.0	34.0	18.0	54.0	54.0	8.0	44.0	44.0	
Effective Green, g (s)	24.0	52.0	52.0	8.0	36.0	36.0	19.0	56.0	56.0	9.0	46.0	46.0	
Actuated g/C Ratio	0.17	0.37	0.37	0.06	0.26	0.26	0.14	0.40	0.40	0.06	0.33	0.33	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	551	1678	600	202	1173	411	461	1790	653	212	1442	458	
v/s Ratio Prot	c0.21	0.22		0.03	c0.22		c0.16	0.37		0.06	c0.35		
v/s Ratio Perm			0.28			0.02			0.06			0.19	
v/c Ratio	1.23	0.60	0.74	0.50	0.86	0.08	1.18	0.93	0.15	0.89	1.07	0.57	
Uniform Delay, d1	58.0	35.6	38.2	64.1	49.7	39.4	60.5	40.0	26.8	65.0	47.0	38.8	
Progression Factor	1.00	1.00	1.00	0.88	0.97	3.53	1.22	0.59	0.48	1.22	0.97	1.19	
Incremental Delay, d2	119.7	0.9	5.9	1.9	7.1	0.2	100.5	8.8	0.4	30.1	44.8	4.3	
Delay (s)	177.7	36.4	44.1	58.3	55.0	139.3	174.4	32.4	13.4	109.1	90.4	50.5	
Level of Service	F	D	D	E	E	F	F	C	B	F	F	D	
Approach Delay (s)		80.4			64.1			63.7			83.5		
Approach LOS		F			E			E			F		
Intersection Summary													
HCM 2000 Control Delay			73.9									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.06										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			98.6%									ICU Level of Service	F
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2041 FB PM Peak Hour
06/10/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	254	597	23	15	1106	199	42	340	57	242	258	258
Future Volume (vph)	254	597	23	15	1106	199	42	340	57	242	258	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	120.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.978			0.925	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1879	0	1825	1777	0
Flt Permitted	0.081			0.382			0.451			0.111		
Satd. Flow (perm)	156	4520	1633	734	4565	1633	866	1879	0	213	1777	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			63			137		5			46	
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		764.9			603.0			3158.3			619.6	
Travel Time (s)		45.9			36.2			162.4			31.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	254	597	23	15	1106	199	42	340	57	242	258	258
Shared Lane Traffic (%)												
Lane Group Flow (vph)	254	597	23	15	1106	199	42	397	0	242	516	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

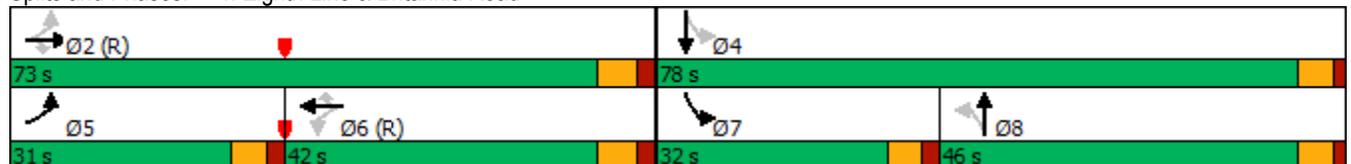
2041 FB PM Peak Hour
06/10/2025

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0		5.0	15.0	
Minimum Split (s)	11.0	26.8	26.8	26.8	26.8	26.8	20.7	20.7		11.0	20.7	
Total Split (s)	31.0	73.0	73.0	42.0	42.0	42.0	46.0	46.0		32.0	78.0	
Total Split (%)	20.5%	48.3%	48.3%	27.8%	27.8%	27.8%	30.5%	30.5%		21.2%	51.7%	
Maximum Green (s)	25.0	66.2	66.2	35.2	35.2	35.2	40.3	40.3		26.0	72.3	
Yellow Time (s)	4.0	4.6	4.6	4.6	4.6	4.6	4.2	4.2		4.0	4.2	
All-Red Time (s)	2.0	2.2	2.2	2.2	2.2	2.2	1.5	1.5		2.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lead/Lag	Lead			Lag			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes			Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	75.8	75.0	75.0	49.6	49.6	49.6	35.7	35.7		63.2	63.5	
Actuated g/C Ratio	0.50	0.50	0.50	0.33	0.33	0.33	0.24	0.24		0.42	0.42	
v/c Ratio	0.87	0.27	0.03	0.06	0.74	0.32	0.21	0.89		0.75	0.67	
Control Delay	66.1	23.7	0.0	44.1	50.0	16.5	47.0	76.6		50.2	35.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	66.1	23.7	0.0	44.1	50.0	16.5	47.0	76.6		50.2	35.5	
LOS	E	C	A	D	D	B	D	E		D	D	
Approach Delay	35.4			44.9			73.8			40.2		
Approach LOS	D			D			E			D		

Intersection Summary

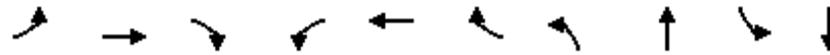
Area Type: Other
 Cycle Length: 151
 Actuated Cycle Length: 151
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 45.1
 Intersection LOS: D
 Intersection Capacity Utilization 97.5%
 ICU Level of Service F
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

2041 FB PM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	254	597	23	15	1106	199	42	397	242	516
v/c Ratio	0.87	0.27	0.03	0.06	0.74	0.32	0.21	0.89	0.75	0.67
Control Delay	66.1	23.7	0.0	44.1	50.0	16.5	47.0	76.6	50.2	35.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.1	23.7	0.0	44.1	50.0	16.5	47.0	76.6	50.2	35.5
Queue Length 50th (m)	57.2	43.5	0.0	3.2	126.2	13.4	10.1	113.3	50.1	110.6
Queue Length 95th (m)	90.4	58.8	0.0	10.1	#182.0	38.3	20.9	149.4	76.0	137.2
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		120.0	
Base Capacity (vph)	354	2246	843	241	1499	628	231	506	366	874
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	0.72	0.27	0.03	0.06	0.74	0.32	0.18	0.78	0.66	0.59

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

2041 FB PM Peak Hour
06/10/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	254	597	23	15	1106	199	42	340	57	242	258	258
Future Volume (vph)	254	597	23	15	1106	199	42	340	57	242	258	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.98		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1880		1825	1777	
Flt Permitted	0.08	1.00	1.00	0.38	1.00	1.00	0.45	1.00		0.11	1.00	
Satd. Flow (perm)	156	4520	1633	734	4565	1633	867	1880		213	1777	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	254	597	23	15	1106	199	42	340	57	242	258	258
RTOR Reduction (vph)	0	0	12	0	0	92	0	4	0	0	27	0
Lane Group Flow (vph)	254	597	11	15	1106	107	42	393	0	242	489	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	75.0	75.0	75.0	49.6	49.6	49.6	35.7	35.7		63.5	63.5	
Effective Green, g (s)	75.0	75.0	75.0	49.6	49.6	49.6	35.7	35.7		63.5	63.5	
Actuated g/C Ratio	0.50	0.50	0.50	0.33	0.33	0.33	0.24	0.24		0.42	0.42	
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	291	2245	811	241	1499	536	204	444		322	747	
v/s Ratio Prot	c0.11	0.13			0.24			c0.21		c0.11	0.28	
v/s Ratio Perm	c0.32		0.01	0.02		0.07	0.05			0.21		
v/c Ratio	0.87	0.27	0.01	0.06	0.74	0.20	0.21	0.89		0.75	0.66	
Uniform Delay, d1	42.9	22.0	19.3	34.8	44.9	36.4	46.3	55.7		37.2	35.0	
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	23.8	0.3	0.0	0.5	3.3	0.8	0.5	18.6		9.5	2.1	
Delay (s)	66.6	22.3	19.3	35.3	48.2	37.3	46.8	74.3		46.7	37.1	
Level of Service	E	C	B	D	D	D	D	E		D	D	
Approach Delay (s)		35.1			46.4			71.7			40.2	
Approach LOS		D			D			E			D	

Intersection Summary

HCM 2000 Control Delay	45.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	151.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	97.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Appendix K

Future Total SYNCHRO Capacity and Queuing Analysis Reports

2031 Future Total

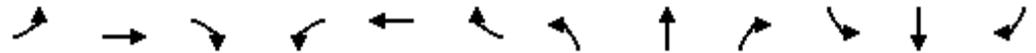
Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2031 FT AM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  		  	  	
Traffic Volume (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509
Future Volume (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3309	4520	1601	3541	4391	1633	1772	4350	1633	1789	4350	1633
Flt Permitted	0.950			0.950			0.112			0.178		
Satd. Flow (perm)	3309	4520	1601	3541	4391	1633	209	4350	1633	335	4350	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			147			150			169			337
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	7%	2%	2%	0%	5%	0%	3%	6%	0%	2%	6%	0%
Adj. Flow (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509
Shared Lane Traffic (%)												
Lane Group Flow (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2031 FT AM Peak Hour
07/08/2025

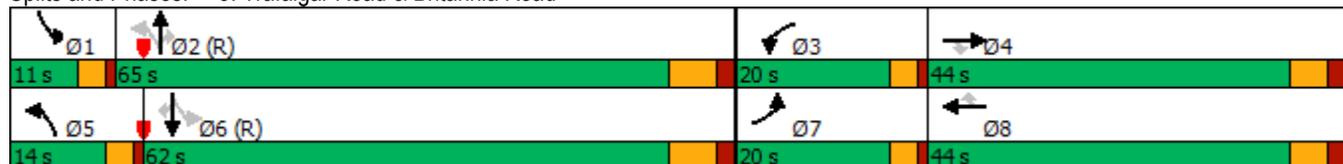


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	41.0	41.0	11.0	41.0	41.0
Total Split (s)	20.0	44.0	44.0	20.0	44.0	44.0	14.0	65.0	65.0	11.0	62.0	62.0
Total Split (%)	14.3%	31.4%	31.4%	14.3%	31.4%	31.4%	10.0%	46.4%	46.4%	7.9%	44.3%	44.3%
Maximum Green (s)	16.0	38.0	38.0	16.0	38.0	38.0	10.0	58.0	58.0	7.0	55.0	55.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	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)	15.2	37.5	37.5	13.2	35.5	35.5	78.4	65.3	65.3	74.2	63.1	63.1
Actuated g/C Ratio	0.11	0.27	0.27	0.09	0.25	0.25	0.56	0.47	0.47	0.53	0.45	0.45
v/c Ratio	0.63	0.59	0.56	0.52	0.63	0.36	0.66	0.49	0.20	0.47	0.61	0.55
Control Delay	67.8	46.3	25.6	79.7	40.7	12.3	48.7	12.3	0.7	29.2	38.5	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	46.3	25.6	79.7	40.7	12.3	48.7	12.3	0.7	29.2	38.5	19.8
LOS	E	D	C	E	D	B	D	B	A	C	D	B
Approach Delay		45.2			42.0			15.2			32.6	
Approach LOS		D			D			B			C	

Intersection Summary

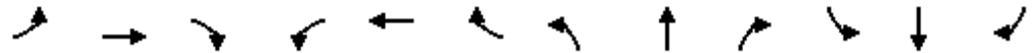
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 50 (36%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 105
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 33.1
 Intersection LOS: C
 Intersection Capacity Utilization 65.9%
 ICU Level of Service C
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

2031 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509
v/c Ratio	0.63	0.59	0.56	0.52	0.63	0.36	0.66	0.49	0.20	0.47	0.61	0.55
Control Delay	67.8	46.3	25.6	79.7	40.7	12.3	48.7	12.3	0.7	29.2	38.5	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.8	46.3	25.6	79.7	40.7	12.3	48.7	12.3	0.7	29.2	38.5	19.8
Queue Length 50th (m)	31.2	70.9	35.9	25.3	65.6	4.2	17.0	67.7	0.2	15.0	108.1	49.9
Queue Length 95th (m)	44.4	85.0	64.4	m35.7	78.0	m20.8	#48.8	38.9	0.5	39.2	158.5	127.2
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	401	1308	568	429	1254	573	246	2027	851	271	1961	921
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.56	0.55	0.53	0.40	0.56	0.33	0.65	0.49	0.20	0.47	0.61	0.55

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Trafalgar Road & Britannia Road

2031 FT AM Peak Hour
07/08/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  		 	  			  			  		
Traffic Volume (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509	
Future Volume (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	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)	3309	4520	1601	3541	4391	1633	1772	4350	1633	1789	4350	1633	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.11	1.00	1.00	0.18	1.00	1.00	
Satd. Flow (perm)	3309	4520	1601	3541	4391	1633	209	4350	1633	336	4350	1633	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	226	713	301	173	699	191	159	1001	169	128	1188	509	
RTOR Reduction (vph)	0	0	108	0	0	112	0	0	90	0	0	185	
Lane Group Flow (vph)	226	713	193	173	699	79	159	1001	79	128	1188	324	
Heavy Vehicles (%)	7%	2%	2%	0%	5%	0%	3%	6%	0%	2%	6%	0%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8	2		2	6		6	
Actuated Green, G (s)	14.2	35.5	35.5	12.2	33.5	33.5	73.4	63.2	63.2	69.2	61.1	61.1	
Effective Green, g (s)	15.2	37.5	37.5	13.2	35.5	35.5	75.4	65.2	65.2	71.2	63.1	63.1	
Actuated g/C Ratio	0.11	0.27	0.27	0.09	0.25	0.25	0.54	0.47	0.47	0.51	0.45	0.45	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	359	1210	428	333	1113	414	237	2025	760	265	1960	736	
v/s Ratio Prot	c0.07	0.16		0.05	c0.16		c0.05	0.23		0.03	0.27		
v/s Ratio Perm			0.12			0.05	c0.31		0.05	0.21		0.20	
v/c Ratio	0.63	0.59	0.45	0.52	0.63	0.19	0.67	0.49	0.10	0.48	0.61	0.44	
Uniform Delay, d1	59.7	44.6	42.7	60.4	46.4	41.0	20.8	26.0	21.0	19.4	29.1	26.3	
Progression Factor	1.00	1.00	1.00	1.24	0.83	1.01	2.06	0.43	0.05	1.48	1.22	1.81	
Incremental Delay, d2	3.4	1.1	1.6	1.3	1.5	0.5	7.2	0.9	0.3	1.3	1.3	1.8	
Delay (s)	63.1	45.7	44.3	76.0	40.0	41.9	50.0	11.9	1.2	30.0	36.9	49.4	
Level of Service	E	D	D	E	D	D	D	B	A	C	D	D	
Approach Delay (s)		48.5			46.2			15.1			39.9		
Approach LOS		D			D			B			D		
Intersection Summary													
HCM 2000 Control Delay			37.1									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.65										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			65.9%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2031 FT AM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	147	878	42	11	484	100	27	150	59	201	261	228
Future Volume (vph)	147	878	42	11	484	100	27	150	59	201	261	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	70.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.958				0.930
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1830	0	1825	1768	0
Flt Permitted	0.385			0.275			0.326			0.255		
Satd. Flow (perm)	740	4520	1633	528	4433	1633	467	1830	0	490	1768	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			68			115		15				46
Link Speed (k/h)		60			60			70				70
Link Distance (m)		764.9			603.0			3158.3				619.6
Travel Time (s)		45.9			36.2			162.4				31.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Adj. Flow (vph)	147	878	42	11	484	100	27	150	59	201	261	228
Shared Lane Traffic (%)												
Lane Group Flow (vph)	147	878	42	11	484	100	27	209	0	201	489	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

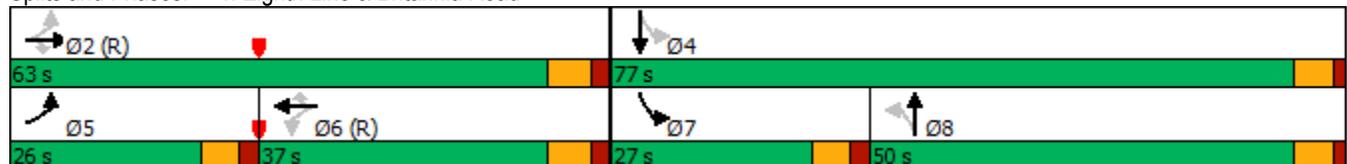
2031 FT AM Peak Hour
07/08/2025

	↖	→	↘	↙	←	↖	↙	↑	↘	↘	↓	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0		5.0	15.0	
Minimum Split (s)	11.0	26.8	26.8	26.8	26.8	26.8	20.7	20.7		11.0	20.7	
Total Split (s)	26.0	63.0	63.0	37.0	37.0	37.0	50.0	50.0		27.0	77.0	
Total Split (%)	18.6%	45.0%	45.0%	26.4%	26.4%	26.4%	35.7%	35.7%		19.3%	55.0%	
Maximum Green (s)	20.0	56.2	56.2	30.2	30.2	30.2	44.3	44.3		21.0	71.3	
Yellow Time (s)	4.0	4.6	4.6	4.6	4.6	4.6	4.2	4.2		4.0	4.2	
All-Red Time (s)	2.0	2.2	2.2	2.2	2.2	2.2	1.5	1.5		2.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lead/Lag	Lead			Lag			Lag	Lag	Lag	Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	84.2	83.4	83.4	66.8	66.8	66.8	20.8	20.8		43.8	44.1	
Actuated g/C Ratio	0.60	0.60	0.60	0.48	0.48	0.48	0.15	0.15		0.31	0.32	
v/c Ratio	0.28	0.33	0.04	0.04	0.23	0.12	0.39	0.73		0.63	0.83	
Control Delay	16.2	18.7	4.6	26.0	23.6	3.7	53.8	53.1		44.7	51.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.2	18.7	4.6	26.0	23.6	3.7	53.8	53.1		44.7	51.0	
LOS	B	B	A	C	C	A	D	D		D	D	
Approach Delay		17.8			20.3			53.2			49.2	
Approach LOS		B			C			D			D	

Intersection Summary

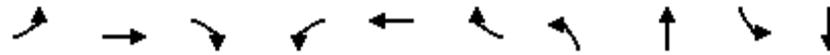
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 30.0
 Intersection LOS: C
 Intersection Capacity Utilization 94.6%
 ICU Level of Service F
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

2031 FT AM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	147	878	42	11	484	100	27	209	201	489
v/c Ratio	0.28	0.33	0.04	0.04	0.23	0.12	0.39	0.73	0.63	0.83
Control Delay	16.2	18.7	4.6	26.0	23.6	3.7	53.8	53.1	44.7	51.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	18.7	4.6	26.0	23.6	3.7	53.8	53.1	44.7	51.0
Queue Length 50th (m)	25.9	70.4	2.2	1.6	31.9	0.0	6.7	52.2	39.3	109.9
Queue Length 95th (m)	48.4	96.5	7.1	6.5	50.4	9.0	15.9	74.5	50.2	132.0
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		70.0	
Base Capacity (vph)	600	2693	1000	251	2114	839	147	589	353	922
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	0.24	0.33	0.04	0.04	0.23	0.12	0.18	0.35	0.57	0.53

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

2031 FT AM Peak Hour
07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	147	878	42	11	484	100	27	150	59	201	261	228
Future Volume (vph)	147	878	42	11	484	100	27	150	59	201	261	228
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1829		1825	1768	
Flt Permitted	0.39	1.00	1.00	0.27	1.00	1.00	0.33	1.00		0.26	1.00	
Satd. Flow (perm)	740	4520	1633	528	4433	1633	467	1829		491	1768	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	147	878	42	11	484	100	27	150	59	201	261	228
RTOR Reduction (vph)	0	0	17	0	0	52	0	13	0	0	32	0
Lane Group Flow (vph)	147	878	25	11	484	48	27	196	0	201	457	0
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	83.4	83.4	83.4	66.7	66.7	66.7	20.9	20.9		44.1	44.1	
Effective Green, g (s)	83.4	83.4	83.4	66.7	66.7	66.7	20.9	20.9		44.1	44.1	
Actuated g/C Ratio	0.60	0.60	0.60	0.48	0.48	0.48	0.15	0.15		0.32	0.32	
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	523	2692	972	251	2112	778	69	273		318	556	
v/s Ratio Prot	0.02	c0.19			0.11			0.11		0.08	c0.26	
v/s Ratio Perm	0.15		0.02	0.02		0.03	0.06			0.12		
v/c Ratio	0.28	0.33	0.03	0.04	0.23	0.06	0.39	0.72		0.63	0.82	
Uniform Delay, d1	12.8	14.2	11.6	19.6	21.5	19.8	53.8	56.7		38.0	44.3	
Progression Factor	1.09	1.21	3.60	1.00	1.00	1.00	0.72	0.73		0.99	0.97	
Incremental Delay, d2	0.3	0.3	0.0	0.3	0.3	0.2	3.6	8.7		4.1	9.6	
Delay (s)	14.2	17.4	41.9	19.9	21.8	19.9	42.6	49.8		41.6	52.4	
Level of Service	B	B	D	B	C	B	D	D		D	D	
Approach Delay (s)		18.0			21.4			49.0			49.3	
Approach LOS		B			C			D			D	

Intersection Summary		
HCM 2000 Control Delay	29.9	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.55	
Actuated Cycle Length (s)	140.0	Sum of lost time (s) 24.5
Intersection Capacity Utilization	94.6%	ICU Level of Service F
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
108: Street P/Collector P & Britannia Road

2031 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕		↖	↕	
Traffic Volume (vph)	55	969	38	144	819	19	130	39	199	44	47	156
Future Volume (vph)	55	969	38	144	819	19	130	39	199	44	47	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.997			0.875				0.885
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4493	0	1789	4507	0	1789	1648	0	1789	1667	0
Flt Permitted	0.276			0.219			0.196			0.611		
Satd. Flow (perm)	520	4493	0	412	4507	0	369	1648	0	1151	1667	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			3			106			114	
Link Speed (k/h)		60			60			48			48	
Link Distance (m)		219.2			337.8			263.0			315.3	
Travel Time (s)		13.2			20.3			19.7			23.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	969	38	144	819	19	130	39	199	44	47	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	1007	0	144	838	0	130	238	0	44	203	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
 108: Street P/Collector P & Britannia Road

2031 FT AM Peak Hour
 07/08/2025

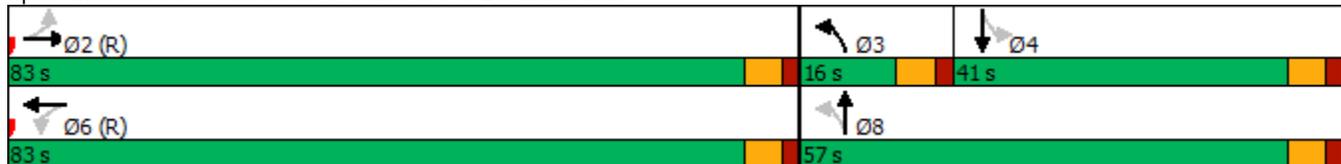


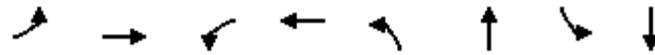
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		11.0	40.0		40.0	40.0	
Total Split (s)	83.0	83.0		83.0	83.0		16.0	57.0		41.0	41.0	
Total Split (%)	59.3%	59.3%		59.3%	59.3%		11.4%	40.7%		29.3%	29.3%	
Maximum Green (s)	77.0	77.0		77.0	77.0		10.0	51.0		35.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	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	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0			27.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	97.8	97.8		97.8	97.8		30.2	30.2		14.4	14.4	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.22	0.22		0.10	0.10	
v/c Ratio	0.15	0.32		0.50	0.27		0.73	0.54		0.37	0.74	
Control Delay	3.8	2.9		17.8	7.0		68.1	29.7		65.7	42.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	3.8	2.9		17.8	7.0		68.1	29.7		65.7	42.7	
LOS	A	A		B	A		E	C		E	D	
Approach Delay		3.0			8.6			43.3			46.8	
Approach LOS		A			A			D			D	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 136 (97%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 14.7
 Intersection LOS: B
 Intersection Capacity Utilization 78.9%
 ICU Level of Service D
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 108: Street P/Collector P & Britannia Road





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	1007	144	838	130	238	44	203
v/c Ratio	0.15	0.32	0.50	0.27	0.73	0.54	0.37	0.74
Control Delay	3.8	2.9	17.8	7.0	68.1	29.7	65.7	42.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	2.9	17.8	7.0	68.1	29.7	65.7	42.7
Queue Length 50th (m)	1.3	9.8	11.5	26.5	30.6	32.3	11.7	24.2
Queue Length 95th (m)	m3.9	17.9	40.2	32.9	#44.0	49.6	22.9	48.7
Internal Link Dist (m)		195.2		313.8		239.0		291.3
Turn Bay Length (m)	60.0		50.0		50.0		50.0	
Base Capacity (vph)	363	3139	287	3148	180	667	287	502
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.32	0.50	0.27	0.72	0.36	0.15	0.40

Intersection Summary

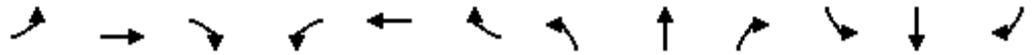
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
 108: Street P/Collector P & Britannia Road

2031 FT AM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖↖		↖	↖↖↖		↖	↖		↖	↖	
Traffic Volume (vph)	55	969	38	144	819	19	130	39	199	44	47	156
Future Volume (vph)	55	969	38	144	819	19	130	39	199	44	47	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.87		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4495		1789	4505		1789	1647		1789	1666	
Flt Permitted	0.28	1.00		0.22	1.00		0.20	1.00		0.61	1.00	
Satd. Flow (perm)	519	4495		413	4505		369	1647		1150	1666	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	969	38	144	819	19	130	39	199	44	47	156
RTOR Reduction (vph)	0	2	0	0	1	0	0	83	0	0	102	0
Lane Group Flow (vph)	55	1005	0	144	837	0	130	155	0	44	101	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	97.8	97.8		97.8	97.8		30.2	30.2		14.4	14.4	
Effective Green, g (s)	97.8	97.8		97.8	97.8		30.2	30.2		14.4	14.4	
Actuated g/C Ratio	0.70	0.70		0.70	0.70		0.22	0.22		0.10	0.10	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	362	3140		288	3147		178	355		118	171	
v/s Ratio Prot		0.22			0.19		c0.05	0.09			0.06	
v/s Ratio Perm	0.11			c0.35			c0.11			0.04		
v/c Ratio	0.15	0.32		0.50	0.27		0.73	0.44		0.37	0.59	
Uniform Delay, d1	7.1	8.2		9.8	7.8		47.4	47.5		58.6	60.0	
Progression Factor	0.35	0.31		0.95	0.83		0.98	0.97		1.00	1.00	
Incremental Delay, d2	0.8	0.2		5.9	0.2		14.3	0.9		2.0	5.1	
Delay (s)	3.3	2.8		15.2	6.7		61.0	47.2		60.6	65.1	
Level of Service	A	A		B	A		E	D		E	E	
Approach Delay (s)		2.8			7.9			52.1			64.3	
Approach LOS		A			A			D			E	

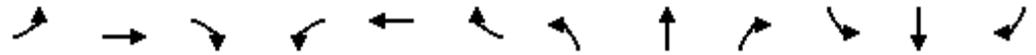
Intersection Summary

HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
110: Collector Q/Collector M & Britannia Road

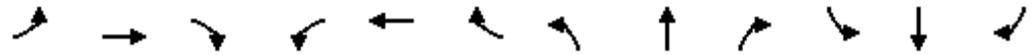
2031 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↶↶↶		↶	↶↶↶		↶	↶		↶	↶	
Traffic Volume (vph)	26	1000	186	17	715	22	222	18	29	42	6	45
Future Volume (vph)	26	1000	186	17	715	22	222	18	29	42	6	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	70.0		0.0	80.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.996			0.907			0.868	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4412	0	1789	4502	0	1789	1708	0	1789	1635	0
Flt Permitted	0.311			0.166			0.436			0.726		
Satd. Flow (perm)	586	4412	0	313	4502	0	821	1708	0	1367	1635	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			3			29			45	
Link Speed (k/h)		60			60			48			48	
Link Distance (m)		337.8			764.9			1307.2			73.6	
Travel Time (s)		20.3			45.9			98.0			5.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	1000	186	17	715	22	222	18	29	42	6	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	1186	0	17	737	0	222	47	0	42	51	0
Enter Blocked Intersection	No	No	No	No	No							
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
 110: Collector Q/Collector M & Britannia Road

2031 FT AM Peak Hour
 07/08/2025

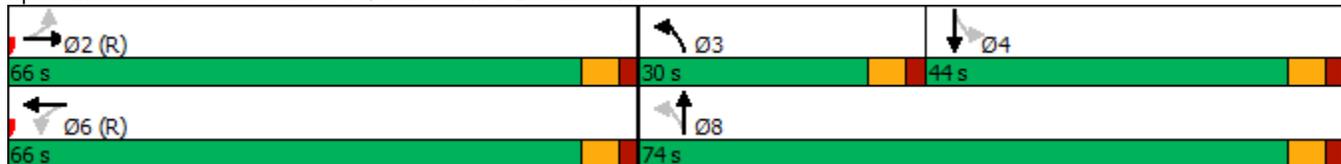


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		11.0	40.0		40.0	40.0	
Total Split (s)	66.0	66.0		66.0	66.0		30.0	74.0		44.0	44.0	
Total Split (%)	47.1%	47.1%		47.1%	47.1%		21.4%	52.9%		31.4%	31.4%	
Maximum Green (s)	60.0	60.0		60.0	60.0		24.0	68.0		38.0	38.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	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	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0			27.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	93.8	93.8		93.8	93.8		34.2	34.2		11.1	11.1	
Actuated g/C Ratio	0.67	0.67		0.67	0.67		0.24	0.24		0.08	0.08	
v/c Ratio	0.07	0.40		0.08	0.24		0.65	0.11		0.39	0.30	
Control Delay	7.0	6.4		8.5	7.2		53.3	18.1		71.6	23.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.0	6.4		8.5	7.2		53.3	18.1		71.6	23.7	
LOS	A	A		A	A		D	B		E	C	
Approach Delay		6.4			7.2			47.2			45.3	
Approach LOS		A			A			D			D	

Intersection Summary

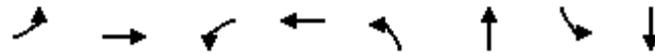
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 12.9
 Intersection LOS: B
 Intersection Capacity Utilization 52.4%
 ICU Level of Service A
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 110: Collector Q/Collector M & Britannia Road



Queues
110: Collector Q/Collector M & Britannia Road

2031 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	26	1186	17	737	222	47	42	51
v/c Ratio	0.07	0.40	0.08	0.24	0.65	0.11	0.39	0.30
Control Delay	7.0	6.4	8.5	7.2	53.3	18.1	71.6	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	6.4	8.5	7.2	53.3	18.1	71.6	23.7
Queue Length 50th (m)	1.4	31.5	1.3	28.2	52.1	3.7	11.4	1.6
Queue Length 95th (m)	4.4	46.2	m3.8	33.8	71.5	12.9	23.3	14.4
Internal Link Dist (m)		313.8		740.9		1283.2		49.6
Turn Bay Length (m)	50.0		70.0		80.0		25.0	
Base Capacity (vph)	392	2965	209	3017	376	844	371	476
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.40	0.08	0.24	0.59	0.06	0.11	0.11

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 110: Collector Q/Collector M & Britannia Road

2031 FT AM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↖↗		↖	↗↖↗		↖	↗		↖	↗	
Traffic Volume (vph)	26	1000	186	17	715	22	222	18	29	42	6	45
Future Volume (vph)	26	1000	186	17	715	22	222	18	29	42	6	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00		1.00	0.91		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4414		1789	4500		1789	1709		1789	1634	
Flt Permitted	0.31	1.00		0.17	1.00		0.44	1.00		0.73	1.00	
Satd. Flow (perm)	586	4414		312	4500		821	1709		1368	1634	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	1000	186	17	715	22	222	18	29	42	6	45
RTOR Reduction (vph)	0	9	0	0	1	0	0	22	0	0	42	0
Lane Group Flow (vph)	26	1177	0	17	736	0	222	25	0	42	9	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	92.6	92.6		92.6	92.6		35.4	35.4		9.1	9.1	
Effective Green, g (s)	92.6	92.6		92.6	92.6		35.4	35.4		9.1	9.1	
Actuated g/C Ratio	0.66	0.66		0.66	0.66		0.25	0.25		0.06	0.06	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	387	2919		206	2976		347	432		88	106	
v/s Ratio Prot		c0.27			0.16		c0.09	0.01			0.01	
v/s Ratio Perm	0.04			0.05			c0.07			0.03		
v/c Ratio	0.07	0.40		0.08	0.25		0.64	0.06		0.48	0.08	
Uniform Delay, d1	8.4	10.9		8.5	9.6		44.8	39.7		63.2	61.5	
Progression Factor	0.62	0.53		0.68	0.69		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4		0.8	0.2		3.9	0.1		4.0	0.3	
Delay (s)	5.5	6.2		6.6	6.8		48.6	39.7		67.2	61.9	
Level of Service	A	A		A	A		D	D		E	E	
Approach Delay (s)		6.2			6.8			47.1			64.3	
Approach LOS		A			A			D			E	

Intersection Summary

HCM 2000 Control Delay	13.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
143: Trafalgar Road & Collector M

2031 FT AM Peak Hour
07/08/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			  
Traffic Volume (vph)	23	250	1433	7	91	1511
Future Volume (vph)	23	250	1433	7	91	1511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	60.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				50.0	
Lane Util. Factor	1.00	1.00	*0.80	0.91	1.00	*0.80
Frt	0.876		0.999			
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1643	0	4516	0	1789	4520
Flt Permitted	0.996				0.117	
Satd. Flow (perm)	1643	0	4516	0	220	4520
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	210		1			
Link Speed (k/h)	48		60			60
Link Distance (m)	229.4		430.6			999.8
Travel Time (s)	17.2		25.8			60.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	23	250	1433	7	91	1511
Shared Lane Traffic (%)						
Lane Group Flow (vph)	273	0	1440	0	91	1511
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	

Lanes, Volumes, Timings
143: Trafalgar Road & Collector M

2031 FT AM Peak Hour
07/08/2025

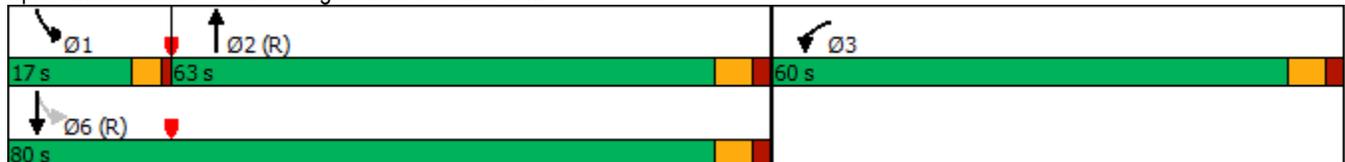


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	3		2		1	6
Switch Phase						
Minimum Initial (s)	10.0		20.0		7.0	20.0
Minimum Split (s)	40.0		26.0		13.0	26.0
Total Split (s)	60.0		63.0		17.0	80.0
Total Split (%)	42.9%		45.0%		12.1%	57.1%
Maximum Green (s)	54.0		57.0		13.0	74.0
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Walk Time (s)	7.0		7.0		7.0	7.0
Flash Dont Walk (s)	27.0		9.0		9.0	9.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	13.9		101.6		116.1	114.1
Actuated g/C Ratio	0.10		0.73		0.83	0.82
v/c Ratio	0.78		0.44		0.33	0.41
Control Delay	30.6		15.1		6.9	4.6
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	30.6		15.1		6.9	4.6
LOS	C		B		A	A
Approach Delay	30.6		15.1			4.7
Approach LOS	C		B			A

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 136 (97%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 11.4
 Intersection LOS: B
 Intersection Capacity Utilization 63.7%
 ICU Level of Service B
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 143: Trafalgar Road & Collector M



Queues
143: Trafalgar Road & Collector M

2031 FT AM Peak Hour
07/08/2025



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	273	1440	91	1511
v/c Ratio	0.78	0.44	0.33	0.41
Control Delay	30.6	15.1	6.9	4.6
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	30.6	15.1	6.9	4.6
Queue Length 50th (m)	17.0	110.0	2.3	17.1
Queue Length 95th (m)	45.3	142.6	11.8	108.5
Internal Link Dist (m)	205.4	406.6		975.8
Turn Bay Length (m)			60.0	
Base Capacity (vph)	762	3278	327	3682
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.36	0.44	0.28	0.41
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 143: Trafalgar Road & Collector M

2031 FT AM Peak Hour
 07/08/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T		T	T
Traffic Volume (vph)	23	250	1433	7	91	1511
Future Volume (vph)	23	250	1433	7	91	1511
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		4.0	6.0
Lane Util. Factor	1.00		*0.80		1.00	*0.80
Frt	0.88		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1644		4517		1789	4520
Flt Permitted	1.00		1.00		0.12	1.00
Satd. Flow (perm)	1644		4517		221	4520
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	23	250	1433	7	91	1511
RTOR Reduction (vph)	189	0	0	0	0	0
Lane Group Flow (vph)	84	0	1440	0	91	1511
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	13.9		101.7		114.1	114.1
Effective Green, g (s)	13.9		101.7		114.1	114.1
Actuated g/C Ratio	0.10		0.73		0.81	0.81
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	163		3281		274	3683
v/s Ratio Prot	c0.05		c0.32		0.02	c0.33
v/s Ratio Perm					0.25	
v/c Ratio	0.51		0.44		0.33	0.41
Uniform Delay, d1	59.8		7.7		4.1	3.6
Progression Factor	1.00		1.74		1.50	1.07
Incremental Delay, d2	2.7		0.4		0.7	0.3
Delay (s)	62.6		13.7		6.8	4.1
Level of Service	E		B		A	A
Approach Delay (s)	62.6		13.7			4.3
Approach LOS	E		B			A

Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 213: Collector P/Local Street A & Collector M

2031 FT AM Peak Hour
 07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	55	47	101	90	37	66	35	106	49	79	93
Future Volume (vph)	26	55	47	101	90	37	66	35	106	49	79	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.950			0.978			0.931			0.943	
Fl _t Protected		0.990			0.978			0.984			0.989	
Satd. Flow (prot)	0	1771	0	0	1801	0	0	1725	0	0	1757	0
Fl _t Permitted		0.990			0.978			0.984			0.989	
Satd. Flow (perm)	0	1771	0	0	1801	0	0	1725	0	0	1757	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		229.4			387.3			315.3			332.4	
Travel Time (s)		17.2			29.0			23.6			24.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	55	47	101	90	37	66	35	106	49	79	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	128	0	0	228	0	0	207	0	0	221	0
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	44.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 213: Collector P/Local Street A & Collector M

2031 FT AM Peak Hour
 07/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	26	55	47	101	90	37	66	35	106	49	79	93
Future Volume (vph)	26	55	47	101	90	37	66	35	106	49	79	93
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	26	55	47	101	90	37	66	35	106	49	79	93
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	128	228	207	221								
Volume Left (vph)	26	101	66	49								
Volume Right (vph)	47	37	106	93								
Hadj (s)	-0.15	0.03	-0.21	-0.17								
Departure Headway (s)	5.2	5.2	5.0	5.0								
Degree Utilization, x	0.19	0.33	0.29	0.31								
Capacity (veh/h)	618	636	667	665								
Control Delay (s)	9.4	10.8	10.0	10.2								
Approach Delay (s)	9.4	10.8	10.0	10.2								
Approach LOS	A	B	A	B								
Intersection Summary												
Delay			10.2									
Level of Service			B									
Intersection Capacity Utilization			44.5%		ICU Level of Service				A			
Analysis Period (min)			15									



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	69	99	7	23	28
Future Volume (vph)	14	69	99	7	23	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.888				0.926	
Fl _t Protected	0.992			0.955		
Satd. Flow (prot)	1659	0	0	1799	1744	0
Fl _t Permitted	0.992			0.955		
Satd. Flow (perm)	1659	0	0	1799	1744	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	387.3			73.6	172.0	
Travel Time (s)	29.0			5.5	12.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	69	99	7	23	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	83	0	0	106	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.2%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 214: Collector M & Street L

2031 FT AM Peak Hour
 07/08/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	69	99	7	23	28
Future Volume (Veh/h)	14	69	99	7	23	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	69	99	7	23	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	73					
pX, platoon unblocked						
vC, conflicting volume	242	37	51			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242	37	51			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	93	94			
cM capacity (veh/h)	699	1035	1555			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	83	106	51			
Volume Left	14	99	0			
Volume Right	69	0	28			
cSH	957	1555	1700			
Volume to Capacity	0.09	0.06	0.03			
Queue Length 95th (m)	2.2	1.5	0.0			
Control Delay (s)	9.1	7.0	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.1	7.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay	6.2					
Intersection Capacity Utilization	24.2%			ICU Level of Service	A	
Analysis Period (min)	15					

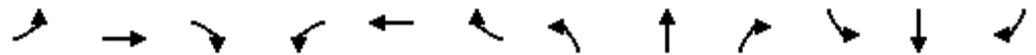
Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2031 FT PM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  			  			  	
Traffic Volume (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
Future Volume (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	1		1	1		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3404	4520	1617	3541	4565	1601	1772	4520	1633	1772	4433	1585
Flt Permitted	0.950			0.950			0.096			0.104		
Satd. Flow (perm)	3404	4520	1617	3541	4565	1601	179	4520	1633	194	4433	1585
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			239			156			150			331
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	2%	1%	0%	1%	2%	3%	2%	0%	3%	4%	3%
Adj. Flow (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
Shared Lane Traffic (%)												
Lane Group Flow (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2031 FT PM Peak Hour
07/08/2025

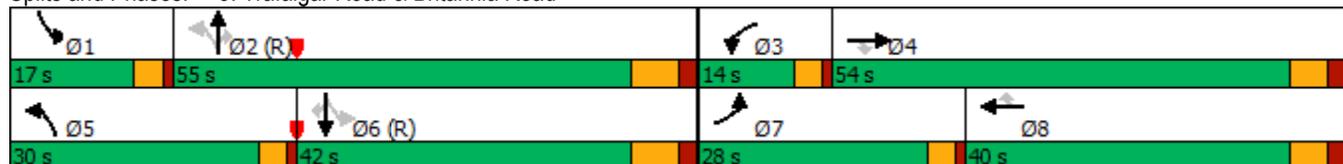


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	41.0	41.0	11.0	41.0	41.0
Total Split (s)	28.0	54.0	54.0	14.0	40.0	40.0	30.0	55.0	55.0	17.0	42.0	42.0
Total Split (%)	20.0%	38.6%	38.6%	10.0%	28.6%	28.6%	21.4%	39.3%	39.3%	12.1%	30.0%	30.0%
Maximum Green (s)	24.0	48.0	48.0	10.0	34.0	34.0	26.0	48.0	48.0	13.0	35.0	35.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes											
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max						
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	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)	24.4	49.7	49.7	10.6	35.9	35.9	69.6	51.0	51.0	55.1	39.4	39.4
Actuated g/C Ratio	0.17	0.36	0.36	0.08	0.26	0.26	0.50	0.36	0.36	0.39	0.28	0.28
v/c Ratio	0.88	0.56	0.33	0.56	0.81	0.27	0.92	0.84	0.31	0.86	0.77	0.55
Control Delay	73.0	38.0	4.9	94.0	37.5	2.5	73.7	27.3	2.3	69.8	55.1	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	38.0	4.9	94.0	37.5	2.5	73.7	27.3	2.3	69.8	55.1	19.6
LOS	E	D	A	F	D	A	E	C	A	E	E	B
Approach Delay		44.2			40.4			32.9			48.2	
Approach LOS		D			D			C			D	

Intersection Summary

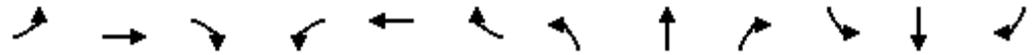
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 85 (61%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 41.0
 Intersection LOS: D
 Intersection Capacity Utilization 87.2%
 ICU Level of Service E
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

2031 FT PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
v/c Ratio	0.88	0.56	0.33	0.56	0.81	0.27	0.92	0.84	0.31	0.86	0.77	0.55
Control Delay	73.0	38.0	4.9	94.0	37.5	2.5	73.7	27.3	2.3	69.8	55.1	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.0	38.0	4.9	94.0	37.5	2.5	73.7	27.3	2.3	69.8	55.1	19.6
Queue Length 50th (m)	72.9	83.3	0.0	22.9	112.2	2.3	54.7	150.1	2.1	41.5	90.8	19.0
Queue Length 95th (m)	#99.5	99.6	17.3	34.1	125.7	3.2	#125.4	110.1	0.4	#81.5	121.5	53.9
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	607	1614	731	278	1173	527	396	1646	689	234	1247	684
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	0.86	0.56	0.33	0.54	0.80	0.27	0.87	0.84	0.31	0.84	0.77	0.55

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
3: Trafalgar Road & Britannia Road

2031 FT PM Peak Hour
07/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
Future Volume (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	1.00	*0.80	1.00	1.00	*0.80	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)	3404	4520	1617	3541	4565	1601	1772	4520	1633	1772	4433	1585
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.10	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	3404	4520	1617	3541	4565	1601	180	4520	1633	194	4433	1585
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	521	903	239	151	943	143	345	1379	211	197	956	378
RTOR Reduction (vph)	0	0	154	0	0	106	0	0	95	0	0	238
Lane Group Flow (vph)	521	903	85	151	943	37	345	1379	116	197	956	140
Heavy Vehicles (%)	4%	2%	1%	0%	1%	2%	3%	2%	0%	3%	4%	3%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2		2	6		6
Actuated Green, G (s)	23.4	47.7	47.7	9.6	33.9	33.9	65.7	49.0	49.0	50.2	37.5	37.5
Effective Green, g (s)	24.4	49.7	49.7	10.6	35.9	35.9	66.7	51.0	51.0	52.2	39.5	39.5
Actuated g/C Ratio	0.17	0.36	0.36	0.08	0.26	0.26	0.48	0.36	0.36	0.37	0.28	0.28
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	593	1604	574	268	1170	410	372	1646	594	226	1250	447
v/s Ratio Prot	c0.15	0.20		0.04	c0.21		c0.17	0.31		0.09	0.22	
v/s Ratio Perm			0.05			0.02	c0.28		0.07	0.24		0.09
v/c Ratio	0.88	0.56	0.15	0.56	0.81	0.09	0.93	0.84	0.19	0.87	0.76	0.31
Uniform Delay, d1	56.4	36.4	30.7	62.5	48.8	39.6	42.1	40.7	30.4	34.9	46.0	39.6
Progression Factor	1.00	1.00	1.00	1.38	0.65	0.27	1.16	0.54	0.12	1.12	1.08	2.32
Incremental Delay, d2	13.9	0.7	0.3	2.5	4.4	0.2	27.9	5.1	0.7	27.1	4.2	1.7
Delay (s)	70.2	37.1	31.0	88.6	36.2	10.9	76.8	27.0	4.2	66.4	53.9	93.5
Level of Service	E	D	C	F	D	B	E	C	A	E	D	F
Approach Delay (s)		46.6			39.7			33.4			65.3	
Approach LOS		D			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			45.7									HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			140.0									Sum of lost time (s) 15.0
Intersection Capacity Utilization			87.2%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2031 FT PM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 				
Traffic Volume (vph)	227	519	35	13	888	163	58	308	44	152	200	201
Future Volume (vph)	227	519	35	13	888	163	58	308	44	152	200	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	70.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.981				0.925
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1885	0	1825	1777	0
Flt Permitted	0.190			0.418			0.404			0.160		
Satd. Flow (perm)	365	4520	1633	803	4565	1633	776	1885	0	307	1777	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			68			156		6				47
Link Speed (k/h)		60			60			70				70
Link Distance (m)		764.9			603.0			3158.3				619.6
Travel Time (s)		45.9			36.2			162.4				31.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	227	519	35	13	888	163	58	308	44	152	200	201
Shared Lane Traffic (%)												
Lane Group Flow (vph)	227	519	35	13	888	163	58	352	0	152	401	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7		4

Queues
4: Eighth Line & Britannia Road

2031 FT PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	227	519	35	13	888	163	58	352	152	401
v/c Ratio	0.60	0.20	0.04	0.04	0.45	0.21	0.33	0.82	0.82	0.66
Control Delay	28.4	9.0	0.8	30.5	31.4	6.2	41.7	58.9	72.4	44.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	9.0	0.8	30.5	31.4	6.2	41.7	58.9	72.4	44.0
Queue Length 50th (m)	21.6	9.8	0.1	2.0	70.7	1.1	14.2	94.2	32.0	87.3
Queue Length 95th (m)	62.8	33.2	0.5	8.0	106.7	17.6	m26.6	126.5	#54.2	110.9
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		70.0	
Base Capacity (vph)	457	2642	983	345	1962	790	267	654	186	816
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	0.50	0.20	0.04	0.04	0.45	0.21	0.22	0.54	0.82	0.49

Intersection Summary

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

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

2031 FT PM Peak Hour
07/08/2025

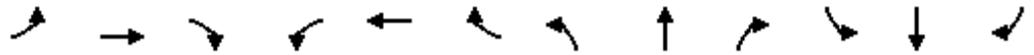


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	227	519	35	13	888	163	58	308	44	152	200	201
Future Volume (vph)	227	519	35	13	888	163	58	308	44	152	200	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.98		1.00	0.92	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1885		1825	1777	
Flt Permitted	0.19	1.00	1.00	0.42	1.00	1.00	0.40	1.00		0.16	1.00	
Satd. Flow (perm)	365	4520	1633	804	4565	1633	775	1885		308	1777	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	227	519	35	13	888	163	58	308	44	152	200	201
RTOR Reduction (vph)	0	0	15	0	0	89	0	5	0	0	32	0
Lane Group Flow (vph)	227	519	20	13	888	74	58	347	0	152	369	0
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	81.9	81.9	81.9	60.2	60.2	60.2	31.6	31.6		45.6	45.6	
Effective Green, g (s)	81.9	81.9	81.9	60.2	60.2	60.2	31.6	31.6		45.6	45.6	
Actuated g/C Ratio	0.59	0.59	0.59	0.43	0.43	0.43	0.23	0.23		0.33	0.33	
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	377	2644	955	345	1962	702	174	425		187	578	
v/s Ratio Prot	c0.07	0.11			0.19			0.18		0.05	c0.21	
v/s Ratio Perm	c0.28		0.01	0.02		0.05	0.07			c0.22		
v/c Ratio	0.60	0.20	0.02	0.04	0.45	0.11	0.33	0.82		0.81	0.64	
Uniform Delay, d1	16.3	13.6	12.2	23.1	28.2	23.8	45.4	51.5		39.1	40.2	
Progression Factor	1.48	0.61	1.62	1.00	1.00	1.00	0.85	0.88		1.15	1.11	
Incremental Delay, d2	2.6	0.2	0.0	0.2	0.8	0.3	1.1	10.9		22.9	2.3	
Delay (s)	26.6	8.5	19.8	23.3	29.0	24.1	39.7	56.4		67.6	47.0	
Level of Service	C	A	B	C	C	C	D	E		E	D	
Approach Delay (s)		14.2			28.2			54.0			52.7	
Approach LOS		B			C			D			D	

Intersection Summary		
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio	0.72	
Actuated Cycle Length (s)	140.0	Sum of lost time (s) 24.5
Intersection Capacity Utilization	89.5%	ICU Level of Service E
Analysis Period (min)	15	
c Critical Lane Group		

Lanes, Volumes, Timings
108: Street P/Collector P & Britannia Road

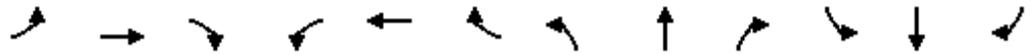
2031 FT PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	179	1040	145	104	1078	76	80	113	127	73	102	122
Future Volume (vph)	179	1040	145	104	1078	76	80	113	127	73	102	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.990			0.921			0.918	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4439	0	1789	4475	0	1789	1735	0	1789	1729	0
Flt Permitted	0.178			0.170			0.222			0.610		
Satd. Flow (perm)	335	4439	0	320	4475	0	418	1735	0	1149	1729	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			12			43			41	
Link Speed (k/h)		60			60			48			48	
Link Distance (m)		219.2			337.8			263.0			315.3	
Travel Time (s)		13.2			20.3			19.7			23.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	1040	145	104	1078	76	80	113	127	73	102	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	1185	0	104	1154	0	80	240	0	73	224	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
108: Street P/Collector P & Britannia Road

2031 FT PM Peak Hour
07/08/2025

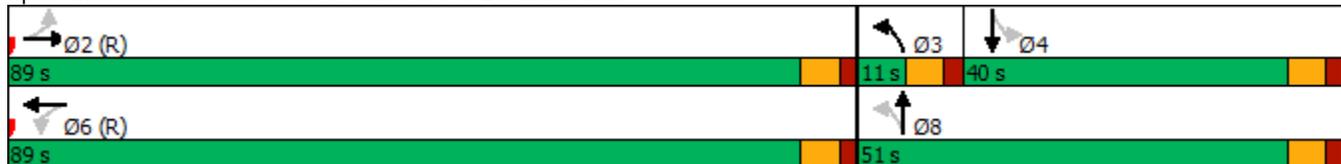


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		11.0	40.0		40.0	40.0	
Total Split (s)	89.0	89.0		89.0	89.0		11.0	51.0		40.0	40.0	
Total Split (%)	63.6%	63.6%		63.6%	63.6%		7.9%	36.4%		28.6%	28.6%	
Maximum Green (s)	83.0	83.0		83.0	83.0		5.0	45.0		34.0	34.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	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	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0			27.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	96.5	96.5		96.5	96.5		31.5	31.5		20.5	20.5	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.22	0.22		0.15	0.15	
v/c Ratio	0.77	0.39		0.47	0.37		0.56	0.57		0.43	0.78	
Control Delay	36.1	3.6		15.3	3.8		54.2	40.6		60.9	64.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.1	3.6		15.3	3.8		54.2	40.6		60.9	64.6	
LOS	D	A		B	A		D	D		E	E	
Approach Delay		7.8			4.8			44.0			63.7	
Approach LOS		A			A			D			E	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 139 (99%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay: 15.3
 Intersection LOS: B
 Intersection Capacity Utilization 82.0%
 ICU Level of Service E
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 108: Street P/Collector P & Britannia Road





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	179	1185	104	1154	80	240	73	224
v/c Ratio	0.77	0.39	0.47	0.37	0.56	0.57	0.43	0.78
Control Delay	36.1	3.6	15.3	3.8	54.2	40.6	60.9	64.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.1	3.6	15.3	3.8	54.2	40.6	60.9	64.6
Queue Length 50th (m)	20.7	14.7	3.3	15.1	14.9	41.9	18.7	49.8
Queue Length 95th (m)	m#85.7	23.7	46.0	20.4	m21.4	m54.9	32.7	73.8
Internal Link Dist (m)		195.2		313.8		239.0		291.3
Turn Bay Length (m)	60.0		50.0		50.0		50.0	
Base Capacity (vph)	231	3068	220	3089	143	586	279	450
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.39	0.47	0.37	0.56	0.41	0.26	0.50

Intersection Summary

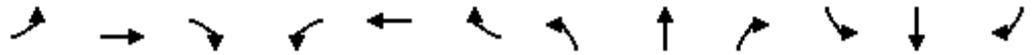
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
 108: Street P/Collector P & Britannia Road

2031 FT PM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↖↗		↖	↗↖↗		↖	↗		↖	↗	
Traffic Volume (vph)	179	1040	145	104	1078	76	80	113	127	73	102	122
Future Volume (vph)	179	1040	145	104	1078	76	80	113	127	73	102	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4437		1789	4476		1789	1734		1789	1730	
Flt Permitted	0.18	1.00		0.17	1.00		0.22	1.00		0.61	1.00	
Satd. Flow (perm)	334	4437		320	4476		418	1734		1148	1730	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	1040	145	104	1078	76	80	113	127	73	102	122
RTOR Reduction (vph)	0	8	0	0	4	0	0	33	0	0	35	0
Lane Group Flow (vph)	179	1177	0	104	1150	0	80	207	0	73	189	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	96.5	96.5		96.5	96.5		31.5	31.5		20.5	20.5	
Effective Green, g (s)	96.5	96.5		96.5	96.5		31.5	31.5		20.5	20.5	
Actuated g/C Ratio	0.69	0.69		0.69	0.69		0.22	0.22		0.15	0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	230	3058		220	3085		143	390		168	253	
v/s Ratio Prot		0.27			0.26		0.02	c0.12			c0.11	
v/s Ratio Perm	c0.54			0.33			0.11			0.06		
v/c Ratio	0.78	0.38		0.47	0.37		0.56	0.53		0.43	0.75	
Uniform Delay, d1	14.6	9.2		10.0	9.1		45.3	47.7		54.5	57.3	
Progression Factor	0.80	0.34		0.64	0.36		0.93	0.93		1.00	1.00	
Incremental Delay, d2	19.6	0.3		6.8	0.3		4.3	1.2		1.8	11.4	
Delay (s)	31.2	3.5		13.2	3.6		46.6	45.6		56.3	68.6	
Level of Service	C	A		B	A		D	D		E	E	
Approach Delay (s)		7.1			4.4			45.9			65.6	
Approach LOS		A			A			D			E	

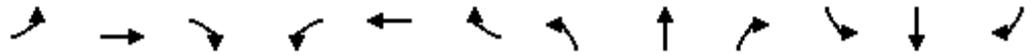
Intersection Summary

HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
110: Collector Q/Collector M & Britannia Road

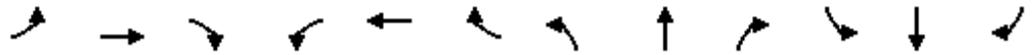
2031 FT PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕		↖	↕	
Traffic Volume (vph)	57	1032	151	21	1102	44	116	12	18	37	20	40
Future Volume (vph)	57	1032	151	21	1102	44	116	12	18	37	20	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	70.0		0.0	80.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.994			0.910			0.900	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4434	0	1789	4493	0	1789	1714	0	1789	1695	0
Flt Permitted	0.184			0.175			0.427			0.738		
Satd. Flow (perm)	347	4434	0	330	4493	0	804	1714	0	1390	1695	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		23			5			18			40	
Link Speed (k/h)		60			60			48			48	
Link Distance (m)		337.8			764.9			1307.2			73.6	
Travel Time (s)		20.3			45.9			98.0			5.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	1032	151	21	1102	44	116	12	18	37	20	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	57	1183	0	21	1146	0	116	30	0	37	60	0
Enter Blocked Intersection	No	No	No	No	No							
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
 110: Collector Q/Collector M & Britannia Road

2031 FT PM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		11.0	40.0		40.0	40.0	
Total Split (s)	78.0	78.0		78.0	78.0		19.0	62.0		43.0	43.0	
Total Split (%)	55.7%	55.7%		55.7%	55.7%		13.6%	44.3%		30.7%	30.7%	
Maximum Green (s)	72.0	72.0		72.0	72.0		13.0	56.0		37.0	37.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	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	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag							Lead			Lag	Lag	
Lead-Lag Optimize?							Yes			Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0			27.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0			0		0	0	
Act Effct Green (s)	102.4	102.4		102.4	102.4		25.6	25.6		10.8	10.8	
Actuated g/C Ratio	0.73	0.73		0.73	0.73		0.18	0.18		0.08	0.08	
v/c Ratio	0.23	0.36		0.09	0.35		0.50	0.09		0.35	0.36	
Control Delay	7.0	4.8		7.6	13.9		56.8	25.8		70.2	32.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.0	4.8		7.6	13.9		56.8	25.8		70.2	32.4	
LOS	A	A		A	B		E	C		E	C	
Approach Delay		4.9			13.8			50.4			46.8	
Approach LOS		A			B			D			D	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 12.9
 Intersection LOS: B
 Intersection Capacity Utilization 68.1%
 ICU Level of Service C
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 110: Collector Q/Collector M & Britannia Road



Queues
110: Collector Q/Collector M & Britannia Road

2031 FT PM Peak Hour
07/08/2025



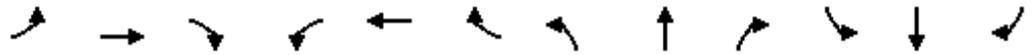
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	57	1183	21	1146	116	30	37	60
v/c Ratio	0.23	0.36	0.09	0.35	0.50	0.09	0.35	0.36
Control Delay	7.0	4.8	7.6	13.9	56.8	25.8	70.2	32.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.0	4.8	7.6	13.9	56.8	25.8	70.2	32.4
Queue Length 50th (m)	3.2	29.0	3.5	97.7	27.7	2.8	10.0	5.3
Queue Length 95th (m)	6.6	32.5	m3.2	116.3	44.8	11.3	21.4	19.5
Internal Link Dist (m)		313.8		740.9		1283.2		49.6
Turn Bay Length (m)	50.0		70.0		80.0		25.0	
Base Capacity (vph)	253	3248	241	3287	242	696	367	477
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.36	0.09	0.35	0.48	0.04	0.10	0.13

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 110: Collector Q/Collector M & Britannia Road

2031 FT PM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↖↗		↖	↗↖↗		↖	↗		↖	↗	
Traffic Volume (vph)	57	1032	151	21	1102	44	116	12	18	37	20	40
Future Volume (vph)	57	1032	151	21	1102	44	116	12	18	37	20	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4434		1789	4494		1789	1714		1789	1695	
Flt Permitted	0.18	1.00		0.17	1.00		0.43	1.00		0.74	1.00	
Satd. Flow (perm)	346	4434		329	4494		804	1714		1389	1695	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	1032	151	21	1102	44	116	12	18	37	20	40
RTOR Reduction (vph)	0	6	0	0	1	0	0	15	0	0	37	0
Lane Group Flow (vph)	57	1177	0	21	1145	0	116	15	0	37	23	0
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	101.1	101.1		101.1	101.1		26.9	26.9		8.8	8.8	
Effective Green, g (s)	101.1	101.1		101.1	101.1		26.9	26.9		8.8	8.8	
Actuated g/C Ratio	0.72	0.72		0.72	0.72		0.19	0.19		0.06	0.06	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	3201		237	3245		239	329		87	106	
v/s Ratio Prot		c0.27			0.25		c0.04	0.01			0.01	
v/s Ratio Perm	0.16			0.06			c0.05			0.03		
v/c Ratio	0.23	0.37		0.09	0.35		0.49	0.05		0.43	0.21	
Uniform Delay, d1	6.5	7.4		5.8	7.3		49.0	46.1		63.2	62.3	
Progression Factor	0.62	0.60		0.96	1.83		1.02	1.04		1.00	1.00	
Incremental Delay, d2	2.0	0.3		0.7	0.3		1.6	0.1		3.3	1.0	
Delay (s)	6.0	4.8		6.2	13.5		51.7	48.2		66.5	63.3	
Level of Service	A	A		A	B		D	D		E	E	
Approach Delay (s)		4.8			13.4			51.0			64.5	
Approach LOS		A			B			D			E	

Intersection Summary

HCM 2000 Control Delay	13.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
143: Trafalgar Road & Collector M

2031 FT PM Peak Hour
07/08/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Traffic Volume (vph)	15	144	1738	20	249	1543
Future Volume (vph)	15	144	1738	20	249	1543
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		0.0	60.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				50.0	
Lane Util. Factor	1.00	1.00	*0.80	0.91	1.00	*0.80
Frt	0.878		0.998			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1645	0	4511	0	1789	4520
Flt Permitted	0.995				0.067	
Satd. Flow (perm)	1645	0	4511	0	126	4520
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	144		1			
Link Speed (k/h)	48		60			60
Link Distance (m)	229.4		430.6			999.8
Travel Time (s)	17.2		25.8			60.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	144	1738	20	249	1543
Shared Lane Traffic (%)						
Lane Group Flow (vph)	159	0	1758	0	249	1543
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		3.7			3.7
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	

Lanes, Volumes, Timings
143: Trafalgar Road & Collector M

2031 FT PM Peak Hour
07/08/2025

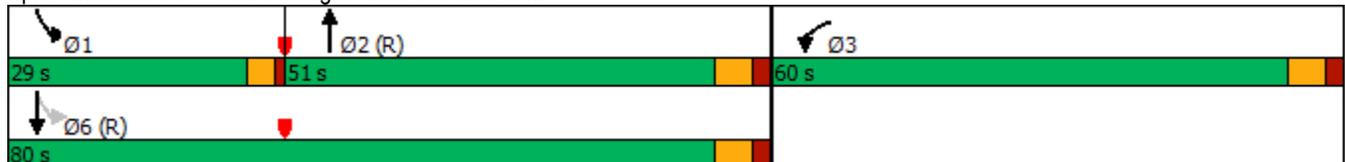


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	3		2		1	6
Switch Phase						
Minimum Initial (s)	10.0		20.0		7.0	20.0
Minimum Split (s)	40.0		26.0		13.0	26.0
Total Split (s)	60.0		51.0		29.0	80.0
Total Split (%)	42.9%		36.4%		20.7%	57.1%
Maximum Green (s)	54.0		45.0		25.0	74.0
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Walk Time (s)	7.0		7.0		7.0	7.0
Flash Dont Walk (s)	27.0		9.0		9.0	9.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	10.9		95.0		119.1	117.1
Actuated g/C Ratio	0.08		0.68		0.85	0.84
v/c Ratio	0.61		0.57		0.77	0.41
Control Delay	22.5		17.3		40.6	6.1
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	22.5		17.3		40.6	6.1
LOS	C		B		D	A
Approach Delay	22.5		17.3			10.9
Approach LOS	C		B			B

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 84 (60%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 14.5
 Intersection LOS: B
 Intersection Capacity Utilization 70.9%
 ICU Level of Service C
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 143: Trafalgar Road & Collector M



Queues
143: Trafalgar Road & Collector M

2031 FT PM Peak Hour
07/08/2025



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	159	1758	249	1543
v/c Ratio	0.61	0.57	0.77	0.41
Control Delay	22.5	17.3	40.6	6.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	22.5	17.3	40.6	6.1
Queue Length 50th (m)	4.0	104.8	40.3	59.3
Queue Length 95th (m)	25.6	132.4	72.4	59.6
Internal Link Dist (m)	205.4	406.6		975.8
Turn Bay Length (m)			60.0	
Base Capacity (vph)	722	3062	405	3780
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	0.22	0.57	0.61	0.41
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 143: Trafalgar Road & Collector M

2031 FT PM Peak Hour
 07/08/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↵		↑↑↑		↵	↑↑↑
Traffic Volume (vph)	15	144	1738	20	249	1543
Future Volume (vph)	15	144	1738	20	249	1543
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		4.0	6.0
Lane Util. Factor	1.00		*0.80		1.00	*0.80
Frt	0.88		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1645		4513		1789	4520
Flt Permitted	1.00		1.00		0.07	1.00
Satd. Flow (perm)	1645		4513		126	4520
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	144	1738	20	249	1543
RTOR Reduction (vph)	133	0	0	0	0	0
Lane Group Flow (vph)	26	0	1758	0	249	1543
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	10.9		95.0		117.1	117.1
Effective Green, g (s)	10.9		95.0		117.1	117.1
Actuated g/C Ratio	0.08		0.68		0.84	0.84
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	128		3062		320	3780
v/s Ratio Prot	c0.02		0.39		c0.10	0.34
v/s Ratio Perm					c0.55	
v/c Ratio	0.20		0.57		0.78	0.41
Uniform Delay, d1	60.5		11.8		35.2	2.8
Progression Factor	1.00		1.31		0.87	1.97
Incremental Delay, d2	0.8		0.4		10.5	0.3
Delay (s)	61.3		16.0		41.0	5.9
Level of Service	E		B		D	A
Approach Delay (s)	61.3		16.0			10.8
Approach LOS	E		B			B

Intersection Summary

HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
213: Collector P/Local Street A & Collector M

2031 FT PM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	66	121	71	44	24	84	128	72	21	86	49
Future Volume (vph)	85	66	121	71	44	24	84	128	72	21	86	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.940			0.977			0.966			0.958	
Fl _t Protected		0.985			0.975			0.985			0.993	
Satd. Flow (prot)	0	1744	0	0	1794	0	0	1792	0	0	1792	0
Fl _t Permitted		0.985			0.975			0.985			0.993	
Satd. Flow (perm)	0	1744	0	0	1794	0	0	1792	0	0	1792	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		229.4			387.3			315.3			332.4	
Travel Time (s)		17.2			29.0			23.6			24.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	85	66	121	71	44	24	84	128	72	21	86	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	272	0	0	139	0	0	284	0	0	156	0
Enter Blocked Intersection	No	No	No	No	No	No						
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	51.5%						ICU Level of Service A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 213: Collector P/Local Street A & Collector M

2031 FT PM Peak Hour
 07/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	85	66	121	71	44	24	84	128	72	21	86	49
Future Volume (vph)	85	66	121	71	44	24	84	128	72	21	86	49
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	85	66	121	71	44	24	84	128	72	21	86	49
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	272	139	284	156								
Volume Left (vph)	85	71	84	21								
Volume Right (vph)	121	24	72	49								
Hadj (s)	-0.17	0.03	-0.06	-0.13								
Departure Headway (s)	5.2	5.6	5.2	5.4								
Degree Utilization, x	0.39	0.22	0.41	0.23								
Capacity (veh/h)	645	578	637	606								
Control Delay (s)	11.4	10.1	11.8	10.0								
Approach Delay (s)	11.4	10.1	11.8	10.0								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay			11.1									
Level of Service			B									
Intersection Capacity Utilization			51.5%	ICU Level of Service	A							
Analysis Period (min)			15									



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	28	109	93	21	15	17
Future Volume (vph)	28	109	93	21	15	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.893				0.928	
Fl _t Protected	0.990			0.961		
Satd. Flow (prot)	1665	0	0	1810	1748	0
Fl _t Permitted	0.990			0.961		
Satd. Flow (perm)	1665	0	0	1810	1748	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	387.3			73.6	172.0	
Travel Time (s)	29.0			5.5	12.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	28	109	93	21	15	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	137	0	0	114	32	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	27.9%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 214: Collector M & Street L

2031 FT PM Peak Hour
 07/08/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	28	109	93	21	15	17
Future Volume (Veh/h)	28	109	93	21	15	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	28	109	93	21	15	17
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	73					
pX, platoon unblocked						
vC, conflicting volume	230	24	32			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	230	24	32			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	90	94			
cM capacity (veh/h)	713	1053	1580			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	137	114	32			
Volume Left	28	93	0			
Volume Right	109	0	17			
cSH	960	1580	1700			
Volume to Capacity	0.14	0.06	0.02			
Queue Length 95th (m)	3.8	1.4	0.0			
Control Delay (s)	9.4	6.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.4	6.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			7.0			
Intersection Capacity Utilization			27.9%	ICU Level of Service	A	
Analysis Period (min)			15			

2041 Future Total

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2041 FT AM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  		 	  		  		
Traffic Volume (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
Future Volume (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			253			156			125			196
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	2%	4%	0%	7%	0%	7%	8%	0%	4%	8%	0%
Adj. Flow (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
Shared Lane Traffic (%)												
Lane Group Flow (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

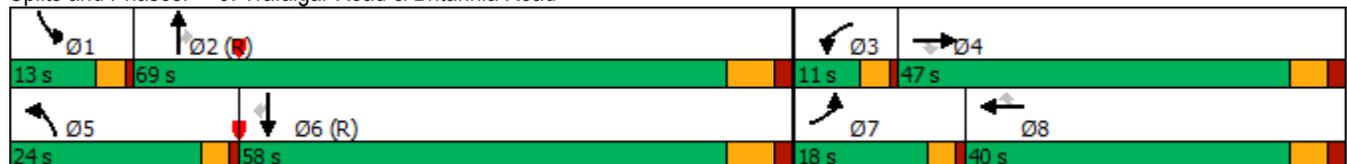
2041 FT AM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	41.0	41.0	11.0	41.0	41.0
Total Split (s)	18.0	47.0	47.0	11.0	40.0	40.0	24.0	69.0	69.0	13.0	58.0	58.0
Total Split (%)	12.9%	33.6%	33.6%	7.9%	28.6%	28.6%	17.1%	49.3%	49.3%	9.3%	41.4%	41.4%
Maximum Green (s)	14.0	41.0	41.0	7.0	34.0	34.0	20.0	62.0	62.0	9.0	51.0	51.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	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)	15.0	42.3	42.3	8.0	35.3	35.3	21.0	64.9	64.9	9.8	53.7	53.7
Actuated g/C Ratio	0.11	0.30	0.30	0.06	0.25	0.25	0.15	0.46	0.46	0.07	0.38	0.38
v/c Ratio	0.91	0.67	0.77	0.43	0.72	0.39	0.91	0.74	0.19	0.56	0.91	0.87
Control Delay	93.7	45.6	30.1	52.3	51.5	15.7	88.9	24.5	4.1	72.6	50.1	41.1
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	93.7	45.6	30.1	52.3	51.5	15.7	88.9	24.5	4.1	72.6	50.1	41.1
LOS	F	D	C	D	D	B	F	C	A	E	D	D
Approach Delay		49.3			44.8			36.9			48.8	
Approach LOS		D			D			D			D	

Intersection Summary

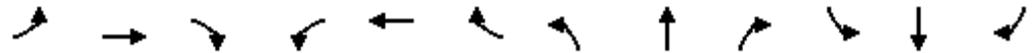
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 90 (64%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 115
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 44.9 Intersection LOS: D
 Intersection Capacity Utilization 79.3% ICU Level of Service D
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

2041 FT AM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
v/c Ratio	0.91	0.67	0.77	0.43	0.72	0.39	0.91	0.74	0.19	0.56	0.91	0.87
Control Delay	93.7	45.6	30.1	52.3	51.5	15.7	88.9	24.5	4.1	72.6	50.1	41.1
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	93.7	45.6	30.1	52.3	51.5	15.7	88.9	24.5	4.1	72.6	50.1	41.1
Queue Length 50th (m)	42.0	92.3	65.3	12.4	82.5	21.6	67.6	91.3	1.9	18.6	162.2	124.1
Queue Length 95th (m)	#68.4	110.2	110.8	m17.1	101.4	41.1	#95.8	104.5	8.7	29.5	#188.7	#196.4
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	321	1388	657	202	1108	535	496	1979	824	243	1637	747
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	0.91	0.66	0.76	0.43	0.71	0.38	0.91	0.74	0.19	0.55	0.91	0.87

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
3: Trafalgar Road & Britannia Road

2041 FT AM Peak Hour
07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑↑	↖	↖↗	↑↑↑	↖	↖↗	↑↑↑	↖	↖↗	↑↑↑	↖
Traffic Volume (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
Future Volume (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	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)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Flt Permitted	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 (perm)	3001	4520	1570	3541	4309	1633	3309	4269	1633	3404	4269	1633
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	293	919	501	86	784	204	452	1468	158	133	1485	648
RTOR Reduction (vph)	0	0	177	0	0	117	0	0	67	0	0	121
Lane Group Flow (vph)	293	919	324	86	784	87	452	1468	91	133	1485	527
Heavy Vehicles (%)	18%	2%	4%	0%	7%	0%	7%	8%	0%	4%	8%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	14.0	40.3	40.3	7.0	33.3	33.3	20.0	62.9	62.9	8.8	51.7	51.7
Effective Green, g (s)	15.0	42.3	42.3	8.0	35.3	35.3	21.0	64.9	64.9	9.8	53.7	53.7
Actuated g/C Ratio	0.11	0.30	0.30	0.06	0.25	0.25	0.15	0.46	0.46	0.07	0.38	0.38
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	321	1365	474	202	1086	411	496	1978	757	238	1637	626
v/s Ratio Prot	c0.10	0.20		0.02	0.18		c0.14	0.34		0.04	c0.35	
v/s Ratio Perm			c0.21			0.05			0.06			0.32
v/c Ratio	0.91	0.67	0.68	0.43	0.72	0.21	0.91	0.74	0.12	0.56	0.91	0.84
Uniform Delay, d1	61.9	42.8	43.0	63.8	47.9	41.4	58.6	30.7	21.3	63.0	40.8	39.3
Progression Factor	1.00	1.00	1.00	0.72	0.99	1.17	1.14	0.71	0.60	1.00	1.00	1.00
Incremental Delay, d2	28.9	1.7	5.2	1.4	2.8	0.5	20.2	2.4	0.3	2.8	8.9	13.0
Delay (s)	90.8	44.5	48.2	47.3	50.3	49.1	87.0	24.1	13.2	65.8	49.7	52.3
Level of Service	F	D	D	D	D	D	F	C	B	E	D	D
Approach Delay (s)		53.5			49.8			37.0			51.4	
Approach LOS		D			D			D			D	

Intersection Summary

HCM 2000 Control Delay	47.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2041 FT AM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  			 			 	
Traffic Volume (vph)	209	1088	48	13	575	118	29	162	78	298	309	274
Future Volume (vph)	209	1088	48	13	575	118	29	162	78	298	309	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	120.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.951				0.930
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1815	0	1825	1768	0
Flt Permitted	0.315			0.214			0.292			0.222		
Satd. Flow (perm)	605	4520	1633	411	4433	1633	419	1815	0	426	1768	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			68			118		17				47
Link Speed (k/h)		60			60			70				70
Link Distance (m)		764.9			603.0			3158.3				619.6
Travel Time (s)		45.9			36.2			162.4				31.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Adj. Flow (vph)	209	1088	48	13	575	118	29	162	78	298	309	274
Shared Lane Traffic (%)												
Lane Group Flow (vph)	209	1088	48	13	575	118	29	240	0	298	583	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7		4

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

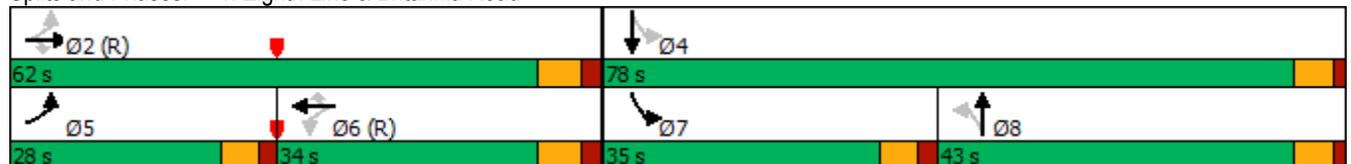
2041 FT AM Peak Hour
07/08/2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	2		2	6		6	8			4			
Detector Phase	5	2	2	6	6	6	8	8		7	4		
Switch Phase													
Minimum Initial (s)	5.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0		5.0	15.0		
Minimum Split (s)	11.0	26.8	26.8	26.8	26.8	26.8	20.7	20.7		11.0	20.7		
Total Split (s)	28.0	62.0	62.0	34.0	34.0	34.0	43.0	43.0		35.0	78.0		
Total Split (%)	20.0%	44.3%	44.3%	24.3%	24.3%	24.3%	30.7%	30.7%		25.0%	55.7%		
Maximum Green (s)	22.0	55.2	55.2	27.2	27.2	27.2	37.3	37.3		29.0	72.3		
Yellow Time (s)	4.0	4.6	4.6	4.6	4.6	4.6	4.2	4.2		4.0	4.2		
All-Red Time (s)	2.0	2.2	2.2	2.2	2.2	2.2	1.5	1.5		2.0	1.5		
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7		
Lead/Lag	Lead			Lag			Lag	Lag	Lag	Lead			
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None		
Act Effct Green (s)	76.7	75.9	75.9	55.8	55.8	55.8	22.8	22.8		51.3	51.6		
Actuated g/C Ratio	0.55	0.54	0.54	0.40	0.40	0.40	0.16	0.16		0.37	0.37		
v/c Ratio	0.46	0.44	0.05	0.08	0.33	0.16	0.43	0.78		0.78	0.86		
Control Delay	18.7	17.2	2.9	36.2	32.4	6.8	66.3	66.2		48.8	51.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	18.7	17.2	2.9	36.2	32.4	6.8	66.3	66.2		48.8	51.9		
LOS	B	B	A	D	C	A	E	E		D	D		
Approach Delay		16.9				28.2				66.2			50.8
Approach LOS		B				C				E			D

Intersection Summary

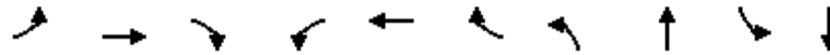
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 32.9
 Intersection LOS: C
 Intersection Capacity Utilization 104.0%
 ICU Level of Service G
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

2041 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	1088	48	13	575	118	29	240	298	583
v/c Ratio	0.46	0.44	0.05	0.08	0.33	0.16	0.43	0.78	0.78	0.86
Control Delay	18.7	17.2	2.9	36.2	32.4	6.8	66.3	66.2	48.8	51.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	17.2	2.9	36.2	32.4	6.8	66.3	66.2	48.8	51.9
Queue Length 50th (m)	20.7	48.6	0.3	2.2	45.3	0.0	6.5	55.3	64.2	140.3
Queue Length 95th (m)	35.5	61.9	3.5	8.9	71.0	15.1	15.8	76.5	81.8	170.6
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		120.0	
Base Capacity (vph)	523	2451	917	163	1766	721	111	496	445	935
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	0.40	0.44	0.05	0.08	0.33	0.16	0.26	0.48	0.67	0.62

Intersection Summary

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

2041 FT AM Peak Hour
07/08/2025



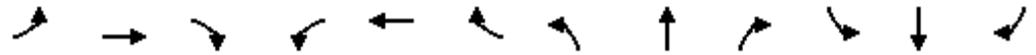
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↗	
Traffic Volume (vph)	209	1088	48	13	575	118	29	162	78	298	309	274
Future Volume (vph)	209	1088	48	13	575	118	29	162	78	298	309	274
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1825	4520	1633	1825	4433	1633	1362	1816		1825	1767	
Flt Permitted	0.31	1.00	1.00	0.21	1.00	1.00	0.29	1.00		0.22	1.00	
Satd. Flow (perm)	605	4520	1633	411	4433	1633	418	1816		426	1767	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	209	1088	48	13	575	118	29	162	78	298	309	274
RTOR Reduction (vph)	0	0	22	0	0	71	0	14	0	0	30	0
Lane Group Flow (vph)	209	1088	26	13	575	47	29	226	0	298	553	0
Heavy Vehicles (%)	0%	2%	0%	0%	4%	0%	34%	0%	2%	0%	2%	0%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	75.9	75.9	75.9	55.7	55.7	55.7	22.8	22.8		51.6	51.6	
Effective Green, g (s)	75.9	75.9	75.9	55.7	55.7	55.7	22.8	22.8		51.6	51.6	
Actuated g/C Ratio	0.54	0.54	0.54	0.40	0.40	0.40	0.16	0.16		0.37	0.37	
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	451	2450	885	163	1763	649	68	295		384	651	
v/s Ratio Prot	0.05	c0.24			0.13			0.12		0.13	c0.31	
v/s Ratio Perm	c0.20		0.02	0.03		0.03	0.07			0.16		
v/c Ratio	0.46	0.44	0.03	0.08	0.33	0.07	0.43	0.77		0.78	0.85	
Uniform Delay, d1	17.3	19.3	14.9	26.2	29.2	26.1	52.7	56.0		35.0	40.6	
Progression Factor	0.85	0.80	1.26	1.00	1.00	1.00	0.93	0.96		1.06	1.06	
Incremental Delay, d2	0.7	0.5	0.1	1.0	0.5	0.2	4.2	11.1		9.5	10.1	
Delay (s)	15.5	16.0	18.8	27.2	29.7	26.3	53.1	64.7		46.7	53.3	
Level of Service	B	B	B	C	C	C	D	E		D	D	
Approach Delay (s)		16.0			29.1			63.4			51.0	
Approach LOS		B			C			E			D	

Intersection Summary

HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	24.5
Intersection Capacity Utilization	104.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
108: Street P/Collector P & Britannia Road

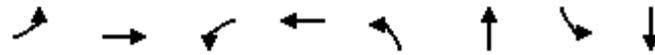
2041 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↕↕↕		↖	↕↕↕		↖	↕		↖	↕	
Traffic Volume (vph)	55	1031	108	125	785	49	129	35	174	44	40	154
Future Volume (vph)	55	1031	108	125	785	49	129	35	174	44	40	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.991			0.875			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4457	0	1789	4480	0	1789	1648	0	1789	1659	0
Flt Permitted	0.257			0.201			0.212			0.627		
Satd. Flow (perm)	484	4457	0	379	4480	0	399	1648	0	1181	1659	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			7			81			135	
Link Speed (k/h)		60			60			48			48	
Link Distance (m)		219.2			337.8			263.0			315.3	
Travel Time (s)		13.2			20.3			19.7			23.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	1031	108	125	785	49	129	35	174	44	40	154
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	1139	0	125	834	0	129	209	0	44	194	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		

Queues
108: Street P/Collector P & Britannia Road

2041 FT AM Peak Hour
07/08/2025



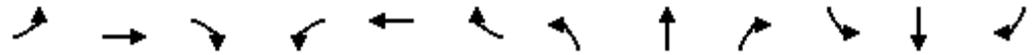
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	55	1139	125	834	129	209	44	194
v/c Ratio	0.13	0.36	0.52	0.29	0.68	0.51	0.41	0.71
Control Delay	6.6	7.5	34.0	18.6	64.2	32.6	70.0	34.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	7.5	34.0	18.6	64.2	32.6	70.0	34.4
Queue Length 50th (m)	3.4	31.0	23.8	57.2	31.4	32.2	11.9	15.9
Queue Length 95th (m)	m6.3	44.7	44.1	78.7	48.0	54.4	23.3	39.9
Internal Link Dist (m)		195.2		313.8		239.0		291.3
Turn Bay Length (m)	60.0		50.0		50.0		50.0	
Base Capacity (vph)	431	3141	242	2863	193	685	312	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.13	0.36	0.52	0.29	0.67	0.31	0.14	0.36

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 108: Street P/Collector P & Britannia Road

2041 FT AM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↗↗↗		↗	↗↗↗		↗	↗		↗	↗	
Traffic Volume (vph)	55	1031	108	125	785	49	129	35	174	44	40	154
Future Volume (vph)	55	1031	108	125	785	49	129	35	174	44	40	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.88		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4456		1789	4480		1789	1648		1789	1659	
Flt Permitted	0.26	1.00		0.20	1.00		0.21	1.00		0.63	1.00	
Satd. Flow (perm)	484	4456		379	4480		399	1648		1181	1659	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	55	1031	108	125	785	49	129	35	174	44	40	154
RTOR Reduction (vph)	0	5	0	0	3	0	0	64	0	0	123	0
Lane Group Flow (vph)	55	1134	0	125	831	0	129	145	0	44	71	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	98.5	98.5		88.6	88.6		29.5	29.5		12.9	12.9	
Effective Green, g (s)	98.5	98.5		88.6	88.6		29.5	29.5		12.9	12.9	
Actuated g/C Ratio	0.70	0.70		0.63	0.63		0.21	0.21		0.09	0.09	
Clearance Time (s)	4.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	395	3135		239	2835		189	347		108	152	
v/s Ratio Prot	0.01	c0.25			0.19		c0.05	0.09			0.04	
v/s Ratio Perm	0.09			c0.33			c0.09			0.04		
v/c Ratio	0.14	0.36		0.52	0.29		0.68	0.42		0.41	0.47	
Uniform Delay, d1	6.8	8.3		14.1	11.6		47.8	47.8		59.9	60.3	
Progression Factor	0.92	0.86		1.46	1.53		0.99	0.98		1.00	1.00	
Incremental Delay, d2	0.1	0.3		7.7	0.3		9.7	0.8		2.5	2.3	
Delay (s)	6.4	7.3		28.3	17.9		57.0	47.5		62.4	62.6	
Level of Service	A	A		C	B		E	D		E	E	
Approach Delay (s)		7.3			19.3			51.1			62.6	
Approach LOS		A			B			D			E	

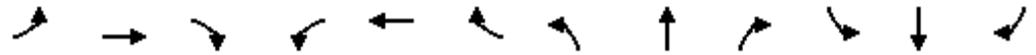
Intersection Summary

HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
110: Collector Q/Collector M & Britannia Road

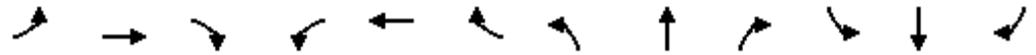
2041 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↶↶↶		↶	↶↶↶		↶	↶		↶	↶	
Traffic Volume (vph)	26	1033	190	113	616	22	299	27	248	40	7	44
Future Volume (vph)	26	1033	190	113	616	22	299	27	248	40	7	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	70.0		0.0	80.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.995			0.865				0.871
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4416	0	1789	4498	0	1789	1629	0	1789	1640	0
Flt Permitted	0.354			0.155			0.724			0.395		
Satd. Flow (perm)	667	4416	0	292	4498	0	1364	1629	0	744	1640	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		32			5			81				44
Link Speed (k/h)		60			60			48				48
Link Distance (m)		337.8			764.9			1307.2				73.6
Travel Time (s)		20.3			45.9			98.0				5.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	1033	190	113	616	22	299	27	248	40	7	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	26	1223	0	113	638	0	299	275	0	40	51	0
Enter Blocked Intersection	No	No	No	No	No							
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
 110: Collector Q/Collector M & Britannia Road

2041 FT AM Peak Hour
 07/08/2025

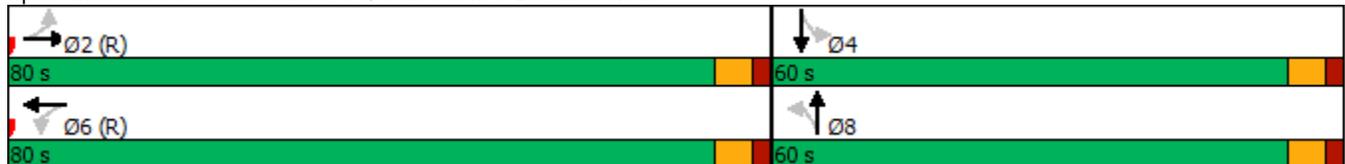


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		40.0	40.0		40.0	40.0	
Total Split (s)	80.0	80.0		80.0	80.0		60.0	60.0		60.0	60.0	
Total Split (%)	57.1%	57.1%		57.1%	57.1%		42.9%	42.9%		42.9%	42.9%	
Maximum Green (s)	74.0	74.0		74.0	74.0		54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	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	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		27.0	27.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	90.3	90.3		90.3	90.3		37.7	37.7		37.7	37.7	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.27	0.27		0.27	0.27	
v/c Ratio	0.06	0.43		0.60	0.22		0.82	0.55		0.20	0.11	
Control Delay	4.0	5.5		43.8	17.3		61.2	30.4		38.4	11.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	4.0	5.5		43.8	17.3		61.2	30.4		38.4	11.2	
LOS	A	A		D	B		E	C		D	B	
Approach Delay		5.5			21.3			46.4			23.2	
Approach LOS		A			C			D			C	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 72 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 19.4
 Intersection LOS: B
 Intersection Capacity Utilization 85.9%
 ICU Level of Service E
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 110: Collector Q/Collector M & Britannia Road





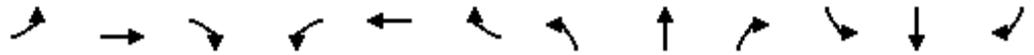
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	26	1223	113	638	299	275	40	51
v/c Ratio	0.06	0.43	0.60	0.22	0.82	0.55	0.20	0.11
Control Delay	4.0	5.5	43.8	17.3	61.2	30.4	38.4	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.0	5.5	43.8	17.3	61.2	30.4	38.4	11.2
Queue Length 50th (m)	0.3	6.0	24.5	47.9	73.7	41.7	8.6	1.4
Queue Length 95th (m)	5.7	100.1	m#59.4	62.2	92.8	57.8	16.9	10.3
Internal Link Dist (m)		313.8		740.9		1283.2		49.6
Turn Bay Length (m)	50.0		70.0		80.0		25.0	
Base Capacity (vph)	430	2860	188	2904	526	678	286	659
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.43	0.60	0.22	0.57	0.41	0.14	0.08

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

HCM Signalized Intersection Capacity Analysis
 110: Collector Q/Collector M & Britannia Road

2041 FT AM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗↖↗		↖	↗↖↗		↖	↗		↖	↗	
Traffic Volume (vph)	26	1033	190	113	616	22	299	27	248	40	7	44
Future Volume (vph)	26	1033	190	113	616	22	299	27	248	40	7	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.86		1.00	0.87	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4415		1789	4497		1789	1629		1789	1640	
Flt Permitted	0.35	1.00		0.15	1.00		0.72	1.00		0.40	1.00	
Satd. Flow (perm)	666	4415		291	4497		1363	1629		745	1640	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	1033	190	113	616	22	299	27	248	40	7	44
RTOR Reduction (vph)	0	11	0	0	2	0	0	59	0	0	32	0
Lane Group Flow (vph)	26	1212	0	113	636	0	299	216	0	40	19	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	90.3	90.3		90.3	90.3		37.7	37.7		37.7	37.7	
Effective Green, g (s)	90.3	90.3		90.3	90.3		37.7	37.7		37.7	37.7	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.27	0.27		0.27	0.27	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	2847		187	2900		367	438		200	441	
v/s Ratio Prot		0.27			0.14			0.13			0.01	
v/s Ratio Perm	0.04			c0.39			c0.22			0.05		
v/c Ratio	0.06	0.43		0.60	0.22		0.81	0.49		0.20	0.04	
Uniform Delay, d1	9.2	12.2		14.5	10.3		47.9	43.1		39.5	37.8	
Progression Factor	0.31	0.39		1.55	1.52		0.93	0.90		1.00	1.00	
Incremental Delay, d2	0.3	0.4		12.7	0.2		13.0	0.9		0.5	0.0	
Delay (s)	3.1	5.2		35.1	15.8		57.3	39.6		40.0	37.9	
Level of Service	A	A		D	B		E	D		D	D	
Approach Delay (s)		5.2			18.7			48.8			38.8	
Approach LOS		A			B			D			D	

Intersection Summary

HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
143: Trafalgar Road & Collector M

2041 FT AM Peak Hour
07/08/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  		 	   
Traffic Volume (vph)	23	251	1952	7	85	1813
Future Volume (vph)	23	251	1952	7	85	1813
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	60.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				50.0	
Lane Util. Factor	1.00	1.00	*0.80	0.91	1.00	*0.80
Frt	0.876		0.999			
Flt Protected	0.996				0.950	
Satd. Flow (prot)	1643	0	4516	0	1789	4520
Flt Permitted	0.996				0.050	
Satd. Flow (perm)	1643	0	4516	0	94	4520
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	169		1			
Link Speed (k/h)	48		60			60
Link Distance (m)	229.4		430.6			999.8
Travel Time (s)	17.2		25.8			60.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	23	251	1952	7	85	1813
Shared Lane Traffic (%)						
Lane Group Flow (vph)	274	0	1959	0	85	1813
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		7.4			7.4
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8				6	

Lanes, Volumes, Timings
143: Trafalgar Road & Collector M

2041 FT AM Peak Hour
07/08/2025

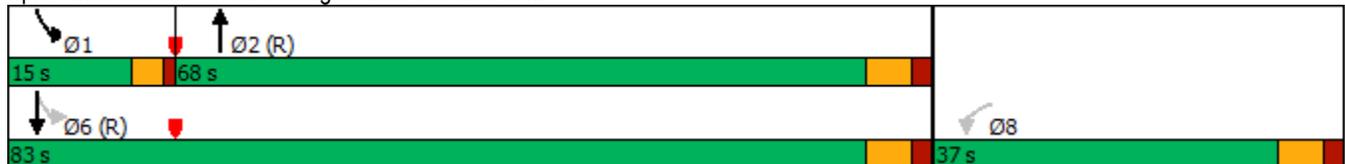


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	8		2		1	6
Switch Phase						
Minimum Initial (s)	5.0		20.0		7.0	20.0
Minimum Split (s)	24.0		26.0		13.0	26.0
Total Split (s)	37.0		68.0		15.0	83.0
Total Split (%)	30.8%		56.7%		12.5%	69.2%
Maximum Green (s)	31.0		62.0		11.0	77.0
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Walk Time (s)	7.0		7.0			7.0
Flash Dont Walk (s)	11.0		9.0			9.0
Pedestrian Calls (#/hr)	0		0			0
Act Effct Green (s)	14.1		84.3		95.9	93.9
Actuated g/C Ratio	0.12		0.70		0.80	0.78
v/c Ratio	0.80		0.62		0.46	0.51
Control Delay	36.8		12.2		20.0	6.0
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	36.8		12.2		20.0	6.0
LOS	D		B		C	A
Approach Delay	36.8		12.2			6.7
Approach LOS	D		B			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: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 11.3
 Intersection LOS: B
 Intersection Capacity Utilization 73.8%
 ICU Level of Service D
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 143: Trafalgar Road & Collector M



Queues
143: Trafalgar Road & Collector M

2041 FT AM Peak Hour
07/08/2025



Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	274	1959	85	1813
v/c Ratio	0.80	0.62	0.46	0.51
Control Delay	36.8	12.2	20.0	6.0
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	36.8	12.2	20.0	6.0
Queue Length 50th (m)	24.1	93.9	3.4	53.0
Queue Length 95th (m)	50.1	152.7	19.6	90.3
Internal Link Dist (m)	205.4	406.6		975.8
Turn Bay Length (m)			60.0	
Base Capacity (vph)	549	3174	230	3537
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	0.50	0.62	0.37	0.51
Intersection Summary				

HCM Signalized Intersection Capacity Analysis
 143: Trafalgar Road & Collector M

2041 FT AM Peak Hour
 07/08/2025



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑↑↑		↑	↑↑↑
Traffic Volume (vph)	23	251	1952	7	85	1813
Future Volume (vph)	23	251	1952	7	85	1813
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		4.0	6.0
Lane Util. Factor	1.00		*0.80		1.00	*0.80
Frt	0.88		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1644		4518		1789	4520
Flt Permitted	1.00		1.00		0.05	1.00
Satd. Flow (perm)	1644		4518		94	4520
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	23	251	1952	7	85	1813
RTOR Reduction (vph)	149	0	0	0	0	0
Lane Group Flow (vph)	125	0	1959	0	85	1813
Turn Type	Perm		NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8				6	
Actuated Green, G (s)	14.1		83.5		93.9	93.9
Effective Green, g (s)	14.1		83.5		93.9	93.9
Actuated g/C Ratio	0.12		0.70		0.78	0.78
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	193		3143		163	3536
v/s Ratio Prot			c0.43		0.03	c0.40
v/s Ratio Perm	c0.08				0.38	
v/c Ratio	0.65		0.62		0.52	0.51
Uniform Delay, d1	50.6		9.8		11.6	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	7.3		0.9		3.0	0.5
Delay (s)	57.8		10.7		14.5	5.3
Level of Service	E		B		B	A
Approach Delay (s)	57.8		10.7			5.7
Approach LOS	E		B			A

Intersection Summary

HCM 2000 Control Delay	11.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
213: Collector P/Local Street A & Collector M

2041 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	24	54	46	101	97	37	68	34	106	49	77	89
Future Volume (vph)	24	54	46	101	97	37	68	34	106	49	77	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.950			0.979			0.931			0.944	
Fl _t Protected		0.990			0.979			0.984			0.989	
Satd. Flow (prot)	0	1771	0	0	1805	0	0	1725	0	0	1758	0
Fl _t Permitted		0.990			0.979			0.984			0.989	
Satd. Flow (perm)	0	1771	0	0	1805	0	0	1725	0	0	1758	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		229.4			387.3			315.3			332.4	
Travel Time (s)		17.2			29.0			23.6			24.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	54	46	101	97	37	68	34	106	49	77	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	124	0	0	235	0	0	208	0	0	215	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	45.0%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 213: Collector P/Local Street A & Collector M

2041 FT AM Peak Hour
 07/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	24	54	46	101	97	37	68	34	106	49	77	89
Future Volume (vph)	24	54	46	101	97	37	68	34	106	49	77	89
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	24	54	46	101	97	37	68	34	106	49	77	89
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	124	235	208	215								
Volume Left (vph)	24	101	68	49								
Volume Right (vph)	46	37	106	89								
Hadj (s)	-0.15	0.03	-0.21	-0.17								
Departure Headway (s)	5.2	5.2	5.0	5.0								
Degree Utilization, x	0.18	0.34	0.29	0.30								
Capacity (veh/h)	618	639	667	663								
Control Delay (s)	9.4	10.9	10.0	10.1								
Approach Delay (s)	9.4	10.9	10.0	10.1								
Approach LOS	A	B	A	B								
Intersection Summary												
Delay			10.2									
Level of Service			B									
Intersection Capacity Utilization			45.0%	ICU Level of Service	A							
Analysis Period (min)			15									

Lanes, Volumes, Timings
214: Collector M & Street L

2041 FT AM Peak Hour
07/08/2025



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	14	70	109	7	23	28
Future Volume (vph)	14	70	109	7	23	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.887				0.926	
Fl _t Protected	0.992			0.955		
Satd. Flow (prot)	1657	0	0	1799	1744	0
Fl _t Permitted	0.992			0.955		
Satd. Flow (perm)	1657	0	0	1799	1744	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	387.3			73.6	172.0	
Travel Time (s)	29.0			5.5	12.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	14	70	109	7	23	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	84	0	0	116	51	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	24.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 214: Collector M & Street L

2041 FT AM Peak Hour
 07/08/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	70	109	7	23	28
Future Volume (Veh/h)	14	70	109	7	23	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	14	70	109	7	23	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)	73					
pX, platoon unblocked						
vC, conflicting volume	262	37	51			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	262	37	51			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	93	93			
cM capacity (veh/h)	676	1035	1555			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	84	116	51			
Volume Left	14	109	0			
Volume Right	70	0	28			
cSH	951	1555	1700			
Volume to Capacity	0.09	0.07	0.03			
Queue Length 95th (m)	2.2	1.7	0.0			
Control Delay (s)	9.2	7.1	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.2	7.1	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			24.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2041 FT PM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	  		  	  		 	  		  		
Traffic Volume (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471
Future Volume (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			242			156			134			312
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		503.1			219.2			264.1			430.6	
Travel Time (s)		30.2			13.2			15.8			25.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	10%	2%	1%	0%	1%	2%	4%	3%	0%	7%	5%	17%
Adj. Flow (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471
Shared Lane Traffic (%)												
Lane Group Flow (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	

Lanes, Volumes, Timings
3: Trafalgar Road & Britannia Road

2041 FT PM Peak Hour
07/08/2025

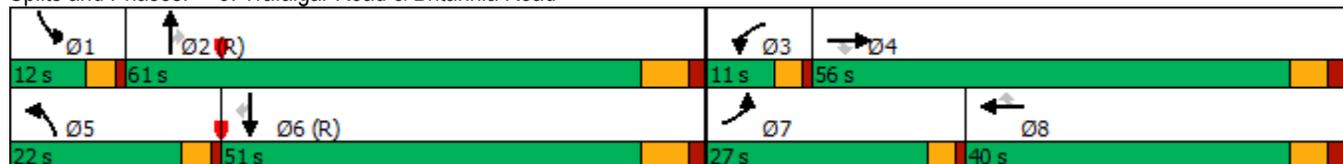


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0	15.0	7.0	15.0	15.0	7.0	25.0	25.0	7.0	25.0	25.0
Minimum Split (s)	11.0	40.0	40.0	11.0	40.0	40.0	11.0	41.0	41.0	11.0	41.0	41.0
Total Split (s)	27.0	56.0	56.0	11.0	40.0	40.0	22.0	61.0	61.0	12.0	51.0	51.0
Total Split (%)	19.3%	40.0%	40.0%	7.9%	28.6%	28.6%	15.7%	43.6%	43.6%	8.6%	36.4%	36.4%
Maximum Green (s)	23.0	50.0	50.0	7.0	34.0	34.0	18.0	54.0	54.0	8.0	44.0	44.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0	-1.0	-2.0	-2.0
Total Lost Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	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)	24.0	52.0	52.0	8.0	36.0	36.0	19.0	56.0	56.0	9.0	46.0	46.0
Actuated g/C Ratio	0.17	0.37	0.37	0.06	0.26	0.26	0.14	0.40	0.40	0.06	0.33	0.33
v/c Ratio	1.23	0.68	0.80	0.63	0.94	0.27	1.18	0.94	0.29	0.98	1.08	0.71
Control Delay	166.9	39.5	31.9	95.7	52.5	5.3	160.7	34.3	6.0	123.9	96.7	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	166.9	39.5	31.9	95.7	52.5	5.3	160.7	34.3	6.0	123.9	96.7	26.6
LOS	F	D	C	F	D	A	F	C	A	F	F	C
Approach Delay		73.4			51.7			60.1			84.5	
Approach LOS		E			D			E			F	

Intersection Summary

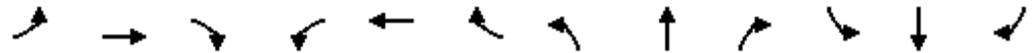
Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 90 (64%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 145
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.23
 Intersection Signal Delay: 69.0
 Intersection LOS: E
 Intersection Capacity Utilization 100.6%
 ICU Level of Service G
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 3: Trafalgar Road & Britannia Road



Queues
3: Trafalgar Road & Britannia Road

2041 FT PM Peak Hour
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471
v/c Ratio	1.23	0.68	0.80	0.63	0.94	0.27	1.18	0.94	0.29	0.98	1.08	0.71
Control Delay	166.9	39.5	31.9	95.7	52.5	5.3	160.7	34.3	6.0	123.9	96.7	26.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	166.9	39.5	31.9	95.7	52.5	5.3	160.7	34.3	6.0	123.9	96.7	26.6
Queue Length 50th (m)	~119.3	109.9	93.7	15.4	127.5	15.6	~93.1	145.2	1.4	30.1	~196.5	55.7
Queue Length 95th (m)	#156.9	128.8	145.6	30.2	#158.6	9.9	#127.8	#202.7	12.8	#55.1	#241.1	110.6
Internal Link Dist (m)		479.1			195.2			240.1			406.6	
Turn Bay Length (m)	125.0		85.0	90.0		70.0	165.0		70.0	140.0		140.0
Base Capacity (vph)	551	1678	752	202	1173	527	461	1790	733	212	1442	668
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.23	0.68	0.80	0.63	0.94	0.27	1.18	0.94	0.29	0.98	1.08	0.71

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
3: Trafalgar Road & Britannia Road

2041 FT PM Peak Hour
07/08/2025

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	 	  		 	  		 	  		 	  		
Traffic Volume (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471	
Future Volume (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Util. Factor	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	1.00	0.97	*0.80	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)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396	
Flt Permitted	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 (perm)	3219	4520	1617	3541	4565	1601	3404	4476	1633	3309	4391	1396	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	679	1140	600	127	1101	140	545	1676	213	207	1564	471	
RTOR Reduction (vph)	0	0	152	0	0	104	0	0	80	0	0	209	
Lane Group Flow (vph)	679	1140	448	127	1101	36	545	1676	133	207	1564	262	
Heavy Vehicles (%)	10%	2%	1%	0%	1%	2%	4%	3%	0%	7%	5%	17%	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	
Protected Phases	7	4		3	8		5	2		1	6		
Permitted Phases			4			8			2			6	
Actuated Green, G (s)	23.0	50.0	50.0	7.0	34.0	34.0	18.0	54.0	54.0	8.0	44.0	44.0	
Effective Green, g (s)	24.0	52.0	52.0	8.0	36.0	36.0	19.0	56.0	56.0	9.0	46.0	46.0	
Actuated g/C Ratio	0.17	0.37	0.37	0.06	0.26	0.26	0.14	0.40	0.40	0.06	0.33	0.33	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0	
Vehicle Extension (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	5.0	
Lane Grp Cap (vph)	551	1678	600	202	1173	411	461	1790	653	212	1442	458	
v/s Ratio Prot	c0.21	0.25		0.04	c0.24		c0.16	0.37		0.06	c0.36		
v/s Ratio Perm			0.28			0.02			0.08			0.19	
v/c Ratio	1.23	0.68	0.75	0.63	0.94	0.09	1.18	0.94	0.20	0.98	1.08	0.57	
Uniform Delay, d1	58.0	37.0	38.3	64.5	50.9	39.5	60.5	40.3	27.4	65.4	47.0	38.8	
Progression Factor	1.00	1.00	1.00	1.28	0.75	0.98	1.23	0.60	0.48	1.17	1.11	1.61	
Incremental Delay, d2	119.7	1.4	6.0	5.3	13.1	0.2	100.2	9.7	0.6	48.5	48.3	4.1	
Delay (s)	177.7	38.4	44.3	88.2	51.3	38.7	174.6	33.8	13.7	124.9	100.5	66.7	
Level of Service	F	D	D	F	D	D	F	C	B	F	F	E	
Approach Delay (s)		79.0			53.4			63.5			95.6		
Approach LOS		E			D			E			F		
Intersection Summary													
HCM 2000 Control Delay			74.8									HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			1.08										
Actuated Cycle Length (s)			140.0									Sum of lost time (s)	15.0
Intersection Capacity Utilization			100.6%									ICU Level of Service	G
Analysis Period (min)			15										
c Critical Lane Group													

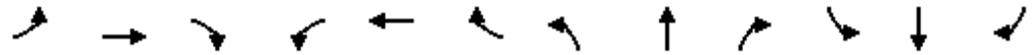
Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2041 FT PM Peak Hour
07/08/2025

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			  							
Traffic Volume (vph)	269	623	39	15	1136	199	63	340	57	242	258	277
Future Volume (vph)	269	623	39	15	1136	199	63	340	57	242	258	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		70.0	100.0		70.0	70.0		0.0	120.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	50.0			50.0			50.0			50.0		
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.978				0.922
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1879	0	1825	1771	0
Flt Permitted	0.073			0.371			0.416			0.111		
Satd. Flow (perm)	140	4520	1633	713	4565	1633	799	1879	0	213	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			63			134		5				49
Link Speed (k/h)		60			60			70				70
Link Distance (m)		764.9			603.0			3158.3				619.6
Travel Time (s)		45.9			36.2			162.4				31.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Adj. Flow (vph)	269	623	39	15	1136	199	63	340	57	242	258	277
Shared Lane Traffic (%)												
Lane Group Flow (vph)	269	623	39	15	1136	199	63	397	0	242	535	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7				28.7
Detector 2 Size(m)		1.8			1.8			1.8				1.8
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex				Cl+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0				0.0
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	5	2			6			8		7		4

Lanes, Volumes, Timings
4: Eighth Line & Britannia Road

2041 FT PM Peak Hour
07/08/2025

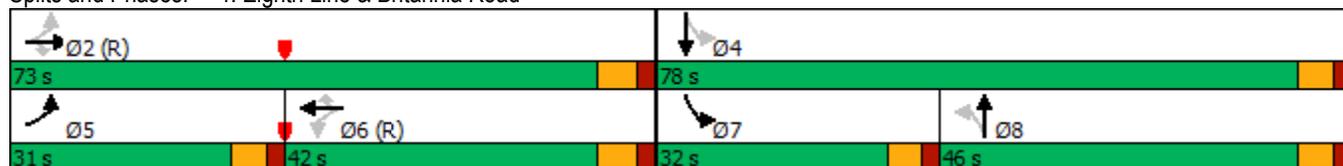


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2		2	6		6	8			4		
Detector Phase	5	2	2	6	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	20.0	20.0	20.0	20.0	20.0	15.0	15.0		5.0	15.0	
Minimum Split (s)	11.0	26.8	26.8	26.8	26.8	26.8	20.7	20.7		11.0	20.7	
Total Split (s)	31.0	73.0	73.0	42.0	42.0	42.0	46.0	46.0		32.0	78.0	
Total Split (%)	20.5%	48.3%	48.3%	27.8%	27.8%	27.8%	30.5%	30.5%		21.2%	51.7%	
Maximum Green (s)	25.0	66.2	66.2	35.2	35.2	35.2	40.3	40.3		26.0	72.3	
Yellow Time (s)	4.0	4.6	4.6	4.6	4.6	4.6	4.2	4.2		4.0	4.2	
All-Red Time (s)	2.0	2.2	2.2	2.2	2.2	2.2	1.5	1.5		2.0	1.5	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7	
Lead/Lag	Lead			Lag	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	76.0	75.2	75.2	48.7	48.7	48.7	35.7	35.7		63.0	63.3	
Actuated g/C Ratio	0.50	0.50	0.50	0.32	0.32	0.32	0.24	0.24		0.42	0.42	
v/c Ratio	0.90	0.28	0.05	0.07	0.77	0.32	0.34	0.89		0.76	0.69	
Control Delay	73.9	23.7	1.9	44.5	51.5	17.2	51.6	76.6		50.8	36.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	73.9	23.7	1.9	44.5	51.5	17.2	51.6	76.6		50.8	36.7	
LOS	E	C	A	D	D	B	D	E		D	D	
Approach Delay		37.3			46.4			73.2			41.1	
Approach LOS		D			D			E			D	

Intersection Summary

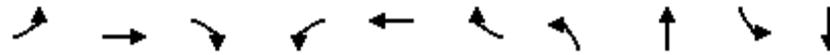
Area Type: Other
 Cycle Length: 151
 Actuated Cycle Length: 151
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 46.3
 Intersection LOS: D
 Intersection Capacity Utilization 100.0%
 ICU Level of Service G
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 4: Eighth Line & Britannia Road



Queues
4: Eighth Line & Britannia Road

2041 FT PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	269	623	39	15	1136	199	63	397	242	535
v/c Ratio	0.90	0.28	0.05	0.07	0.77	0.32	0.34	0.89	0.76	0.69
Control Delay	73.9	23.7	1.9	44.5	51.5	17.2	51.6	76.6	50.8	36.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.9	23.7	1.9	44.5	51.5	17.2	51.6	76.6	50.8	36.7
Queue Length 50th (m)	63.8	45.5	0.0	3.2	132.6	14.3	15.6	113.3	50.3	116.5
Queue Length 95th (m)	#106.0	61.4	2.9	10.1	#189.8	39.1	29.4	149.4	76.0	144.4
Internal Link Dist (m)		740.9			579.0			3134.3		595.6
Turn Bay Length (m)	70.0		70.0	100.0		70.0	70.0		120.0	
Base Capacity (vph)	351	2252	845	230	1473	617	213	506	366	873
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	0.77	0.28	0.05	0.07	0.77	0.32	0.30	0.78	0.66	0.61

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
4: Eighth Line & Britannia Road

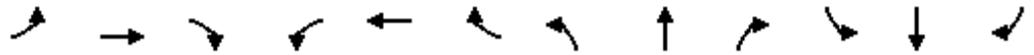
2041 FT PM Peak Hour
07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	↘	↑↑↑	↗	↘	↑↑↑	↗	↘	↗		↘	↗			
Traffic Volume (vph)	269	623	39	15	1136	199	63	340	57	242	258	277		
Future Volume (vph)	269	623	39	15	1136	199	63	340	57	242	258	277		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7			
Lane Util. Factor	1.00	*0.80	1.00	1.00	*0.80	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	0.98		1.00	0.92			
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00			
Satd. Flow (prot)	1825	4520	1633	1825	4565	1633	1825	1880		1825	1772			
Flt Permitted	0.07	1.00	1.00	0.37	1.00	1.00	0.42	1.00		0.11	1.00			
Satd. Flow (perm)	140	4520	1633	712	4565	1633	798	1880		213	1772			
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Adj. Flow (vph)	269	623	39	15	1136	199	63	340	57	242	258	277		
RTOR Reduction (vph)	0	0	20	0	0	91	0	4	0	0	28	0		
Lane Group Flow (vph)	269	623	19	15	1136	108	63	393	0	242	507	0		
Heavy Vehicles (%)	0%	2%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%		
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		pm+pt	NA			
Protected Phases	5	2			6			8		7	4			
Permitted Phases	2		2	6		6	8			4				
Actuated Green, G (s)	75.2	75.2	75.2	48.7	48.7	48.7	35.7	35.7		63.3	63.3			
Effective Green, g (s)	75.2	75.2	75.2	48.7	48.7	48.7	35.7	35.7		63.3	63.3			
Actuated g/C Ratio	0.50	0.50	0.50	0.32	0.32	0.32	0.24	0.24		0.42	0.42			
Clearance Time (s)	6.0	6.8	6.8	6.8	6.8	6.8	5.7	5.7		6.0	5.7			
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	298	2251	813	229	1472	526	188	444		319	742			
v/s Ratio Prot	c0.12	0.14			0.25			c0.21		0.11	c0.29			
v/s Ratio Perm	c0.33		0.01	0.02		0.07	0.08			0.21				
v/c Ratio	0.90	0.28	0.02	0.07	0.77	0.21	0.34	0.89		0.76	0.68			
Uniform Delay, d1	46.2	22.1	19.3	35.4	46.1	37.1	47.8	55.7		37.4	35.7			
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	28.5	0.3	0.1	0.6	4.0	0.9	1.1	18.6		9.9	2.6			
Delay (s)	74.7	22.4	19.3	36.0	50.1	38.0	48.9	74.3		47.3	38.3			
Level of Service	E	C	B	D	D	D	D	E		D	D			
Approach Delay (s)		37.4			48.2			70.8			41.1			
Approach LOS		D			D			E			D			
Intersection Summary														
HCM 2000 Control Delay			46.7									HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			0.90											
Actuated Cycle Length (s)			151.0								24.5			
Intersection Capacity Utilization			100.0%										ICU Level of Service	G
Analysis Period (min)			15											
c Critical Lane Group														

Lanes, Volumes, Timings
108: Street P/Collector P & Britannia Road

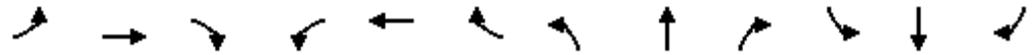
2041 FT PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↶↶↶		↶	↶↶↶		↶	↶		↶	↶	
Traffic Volume (vph)	179	1174	208	106	1128	76	80	89	129	73	81	176
Future Volume (vph)	179	1174	208	106	1128	76	80	89	129	73	81	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	60.0		0.0	50.0		0.0	50.0		0.0	50.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.977			0.991			0.911				0.897
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4416	0	1789	4480	0	1789	1716	0	1789	1689	0
Flt Permitted	0.134			0.148			0.166			0.622		
Satd. Flow (perm)	252	4416	0	279	4480	0	313	1716	0	1172	1689	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			8			58			74	
Link Speed (k/h)		60			60			48			48	
Link Distance (m)		219.2			337.8			263.0			315.3	
Travel Time (s)		13.2			20.3			19.7			23.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	1174	208	106	1128	76	80	89	129	73	81	176
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	1382	0	106	1204	0	80	218	0	73	257	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(m)		7.4			7.4			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru										
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex										
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
 108: Street P/Collector P & Britannia Road

2041 FT PM Peak Hour
 07/08/2025

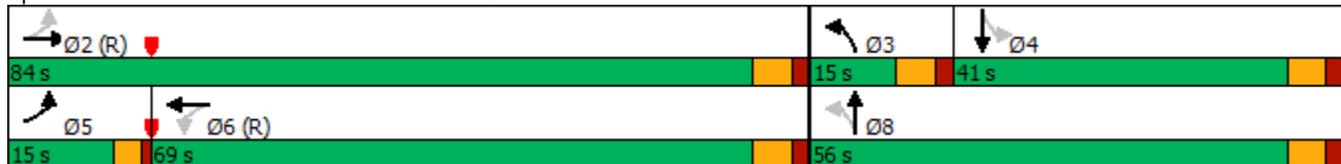


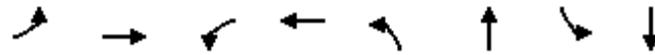
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	5	2		6	6		3	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	20.0		20.0	20.0		5.0	10.0		10.0	10.0	
Minimum Split (s)	13.0	26.0		26.0	26.0		11.0	40.0		40.0	40.0	
Total Split (s)	15.0	84.0		69.0	69.0		15.0	56.0		41.0	41.0	
Total Split (%)	10.7%	60.0%		49.3%	49.3%		10.7%	40.0%		29.3%	29.3%	
Maximum Green (s)	11.0	78.0		63.0	63.0		9.0	50.0		35.0	35.0	
Yellow Time (s)	3.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	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	
Total Lost Time (s)	4.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead			Lag			Lead			Lag		
Lead-Lag Optimize?	Yes			Yes			Yes			Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)		7.0		7.0	7.0			7.0		7.0	7.0	
Flash Dont Walk (s)		9.0		9.0	9.0			27.0		27.0	27.0	
Pedestrian Calls (#/hr)		0		0	0			0		0	0	
Act Effct Green (s)	94.1	92.1		76.7	76.7		35.9	35.9		21.3	21.3	
Actuated g/C Ratio	0.67	0.66		0.55	0.55		0.26	0.26		0.15	0.15	
v/c Ratio	0.61	0.47		0.70	0.49		0.47	0.45		0.41	0.81	
Control Delay	39.7	9.4		63.9	30.9		43.2	30.6		58.5	58.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.7	9.4		63.9	30.9		43.2	30.6		58.5	58.6	
LOS	D	A		E	C		D	C		E	E	
Approach Delay		12.8			33.6			34.0			58.5	
Approach LOS		B			C			C			E	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 120
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 26.7
 Intersection LOS: C
 Intersection Capacity Utilization 84.9%
 ICU Level of Service E
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 108: Street P/Collector P & Britannia Road





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	179	1382	106	1204	80	218	73	257
v/c Ratio	0.61	0.47	0.70	0.49	0.47	0.45	0.41	0.81
Control Delay	39.7	9.4	63.9	30.9	43.2	30.6	58.5	58.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	9.4	63.9	30.9	43.2	30.6	58.5	58.6
Queue Length 50th (m)	28.3	44.8	25.7	105.1	13.1	40.7	18.5	50.3
Queue Length 95th (m)	m50.3	m52.5	#65.1	139.6	m18.9	32.1	31.9	75.4
Internal Link Dist (m)		195.2		313.8		239.0		291.3
Turn Bay Length (m)	60.0		50.0		50.0		50.0	
Base Capacity (vph)	304	2916	152	2456	175	650	293	477
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.47	0.70	0.49	0.46	0.34	0.25	0.54

Intersection Summary

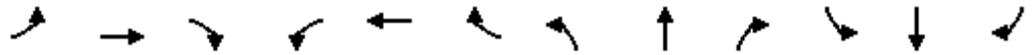
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
 108: Street P/Collector P & Britannia Road

2041 FT PM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑		↗	↑		↖	↑	
Traffic Volume (vph)	179	1174	208	106	1128	76	80	89	129	73	81	176
Future Volume (vph)	179	1174	208	106	1128	76	80	89	129	73	81	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.99		1.00	0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4418		1789	4477		1789	1716		1789	1690	
Flt Permitted	0.13	1.00		0.15	1.00		0.17	1.00		0.62	1.00	
Satd. Flow (perm)	253	4418		279	4477		312	1716		1171	1690	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	1174	208	106	1128	76	80	89	129	73	81	176
RTOR Reduction (vph)	0	11	0	0	4	0	0	43	0	0	63	0
Lane Group Flow (vph)	179	1371	0	106	1200	0	80	175	0	73	194	0
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	92.1	92.1		76.7	76.7		35.9	35.9		21.3	21.3	
Effective Green, g (s)	92.1	92.1		76.7	76.7		35.9	35.9		21.3	21.3	
Actuated g/C Ratio	0.66	0.66		0.55	0.55		0.26	0.26		0.15	0.15	
Clearance Time (s)	4.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	291	2906		152	2452		170	440		178	257	
v/s Ratio Prot	c0.05	0.31			0.27		0.03	c0.10			c0.11	
v/s Ratio Perm	0.35			c0.38			0.09			0.06		
v/c Ratio	0.62	0.47		0.70	0.49		0.47	0.40		0.41	0.76	
Uniform Delay, d1	12.8	11.9		23.2	19.6		42.0	43.1		53.7	56.9	
Progression Factor	3.17	0.72		1.44	1.44		0.92	0.92		1.00	1.00	
Incremental Delay, d2	2.9	0.4		22.5	0.7		1.8	0.5		1.5	11.9	
Delay (s)	43.4	8.9		55.9	28.8		40.3	40.2		55.2	68.8	
Level of Service	D	A		E	C		D	D		E	E	
Approach Delay (s)		12.9			31.0			40.3			65.8	
Approach LOS		B			C			D			E	

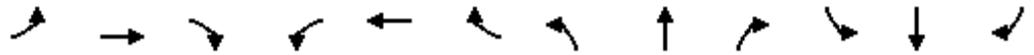
Intersection Summary

HCM 2000 Control Delay	27.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
110: Collector Q/Collector M & Britannia Road

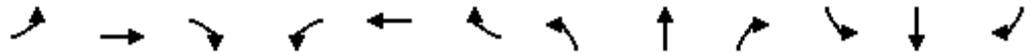
2041 FT PM Peak Hour
07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↕↕		↔	↕↕↕		↔	↕		↔	↕	
Traffic Volume (vph)	56	1087	233	173	1095	47	175	15	142	36	24	40
Future Volume (vph)	56	1087	233	173	1095	47	175	15	142	36	24	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		50.0	70.0		0.0	80.0		0.0	25.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	50.0			50.0			15.0			15.0		
Lane Util. Factor	1.00	*0.80	0.91	1.00	*0.80	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.994			0.864			0.906	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	4403	0	1789	4493	0	1789	1627	0	1789	1706	0
Flt Permitted	0.187			0.146			0.715			0.519		
Satd. Flow (perm)	352	4403	0	275	4493	0	1347	1627	0	978	1706	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			6			70			40	
Link Speed (k/h)		60			60			48			48	
Link Distance (m)		337.8			764.9			1307.2			73.6	
Travel Time (s)		20.3			45.9			98.0			5.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	56	1087	233	173	1095	47	175	15	142	36	24	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	56	1320	0	173	1142	0	175	157	0	36	64	0
Enter Blocked Intersection	No	No	No	No	No							
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		

Lanes, Volumes, Timings
 110: Collector Q/Collector M & Britannia Road

2041 FT PM Peak Hour
 07/08/2025

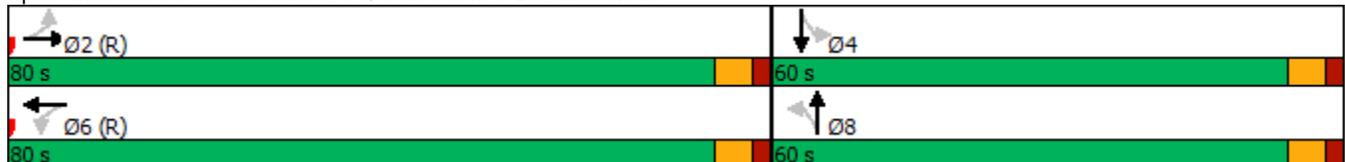


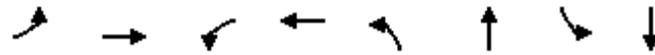
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		40.0	40.0		40.0	40.0	
Total Split (s)	80.0	80.0		80.0	80.0		60.0	60.0		60.0	60.0	
Total Split (%)	57.1%	57.1%		57.1%	57.1%		42.9%	42.9%		42.9%	42.9%	
Maximum Green (s)	74.0	74.0		74.0	74.0		54.0	54.0		54.0	54.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	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	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	9.0	9.0		9.0	9.0		27.0	27.0		27.0	27.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	103.9	103.9		103.9	103.9		24.1	24.1		24.1	24.1	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.17	0.17		0.17	0.17	
v/c Ratio	0.21	0.40		0.85	0.34		0.76	0.46		0.21	0.20	
Control Delay	7.6	4.7		52.8	7.1		73.6	30.6		49.8	22.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	7.6	4.7		52.8	7.1		73.6	30.6		49.8	22.0	
LOS	A	A		D	A		E	C		D	C	
Approach Delay		4.8			13.1			53.2			32.0	
Approach LOS		A			B			D			C	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 72 (51%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 130
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85
 Intersection Signal Delay: 14.3
 Intersection LOS: B
 Intersection Capacity Utilization 80.9%
 ICU Level of Service D
 Analysis Period (min) 15
 * User Entered Value

Splits and Phases: 110: Collector Q/Collector M & Britannia Road





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	56	1320	173	1142	175	157	36	64
v/c Ratio	0.21	0.40	0.85	0.34	0.76	0.46	0.21	0.20
Control Delay	7.6	4.7	52.8	7.1	73.6	30.6	49.8	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	4.7	52.8	7.1	73.6	30.6	49.8	22.0
Queue Length 50th (m)	0.5	4.2	29.5	40.0	46.6	21.6	8.7	5.7
Queue Length 95th (m)	18.0	121.7	#93.5	62.7	m66.8	m39.9	17.7	17.3
Internal Link Dist (m)		313.8		740.9		1283.2		49.6
Turn Bay Length (m)	50.0		70.0		80.0		25.0	
Base Capacity (vph)	261	3277	204	3335	519	670	377	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.40	0.85	0.34	0.34	0.23	0.10	0.09

Intersection Summary

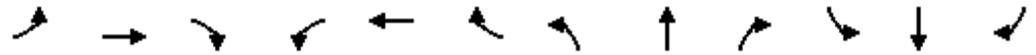
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

HCM Signalized Intersection Capacity Analysis
 110: Collector Q/Collector M & Britannia Road

2041 FT PM Peak Hour
 07/08/2025



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↗	↑↑↑		↖	↑↑↑		↖	↑		↗	↑	
Traffic Volume (vph)	56	1087	233	173	1095	47	175	15	142	36	24	40
Future Volume (vph)	56	1087	233	173	1095	47	175	15	142	36	24	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	*0.80		1.00	*0.80		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.86		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1789	4401		1789	4492		1789	1628		1789	1707	
Flt Permitted	0.19	1.00		0.15	1.00		0.72	1.00		0.52	1.00	
Satd. Flow (perm)	352	4401		276	4492		1347	1628		977	1707	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	56	1087	233	173	1095	47	175	15	142	36	24	40
RTOR Reduction (vph)	0	10	0	0	2	0	0	58	0	0	33	0
Lane Group Flow (vph)	56	1310	0	173	1140	0	175	99	0	36	31	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	103.9	103.9		103.9	103.9		24.1	24.1		24.1	24.1	
Effective Green, g (s)	103.9	103.9		103.9	103.9		24.1	24.1		24.1	24.1	
Actuated g/C Ratio	0.74	0.74		0.74	0.74		0.17	0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	261	3266		204	3333		231	280		168	293	
v/s Ratio Prot		0.30			0.25			0.06			0.02	
v/s Ratio Perm	0.16			c0.63			c0.13			0.04		
v/c Ratio	0.21	0.40		0.85	0.34		0.76	0.35		0.21	0.11	
Uniform Delay, d1	5.5	6.6		12.6	6.2		55.2	51.1		49.8	48.9	
Progression Factor	0.76	0.61		1.00	1.00		0.99	0.97		1.00	1.00	
Incremental Delay, d2	1.7	0.3		33.2	0.3		13.2	0.8		0.6	0.2	
Delay (s)	5.9	4.4		45.7	6.5		67.7	50.4		50.5	49.0	
Level of Service	A	A		D	A		E	D		D	D	
Approach Delay (s)		4.4			11.7			59.5			49.5	
Approach LOS		A			B			E			D	

Intersection Summary		
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.83	B
Actuated Cycle Length (s)	140.0	Sum of lost time (s)
Intersection Capacity Utilization	80.9%	12.0
Analysis Period (min)	15	ICU Level of Service
		D

c Critical Lane Group

Lanes, Volumes, Timings
143: Trafalgar Road & Collector M

2041 FT PM Peak Hour
07/08/2025

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  		 	  
Traffic Volume (vph)	15	144	2054	20	250	2246
Future Volume (vph)	15	144	2054	20	250	2246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0		25.0	60.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	2.5				50.0	
Lane Util. Factor	1.00	1.00	*0.80	0.91	1.00	*0.80
Frt	0.878		0.999			
Flt Protected	0.995				0.950	
Satd. Flow (prot)	1645	0	4516	0	1789	4520
Flt Permitted	0.995				0.046	
Satd. Flow (perm)	1645	0	4516	0	87	4520
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)	116		1			
Link Speed (k/h)	48		60			60
Link Distance (m)	229.4		430.6			999.8
Travel Time (s)	17.2		25.8			60.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	144	2054	20	250	2246
Shared Lane Traffic (%)						
Lane Group Flow (vph)	159	0	2074	0	250	2246
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		7.4			7.4
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Number of Detectors	1		2		1	2
Detector Template	Left		Thru		Left	Thru
Leading Detector (m)	6.1		30.5		6.1	30.5
Trailing Detector (m)	0.0		0.0		0.0	0.0
Detector 1 Position(m)	0.0		0.0		0.0	0.0
Detector 1 Size(m)	6.1		1.8		6.1	1.8
Detector 1 Type	Cl+Ex		Cl+Ex		Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0		0.0	0.0
Detector 1 Queue (s)	0.0		0.0		0.0	0.0
Detector 1 Delay (s)	0.0		0.0		0.0	0.0
Detector 2 Position(m)			28.7			28.7
Detector 2 Size(m)			1.8			1.8
Detector 2 Type			Cl+Ex			Cl+Ex
Detector 2 Channel						
Detector 2 Extend (s)			0.0			0.0
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	

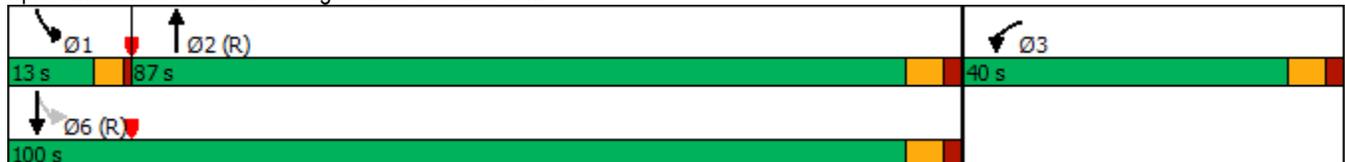


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Detector Phase	3		2		1	6
Switch Phase						
Minimum Initial (s)	10.0		20.0		7.0	20.0
Minimum Split (s)	40.0		26.0		13.0	26.0
Total Split (s)	40.0		87.0		13.0	100.0
Total Split (%)	28.6%		62.1%		9.3%	71.4%
Maximum Green (s)	34.0		81.0		9.0	94.0
Yellow Time (s)	4.0		4.0		3.0	4.0
All-Red Time (s)	2.0		2.0		1.0	2.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0
Total Lost Time (s)	6.0		6.0		4.0	6.0
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Recall Mode	None		C-Max		None	C-Max
Walk Time (s)	7.0		7.0		7.0	7.0
Flash Dont Walk (s)	27.0		9.0		9.0	9.0
Pedestrian Calls (#/hr)	0		0		0	0
Act Effct Green (s)	11.8		83.2		118.2	116.2
Actuated g/C Ratio	0.08		0.59		0.84	0.83
v/c Ratio	0.65		0.77		0.59	0.60
Control Delay	31.8		24.1		33.4	8.5
Queue Delay	0.0		0.0		0.0	0.0
Total Delay	31.8		24.1		33.4	8.5
LOS	C		C		C	A
Approach Delay	31.8		24.1			11.0
Approach LOS	C		C			B

Intersection Summary

Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	140
Offset:	0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle:	110
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.77
Intersection Signal Delay:	17.4
Intersection LOS:	B
Intersection Capacity Utilization:	77.0%
ICU Level of Service:	D
Analysis Period (min):	15
* User Entered Value	

Splits and Phases: 143: Trafalgar Road & Collector M





Lane Group	WBL	NBT	SBL	SBT
Lane Group Flow (vph)	159	2074	250	2246
v/c Ratio	0.65	0.77	0.59	0.60
Control Delay	31.8	24.1	33.4	8.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	31.8	24.1	33.4	8.5
Queue Length 50th (m)	11.6	247.6	55.9	100.7
Queue Length 95th (m)	33.6	m246.7	83.0	149.5
Internal Link Dist (m)	205.4	406.6		975.8
Turn Bay Length (m)			60.0	
Base Capacity (vph)	487	2683	425	3750
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.33	0.77	0.59	0.60

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
 143: Trafalgar Road & Collector M

2041 FT PM Peak Hour
 07/08/2025

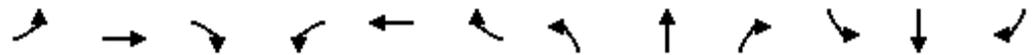
						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 		 	  
Traffic Volume (vph)	15	144	2054	20	250	2246
Future Volume (vph)	15	144	2054	20	250	2246
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		4.0	6.0
Lane Util. Factor	1.00		*0.80		1.00	*0.80
Frt	0.88		1.00		1.00	1.00
Flt Protected	1.00		1.00		0.95	1.00
Satd. Flow (prot)	1645		4514		1789	4520
Flt Permitted	1.00		1.00		0.05	1.00
Satd. Flow (perm)	1645		4514		86	4520
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	15	144	2054	20	250	2246
RTOR Reduction (vph)	106	0	0	0	0	0
Lane Group Flow (vph)	53	0	2074	0	250	2246
Turn Type	Prot		NA		pm+pt	NA
Protected Phases	3		2		1	6
Permitted Phases					6	
Actuated Green, G (s)	11.8		83.2		116.2	116.2
Effective Green, g (s)	11.8		83.2		116.2	116.2
Actuated g/C Ratio	0.08		0.59		0.83	0.83
Clearance Time (s)	6.0		6.0		4.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	138		2682		424	3751
v/s Ratio Prot	c0.03		c0.46		0.12	c0.50
v/s Ratio Perm					0.37	
v/c Ratio	0.38		0.77		0.59	0.60
Uniform Delay, d1	60.7		21.3		38.7	4.0
Progression Factor	1.00		1.09		0.84	1.84
Incremental Delay, d2	1.8		0.6		1.6	0.5
Delay (s)	62.4		23.8		34.0	8.0
Level of Service	E		C		C	A
Approach Delay (s)	62.4		23.8			10.6
Approach LOS	E		C			B

Intersection Summary			
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 213: Collector P/Local Street A & Collector M

2041 FT PM Peak Hour
 07/08/2025



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	84	69	118	70	46	24	81	123	71	21	81	48
Future Volume (vph)	84	69	118	70	46	24	81	123	71	21	81	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.941			0.977			0.965			0.957	
Fl _t Protected		0.985			0.976			0.985			0.993	
Satd. Flow (prot)	0	1746	0	0	1796	0	0	1790	0	0	1790	0
Fl _t Permitted		0.985			0.976			0.985			0.993	
Satd. Flow (perm)	0	1746	0	0	1796	0	0	1790	0	0	1790	0
Link Speed (k/h)		48			48			48			48	
Link Distance (m)		229.4			387.3			315.3			332.4	
Travel Time (s)		17.2			29.0			23.6			24.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	84	69	118	70	46	24	81	123	71	21	81	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	0	0	140	0	0	275	0	0	150	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(m)		0.0			0.0			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	50.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 213: Collector P/Local Street A & Collector M

2041 FT PM Peak Hour
 07/08/2025

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	84	69	118	70	46	24	81	123	71	21	81	48
Future Volume (vph)	84	69	118	70	46	24	81	123	71	21	81	48
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	84	69	118	70	46	24	81	123	71	21	81	48
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	271	140	275	150								
Volume Left (vph)	84	70	81	21								
Volume Right (vph)	118	24	71	48								
Hadj (s)	-0.17	0.03	-0.06	-0.13								
Departure Headway (s)	5.1	5.5	5.2	5.3								
Degree Utilization, x	0.39	0.21	0.40	0.22								
Capacity (veh/h)	652	588	639	609								
Control Delay (s)	11.3	10.0	11.6	9.9								
Approach Delay (s)	11.3	10.0	11.6	9.9								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay			10.9									
Level of Service			B									
Intersection Capacity Utilization			50.7%	ICU Level of Service	A							
Analysis Period (min)			15									



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	27	113	96	19	14	16
Future Volume (vph)	27	113	96	19	14	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.891				0.928	
Fl _t Protected	0.990			0.960		
Satd. Flow (prot)	1661	0	0	1808	1748	0
Fl _t Permitted	0.990			0.960		
Satd. Flow (perm)	1661	0	0	1808	1748	0
Link Speed (k/h)	48			48	48	
Link Distance (m)	387.3			73.6	172.0	
Travel Time (s)	29.0			5.5	12.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	113	96	19	14	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	140	0	0	115	30	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	28.1%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
 214: Collector M & Street L

2041 FT PM Peak Hour
 07/08/2025



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	113	96	19	14	16
Future Volume (Veh/h)	27	113	96	19	14	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	27	113	96	19	14	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)	73					
pX, platoon unblocked						
vC, conflicting volume	233	22	30			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233	22	30			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	89	94			
cM capacity (veh/h)	709	1055	1583			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	140	115	30			
Volume Left	27	96	0			
Volume Right	113	0	16			
cSH	964	1583	1700			
Volume to Capacity	0.15	0.06	0.02			
Queue Length 95th (m)	3.9	1.5	0.0			
Control Delay (s)	9.4	6.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.4	6.3	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			7.1			
Intersection Capacity Utilization			28.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Appendix L

Proposed Active Transportation Plan

G:\Projects\2021\10265 - Mattamy - White Squadron and Renal03 Analysis\04 Active Transportation Plan



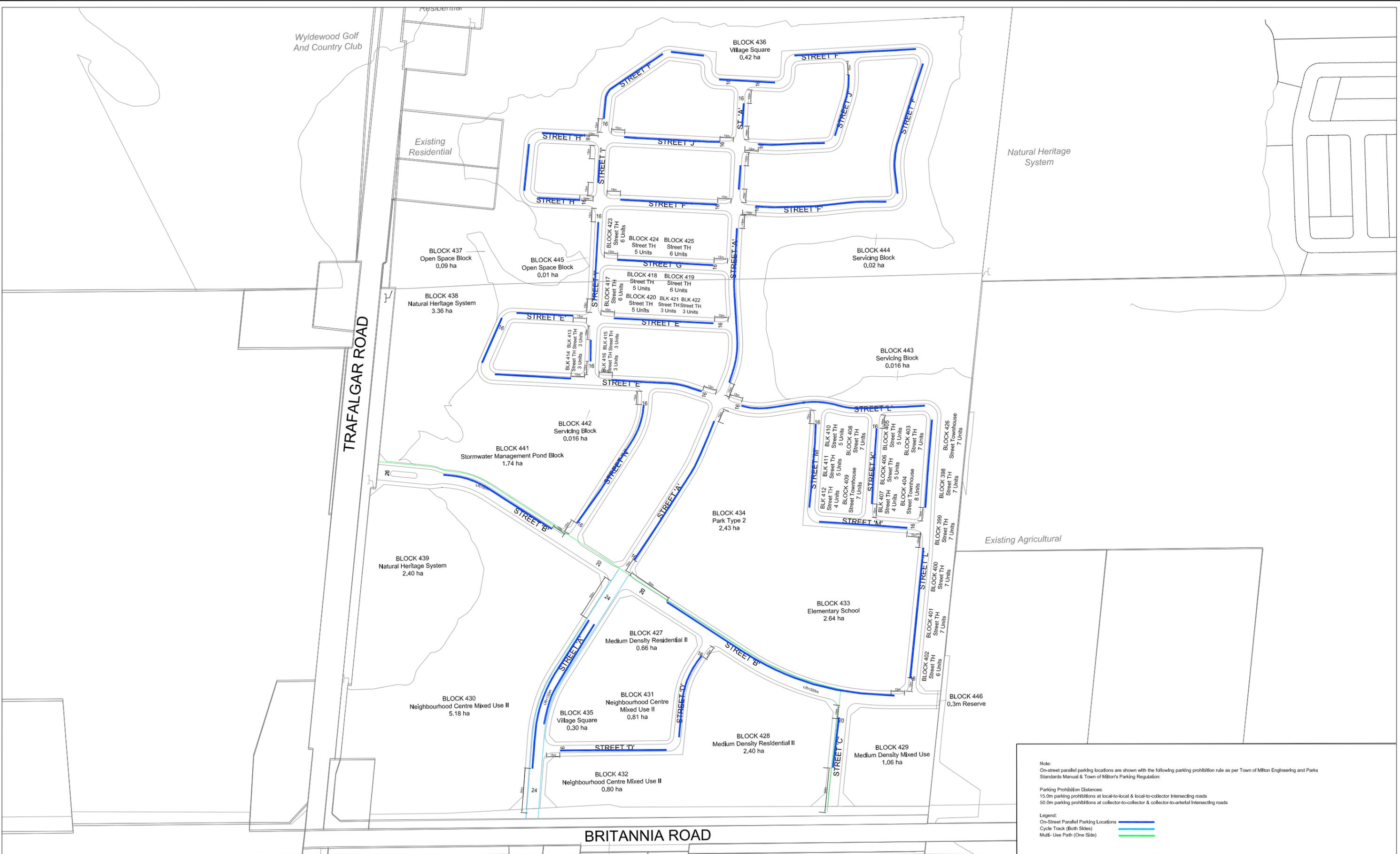
LEGEND	
MULTI-USE PATH ON BOTH SIDES	
MULTI-USE PATH ON ONE SIDES	
BIKE LANE ON BOTH SIDES	



Appendix M

On-street Parking Plan

G:\Projects\2021\10265 - Mattamy - White Squadron and Renat\03 Analysis\05 Parking Plan



Note:
On-street parallel parking locations are shown with the following parking prohibition rule as per Town of Milton Engineering and Parks Standards Manual & Town of Milton's Parking Regulation:

Parking Prohibition Distances:
15.0m parking prohibitions at local-to-local & local-to-collector intersecting roads
50.0m parking prohibitions at collector-to-collector & collector-to-arterial intersecting roads

Legend:
On-Street Parallel Parking Locations —
Cycle Track (Both Sides) —
Multi-Use Path (One Side) —

