



Prologis

TRANSPORTATION IMPACT STUDY UPDATE

Proposed Industrial Warehouse
Development

**12519-12713 Humber Station
Road, Caledon, ON**

August 2025
25134



August 6, 2025

Reference Number: 25134

PROLOGIS

c/o Mainline Planning
185 The West Mall, Suite 700
Toronto, ON
M9C 5L5

**RE: Transportation Impact Study Update
 Proposed Industrial Warehouse Development
 12519-12713 Humber Station Road, Town of Caledon**

LEA Consulting Ltd. (LEA) is pleased to present the findings of our Transportation Impact Study (TIS) for the proposed industrial warehouse development located at 12519-12713 Humber Station Road in the Town of Caledon. This TIS has been prepared for Prologis in support of the Zoning By-law Amendment (ZBA), Draft Plan of Subdivision (DPS), and Site Plan Approval (SPA) applications for the proposed development. This report concludes that the traffic associated with the proposed development maintains acceptable conditions for the road network in the surrounding area, with minor optimizations for the network.

By way of background, LEA previously prepared a TIS dated November 2024 in support of the first submission. This update incorporates the comments received from the Town and Region's transportation staff regarding the November 2024 submission. Comments received are provided below in italics, followed by LEA's response.

TOWN OF CALEDON PLANNING AND DEVELOPMENT COMMENTS (ZBA/DPS)

Traffic Impact Study

Comment 16.6: Please provide an addendum which clearly identifies the requested relief to parking and provides justification for the relief.

- ▶ **LEA Response:** The revised development proposal includes 717 parking spaces which meets the zoning by-law requirements. As such, a parking justification is not required.

Comment 16.7: Please also include an analysis on the necessary truck and trailer parking for the proposed use.

- ▶ **LEA Response:** A total of 356 truck trailer spaces are proposed to support the warehousing activities on-site. A review of an approved comparable industrial warehouse development reveals that provision of truck trailer spaces at a rate of 0.15 space per 100 m² is adequate for a development of this size. This equates to a projected 218 trailer spaces. The proposed supply results in a surplus of 138 trailer spaces and is therefore sufficient to support the proposed use. The truck trailer spaces were also reviewed as part of the functional design review which concluded that all spaces could be accessed and egressed by the appropriate vehicles.



TOWN OF CALEDON DEVELOPMENT ENGINEERING (ZBA/DPS)

Draft Plan Comments

Comment 17.1: *The Environmental Assessment (EA) for George Bolton Parkway (GBP) is still underway. The Town is waiting for clarification from the Ministry of Transportation (MTO) that the proposed location where GBP connects to Humber Station Road is acceptable. The Town is also waiting for confirmation through the EA that GBP's proposed 26.0 m right of way at Humber Station is sufficient to accommodate required turning lanes, through lanes, sidewalks, active transportation etc. Until clearance is provided by the MTO and GBP right of way width determined, the Development Engineering cannot draft approve the plan.*

- ▶ **LEA Response:** Noted. While the general ROW for the collector is 26 m per Town standard for an industrial collector road, the section approaching Humber Station Road is recommended to be potentially widened to protect for a second left-turn lane while accommodating active transportation facilities, subject to confirmation with MTO and further studies.

Comment 17.6: *Currently Humber Station is rural road that does not support truck traffic and subject to half load season. The DC Background Study Identifies Humber Station for reconstruction prior to 2031, however a portion between Mayfield Road and Healey Road is subject to Highway 413 construction, which may impact time of its reconstruction.*

- ▶ **LEA Response:** The Region of Peel is proposing to install a watermain and sanitary sewer along Humber Station Road (between Mayfield Road and Healey Road) and along Healey Road (between Humber Station Road and Coleraine Drive). Based on discussions with the Region, as part of the sanitary trunk sewer project, the road is being restored to an interim condition, which will support truck loads for the next 5 years and 10 years along Humber Station Road and Healey Road, until the ultimate road widening occurs. Refer to correspondence with the Region in **Appendix D** of the TIS Update.

TOWN OF CALEDON TRANSPORTATION (ZBA/DPS)

Comment 18.1: *The Environmental Assessment (EA) for George Bolton Parkway (GBP) is ongoing. The Town is awaiting confirmation from the Ministry of Transportation (MTO) regarding the acceptability of GBP's proposed connection to Humber Station Road. Additionally, the EA must verify whether the proposed 26.0 m right-of-way at Humber Station is adequate to accommodate turning lanes, through lanes, sidewalks, and active transportation. Until the MTO provides clearance and the right-of-way width is confirmed, Staff cannot grant draft plan approval.*

- ▶ **LEA Response:** Noted.

Comment 18.4: *An AutoTURN analysis is required for all new intersections, access driveways, and on-site circulation.*



- **LEA Response:** An AutoTURN analysis has been provided for the access driveways and on-site circulation. Refer to **Appendix L** of the TIS Update.

Comment 18.5: *All intersection angles must be between 85 and 95 degrees, with a minimum horizontal centerline curve radius of 65 m. Ensure all centerline radii comply with this standard and are clearly labeled on the draft plan.*

- **LEA Response:** Noted. Refer to Functional Design Review in **Appendix L**.

Comment 18.6: *Please note that a parking justification study will be required if fewer than the required parking spaces are proposed. A work plan (Terms of Reference) for the parking justification study should be circulated with Town Transportation Staff prior to starting the parking portion of the investigations.*

- **LEA Response:** The revised development proposal includes 717 parking spaces which meets the zoning by-law requirements. As such, a parking justification is not required.

Comment 18.7: *The proposed transit network is currently limited to what has been identified in MMTMP. Please include the policy recommendations and provide commentary/recommendations on potential new local public transit routes:*

- Routes serving areas within the community
- Routes connecting east-west communities. Please note that all recommendations are subject to review/approval by Brampton Transit.
- **LEA Response:** According to the MMTMP, Humber Station Road, Mayfield Road, and Healey Road are identified as future transit corridors. The proposed development does not warrant the introduction of a community transit route, nor is it expected to require modifications to the existing Brampton Transit Route 41. The site will be served by the existing Brampton Transit service and future planned service on Humber Station Road. As the area continues to develop, the need for additional transit routes or services can be evaluated.

Comment 18.8: *Please incorporate Active Transportation (AT) network plan highlighting the existing and proposed AT components such as trails, greenways, pedestrian connections, etc., to review the seamless connectivity within the Study Area.*

- **LEA Response:** An Active Transportation (AT) network plan has been prepared and included in the updated traffic study. Refer to **Figure 3-6** in the TIS Update.

Comment 18.9: *Kindly be aware that a Terms of Reference (TOR) was not distributed to reviewing agencies before submission. It is highly advisable to circulate a TOR prior to initial submissions in the future. This ensures a defined scope of work, aiming to minimize subsequent comments.*

- **LEA Response:** Noted.

Comment 18.10: *Town Transportation Staff defer to the Region of Peel for comments on roadways and intersections under their jurisdiction.*



- ▶ **LEA Response:** Noted.

TOWN OF CALEDON TRANSPORTATION COMMENTS (SPA)

Comment 7.3 (Fire): Show locations of fire access route signs as per By-Law 2015-0058.

- ▶ **LEA Response:** Noted. Fire access route signs are provided in the Pavement Marking & Signage Plan in **Appendix L** in the TIS Update.

Comment 19.1 (Transportation): The proposed land use is inconsistent. Please clarify whether it is designated as industrial or warehouse, and update the Trip Generation and Parking Calculations accordingly. Additionally, confirm the anticipated Office Net Floor Area.

- ▶ **LEA Response:** An industrial building is proposed on site. It is understood that warehousing activities are proposed for the building. The trip generation and parking calculations were based on the warehouse land use. No changes to the trip generation land use or parking calculations are required. Text within the traffic study has been updated to clarify the proposed use.

Comment 19.2 (Transportation): Please include the analysis for a 5-year horizon following full site build-out, factoring in the complete extension of George Bolton Parkway from west of Coleraine Drive to Humber Station Road.

- ▶ **LEA Response:** Noted. An additional 5-year horizon post build out has been included in the revised traffic study.

Comment 19.3 (Transportation): On-Road cycling facilities are not preferred as part of the ATMP. All new collector roads should have in-boulevard cycling and pedestrian facilities, preferably Multi-use Path (MUP). Please revise Figure 2.5 and Section 3.4.

- ▶ **LEA Response:** Noted. **Section 3.4** of the TIS Update has been updated to reflect the Town's preference for multi-use paths on new collector roads.

Comment 19.4 (Transportation): MMLOS analysis is currently limited to the existing conditions. It would be beneficial to include a future MMLOS evaluation to provide a comparison.

- ▶ **LEA Response:** A future MMLOS assessment has been included in the revised traffic study.

Comment 19.5 (Transportation): Humber Station Road Widening is planned between Mayfield Road and the north limit of Highway 9. Please correct Table 3.3.

- ▶ **LEA Response:** Noted. Text updated.

Comment 19.6 (Transportation): It is noted that the City of Ottawa's Multi-Modal Level of Service (MMLOS) Guidelines were used to assess the existing conditions. Given that the City of Vaughan has its own guidelines



for evaluating active transportation provisions, please clarify the rationale for using Ottawa's guidelines and how they compare to Vaughan's standards, which are more geographically closer to Caledon.

- ▶ **LEA Response:** While the City of Vaughan is geographically closer to the Town of Caledon, the City of Ottawa's Multi-Modal Level of Service Guideline is a typical standard used to evaluate multi modal travel for developments throughout the GTA. The City of Ottawa Guidelines provide a more thorough assessment of the level of service (LOS) of each mode by including factors that affect safety and comfort of non-auto modes such as Average Annual Daily Traffic (AADT), operating speeds of vehicles, and presence of on-street parking adjacent to pedestrian/cycling facilities, whereas the York Region Transportation Mobility Plan Guidelines consider only the width of pedestrian/cycling facilities and the level of separation from vehicular traffic.

Comment 19.7.1 (Transportation): *In terms of Intersection Operational Analysis: Existing conditions have been analyzed using HCM 2000, while future conditions were evaluated with HCM 6th Edition. To ensure consistency, Town Transportation Staff recommends using the HCM 6th Edition methodology for both existing and future operational analysis results.*

- ▶ **LEA Response:** The intersection capacity analysis has been updated to be evaluated using HCM 6th Edition.

Comment 19.7.2 (Transportation): *The queues for unsignalized intersections have been reported incorrectly and should be presented in meters.*

- ▶ **LEA Response:** Noted. LOS tables revised.

Comment 19.8 (Transportation): *The study doesn't mention the Electric Vehicle parking requirements outlined in the Town's Green Development Standard. Also, include the review of bicycle parking in the report.*

- ▶ **LEA Response:** A review of the Town's Green Development standards has been prepared. Refer to **Section 9.1.2**. The proposed development will allocate 5% of the proposed supply to have EVSE capabilities. Please see **Section 9.3** for a review on bicycle parking.

Comment 19.9.1 (Transportation): *The Access Review should include a discussion of corner clearance, sightlines, curb radii and throat length. As part of this review, Site-Access 2 should be considered as full-movement access.*

- ▶ **LEA Response:** Refer to functional design review in **Section 10.2** and **Appendix L** of the TIS Update.

Comment 19.9.2 (Transportation): *The review should be completed in accordance with the requirements outlined within the OPSD 350.010 drawing and the TAC Geometric Design Guide.*

- ▶ **LEA Response:** Noted. Refer to functional design review in **Appendix L** in the TIS Update.

Comment 19.9.3 (Transportation): *Review the 15 m corner radius at Site-Access 1. A large corner radius could lead to higher vehicle speeds and an increased risk of pedestrian-involved collisions.*



- ▶ **LEA Response:** Noted. Refer to functional design review in **Appendix L** of the TIS Update.

Comment 19.12 (Transportation): *Vehicle maneuvering assessment confirming the circulation of fire emergency vehicles was not completed.*

- ▶ **LEA Response:** A fire emergency review has been prepared as part of the functional design review. Refer to **Appendix L** in the TIS Update.

Comment 19.15 (Transportation): *Please provide the Pavement Marking and Signage Plan for the Town review. Ensure that Fire Route locations are shown on the architectural drawings in compliance with BL-2024-048.*

- ▶ **LEA Response:** A Pavement Marking & Signage Plan has been prepared. Refer to **Appendix L** in the TIS Update.

Should you have any questions regarding this Transportation Impact Study, please do not hesitate to contact the undersigned at (905) 470-0015.

Yours truly,

LEA CONSULTING LTD.

Christopher Sidlar, M.Sc.pl., MCIP, RPP
Senior Vice President, Transportation

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Enclosed: Transportation Impact Study Update, Proposed Industrial Development – 12519-12713
Humber Station Road, Caledon ON (August 2025)

Disclaimer

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1 INTRODUCTION

LEA Consulting Ltd. (LEA) has been retained by Prologis to undertake a Transportation Impact Study (TIS) in support of the Draft Plan of Subdivision (DPS), Zoning By-law Amendment (ZBA), and Site Plan Approval (SPA) applications for Phase 1 of the proposed industrial development located at 12519-12713 Humber Station Road, in the Town of Caledon (herein referred to as the “subject site”). It is understood that the master plan concept for the development lands includes six (6) industrial warehouse buildings. This TIS has been prepared to support Phase 1 of the development which will introduce the first building to the currently vacant site.

By way of background, LEA previously prepared a TIS, dated November 2024 in support of the initial application. Since then, comments have been received from the Town of Caledon and the proposed site plan has been updated with new site statistics. This TIS Update reviews the changes and refinements to the proposed site plan from a transportation perspective and responds to the transportation related comments received.

The development lands are bounded by Humber Station Road to the west, the Clarkway Tributary to the east, and vacant lands to the north and south, as illustrated in **Figure 1-1**.

Figure 1-1: Subject Site & Future Development Lands Location



Source: Google Maps, Accessed August 2024

The purpose of this study is to assess the proposed development from a transportation perspective, to determine the traffic impacts to the adjacent road network over a six (6) year horizon to full build-out (2029) and five (5) years post build-out (2034), and to identify any required mitigation measures. In addition, this study provides a review of the parking and loading supply and outlines Transportation Demand Management (TDM) measures to encourage alternative modes of travel. The study will be conducted in accordance with the Town of Caledon *Transportation Impact Study Guidelines (2017)* and in-line with the Region of Peel *Transportation Impact Study Guidelines*.

1.1 PROPOSED DEVELOPMENT

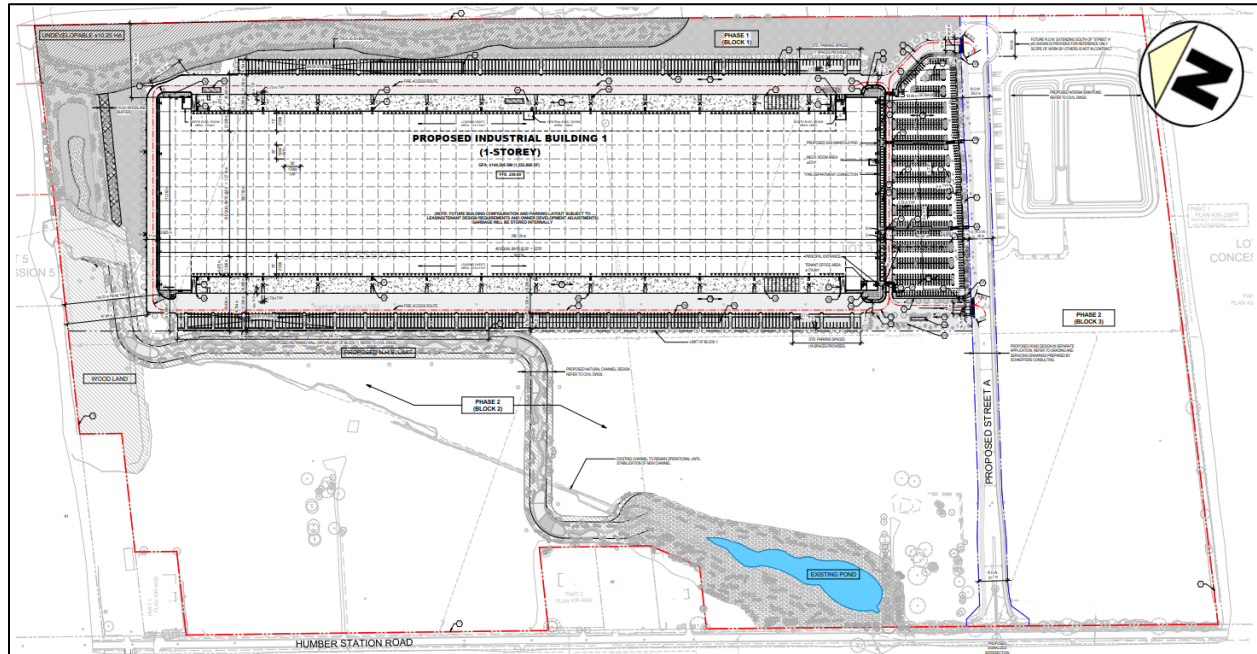
The revised development proposal for Phase 1 consists of a 144,266 m² industrial building, inclusive of 175 m² of office space. It is understood that warehousing activities are proposed. The proposed development will provide 717 parking spaces, 356 trailer parking spaces, and 255 loading docks at grade. Since the November 2024 TIS, the warehouse GFA increased by 1,044 m². A breakdown of the site statistics between the November 2024 TIS and current application is outlined in **Table 1-1**.

Table 1-1: Proposed Site Statistics

Land Use	Previous Submission (November 2024)	Current Submission (August 2025)	Difference
Industrial (Warehouse)	143,047 m ²	144,091 m ²	+1,044 m ²
Office	175 m ²	175 m ²	No Change
Total	143,222 m²	144,266 m²	+1,044 m²
Parking Supply	681 spaces plus 391 trailer parking spaces	717 spaces plus 356 trailer parking spaces	+36 spaces -35 trailer parking spaces
Loading Supply	260 spaces	255 spaces	-5 spaces

As part of the development proposal, the partial extension of George Bolton Parkway will be constructed, from Humber Station Road to the Clarkway Tributary. The intersection of Humber Station Road & George Bolton Parkway is proposed as a signalized full movements intersection. Access to the proposed development will be provided via two (2) full-movement accesses off the future George Bolton Parkway extension. The proposed site plan is illustrated in **Figure 1-2**.

Figure 1-2: Proposed Site Plan



Source: Petroff Partnership Architects, August 2025

2 EXISTING TRANSPORTATION CONDITIONS

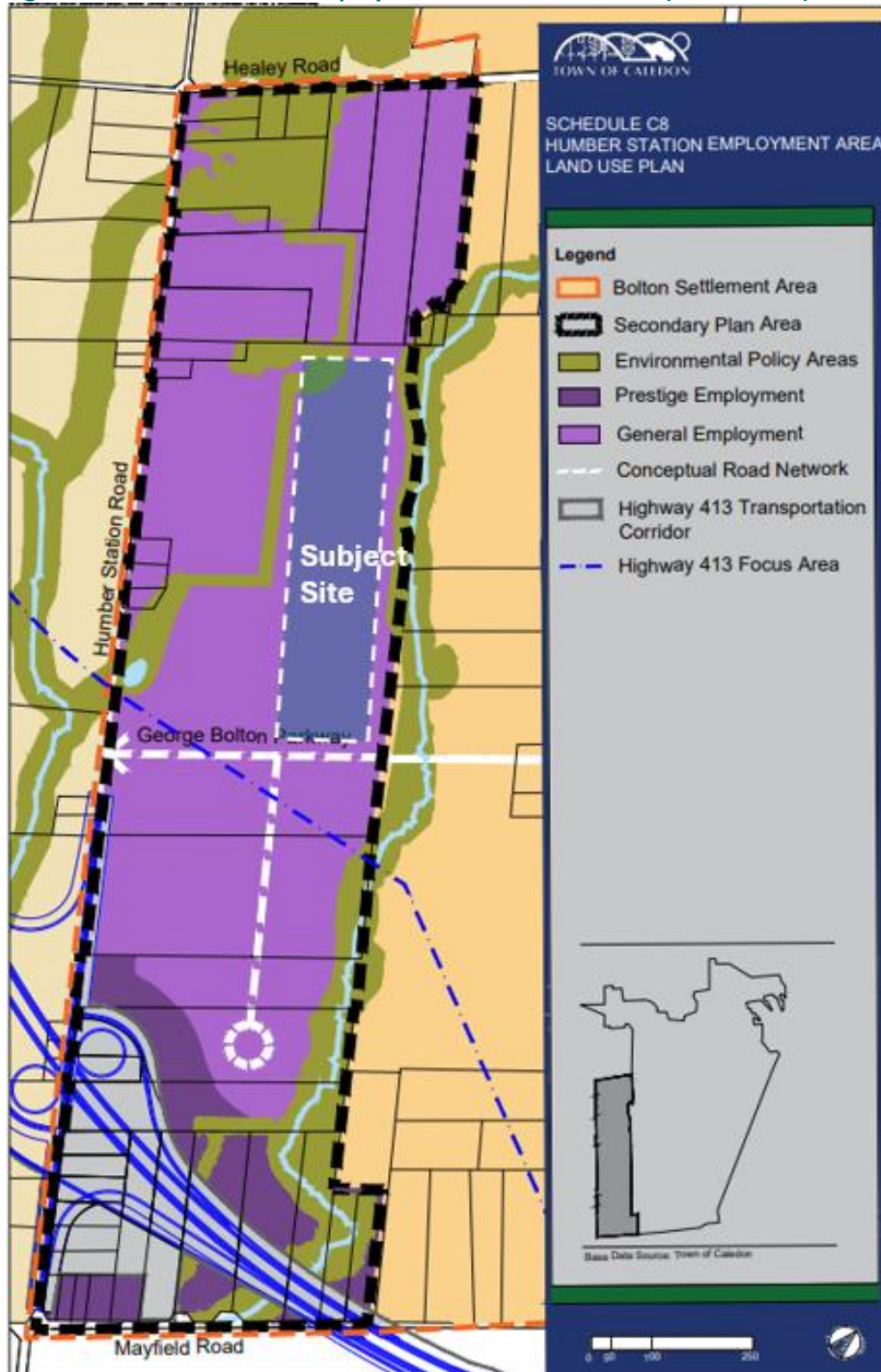
This section reviews the existing transportation conditions and policy context within the study area, including the road, transit, cycling, and pedestrian networks. The study area was determined by assessing the size of the proposed development and its anticipated transportation impacts. The intersections and streets included in the analysis are listed below:

- ▶ Humber Station Road & Healey Road (unsignalized);
- ▶ Humber Station Road/Clarkway Drive & Mayfield Road (signalized); and
- ▶ Humber Station Road & George Bolton Parkway Extension (future – signalized).

2.1 HUMBER STATION EMPLOYMENT AREA SECONDARY PLAN

The Town of Caledon is working with the Humber Station Villages Landowners Group (HSV LOG) to prepare a secondary plan for the Humber Station Employment Area lands in southwest Caledon. On October 10, 2023, Council adopted Official Plan Amendment No. 274 (OPA 274), to expand the Bolton Rural Service Centre Boundary and designate the Humber Station Employment lands as a 'New Employment Area'. The secondary plan is currently under review and will include more detailed policies and land use designations to guide development on the employment lands. The subject site is located within the central region of the Humber Station Employment Area lands as illustrated in the proposed Land Use Schedule (C8) shown in **Figure 2-1**. The employment lands are planned for employment consisting of Prestige Employment and predominately General Employment land use designations.

Figure 2-1: Humber Station Employment Area Land Use Plan (Schedule C8)

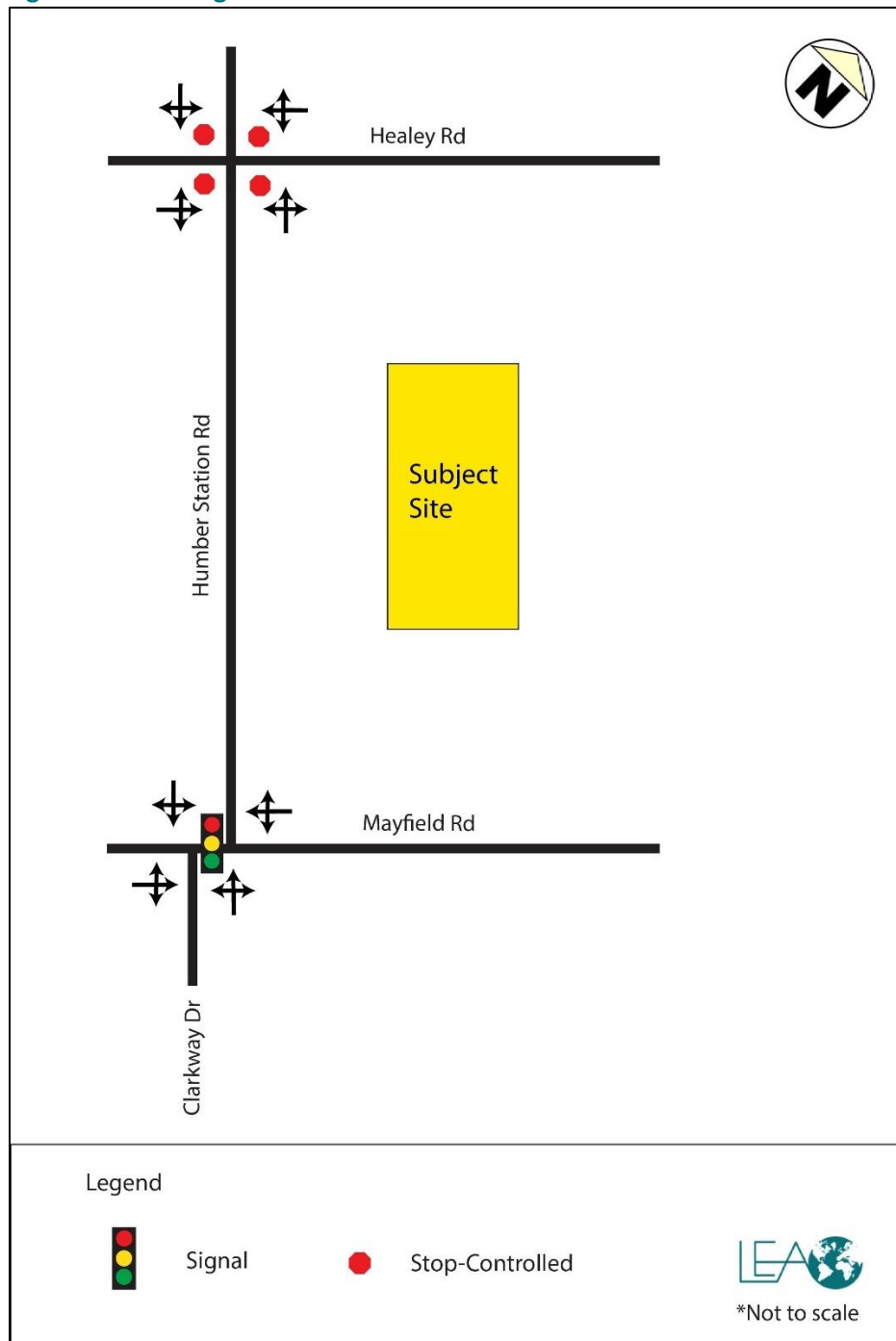


Source: Town of Caledon, 2024

2.2 EXISTING ROAD NETWORK

The following section provides a description and classification of roadways within the study area. All regional roadways are under the jurisdiction of Peel Region while the remaining roadways are under the jurisdiction of the Town of Caledon or City of Brampton. **Figure 2-2** illustrates the existing lane configuration and traffic control of the study area intersections.

Figure 2-2: Existing Road Network



- **Humber Station Road** is a north-south collector road under the jurisdiction of the Town of Caledon. The roadway extends north from Mayfield Road to Highway 9, operating with a 2-lane cross-section (1 lane per direction) and with a posted speed limit of 80 km/h within the study area. Of note, the Town of Caledon plans to reduce the posted speed limit along Humber Station Road to 60 km/h, which will be presented to Council in 2024.
- **Clarkway Drive** is a north-south collector road under the jurisdiction of the City of Brampton. The roadway extends north from Cottrelle Boulevard in Brampton to Mayfield Road, operating with a 2-lane cross-section (1 lane per direction) and with a posted speed limit of 70 km/h within the study area.
- **Mayfield Road** is an east-west high-capacity arterial road under the jurisdiction of Peel Region. The roadway extends west from Albion Vaughan Road to Winston Churchill Boulevard in Halton Hills. The roadway acts as a municipal boundary between Caledon and Brampton. Mayfield Road operates with a 2-lane cross-section (1 lane per direction) and with a posted speed limit of 80 km/h within the study area.
- **Healey Road** is an east-west collector road under the jurisdiction of the Town of Caledon. The roadway extends west from Queen Street S to Airport Road, operating with a 2-lane cross-section (1 lane per direction) and with a posted speed limit of 60 km/h within the study area.
- **George Bolton Parkway** is an east-west industrial collector road under the jurisdiction of the Town of Caledon. The roadway extends west from Highway 50 and terminates approximately 430 m west of Coleraine Drive. George Bolton Parkway operates with a 2-lane cross-section (1 lane per direction) and with a posted speed limit of 50 km/h within the study area. As part of the development proposal, the partial extension of George Bolton Parkway west of the Clarkway Tributary will be constructed.

2.3 EXISTING TRANSIT NETWORK

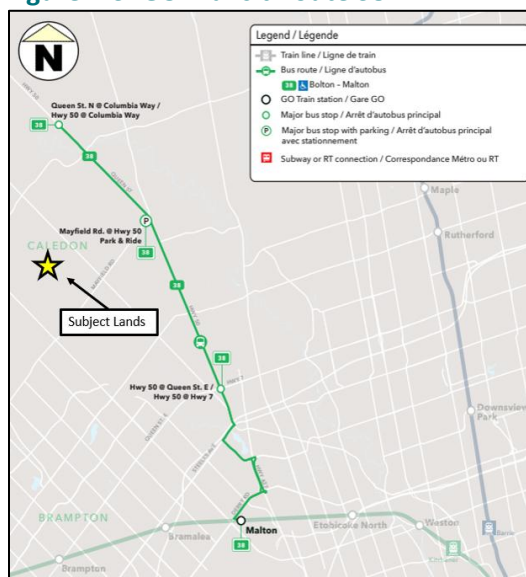
There is currently no Town-wide local public transit service operated by the Town of Caledon. However, following the Town's Transit Feasibility Study in 2019, Voyago was retained to provide local service in the Bolton area. It is understood that as of 2024, service by Voyago has been replaced by Brampton Transit via Route 41 which operates along Highway 50 between Queen Street/Highway 7 in Brampton to Columbia Way/Bolton Heights in Caledon. The route operates Monday to Friday during peak commute hours. The closest bus stop to the subject site is located at George Bolton Parkway & Coleraine Drive. However, given the lack of mid-block road connections to Coleraine Drive, this bus stop is located approximately 5 km from the subject site.

An inter-regional commuter bus service is also available within the Bolton area. The inter-regional route is operated by GO Transit between Malton and the area of Highway 50 & Columbia Way with opportunities to transfer to Metrolinx's GO rail transit. The route operates Monday to Friday during peak hours. The existing transit routes within the Bolton area are illustrated in **Figure 2-3** and **Figure 2-4**. Details of the available services in the area are provided in **Table 2-1**.

Table 2-1: Existing Transit Service

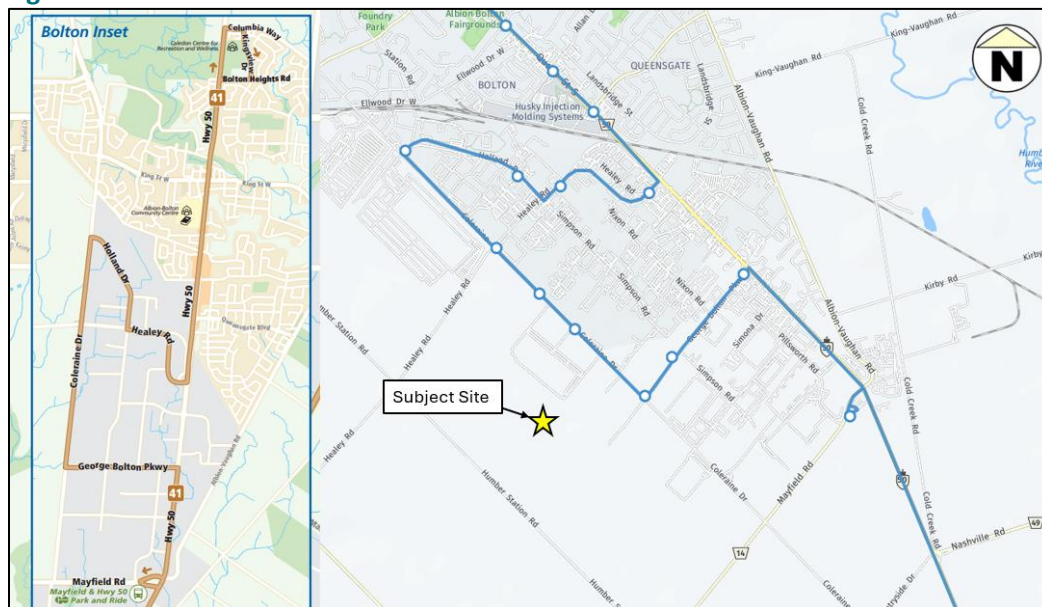
Transit System	Route	Description	Frequency	Accessibility from Subject Site
GO Transit	Route 38	Bolton to Malton (Monday to Friday, 5AM - 7:30AM and 3:30PM - 6:30PM)	60 minutes	Mayfield Road @ Highway 50: 4.3 km
Brampton Transit	Route 41	Bolton to Brampton (Monday to Friday, 5AM - 9:30AM and 3PM - 6:30 PM)	2 hours	George Bolton Parkway @ Coleraine Drive: 5 km

Figure 2-3: GO Transit Route 38



Source: GO Train and Bus Schedule (Metrolinx, April 2023)

Figure 2-4: Bolton Local Transit Route

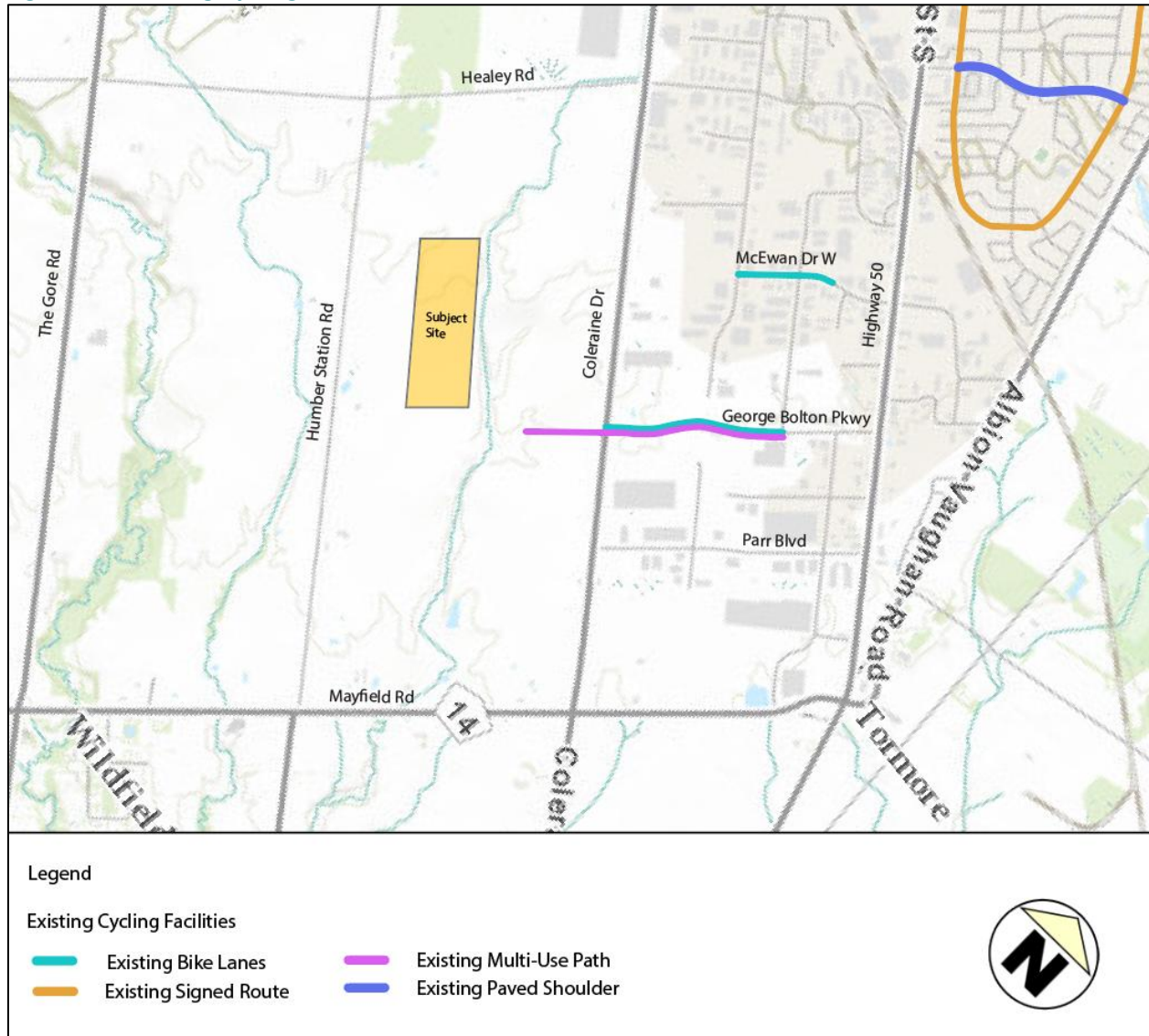


Source: Brampton Transit & Triplix, 2024

2.4 EXISTING CYCLING NETWORK

Cycling facilities in Caledon consist of on and off-road facilities that are managed by the Town of Caledon, Peel Region, and adjacent municipalities. Due to the current rural and undeveloped nature of the study area, there are a limited number of active transportation and cycling facilities. Bike lanes are provided on both sides of George Bolton Parkway, east of Coleraine Drive as well as along a portion of McEwan Drive W. A multi-use path is also provided along the north side of George Bolton Parkway between the Clarkway Tributary and Nixon Road. However, no cycling facilities are available along the remaining study area roadways. **Figure 2-5** illustrates the existing cycling facilities within the study area.

Figure 2-5: Existing Cycling Network



2.5 EXISTING PEDESTRIAN NETWORK

Given the rural nature of the study area, the site exhibits poor pedestrian connectivity. Surrounding the study area, sidewalks and a multi-use path are provided along George Bolton Parkway, east of the tributary. However, sidewalks are missing along the surrounding collector and arterial roadways including Mayfield Road, Humber Station Road, and Healey Road. Improvements to the pedestrian connectivity which will be addressed as the Secondary Plan Area becomes urbanized through development.

2.6 TRAFFIC DATA COLLECTION

Turning movement counts (TMCs) were used as the source of traffic data for the intersection capacity analysis. Traffic counts were collected by LEA Consulting on Wednesday, May 3, 2023, between 7:00AM - 9:30AM and 4:00PM - 6:30PM to capture the weekday AM and PM peak periods.

Signal timing plans at the signalized intersections were obtained from the Region of Peel. Heavy vehicle traffic, pedestrian traffic, and cyclist traffic were recorded separately and included in the capacity analysis. A summary of the TMC data collected is provided in **Table 2-2**, with detailed traffic counts and signal timing plans available in **Appendix A**.

Table 2-2: Data Collection Summary

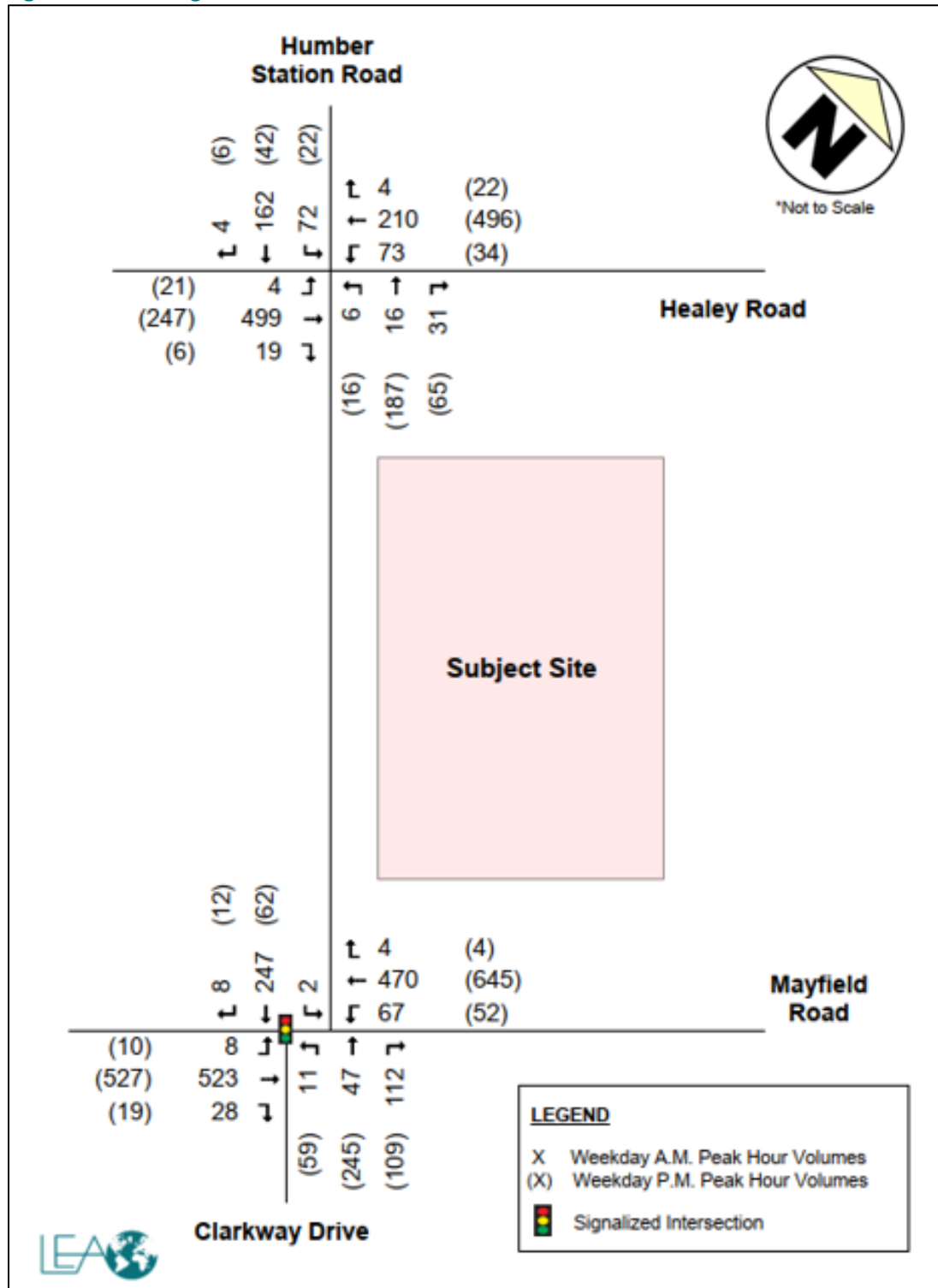
Intersection	TMC Date	Source
Humber Station Road & Healey Road	Wednesday, May 3, 2023	LEA Consulting
Mayfield Road & Humber Station Road/Clarkway Drive		

As of fall 2022, it is understood that the Town of Caledon accepts new traffic data. As such, no COVID adjustments were made on the counts collected.

2.7 EXISTING TRAFFIC VOLUMES

The existing traffic volumes during the weekday AM and PM peak hours are illustrated in **Figure 2-6**. Volume balancing was applied to through movements where adjacent intersections had volume discrepancies greater than 10%.

Figure 2-6: Existing Peak Hour Traffic Volumes



3 FUTURE BACKGROUND TRANSPORTATION CONDITIONS

For the analysis of future background traffic conditions, this study considers a six (6) year horizon from 2023 to full build-out (2029) and five (5) years post build-out (2034). Future background conditions include traffic added to the network from other future developments, corridor growth, and road network improvements. The future background conditions will be used as the baseline for evaluating the impact of the proposed development.

3.1 BACKGROUND DEVELOPMENTS

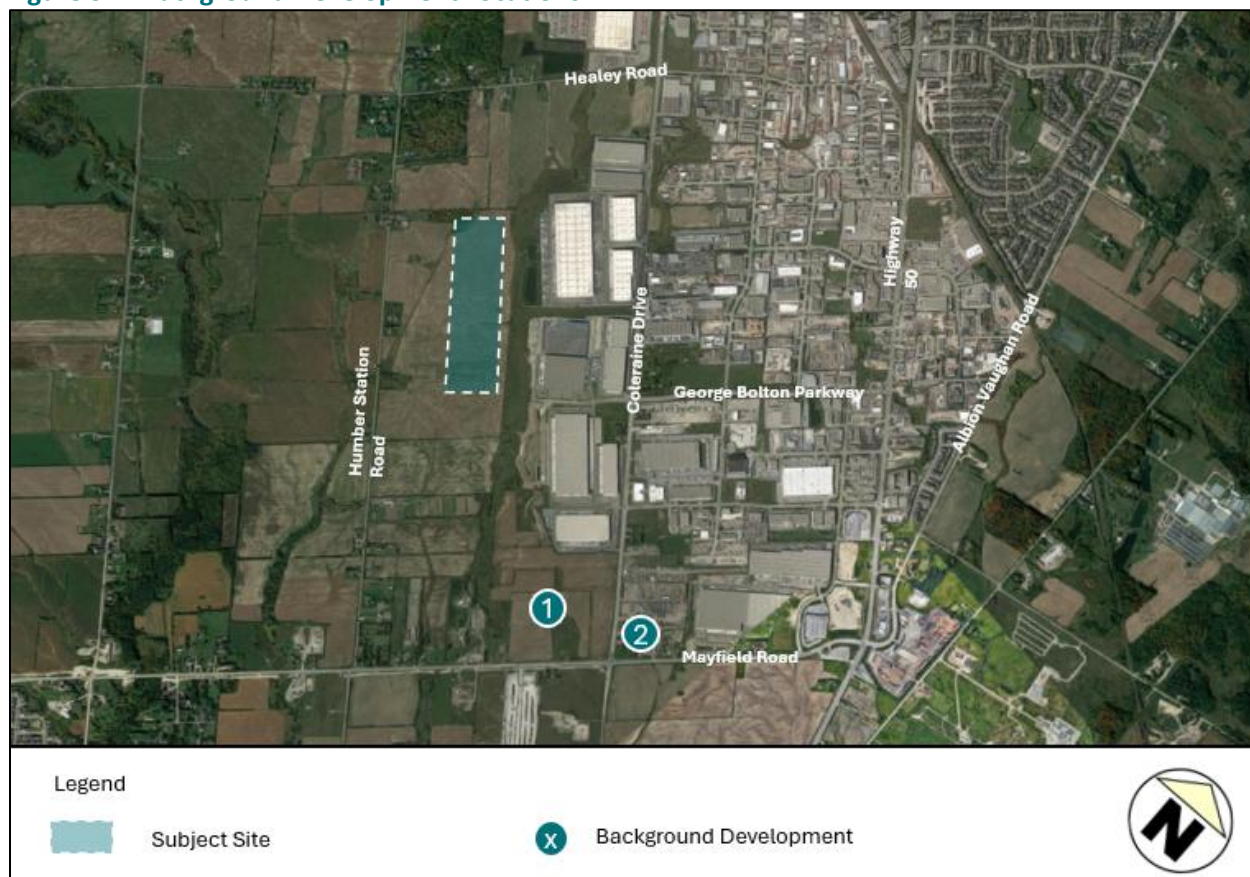
Two (2) background developments have been identified within the surrounding study area. Information on the background developments included in the analysis was obtained from the Town's development application online inventory. The background developments are summarized in **Table 3-1** with their location illustrated in **Figure 3-1**.

Table 3-1: Background Developments

#	Development	Statistics	Anticipated Horizon	Source
1	Triangle Lands	406,000 m ² of industrial GFA	2029	LEA Estimate
2	Coleraine Drive & Mayfield Road Block Plan (South Simpson Landowners Group)	224,000 m ² of industrial GFA	2029	LEA Estimate

As traffic studies were not available for the background developments, site traffic was estimated based on ITE Trip Generation rates and TTS trip distribution, and subsequently assigned to the study area. It was assumed that site accesses for the Triangle Lands and Coleraine Drive & Mayfield Road Block Plan development would occur along Mayfield Road. Detailed trip generation calculations for the background developments are provided in **Appendix B**.

Figure 3-1: Background Development Locations



3.2 CORRIDOR GROWTH

EMME plots from the Region of Peel's 2021, 2031, and 2041 Travel Demand Forecasting Model were used to determine corridor growth rates along major roads. **Table 3-2** summarizes the applied growth rates calculated between screenlines. Detailed corridor growth rate calculations are provided in **Appendix C**.

Table 3-2: Corridor Growth Summary

Corridor	Direction	Annual Growth Rate (AM/PM)
Humber Station Road	Northbound	2%
	Southbound	1%
Mayfield Road	Eastbound	3%
	Westbound	2%
Healey Road	Eastbound	3%
	Westbound	4%

3.3 PLANNED EXTERNAL ROAD NETWORK

There are several proposed and planned changes to the road network surrounding the subject site. The road network improvements considered are summarized in **Table 3-3**. Of note, based on correspondence with Regional staff (see **Appendix D**), it is understood that the widening of Mayfield Road from 2 to 6 lanes west of Humber Station Road and from 2 to 4 lanes between Humber Station Road and Highway 50

is scheduled for construction starting 2026. As such, the completion of this improvement has been considered by the 2029 horizon year.

Table 3-3: Future Transportation Network Improvements

Roadway	Network Improvement	Horizon Year as per Policy Document	Included in Analysis?
Provincial			
Highway 413	Ontario Ministry of Transportation Highway 413 Transportation Corridor Route Planning Study (Formerly GTA West) New 400-series highway with an interchange at Humber Station Road, north of Mayfield Road	2041	No
Regional			
Mayfield Road	Peel Region Long Range Transportation Plan - Widening from 2 to 6 lanes, between Dixie Road and Humber Station Road - Widening from 2 to 4 lanes, between Humber Station Road and Highway 50	2031 – Construction starts in 2026 ⁽¹⁾	Yes – 2029 & 2034
	Peel Region Long Range Transportation Plan Widening from 4 to 6 lanes, between Humber Station Road and Coleraine Drive	2041	No
Arterial A2	Peel Region Long Range Transportation Plan New 6-lane road connection located between Humber Station Road and Coleraine Drive, extending from Mayfield Road to Highway 50	2041	No
Local			
Humber Station Road	Town of Caledon Transportation Master Plan Proposed signalization of Humber Station Road & Healey Road	2031 ⁽²⁾	Yes – 2029 & 2034
	Town of Caledon Multi-Modal Transportation Master Plan Widening from 2 to 4 lanes, between north limit of Highway 9 and Mayfield Road	2031	Yes – 2034
	Watermain and Sanitary Improvement Installation of new watermain and sanitary sewer along Humber Station Road from Healey Road to Mayfield Road. As part of the sanitary trunk sewer project, the road is being restored to an interim condition to support truck loads for the next 5 years until ultimate road widening occurs. Refer to correspondence with the Region in Appendix D.	2031	Yes
Healey Road	Town of Caledon Transportation Master Plan Proposed signalization of Humber Station Road & Healey Road	2031 ⁽²⁾	Yes – 2029 & 2034
	Town of Caledon Multi-Modal Transportation Master Plan Widening from 2 to 4 lanes, between Heritage Road and Coleraine Drive	2031	Yes – 2034
George Bolton Parkway	Town of Caledon Multi-Modal Transportation Master Plan	2031	Yes – partial build out in 2029 and

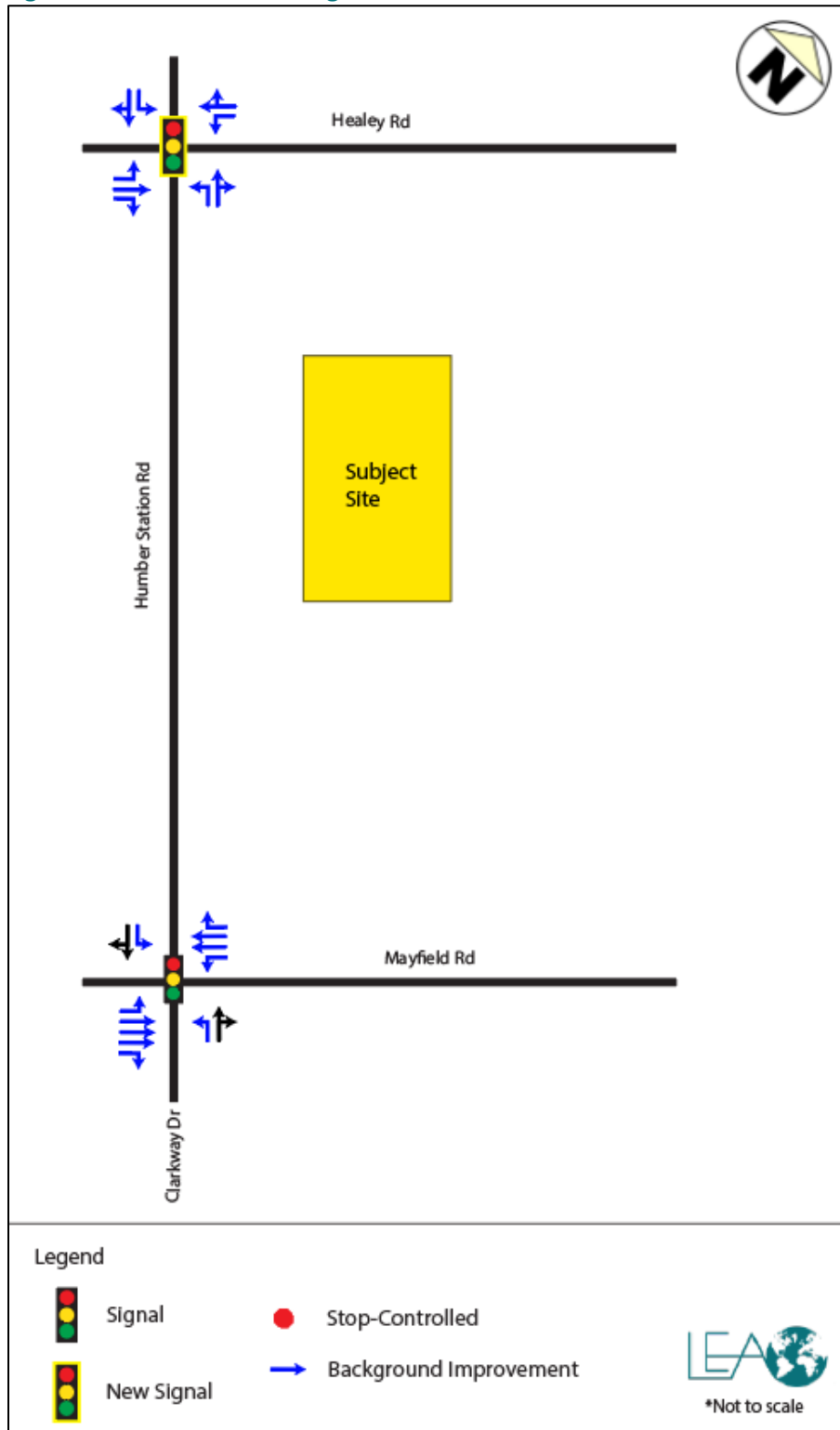
Roadway	Network Improvement	Horizon Year as per Policy Document	Included in Analysis?
	4-lane extension between Coleraine Drive and Humber Station Road		full build out in 2034

Note: (1) – The widening of Mayfield Road from 2 to 6 lanes west of Humber Station Road and from 2 to 4 lanes between Humber Station Road and Highway 50 has been considered under the 2029 horizon year based on correspondence with the Region.

*(2) – Based on the capacity analysis results in **Section 6**, the signalization of Humber Station Road & Healey Road is recommended by the 2029 horizon year.*

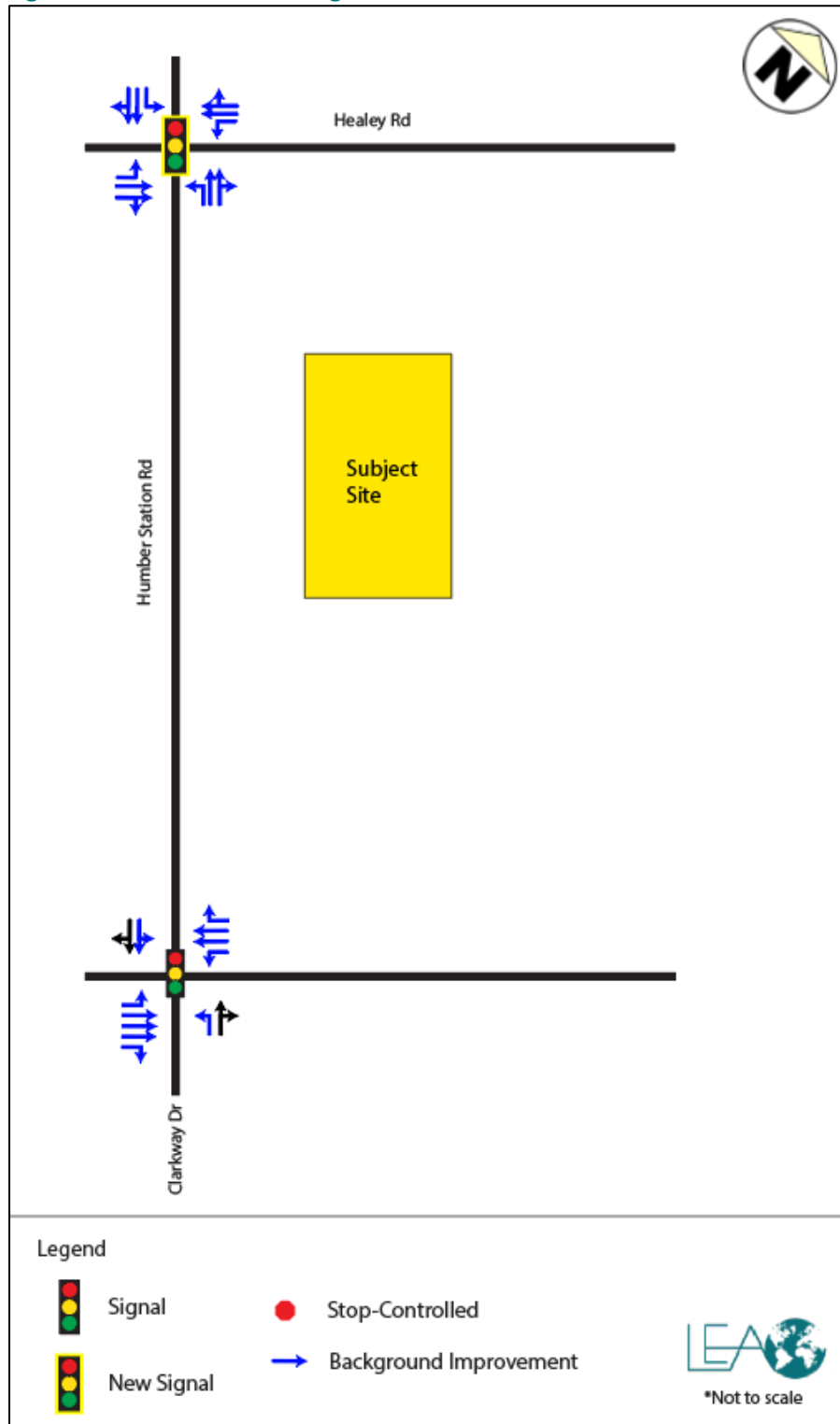
Figure 3-2 and **Figure 3-3** illustrates the 2029 and 2034 future background road networks, respectively. Lane configurations for Mayfield Road & Humber Station Road/Clarkway Road and Humber Station Road & Healey Road were based on required improvements from the intersection capacity analysis results in **Section 6**. It was assumed that the dedicated turn lanes would be implemented with the signalization of Humber Station Road & Healey Road and widening of Mayfield as part of future background improvements.

Figure 3-2: 2029 Future Background Road Network



Note: Lane configuration and traffic control for new intersections were based on required improvements from the intersection capacity analysis results in **Section 6**.

Figure 3-3: 2034 Future Background Road Network

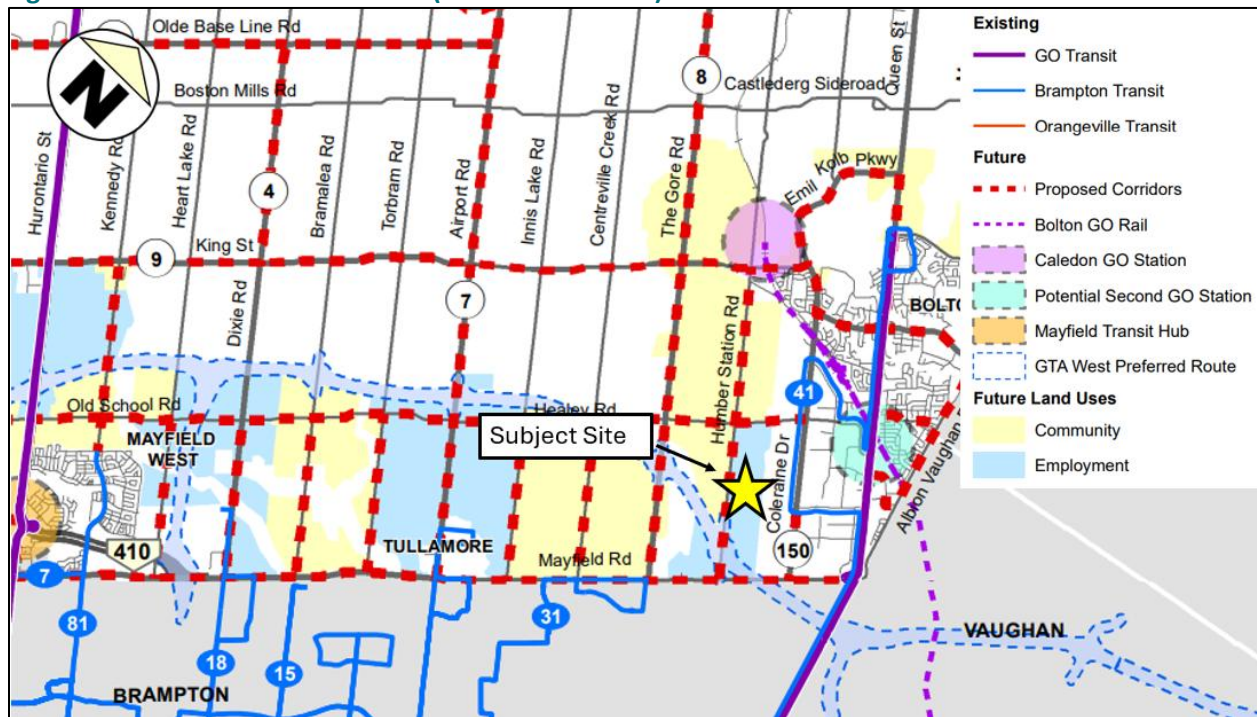


3.4 PLANNED TRANSIT AND ACTIVE TRANSPORTATION IMPROVEMENTS

As illustrated in **Figure 3-4**, the Town of Caledon's MMTMP proposes a future transit network including local transit routes along the Humber Station Employment Area boundary roadways and commuter rail service to connect the west side of Toronto to Vaughan and Caledon. The Bolton commuter rail corridor would include a planned Major Transit Station Area (MTSA) centered around the Caledon GO Station (planned at King Street & Humber Station Road). A second potential GO Station / MTSA is identified in the draft MMTMP along Highway 50 / Queen Street. This second GO Station would support new high density mixed-use transit-oriented communities. It is understood that this station will be further assessed as part of future secondary plan processes. Furthermore, a Highway 413 Transitway station is proposed at Mayfield Road & Humber Station Road. The transit corridor is expected to provide separated, exclusive access alongside the highway for public transit.

These nearby transit initiatives aim to expand transit reach to existing and proposed residential and employment land uses. Having more frequent and reliable transit service, as well as improving first/last mile initiatives to existing transit stops will enhance the multi-modal transportation network in the study area.

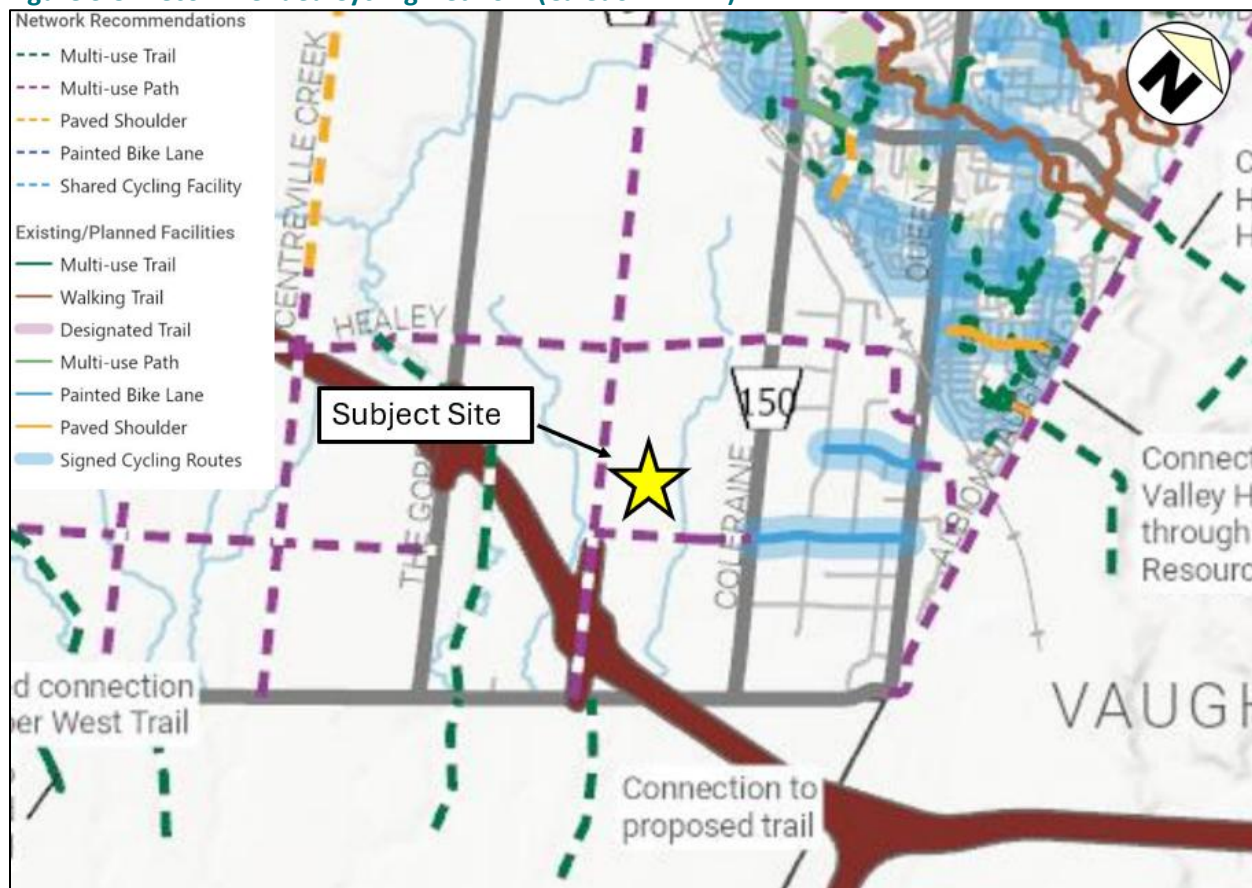
Figure 3-4: Future Transit Network (Caledon MMTMP)



Source: Multi-Modal Transportation Master Plan (Town of Caledon, June 2024)

Dedicated pedestrian and cycling facilities are provisionally planned for all 3 surrounding roadways. The Town of Caledon's MMTMP proposes physically separated cycling facilities along Humber Station Road and Healey Road. As per the Town of Caledon's Active Transportation Master Plan, there is a preference for these separated cycling facilities to be in-boulevard multi-use paths (see **Figure 3-5**). Regional cycling connections are also planned along Mayfield Road. These external facilities will serve as active transportation links to nearby neighbourhoods within the community.

Figure 3-5: Recommended Cycling Network (Caledon ATMP)

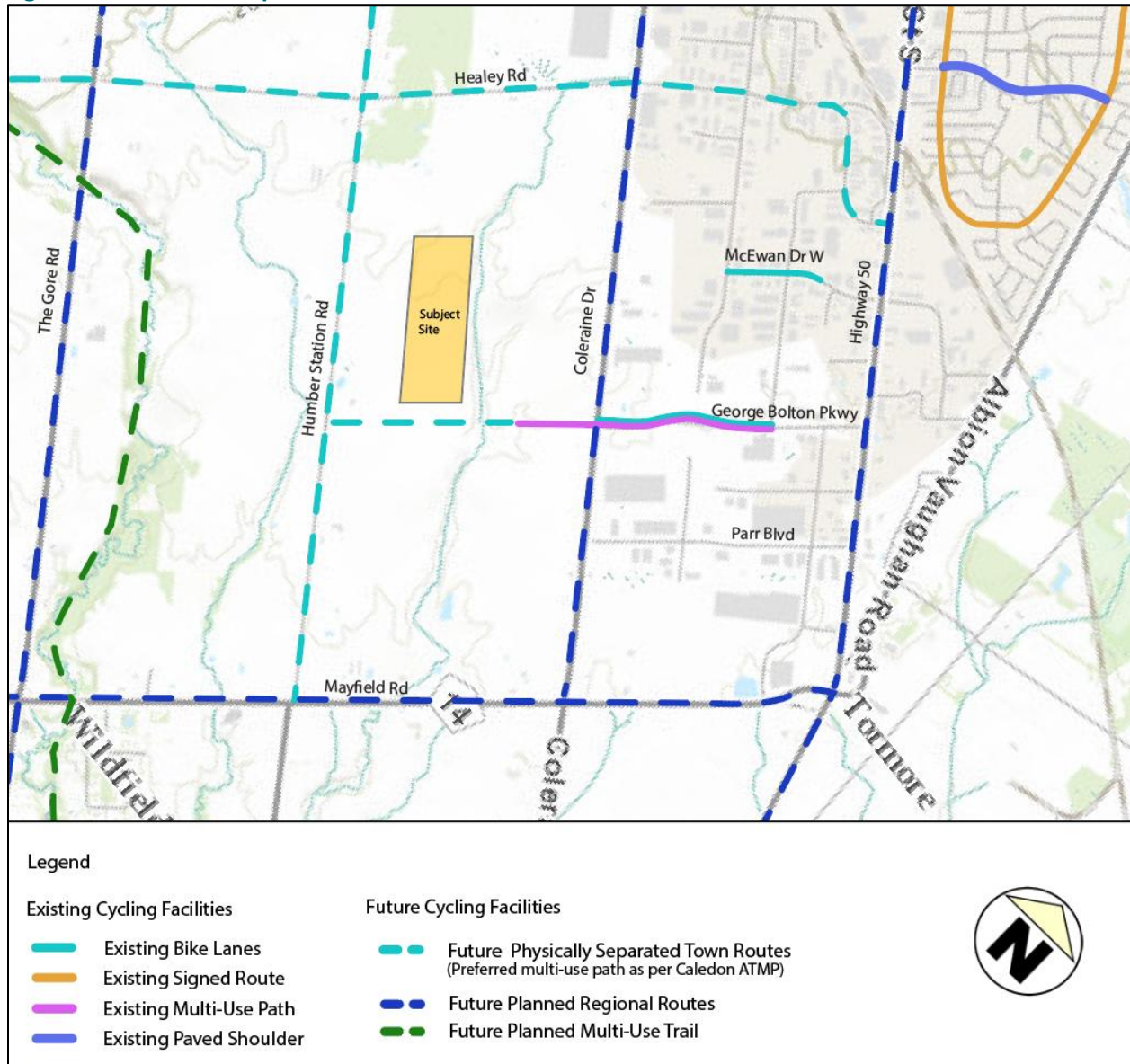


Source: Active Transportation Master Plan (Town of Caledon, June 2024)

As part of the development lands, George Bolton Parkway will extend from its existing terminal west of Coleraine Drive to Humber Station Road. The proposed active transportation facilities along the George Bolton extension will be informed by the Town's MMTMP and evaluated as part of the EA for the George Bolton Parkway extension. The type of active transportation facility will be determined through this process and in consultation with any available standard cross-sections for industrial collector roads. The active transportation facilities along George Bolton will serve as the primary link to external facilities.

A conceptual Active Transportation Network Plan illustrating the existing and future active transportation connections is provided in **Figure 3-6**. Of note, this network plan was informed by the Town and Region's TMP.

Figure 3-6: Active Transportation Network Plan



3.5 FUTURE BACKGROUND TRAFFIC VOLUMES

The future background traffic volumes for the weekday AM and PM peak hours under the 2029 and 2034 horizon years are illustrated in **Figure 3-7** and **Figure 3-8**, respectively.

Figure 3-7: 2029 Future Background Peak Hour Traffic Volumes

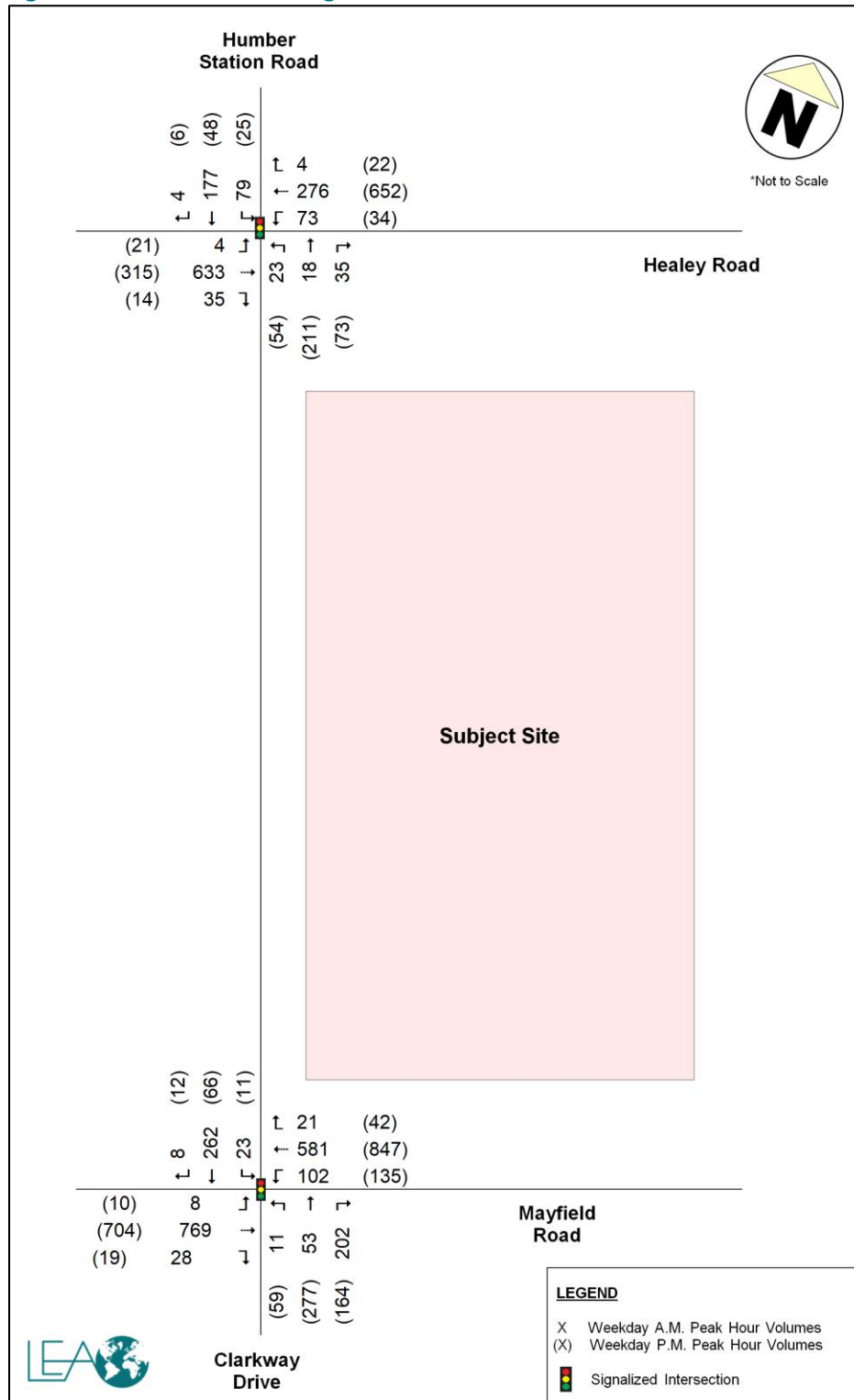
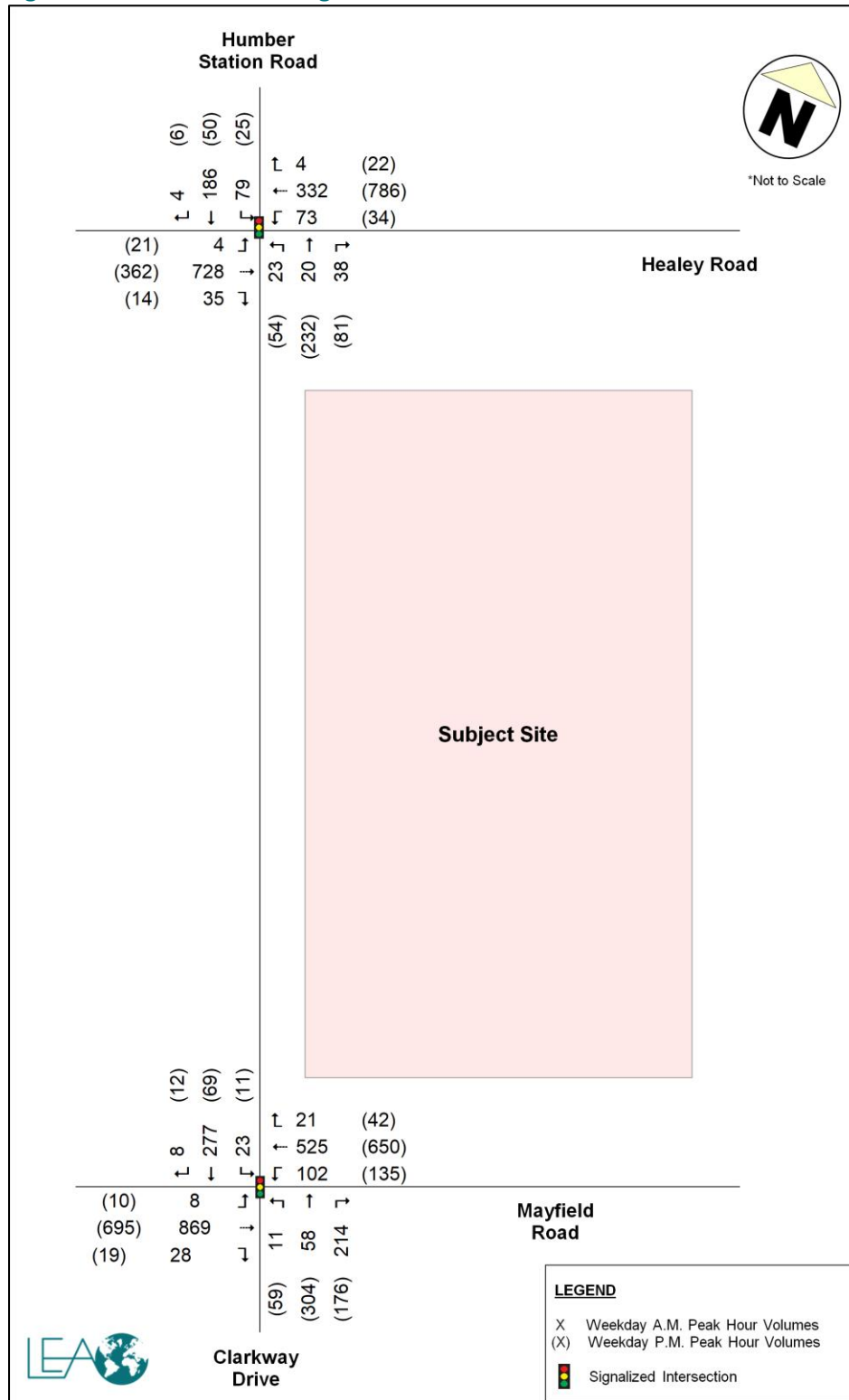


Figure 3-8: 2034 Future Background Peak Hour Traffic Volumes



4 SITE-GENERATED TRAFFIC

Prologis Building 1 is being delivered first by the 2029 horizon year. Access to the proposed development will be provided via two (2) full-movement accesses off the George Bolton Parkway extension. The calculation, distribution, and assignment of future site generated trips are discussed below.

4.1 TRIP GENERATION

It is understood that warehousing activities are proposed for Building 1. As such, trip generation was estimated using average baseline auto and truck trip rates from the ITE Trip Generation Manual 11th Edition for ITE LUC 150 – Warehousing in General Urban/Suburban and based on the proposed industrial GFA of 144,266 m² (1,552,866 ft²). The site trip generation is provided in **Table 4-1**.

Table 4-1: Trip Generation

Land Use	Description	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Building 1							
ITE LUC 150 – Warehousing 1,552,866 ft²	Auto Trip Rate (/1000 ft²)	0.13	0.04	0.17	0.05	0.13	0.18
	Total ITE Auto Trips	203	61	264	78	201	279
	Truck Trip Rate (/1000 ft²)	0.01	0.01	0.02	0.02	0.01	0.03
	Total ITE Truck Trips	16	15	31	24	22	46
	External Auto Trips (100%)	219	76	295	102	223	325

The proposed development is anticipated to generate 295 two-way vehicle trips during the AM peak hour (219 inbound and 76 outbound) and 325 two-way vehicle trips during the PM peak hour (102 inbound and 223 outbound). This includes 31 two-way truck trips (16 inbound and 15 outbound) during the AM peak hour and 46 two-way truck trips (24 inbound and 22 outbound) during the PM peak hour.

4.2 TRIP DISTRIBUTION AND ASSIGNMENT

The directional trip distribution of site traffic was derived using the 2016 TTS data filtered for trips originating in/destined to industrial areas during the AM and PM peak periods within Traffic Analysis Zones (TAZ) 3017 and 3191. Inbound and outbound distribution was based on the results of the peak hour for the peak direction (i.e., inbound direction based on AM in and outbound distribution based on PM out). Site traffic was assigned to the road network based on logical routing, turn restrictions, and changes in the future network.

The trip distribution for the proposed development is outlined in **Table 4-2**. Detailed TTS data is provided in **Appendix E**. Of note, the 2029 horizon does not include the full extension of George Bolton Parkway. As such, all site traffic was assigned to the intersection of George Bolton Parkway & Humber Station Road to access the site. Under the 2034 horizon, with the full extension of George Bolton Parkway, site traffic was assigned to/from the east or west via the road extension.

Table 4-2: Trip Distribution

Direction From/ To	Expected Route	Weekday AM/PM			
		2029		2034	
		In	Out	In	Out
North	Humber Station Road	3%	0%	3%	0%
South	Clarkway Drive	18%	22%	18%	22%
East	Healey Road	20%	18%	0%	0%
	Mayfield Road	11%	13%	0%	0%
	George Bolton Parkway	0%	0%	31%	31%
West	Healey Road	13%	16%	13%	16%
	Mayfield Road	35%	31%	35%	31%
Total		100%	100%	100%	100%

The site-generated traffic volumes for the weekday AM and PM peak hours under the 2029 and 2034 horizon years for the auto and truck trips are illustrated in **Figure 4-2** to **Figure 4-4**.

Figure 4-1: 2029 Site Generated Peak Hour Auto Traffic Volumes

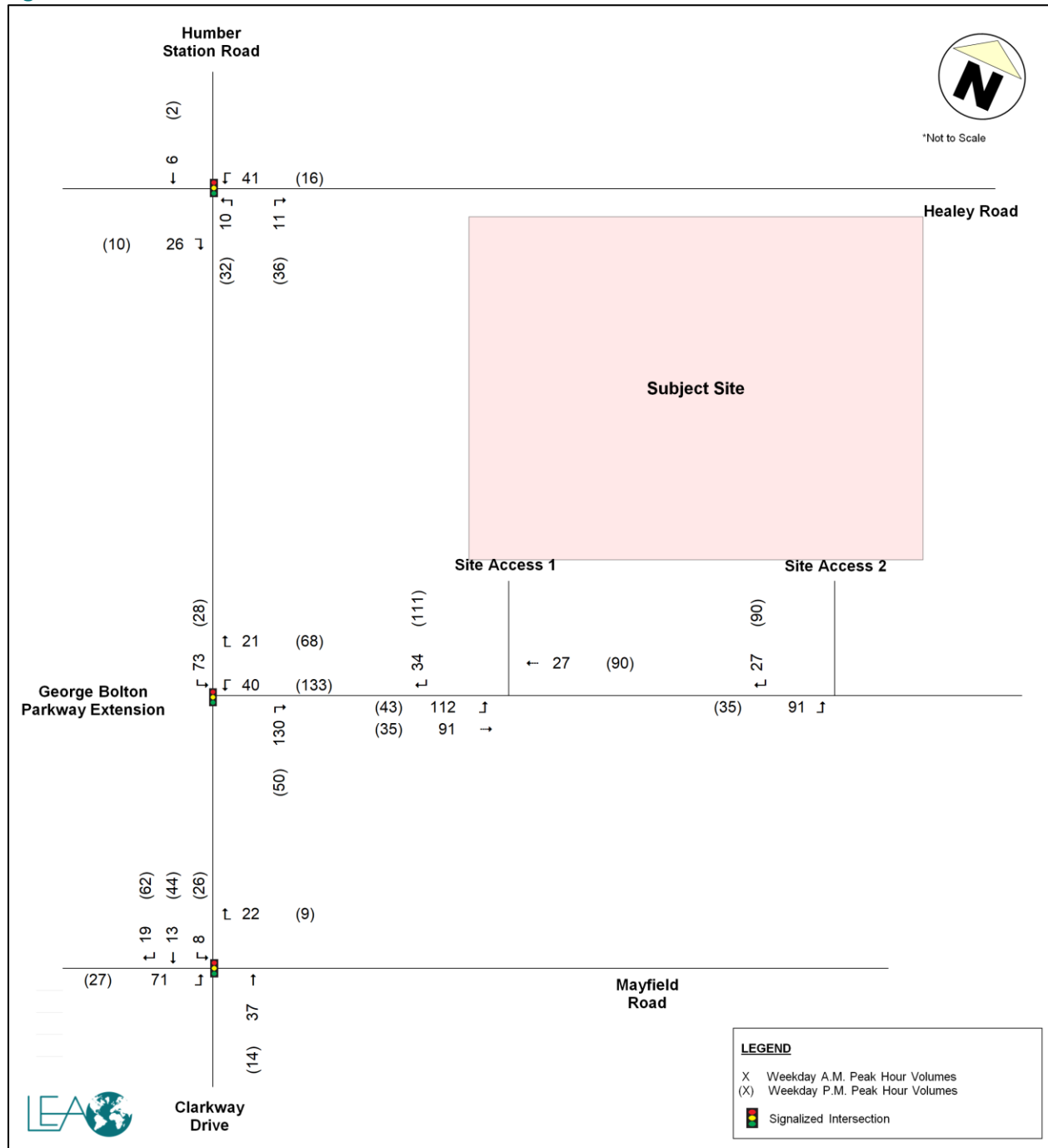


Figure 4-2: 2029 Site Generated Peak Hour Truck Traffic Volumes

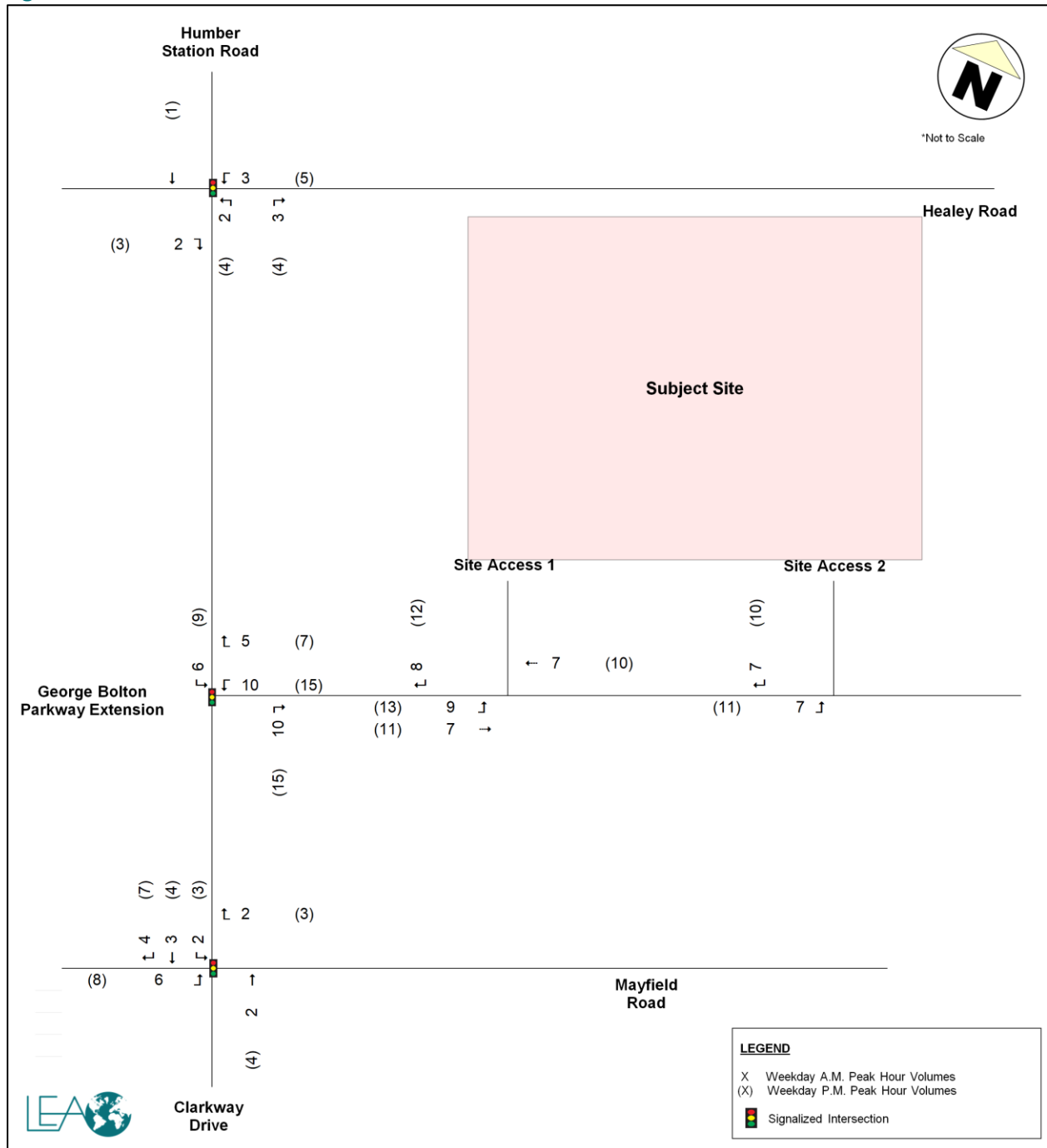


Figure 4-3: 2034 Site Generated Peak Hour Auto Traffic Volumes

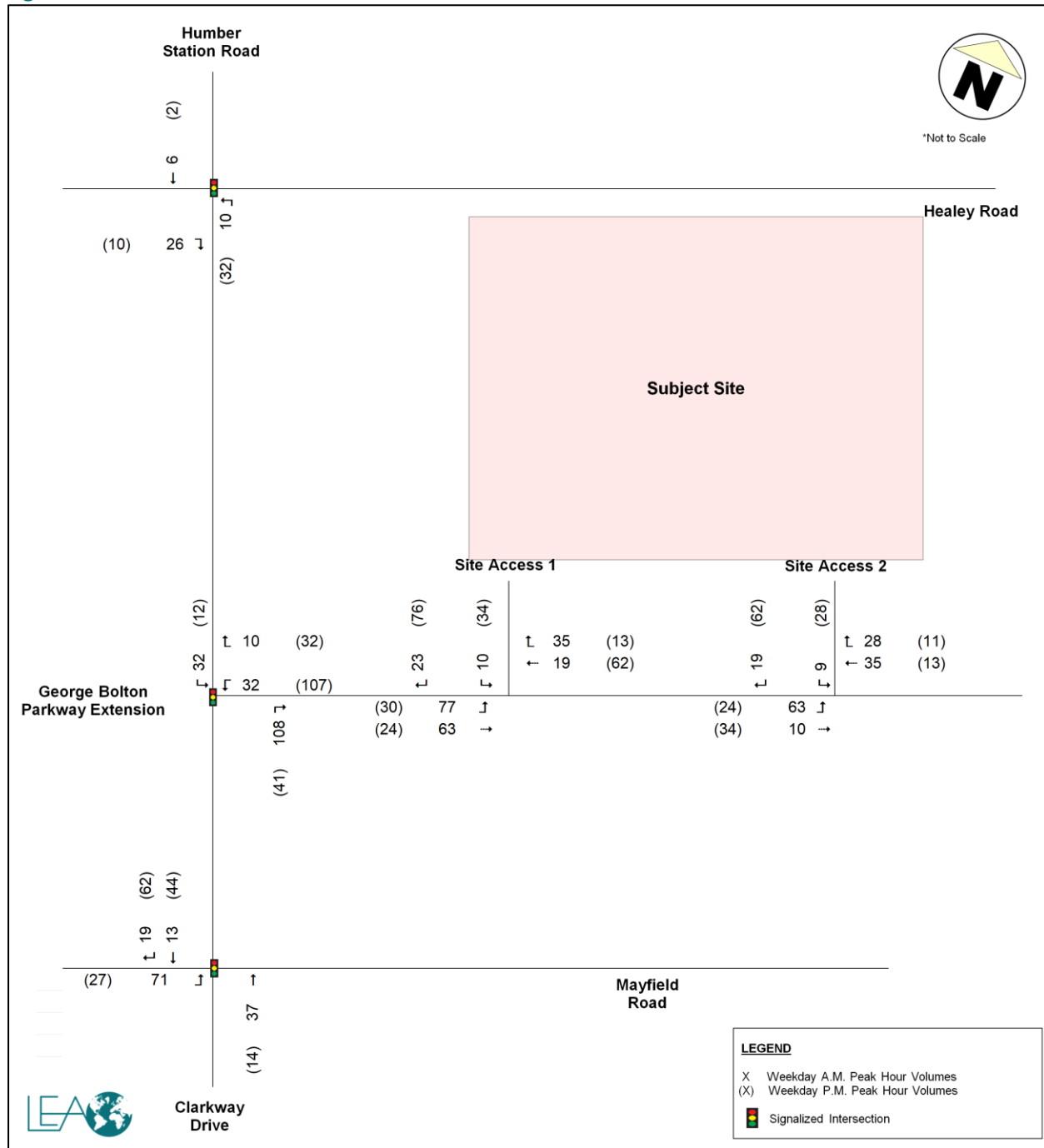
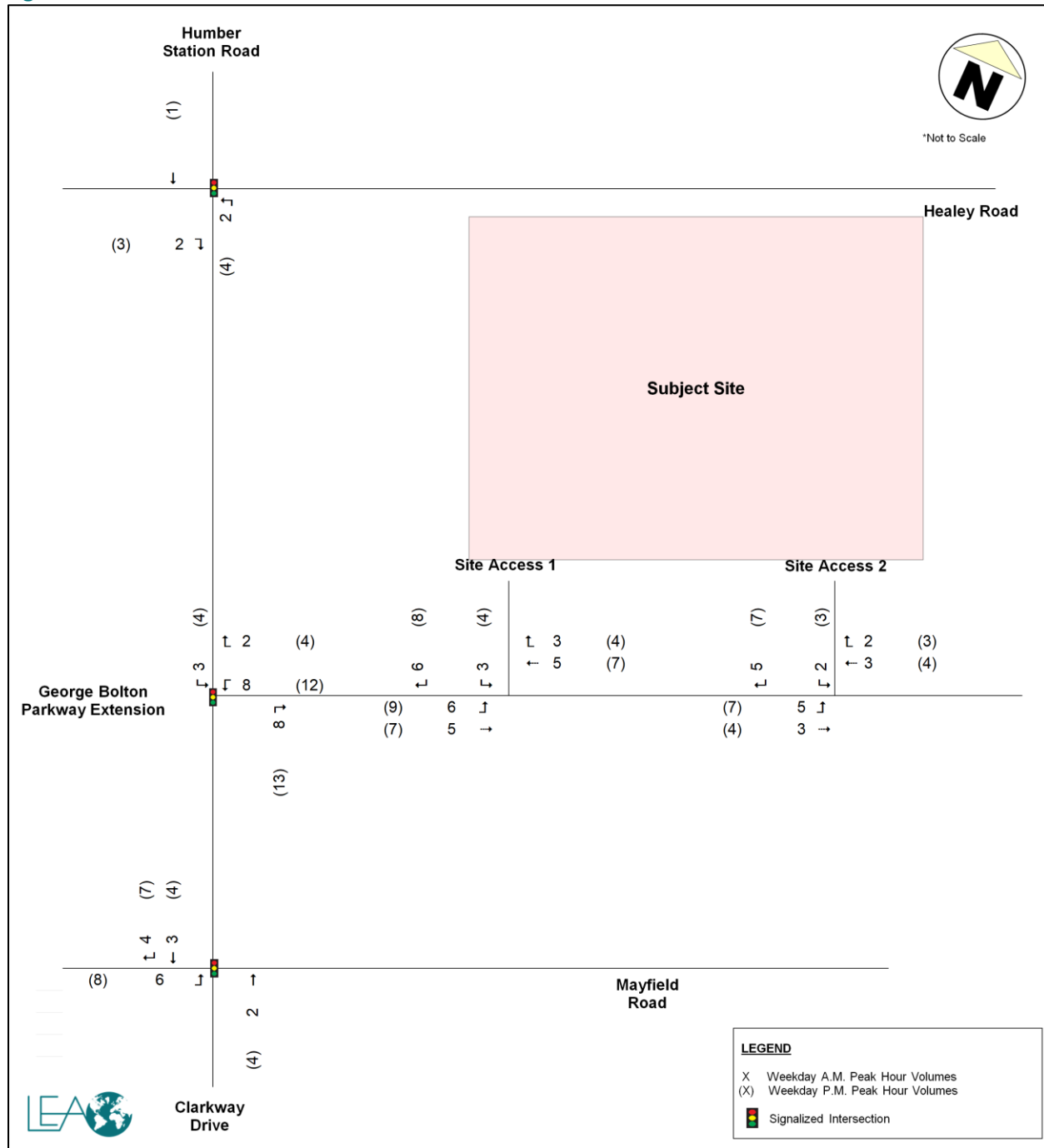


Figure 4-4: 2034 Site Generated Peak Hour Truck Traffic Volumes



5 FUTURE TOTAL TRANSPORTATION CONDITIONS

Future total traffic conditions include the addition of site vehicle trips to future background volumes. As part of the development proposal, a partial extension of George Bolton Parkway will be constructed from Humber Station Road to the Clarkway Tributary. **Figure 5-1** and **Figure 5-2** illustrates the future road network with the site accesses in place under the 2029 and 2034 horizons, respectively.

Figure 5-1: 2029 Future Road Network with Site Accesses

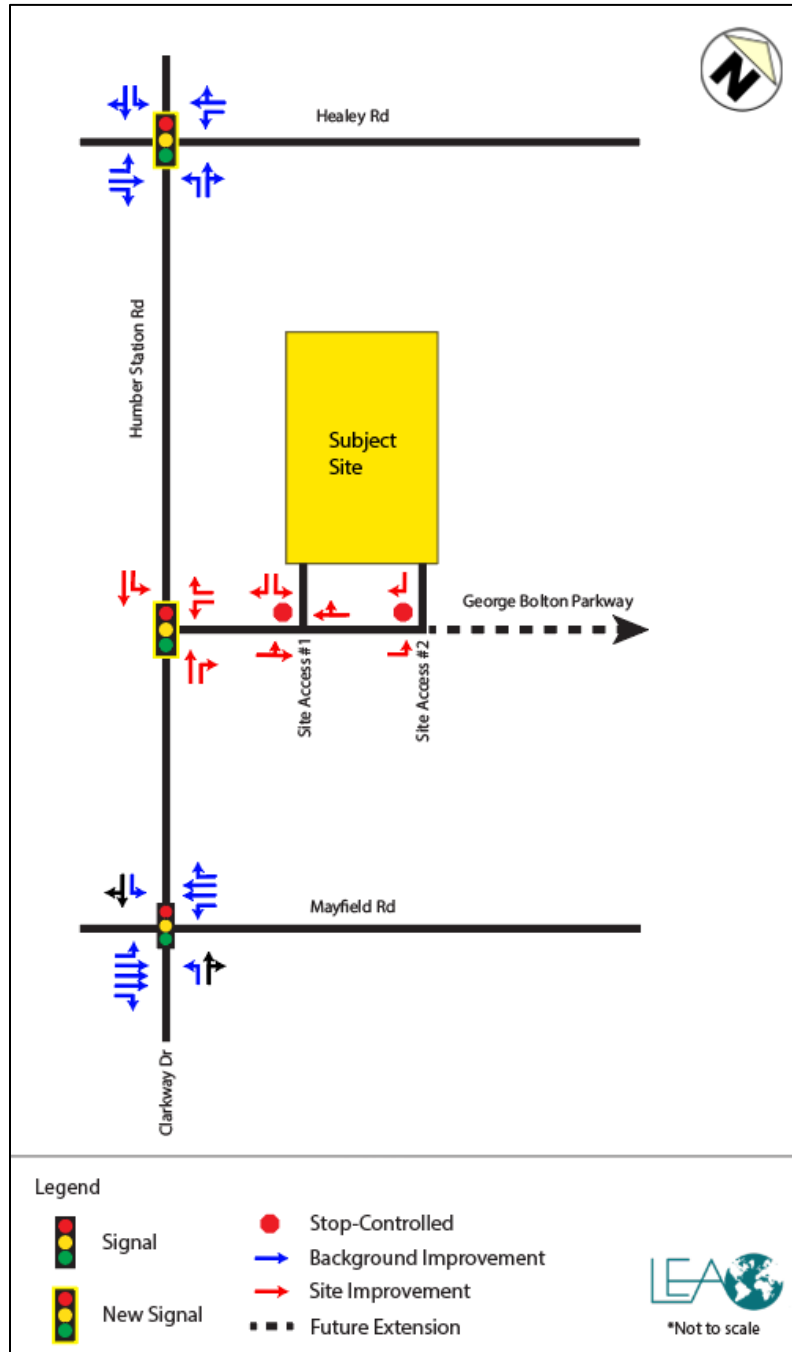
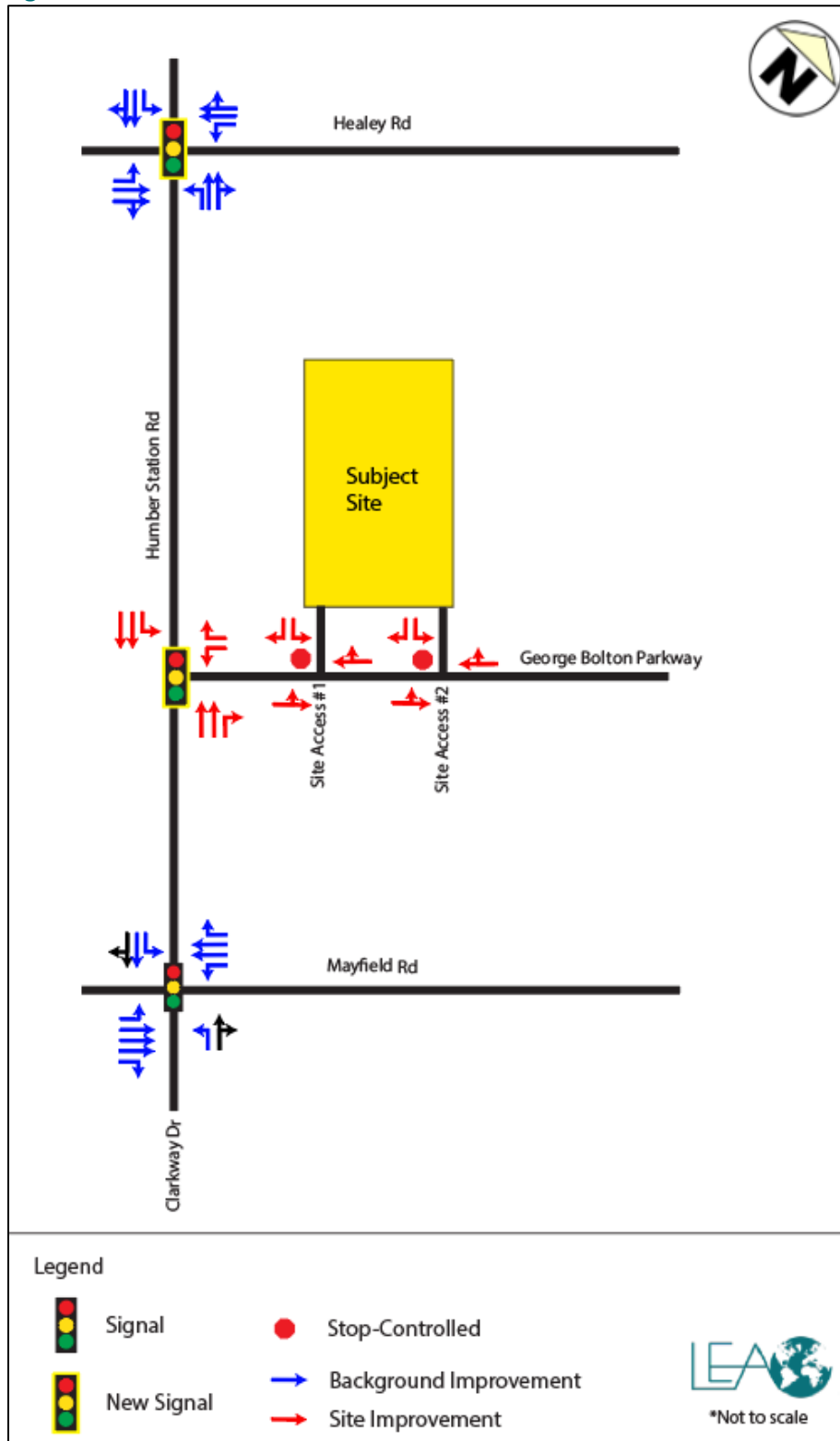


Figure 5-2: 2034 Future Road Network with Site Accesses



5.1 FUTURE TOTAL TRAFFIC VOLUMES

The future total traffic volumes during the weekday AM and PM peak hours under the 2029 and 2034 horizon years are illustrated in **Figure 5-3** and Figure 5-4, respectively.

Figure 5-3: 2029 Future Total Peak Hour Traffic Volumes

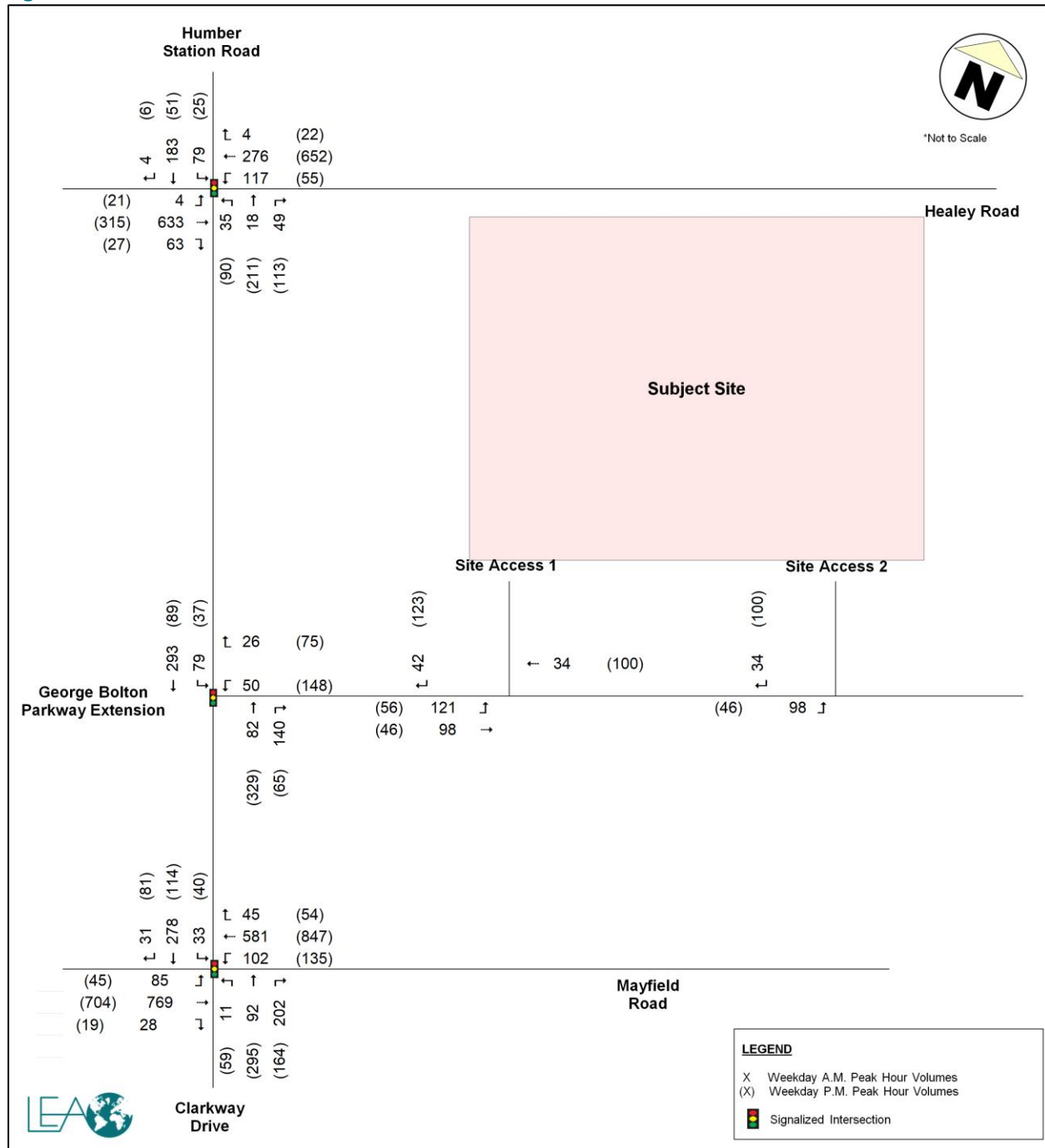
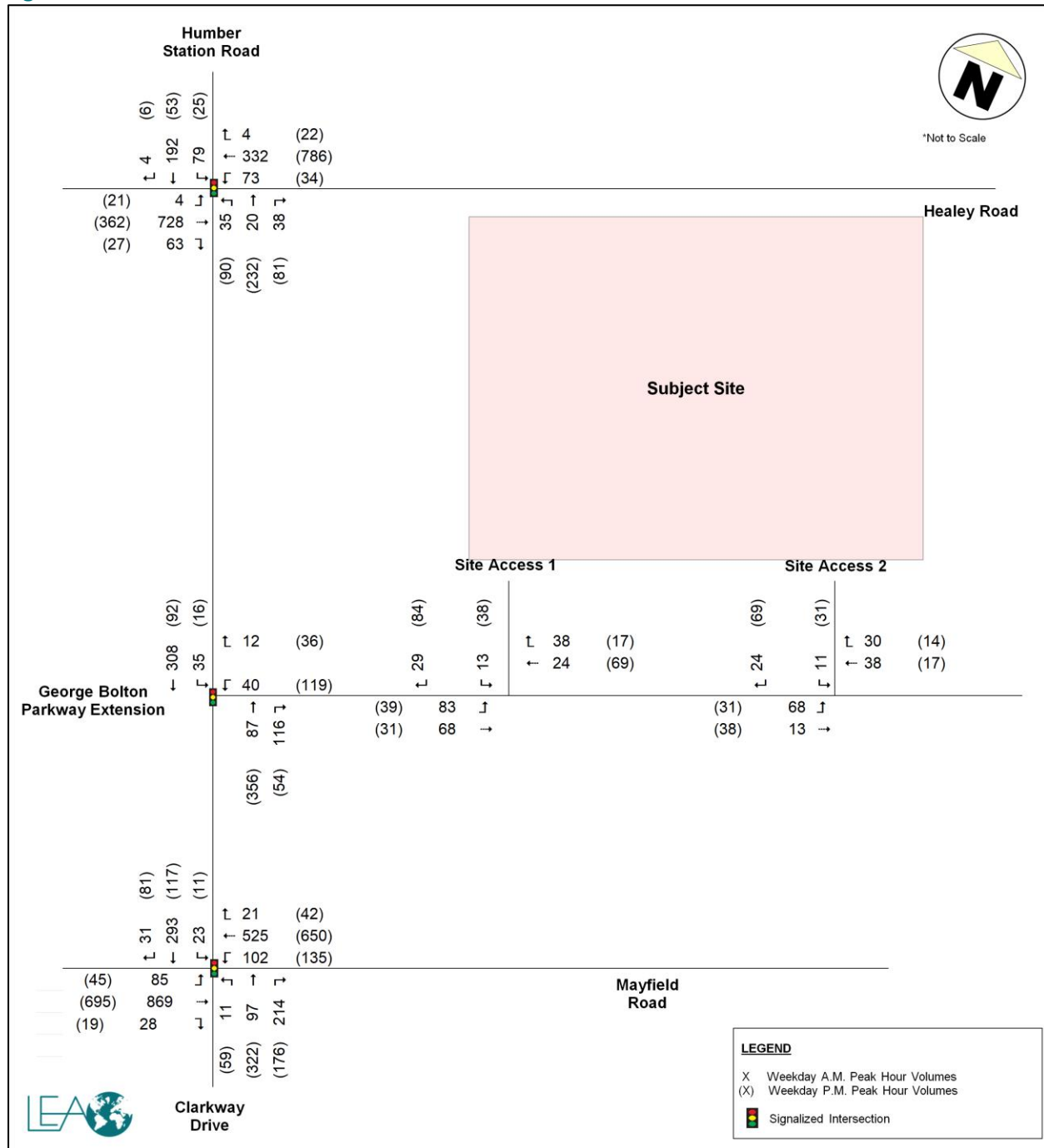


Figure 5-4: 2034 Future Total Peak Hour Traffic Volumes



6 INTERSECTION CAPACITY ANALYSIS

The intersection capacity analysis was undertaken using Synchro 11.0, based on the Highway Capacity Manual (HCM) 6th edition, and adhering to the Town of Caledon's Transportation Impact Studies Terms of Reference and Guidelines dated March 2017. As per the Town of Caledon guidelines, critical movements of interest for signalized intersections were identified as those with a volume-to-capacity (v/c) ratio greater than 0.90 for overall intersection operations, through movements or shared through/turning movements and a v/c ratio greater than 1.00 for exclusive turning movements. For unsignalized intersections, critical movements were identified as those with a level-of-service (LOS) 'E' or greater. LOS definitions are included in **Appendix F**.

6.1 EXISTING SYNCHRO MODEL INPUTS

Existing traffic operations were assessed to provide a baseline for future traffic operations and identify intersections currently experiencing capacity constraints. The existing analysis incorporates the most recent signal timing plans for the study intersections. The applied Peak Hour Factor (PHF) values were calculated based on surveyed counts.

6.2 FUTURE BACKGROUND SYNCHRO MODEL INPUTS

Input parameters from the existing scenario were maintained with corresponding future background volumes, with the exception of the following changes:

- ▶ Clarkway Drive/Humber Station Road & Mayfield Road
 - Optimized splits during the AM and PM peak hours while maintaining the overall cycle length of 120 seconds under the 2029 horizon and carried through to the 2034 horizon.
 - Lane configuration changed to accommodate the widening of Mayfield Road, with the introduction of 3 eastbound through lanes and 2 westbound through lanes. Exclusive left and right-turning lanes were also added for the westbound and eastbound directions, as well as and exclusive left turning lanes for the northbound and southbound directions.
- ▶ Humber Station Road & Healey Road
 - New signalized intersection under the 2029 horizon year.
 - Lane configuration changed to accommodate signalization and widening of Humber Station Road and Healey Road, with the introduction of exclusive left-turning lanes for all directions.

6.3 FUTURE TOTAL SYNCHRO MODEL INPUTS

Input parameters from the existing and future background scenarios were maintained with corresponding future total volumes, with the exception of the following changes:

- ▶ Humber Station Road & George Bolton Parkway Extension

- New intersection to facilitate access for the subject site. The intersection is recommended as a signalized intersection under the 2029 horizon year. Partial buildout of the George Bolton Parkway extension was assumed to accommodate access to the subject site. Ultimate 2034 conditions include the full western extension of George Bolton Parkway, connecting Coleraine Drive to Humber Station.
- ▶ George Bolton Parkway & Site Access 1
 - New unsignalized intersection to facilitate access for the subject site.
- ▶ George Bolton Parkway & Site Access 2
 - New unsignalized intersection to facilitate access for the subject site.

The following sections outline a comparison of the capacity analysis results under existing, future background, and future total conditions. Detailed capacity analysis results are provided in the following appendices:

- ▶ **Appendix G:** Existing Intersection Capacity Analysis;
- ▶ **Appendix H:** 2029 & 2034 Future Background Intersection Capacity Analysis; and
- ▶ **Appendix I:** 2029 & 2034 Future Total Intersection Capacity Analysis.

6.4 2029 SIGNALIZED INTERSECTIONS

The results for the signalized intersections under the 2029 horizon during the weekday AM and PM peak hours are summarized in the sections below.

6.4.1 Clarkway Drive/Humber Station Road & Mayfield Road (2029)

As per the Peel Region Long Range Transportation Plan (2019), Mayfield Road is planned to be widened from 2 to 6 lanes west of Humber Station Road and from 2 to 4 lanes between Humber Station Road and Highway 50 by 2031. However, based on correspondence with Peel Region staff, it is understood that this improvement is scheduled for construction starting 2026. It is further understood that the widening of Mayfield Road will include realignment of the north and south legs of Humber Station Road to eliminate the existing jogged intersection and split phasing. As such, completion of these improvements has been incorporated into the analysis by the 2029 horizon year.

As per the Mayfield Road Improvement Class Environment Assessment (April 2013), exclusive left- and right-turning lanes for the westbound and eastbound directions, and exclusive left turning lanes for the northbound and southbound directions have been included in the analysis.

To reflect the realignment of Humber Station Road and removal of the existing split phasing, optimized signal timing plans were applied during both peak hours while maintaining the overall cycle length. The signal timing optimizations for the future horizons are summarized in **Table 6-1**.

Table 6-1: Signal Timing Optimizations, Clarkway Drive/Humber Station Road & Mayfield Road

Horizon	Cycle Length (s)	Signal Timing
Existing Weekday AM	120	
2029 & 2034 Weekday AM (Optimized)	120	
Existing Weekday PM	120	
2029 & 2034 Weekday PM (Optimized)	120	

The intersection capacity analysis at Clarkway Drive/Humber Station Road & Mayfield Road under the 2029 horizon year is summarized in **Table 6-2** for the weekday AM and PM peak hours.

Table 6-2: Capacity Analysis, Clarkway Drive/Humber Station Road & Mayfield Road (2029)

Mvmt	Existing Traffic (2023)				Future Background (2029 - Optimized)				Future Total (2029 - Optimized)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	-	-	C (23)	-/-	-	-	B (19)	-/-	-	-	C (20)	-/-
EBL	559	0.49	A (9)	107/155	8	0.02	B (10)	1/3	85	0.19	B (15)	8/20
EBT					769	0.26	A (8)	25/39	769	0.27	A (10)	28/43
EBR					28	0.03	A (7)	0/3	28	0.04	A (8)	0/3
WBL	541	0.55	A (9)	70/103	102	0.23	B (13)	9/23	102	0.25	B (15)	10/25
WBT					581	0.29	A (8)	28/45	581	0.30	B (10)	31/50
WBR					21	0.02	A (7)	0/2	45	0.05	A (8)	0/5
NBL	170	0.59	D (51)	42/71	11	0.09	D (53)	2/7	11	0.08	D (51)	2/7
NBTR					255	0.77	D (49)	36/61	294	0.76	D (45)	46/71
SBL	257	0.82	E (65)	66/116	23	0.20	E (56)	6/15	33	0.26	D (55)	7/18
SBTR					270	0.72	D (47)	71/98	309	0.72	D (44)	81/109
PM Peak												
Overall	-	-	C (29)	-/-	-	-	C (23)	-/-	-	-	C (24)	-/-
EBL	556	0.54	B (15)	124/197	10	0.03	B (19)	1/4	45	0.17	C (25)	5/14
EBT					704	0.26	B (12)	30/45	704	0.27	B (14)	31/45
EBR					19	0.02	B (10)	0/2	19	0.02	B (12)	0/2
WBL	701	0.73	C (20)	214/299	135	0.34	B (20)	17/39	135	0.36	C (23)	18/39
WBT					847	0.44	B (14)	60/89	847	0.47	B (17)	62/89
WBR					42	0.05	B (10)	0/6	54	0.07	B (12)	0/7
NBL	413	0.88	E (60)	96/151	59	0.17	D (35)	11/21	59	0.20	D (38)	11/21
NBTR					441	0.90	D (54)	100/130	459	0.84	D (47)	105/138
SBL	74	0.16	C (34)	18/34	11	0.12	E (57)	2/8	40	0.34	E (56)	10/23
SBTR					78	0.15	C (32)	16/30	195	0.37	C (32)	39/68

Note: Queues are presented in metres

Existing Conditions: The signalized intersection operates within capacity, with acceptable delays and an overall LOS of 'C' during both weekday AM and PM peak hours. The southbound movement during the AM peak hour and the northbound movement during the PM peak hour experiences some delay and a LOS of 'E'; however, operates with residual capacity. All existing 95th percentile queues are acceptable.

It should be noted that these conditions improve under future conditions as a result of intersection reconstruction to remove the jog between the north and south approaches along with the widening of Mayfield Road within the 2029 horizon and widening of Humber Station Road within the 2034 horizon.

Future Background Conditions (2029): With signal optimization and widening of Mayfield Road, the intersection is expected to generally operate well under future background conditions with acceptable delays and an overall LOS of 'C' or better during both peak hours. However, it is noted that the southbound left movement operates with a LOS 'E' during both peak hours and the v/c ratio for the northbound through-right movement reaches 0.90 during the PM peak hour. No other constraints are noted for this intersection. All 95th percentile queue lengths are acceptable.

Future Total Conditions (2029): The intersection is expected to experience some increase in delays and v/c ratios when compared to future background conditions. The addition of site traffic is expected to have an acceptable impact on intersection operations. No traffic constraints have been identified and no intersection modifications are recommended.

6.4.2 Humber Station Road & Healey Road (2029)

As per *Town of Caledon Transportation Master Plan (2017)*, Humber Station Road & Healey Road is planned to be signalized by 2031. However, this improvement was applied under the 2029 horizon year to accommodate future traffic volumes. The recommended signal timing plan under future conditions is summarized in **Table 6-3**. Furthermore, exclusive left-turning lanes are recommended for all directions.

Table 6-3: Recommended Timing Plan, Humber Station Road & Healey Road

Horizon	Cycle Length (s)	Signal Timing Modifications
Existing Weekday AM	-	-
2029 & 2034 Weekday AM (New)	120	
Existing Weekday PM	-	-
2029 & 2034 Weekday PM (New)	120	

The intersection capacity analysis at Humber Station Road & Healey Road under the 2029 horizon year is summarized in **Table 6-4** for the weekday AM and PM peak hours.

Table 6-4: Capacity Analysis, Humber Station Road & Healey Road (2029)

Mvmt	Existing Traffic (2023)				Future Background (2029 - New)				Future Total (2029 - New)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	See Section 6.5.1				-	-	B (19)	-/-	-	-	B (19)	-/-
EBL					4	0.01	A (5)	0/2	4	0.01	A (6)	0/2
EBT					633	0.51	A (9)	75/128	633	0.53	B (11)	78/132
EBR					35	0.03	A (5)	0/3	63	0.06	A (6)	1/7
WBL					73	0.15	A (6)	4/9	117	0.25	A (7)	6/14
WBTR					280	0.21	A (4)	16/31	280	0.21	A (4)	17/32
NBL					23	0.24	E (58)	6/16	35	0.32	E (57)	9/21
NBTR					53	0.24	D (47)	5/19	67	0.28	D (45)	5/20
SBL					79	0.41	D (52)	20/34	79	0.39	D (51)	19/34
SBTR					181	0.74	D (54)	46/68	187	0.69	D (52)	48/70
PM Peak												
Overall	See Section 6.5.1				-	-	B (19)	-/-	-	-	C (21)	-/-
EBL					21	0.04	B (12)	1/5	21	0.05	B (14)	2/6
EBT					315	0.24	A (6)	24/45	315	0.25	A (7)	26/49
EBR					14	0.01	A (5)	0/2	27	0.03	A (6)	0/4
WBL					34	0.05	A (7)	2/7	55	0.09	A (9)	4/11
WBTR					674	0.51	A (9)	66/118	674	0.53	B (10)	73/130
NBL					54	0.20	D (43)	14/28	90	0.30	D (42)	22/26
NBTR					284	0.82	D (51)	73/101	324	0.84	D (49)	80/110
SBL					25	0.24	E (57)	6/14	25	0.24	E (57)	5/14
SBTR					54	0.15	D (40)	10/20	57	0.15	D (38)	11/20

Note: Queues are presented in metres

Future Background Conditions (2029): With signalization, the intersection is expected to generally operate well, with acceptable delays and an overall LOS of 'B' during both peak hours. However, it is noted that the northbound left movement operates at LOS 'E' during the AM peak hour and the southbound left movement operates at LOS 'E' during the PM peak hour. No other constraints are noted for this intersection. All 95th percentile queue lengths are acceptable.

Future Total Conditions (2029): Minor increases in delay and v/c ratio are expected under futural total conditions compared to future background conditions during both weekday peak hours. The addition of site traffic is expected to have an acceptable impact on intersection operations. No constraints have been identified as a result of site traffic.

6.4.3 Humber Station Road & George Bolton Parkway Extension (2029)

The future intersection of George Bolton Parkway & Humber Station Road Extension is proposed as a full movements signalized intersection by the 2029 horizon. The recommended signal timing plan under future conditions is summarized in **Table 6-5**.

As per the *Town of Caledon's Multi-Modal Transportation Master Plan (2024)*, George Bolton Parkway is planned as a 4-lane connection from Humber Station Road to Coleraine Drive by 2031. However, the 2029 horizon includes the partial buildout of George Bolton Parkway to facilitate access to the subject site.

To understand the minimum road network required to service the lands, George Bolton Parkway was analyzed as a 2-lane cross-section. A sensitivity analysis is provided in **Section 7** detailing operations for George Bolton Parkway as 4-lanes.

Table 6-5: Recommended Timing Plan, Humber Station Road & George Bolton Parkway Extension

Horizon	Cycle Length (s)	Signal Timing
Existing Weekday AM	-	-
2029 & 2034 Weekday AM (New)	120	
Existing Weekday PM	-	-
2029 & 2034 Weekday PM (New)	120	

The intersection capacity analysis at Humber Station Road & George Bolton Parkway extension under the 2029 and horizon year are summarized in **Table 6-6** for the weekday AM and PM peak hours.

Table 6-6: Capacity Analysis, Humber Station Road & George Bolton Parkway Extension (2029)

Mvmt	Existing Traffic (2023)				Future Background (2029)				Future Total (2029 - New)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	-				-				-	-	A (9)	-/-
WBL									50	0.36	D (53)	12/25
WBR									26	0.21	D (51)	0/9
NBT									82	0.06	A (3)	5/10
NBR									140	0.12	A (3)	0/9
SBL									79	0.09	A (3)	3/8
SBT									293	0.20	A (3)	13/29
PM Peak												
Overall	-				-				-	-	B (20)	-/-
WBL									148	0.79	E (59)	35/55
WBR									75	0.45	D (52)	0/13
NBT									329	0.23	A (4)	33/63
NBR									65	0.06	A (4)	1/8
SBL									37	0.05	A (5)	3/8
SBT									89	0.06	A (3)	6/14

Note: Queues are presented in metres

Future Total Conditions (2029): With signalization, the intersection is expected to have acceptable operations, with all movements operating with acceptable delays and v/c ratios. However, it is noted that the westbound left movement will operate with a LOS 'E' and with 95th percentile queue lengths of 55 m in the PM peak hour.

6.5 2029 UNSIGNALIZED INTERSECTIONS

The results for the unsignalized intersections under the 2029 horizon during the weekday AM and PM peak hours are summarized in the sections below.

6.5.1 Humber Station Road & Healey Road (Existing)

As previously mentioned, signalization of Humber Station Road & Healey Road is recommended in 2029. As such, only the existing intersection operations are provided below in **Table 6-7** for the weekday AM and PM peak hours.

Table 6-7: Capacity Analysis, Humber Station Road & Healey Road (Existing)

Mvmt	Existing Conditions (2023)			
	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak				
Overall	-	-	D (30)	-/-
NBLTR	53	0.11	B (11)	-/0
EBLTR	522	0.93	E (47)	-/12
WBLTR	287	0.52	C (16)	-/3
SBLTR	238	0.47	C (16)	-/3
PM Peak				
Overall	-	-	D (26)	-/-
NBLTR	268	0.49	C (16)	-/3
EBLTR	274	0.48	B (15)	-/3
WBLTR	552	0.89	E (39)	-/11
SBLTR	70	0.14	B (11)	-/1

Note: Queues are presented in metres

Existing Conditions: All movements at the unsignalized intersection operate with residual capacity and acceptable delays; however, it is noted that the eastbound movement operates with a LOS 'E' during the AM peak hour and the westbound movement operates with a LOS 'E' during the PM peak hour. The v/c ratios for these movements are noted to be approaching capacity under existing conditions. All existing 95th percentile queues are acceptable.

6.5.2 George Bolton Parkway Extension & Subject Site Access 1 (2029)

The intersection capacity analysis at George Bolton Parkway Extension & Subject Site Access 1 under the 2029 and horizon year is summarized in **Table 6-8** for the weekday AM and PM peak hours.

Table 6-8: Capacity Analysis, George Bolton Parkway Extension & Subject Site Access 1 (2029)

Mvmt	Existing Traffic (2023)				Future Background (2029)				Future Total (2029 - New)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall									-	-	- (4)	-/-
EBL									121	0.09	A (8)	-/0
EBT									98	0.00	A (0)	-/0
WBT									34	0.00	(0)	-/0
SBL									0	0.00	A (0)	-/0
SBR									42	0.05	A (9)	-/0

Mvmt	Existing Traffic (2023)				Future Background (2029)				Future Total (2029 - New)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
PM Peak												
Overall									-	-	- (5)	-/-
EBL									56	0.05	A (8)	-/0
EBT									46	0.00	A (0)	-/0
WBT									100	0.00	(0)	-/0
SBL									0	0.00	A (0)	-/0
SBR									123	0.15	A (10)	-/1

Note: Queues are presented in metres

Future Total Conditions (2029): Site Access 1 is expected to operate well within capacity and with acceptable delays during both peak hours. No constraints have been identified as a result of site traffic.

6.5.3 George Bolton Parkway Extension & Subject Site Access 2 (2029)

The intersection capacity analysis at George Bolton Parkway Extension & Subject Site Access 2 under the 2029 and horizon year is summarized in **Table 6-9** for the weekday AM and PM peak hours.

Table 6-9: Capacity Analysis, George Bolton Parkway Extension & Subject Site Access 2 (2029)

Mvmt	Existing Traffic (2023)				Future Background (2029)				Future Total (2029 - New)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	-				-				-	-	- (8)	-/-
EBL									98	0.07	A (7)	-/0
EBT									0	0.00	A (0)	-/0
WBT									0	0.00	(0)	-/0
WBR									0	0.00	(0)	-/0
SBR									34	0.04	A (9)	-/0
PM Peak												
Overall	-				-				-	-	- (8)	-/-
EBL									46	0.03	A (8)	-/0
EBT									0	0.00	A (0)	-/0
WBT									0	0.00	(0)	-/0
WBR									0	0.00	(0)	-/0
SBR									100	0.10	A (9)	-/0

Note: Queues are presented in metres

Future Total Conditions (2029): Site Access 2 is expected to operate well within capacity and with acceptable delays during both peak hours. No constraints have been identified as a result of site traffic.

6.6 2034 SIGNALIZED INTERSECTIONS

The results for the signalized intersections under the 2034 horizon during the weekday AM and PM peak hours are summarized in the sections below.

6.6.1 Clarkway Drive/Humber Station Road & Mayfield Road (2034)

The optimized signal timing plans from the 2029 horizon were carried forward to the 2034 horizon. The intersection capacity analysis at Clarkway Drive/Humber Station Road & Mayfield Road under the 2034 horizon year is summarized in **Table 6-10** for the weekday AM and PM peak hours.

Table 6-10: Capacity Analysis, Clarkway Drive/Humber Station Road & Mayfield Road (2034)

Mvmt	Existing Traffic (2023)				Future Background (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	-	-	C (23)	-/-	-	-	B (19)	-/-	-	-	B (20)	-/-
EBL	559	0.49	A (9)	107/155	8	0.02	B (10)	1/3	85	0.18	B (14)	7/19
EBT					869	0.29	A (9)	27/44	869	0.31	B (10)	30/48
EBR					28	0.03	A (7)	0/3	28	0.04	A (8)	0/3
WBL	541	0.55	A (9)	70/103	102	0.26	B (15)	9/24	102	0.28	B (17)	10/26
WBT					525	0.27	A (9)	23/41	525	0.28	B (10)	26/44
WBR					21	0.02	A (7)	0/2	21	0.02	A (8)	0/2
NBL	170	0.59	D (51)	42/71	11	0.05	D (44)	2/7	11	0.05	D (42)	2/7
NBTR					272	0.79	D (48)	50/75	311	0.80	D (46)	60/85
SBL	257	0.82	E (65)	66/116	23	0.20	E (55)	6/15	23	0.20	E (55)	5/15
SBTR					285	0.37	D (40)	39/52	324	0.39	D (38)	43/56
PM Peak												
Overall	-	-	C (29)	-/-	-	-	C (25)	-/-	-	-	C (26)	-/-
EBL	556	0.54	B (15)	124/197	10	0.03	B (18)	1/4	45	0.14	C (21)	5/13
EBT					695	0.27	B (13)	32/44	695	0.27	B (14)	33/44
EBR					19	0.02	B (11)	0/2	19	0.02	B (12)	0/2
WBL	701	0.73	C (20)	214/299	135	0.35	C (22)	18/39	135	0.36	C (23)	19/39
WBT					650	0.36	B (14)	45/65	650	0.37	B (15)	47/65
WBR					42	0.05	B (11)	0/6	42	0.05	B (12)	0/6
NBL	413	0.88	E (60)	96/151	59	0.15	C (32)	11/21	59	0.17	C (34)	11/21
NBTR					480	0.91	E (56)	110/145	498	0.92	E (57)	114/153
SBL	74	0.16	C (34)	18/34	11	0.12	E (57)	2/9	11	0.12	E (57)	3/9
SBTR					81	0.08	C (30)	8/16	198	0.20	C (30)	19/27

Note: Queues are presented in metres

Future Background Conditions (2034): The intersection is expected to generally operate well under future background conditions with acceptable delays and an overall LOS of 'C' or better during both peak hours. However, it is noted that the southbound left movement operates with a LOS 'E' during both peak hours and the v/c ratio for the northbound through-right movement exceeds 0.90 during the PM peak hour. No other constraints are noted for this intersection. All 95th percentile queue lengths are acceptable.

Future Total Conditions (2034): The intersection is expected to experience some increase in delays and v/c ratios when compared to future background conditions. The addition of site traffic is expected to have

an acceptable impact on intersection operations. No traffic constraints have been identified and no intersection modifications are recommended.

6.6.2 Humber Station Road & Healey Road (2034)

The recommended signal timing plans from the 2029 horizon were carried forward to the 2034 horizon. The intersection capacity analysis at Humber Station Road & Healy Road under the 2034 horizon year is summarized in **Table 6-11** for the weekday AM and PM peak hours.

Table 6-11: Capacity Analysis, Humber Station Road & Healey Road (2034)

Mvmt	Existing Traffic (2023)				Future Background (2029 - New)				Future Total (2029 - New)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	See Section 6.5.1				-	-	B (16)	-/-	-	-	B (16)	-/-
EBL					4	0.01	A (4)	0/2	4	0.01	A (4)	0/2
EBT												
EBR					763	0.31	A (6)	33/53	791	0.32	A (6)	35/55
WBL					73	0.14	A (3)	3/7	73	0.14	A (4)	3/7
WBTR					336	0.12	A (3)	7/14	336	0.12	A (3)	7/14
NBL					23	0.20	E (55)	6/16	35	0.31	E (57)	10/21
NBTR					58	0.23	D (49)	4/11	58	0.23	D (49)	3/11
SBL					79	0.47	E (55)	20/36	79	0.47	E (55)	20/36
SBTR					190	0.50	D (52)	25/36	196	0.52	D (52)	26/37
PM Peak												
Overall	See Section 6.5.1				-	-	B (17)	-/-	-	-	B (17)	-/-
EBL					21	0.04	A (5)	1/3	21	0.04	A (5)	1/4
EBT												
EBR					376	0.14	A (3)	9/16	389	0.14	A (3)	9/17
WBL					34	0.04	A (4)	2/4	34	0.04	A (4)	2/5
WBTR					808	0.29	A (4)	23/36	808	0.29	A (4)	23/39
NBL					54	0.26	D (49)	14/29	90	0.45	D (52)	24/42
NBTR					313	0.70	D (54)	39/55	313	0.70	D (54)	38/54
SBL					25	0.24	E (57)	6/15	25	0.24	E (57)	6/15
SBTR					56	0.12	D (46)	6/12	59	0.13	D (46)	6/13

Note: Queues are presented in metres

Future Background Conditions (2034): the intersection is expected to generally operate well, with acceptable delays and an overall LOS of 'B' during both peak hours. However, it is noted that the northbound left movement operates with a LOS 'E' during the AM peak hour and the southbound left movement operates at LOS 'E' during both peak hours. No other constraints are noted for this intersection. All 95th percentile queue lengths are acceptable.

Future Total Conditions (2034): Minor increases in delay and v/c ratio are expected under futural total conditions compared to future background conditions during both weekday peak hours. The addition of site traffic is expected to have an acceptable impact on intersection operations. No constraints have been identified as a result of site traffic. It is noted that the 95th percentile queue for the northbound left movement will be 42 m in the PM peak hour, exceeding the assumed storage length of 30 m. A 45 m storage capacity would be a more appropriate assumption based on this conclusion.

6.6.3 Humber Station Road & George Bolton Parkway Extension (2034)

The full extension of George Bolton Parkway from Coleraine Drive to Humber Station Road is proposed within the 2034 horizon. The recommended signal timing plans from the 2029 horizon were carried forward to the 2034 horizon. As previously noted, to understand the minimum road network required to service the lands, George Bolton Parkway was analyzed as a 2-lane cross-section. A sensitivity analysis is provided in **Section 7** detailing operations for George Bolton Parkway as 4-lanes.

The intersection capacity analysis at Humber Station Road & George Bolton Parkway extension under the 2034 and horizon year are summarized in **Table 6-12** for the weekday AM and PM peak hours.

Table 6-12: Capacity Analysis, Humber Station Road & George Bolton Parkway Extension (2034)

Mvmt	Existing Traffic (2023)				Future Background (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	-				-				-	-	A (7)	-/-
WBL									40	0.32	D (53)	9/21
WBR									12	0.10	D (51)	0/6
NBT									87	0.03	A (3)	3/4
NBR									116	0.10	A (3)	0/6
SBL									35	0.04	A (3)	1/2
SBT									308	0.11	A (3)	6/6
PM Peak												
Overall	-				-				-	-	B (15)	-/-
WBL									119	0.72	E (58)	29/46
WBR									36	0.25	D (51)	0/10
NBT									356	0.13	A (3)	17/32
NBR									54	0.05	A (3)	1/5
SBL									16	0.02	A (4)	1/3
SBT									92	0.03	A (3)	1/6

Note: Queues are presented in metres

Future Total Conditions (2034): With the full extension of George Bolton Parkway, the intersection is expected to have acceptable operations, with all movements operating with acceptable delays and v/c ratios. However, it is noted that the westbound left movement will operate with a LOS 'E' and with 95th percentile queue lengths of 46 m in the PM peak hour.

6.7 2034 UNSIGNALIZED INTERSECTIONS

The results for the unsignalized intersections under the 2034 horizon during the weekday AM and PM peak hours are summarized in the sections below.

6.7.1 George Bolton Parkway Extension & Subject Site Access 1 (2034)

The intersection capacity analysis at George Bolton Parkway Extension & Subject Site Access 1 under the 2034 and horizon year is summarized in **Table 6-13** for the weekday AM and PM peak hours.

Table 6-13: Capacity Analysis, George Bolton Parkway Extension & Subject Site Access 1 (2034)

Mvmt	Existing Traffic (2023)				Future Background (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall	-				-				-	-	- (4)	-/-
EBL									83	0.06	A (8)	-/0
EBT									68	0.00	A (0)	-/0
WBT									24	0.00	(0)	-/0
WBR									38	0.00	(0)	-/0
SBL									13	0.02	B (11)	-/0
SBR									29	0.03	A (9)	-/0
PM Peak												
Overall	-				-				-	-	- (5)	-/-
EBL									39	0.03	A (8)	-/0
EBT									31	0.00	A (0)	-/0
WBT									69	0.00	(0)	-/0
WBR									17	0.00	(0)	-/0
SBL									38	0.06	B (10)	-/0
SBR									84	0.10	A (9)	-/0

Note: Queues are presented in metres

Future Total Conditions (2034): Site Access 1 is expected to operate well within capacity and with acceptable delays during both peak hours. No constraints have been identified as a result of site traffic.

6.7.2 George Bolton Parkway Extension & Subject Site Access 2 (2034)

The intersection capacity analysis at George Bolton Parkway Extension & Subject Site Access 2 under the 2029 and horizon year is summarized in **Table 6-14** for the weekday AM and PM peak hours.

Table 6-14: Capacity Analysis, George Bolton Parkway Extension & Subject Site Access 2 (2034)

Mvmt	Existing Traffic (2023)				Future Background (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak												
Overall									-	-	- (5)	-/-
EBL									68	0.05	A (8)	-/0
EBT									13	0.00	A (0)	-/0

Mvmt	Existing Traffic (2023)				Future Background (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
WBT									38	0.00	(0)	-/0
WBR									30	0.00	(0)	-/0
SBL									11	0.02	B (10)	-/0
SBR									24	0.03	A (9)	-/0
PM Peak												
Overall	-				-				-	-	- (6)	-/-
EBL									31	0.02	A (8)	-/0
EBT									38	0.00	A (0)	-/0
WBT									17	0.00	(0)	-/0
WBR									14	0.00	(0)	-/0
SBL									31	0.04	A (10)	-/0
SBR									69	0.07	A (9)	-/0

Note: Queues are presented in metres

Future Total Conditions (2029): Site Access 2 is expected to operate well within capacity and with acceptable delays during both peak hours. No constraints have been identified as a result of site traffic.

6.8 SUMMARY OF INTERSECTION CAPACITY ANALYSIS RESULTS

With signal optimizations, the realignment of the Clarkway Drive/Humber Station Road & Mayfield Road intersection, and planned widenings along Mayfield Road, the intersection capacity analysis results indicate that site traffic is expected to have an acceptable impact on the surrounding road network. In addition, the proposed site accesses to the subject site are expected to operate sufficiently under future conditions. Furthermore, signalization is recommended at Humber Station Road & Healey Road by the 2029 horizon to accommodate future traffic growth, a recommendation which is irrespective of site traffic given that the intersection operates poorly under future background conditions. Overall, the subject site is expected to have an acceptable impact on the road network operations in the surrounding area.

7 SENSITIVITY ANALYSIS

The intersection capacity analysis undertaken in **Section 6** assumed a 2-lane cross-section for George Bolton Parkway to understand the minimum road network improvements required to service the subject site. It is understood that as per the *Town of Caledon's Multi-Modal Transportation Master Plan (2024)*, George Bolton Parkway is planned as a 4-lane connection. As such, the following sensitivity analysis has been prepared to compare the traffic operations between a George Bolton Parkway extension as 2 lanes vs. 4 lanes. The following intersections were included in the sensitivity analysis under the 2029 and 2034 horizons:

- Humber Station Road & George Bolton Parkway Extension;
- George Bolton Parkway Extension & Subject Site Access 1; and
- George Bolton Parkway Extension & Subject Site Access 2.

Figure 7-1 and **Figure 7-2** illustrate the lane configurations assumed under each scenario.

Figure 7-1: George Bolton Parkway Extension (2-lanes vs 4-lanes) Lane Configuration (2029)

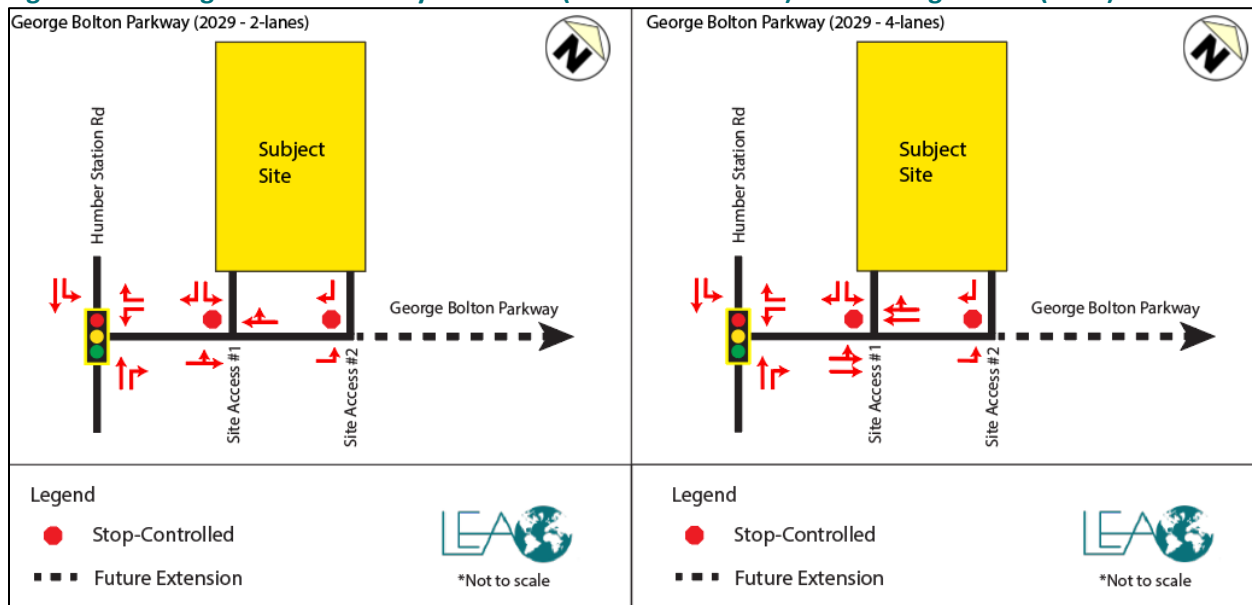
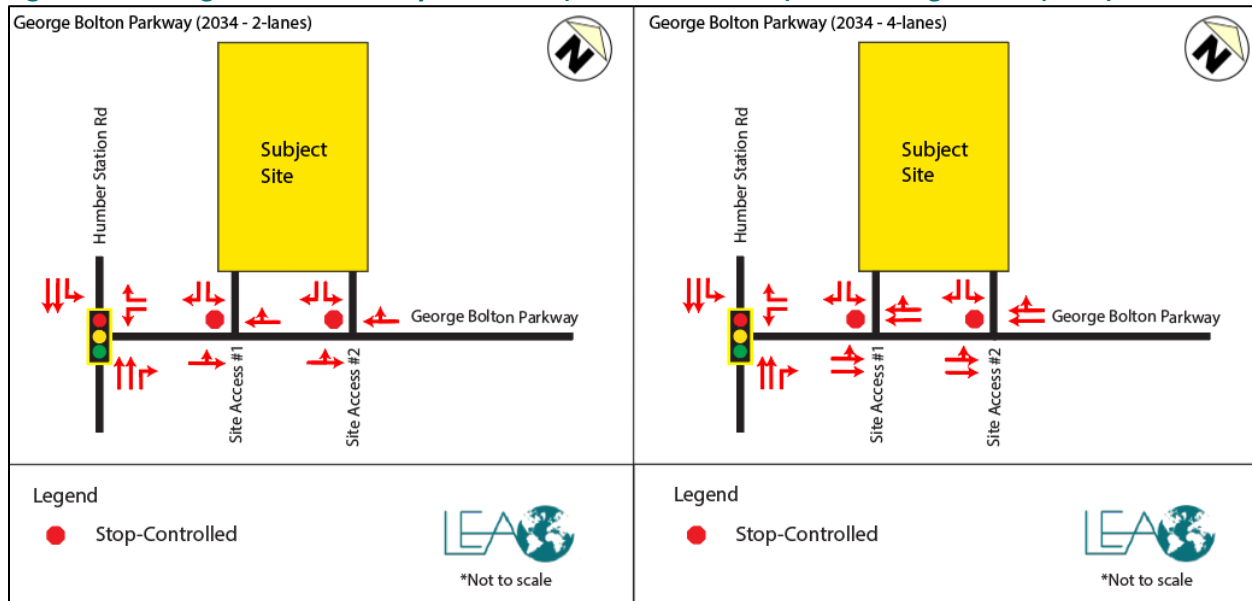


Figure 7-2: George Bolton Parkway Extension (2-lanes vs 4-lanes) Lane Configuration (2034)



7.1 HUMBER STATION ROAD & GEORGE BOLTON PARKWAY EXTENSION – SENSITIVITY

A comparison of the intersection capacity analysis between the 2-lane vs. 4-lane George Bolton Parkway extension for the intersection of Humber Station Road & George Bolton Parkway Extension under the 2029 and 2034 horizons are summarized in **Table 7-1** and **Table 7-2**, respectively. Detailed synchro results are provided in **Appendix J**.

Table 7-1: Sensitivity Analysis – Humber Station Road & George Bolton Parkway Extension (2029)

Mvmt	George Bolton Parkway (2-lanes)				George Bolton Parkway (4-lanes) Sensitivity			
	Future Total (2029)				Future Total (2029)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak								
Overall	-	-	A (9)	-/-	-	-	A (9)	-/-
WBL	50	0.36	D (53)	12/25	50	0.36	D (53)	12/25
WBR	26	0.21	D (51)	0/9	26	0.21	D (51)	0/9
NBT	82	0.06	A (3)	5/10	82	0.06	A (3)	5/10
NBR	140	0.12	A (3)	0/9	140	0.12	A (3)	0/9
SBL	79	0.09	A (3)	3/8	79	0.09	A (3)	3/8
SBT	293	0.20	A (3)	13/29	293	0.20	A (3)	13/29
PM Peak								
Overall	-	-	B (20)	-/-	-	-	B (20)	-/-
WBL	148	0.79	E (59)	35/55	148	0.79	E (59)	35/55
WBR	75	0.45	D (52)	0/13	75	0.45	D (52)	0/13
NBT	329	0.23	A (4)	33/63	329	0.23	A (4)	33/63
NBR	65	0.06	A (4)	1/8	65	0.06	A (4)	1/8
SBL	37	0.05	A (5)	3/8	37	0.05	A (5)	3/8

Mvmt	George Bolton Parkway (2-lanes)				George Bolton Parkway (4-lanes) Sensitivity			
	Future Total (2029)				Future Total (2029)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
SBT	89	0.06	A (3)	6/14	89	0.06	A (3)	6/14

Note: Queues are presented in metres

Table 7-2: Sensitivity Analysis – Humber Station Road & George Bolton Parkway Extension (2034)

Mvmt	George Bolton Parkway (2-lanes)				George Bolton Parkway (4-lanes) Sensitivity			
	Future Total (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak								
Overall	-	-	A (7)	-/-	-	-	A (7)	-/-
WBL	40	0.32	D (53)	9/21	40	0.32	D (53)	9/21
WBR	12	0.10	D (51)	0/6	12	0.10	D (51)	0/6
NBT	87	0.03	A (3)	3/4	87	0.03	A (3)	3/4
NBR	116	0.10	A (3)	0/6	116	0.10	A (3)	0/6
SBL	35	0.04	A (3)	1/2	35	0.04	A (3)	1/2
SBT	308	0.11	A (3)	6/6	308	0.11	A (3)	6/6
PM Peak								
Overall	-	-	B (15)	-/-	-	-	B (15)	-/-
WBL	119	0.72	E (58)	29/46	119	0.72	E (58)	29/46
WBR	36	0.25	D (51)	0/10	36	0.25	D (51)	0/10
NBT	356	0.13	A (3)	17/32	356	0.13	A (3)	17/32
NBR	54	0.05	A (3)	1/5	54	0.05	A (3)	1/5
SBL	16	0.02	A (4)	1/3	16	0.02	A (4)	1/3
SBT	92	0.03	A (3)	1/6	92	0.03	A (3)	1/6

Note: Queues are presented in metres

Future Total Conditions (2029 & 2034): The intersection of Humber Station Road & George Bolton Parkway Extension operates the same with a 2-lane or 4-lane George Bolton cross-section under both peak hours and both horizon years.

7.2 GEORGE BOLTON PARKWAY EXTENSION & SITE ACCESS 1 – SENSITIVITY

A comparison of the intersection capacity analysis between the 2-lane vs. 4-lane George Bolton Parkway extension for Site Access 1 under the 2029 and 2034 horizons are summarized in **Table 7-3** and **Table 7-4**, respectively.

Table 7-3: Sensitivity Analysis –George Bolton Parkway Extension & Site Access 1 (2029)

Mvmt	George Bolton Parkway (2-lanes)				George Bolton Parkway (4-lanes) Sensitivity			
	Future Total (2029)				Future Total (2029)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak								
Overall	-	-	- (4)	-/-	-	-	- (4)	-/-
EBL	121	0.09	A (8)	-/0	121	0.09	A (8)	-/0
EBT	98	0.00	A (0)	-/0	98	0.00	A (0)	-/0
WBT	34	0.00	(0)	-/0	34	0.00	(0)	-/0
SBL	0	0.00	A (0)	-/0	0	0.00	A (0)	-/0
SBR	42	0.05	A (9)	-/0	42	0.05	A (9)	-/0
PM Peak								
Overall	-	-	- (5)	-/-	-	-	- (5)	-/-
EBL	56	0.05	A (8)	-/0	56	0.05	A (8)	-/0
EBT	46	0.00	A (0)	-/0	46	0.00	A (0)	-/0
WBT	100	0.00	(0)	-/0	100	0.00	(0)	-/0
SBL	0	0.00	A (0)	-/0	0	0.00	A (0)	-/0
SBR	123	0.15	A (10)	-/1	123	0.14	A (9)	-/1

Note: Queues are presented in metres

Table 7-4: Sensitivity Analysis –George Bolton Parkway Extension & Site Access 1 (2034)

Mvmt	George Bolton Parkway (2-lanes)				George Bolton Parkway (4-lanes) Sensitivity			
	Future Total (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak								
Overall	-	-	- (4)	-/-	-	-	- (4)	-/-
EBL	83	0.06	A (8)	-/0	83	0.06	A (8)	-/0
EBT	68	0.00	A (0)	-/0	68	0.00	A (0)	-/0
WBT	24	0.00	(0)	-/0	24	0.00	(0)	-/0
WBR	38	0.00	(0)	-/0	38	0.00	(0)	-/0
SBL	13	0.02	B (11)	-/0	13	0.02	B (11)	-/0
SBR	29	0.03	A (9)	-/0	29	0.03	A (9)	-/0
PM Peak								
Overall	-	-	- (5)	-/-	-	-	- (5)	-/-
EBL	39	0.03	A (8)	-/0	39	0.03	A (8)	-/0
EBT	31	0.00	A (0)	-/0	31	0.00	A (0)	-/0
WBT	69	0.00	(0)	-/0	69	0.00	(0)	-/0
WBR	17	0.00	(0)	-/0	17	0.00	(0)	-/0
SBL	38	0.06	B (10)	-/0	38	0.06	B (10)	-/0
SBR	84	0.10	A (9)	-/0	84	0.09	A (9)	-/0

Note: Queues are presented in metres

Future Total Conditions (2029 & 2034): The intersection of George Bolton Parkway Extension & Site Access 1 operates the same with a 2-lane or 4-lane George Bolton cross-section under both peak hours and both horizon years.

7.3 GEORGE BOLTON PARKWAY EXTENSION & SITE ACCESS 2 – SENSITIVITY

A comparison of the intersection capacity analysis between the 2-lane vs. 4-lane George Bolton Parkway extension for Site Access 2 under the 2029 and 2034 horizons are summarized in **Table 7-5** and **Table 7-6**, respectively.

Table 7-5: Sensitivity Analysis –George Bolton Parkway Extension & Site Access 2 (2029)

Mvmt	George Bolton Parkway (2-lanes)				George Bolton Parkway (4-lanes) Sensitivity			
	Future Total (2029)				Future Total (2029)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak								
Overall	-	-	- (8)	-/-	-	-	- (8)	-/-
EBL	98	0.07	A (7)	-/0	98	0.07	A (7)	-/0
EBT	0	0.00	A (0)	-/0	0	0.00	A (0)	-/0
WBT	0	0.00	(0)	-/0	0	0.00	(0)	-/0
SBL	0	0.00	(0)	-/0	0	0.00	(0)	-/0
SBR	34	0.04	A (9)	-/0	34	0.04	A (9)	-/0
PM Peak								
Overall	-	-	- (8)	-/-	-	-	- (8)	-/-
EBL	46	0.03	A (8)	-/0	46	0.03	A (8)	-/0
EBT	0	0.00	A (0)	-/0	0	0.00	A (0)	-/0
WBT	0	0.00	(0)	-/0	0	0.00	(0)	-/0
SBL	0	0.00	(0)	-/0	0	0.00	(0)	-/0
SBR	100	0.10	A (9)	-/0	100	0.10	A (9)	-/0

Note: Queues are presented in metres

Table 7-6: Sensitivity Analysis –George Bolton Parkway Extension & Site Access 2 (2034)

Mvmt	George Bolton Parkway (2-lanes)				George Bolton Parkway (4-lanes) Sensitivity			
	Future Total (2034)				Future Total (2034)			
	Vol	V/C	LOS (Delay)	Queues (50/95)	Vol	V/C	LOS (Delay)	Queues (50/95)
AM Peak								
Overall	-	-	- (5)	-/-	-	-	- (5)	-/-
EBL	68	0.05	A (8)	-/0	68	0.05	A (8)	-/0
EBT	13	0.00	A (0)	-/0	13	0.00	A (0)	-/0
WBT	38	0.00	(0)	-/0	38	0.00	(0)	-/0
SBL	30	0.00	(0)	-/0	30	0.00	(0)	-/0
SBR	11	0.02	B (10)	-/0	11	0.02	B (10)	-/0
PM Peak								
Overall	-	-	- (6)	-/-	-	-	- (6)	-/-
EBL	31	0.02	A (8)	-/0	31	0.02	A (8)	-/0
EBT	38	0.00	A (0)	-/0	38	0.00	A (0)	-/0
WBT	17	0.00	(0)	-/0	17	0.00	(0)	-/0
SBL	14	0.00	(0)	-/0	14	0.00	(0)	-/0
SBR	31	0.04	A (10)	-/0	31	0.04	A (10)	-/0

Note: Queues are presented in metres

Future Total Conditions (2029 & 2034): The intersection of George Bolton Parkway Extension & Site Access 2 operates the same with a 2-lane or 4-lane George Bolton cross-section under both peak hours and both horizon years

8 MULTI-MODAL LEVEL OF SERVICE

The City of Ottawa’s Multi-Modal Level of Service (MMLOS) Guidelines were adopted to generate levels of service (LOS) to describe the convenience and comfort level of existing and proposed transit and active transportation infrastructure within the subject area. While the Town of Caledon is geographically closer to York Region, the City of Ottawa’s MMLOS Guidelines were reviewed rather than York Region guidelines. The City of Ottawa Guidelines provide a more thorough assessment of the level of service (LOS) of each mode by including factors that affect safety and comfort of non-auto modes such as Average Annual Daily Traffic (AADT), operating speeds of vehicles, and presence of on-street parking adjacent to pedestrian/cycling facilities, whereas the York Region Transportation Mobility Plan Guidelines consider only the width of pedestrian/cycling facilities and the level of separation from vehicular traffic. The City of Ottawa’s MMLOS Guidelines is also a typical standard applied to developments throughout the GTA.

The results are presented on a scale of ‘A’ to ‘F’, where ‘A’ represents preferred conditions and ‘F’ represents the least preferred conditions, depending on the criteria of each mode. It should be noted that LOS is not always the desired target for all modes, as each mode is considered independently, and the minimum LOS targets depend on the context of the street and surrounding area. The bicycle level of service (BLOS) and pedestrian level of service (PLOS) evaluations were conducted for the “worst section” of the street segments within the study area. Of note, a transit level of service (TLOS) evaluation was not conducted as none of the studied intersections have bus stops.

A breakdown of the calculations and lookup tables from the MMLOS Guidelines are provided in **Appendix K**.

8.1 BICYCLE LEVEL OF SERVICE EVALUATION

The BLOS evaluation was conducted for the worst segments of Healey Road, Humber Station Road, and Mayfield Road within the study area. **Table 8-1** summarizes the existing and future bicycle level of service evaluation.

Table 8-1: Bicycle Level of Service (BLOS)

Segment	From	To	Side	Existing	Future Background
				LOS	LOS
Healey Road	Humber Station Road	Coleraine Drive	North	F	A
			South	F	A
Humber Station Road	Healey Road	Mayfield Road	East	F	A
			West	F	A
Mayfield Road	Humber Station Road	Coleraine Drive	North	F	A
			South	F	A

Under existing conditions, the study area displays a BLOS of ‘F’. This is largely due to the lack of dedicated cycling facilities, the number of travel lanes, and the speed of traffic along most roads within the study area.

Under future conditions, the study area displays a BLOS of 'A' under future conditions, as physically separated bikeways are proposed along all major streets in the study area.

8.2 PEDESTRIAN LEVEL OF SERVICE EVALUATION

The PLOS evaluation was conducted for the worst segments of Healey Road, Humber Station Road, and Mayfield Road within the study area **Table 8-2** summarizes the existing and future pedestrian level of service evaluation.

Table 8-2: Pedestrian Level of Service (PLOS)

Segment	From	To	Side	Existing	Future
				LOS	LOS
Healey Road	Humber Station Road	Coleraine Drive	North	F	D
			South	F	D
Humber Station Road	Healey Road	Mayfield Road	East	F	D
			West	F	D
Mayfield Road	Humber Station Road	Coleraine Drive	North	F	E
			South	F	D
George Bolt Parkway	Humber Station Road	Coleraine Drive	North	-	B
			South	-	C

Under existing conditions, the study area displays a PLOS of 'F'. This is largely due to the lack of pedestrian facilities along the arterial and collector roads within the study area including Mayfield Road, Humber Station Road, and Healey Road.

As per the Town of Caledon ATMP, multi-use paths are proposed along Healey Road and Humber Station Road. While detailed plans are not available, the analysis above assumes 3 m wide multi-use paths will be provided on both sides of each street, with 1 m buffers from the roadway. These assumptions will result in a PLOS D under future conditions due to the high operating speeds of the roadways, however, are an improvement from the existing condition.

Mayfield Road will be widened by Peel Region, and the current design includes a 1.5 m wide sidewalk and 3 m wide boulevard on one side, and a 3 m multi-use trail and 3 m boulevard on the other side, resulting in a PLOS E for the sidewalk and D for the trail. The poor level of service is a result of the high traffic and high posted speed limit on Mayfield Road; however, it is an improvement from the existing condition with no facilities.

George Bolton Parkway is currently subject to an Environmental Assessment process. It is expected that the future pedestrian environment will include a 3 m wide multi-use trail on one side and a 1.8 m sidewalk on the other, both with 4m wide buffers from the street. This will result in PLOS B and C, respectively.

9 PARKING AND LOADING REVIEW

9.1 VEHICULAR PARKING REVIEW

The vehicle parking requirements for the proposed development are subject to standards provided within the Town of Caledon Zoning By-law 2006-50, *Section 5 - Parking, Loading and Delivery (Section 5.2.3 - Non-Residential Parking Requirements, Revised: July 20, 2023)*. It should be noted that the proposed net floor area (NFA) is 113,275 m² which excludes the 255 loading docks and their interior loading areas. The parking requirements and proposed supply are summarized in **Table 9-1**.

Table 9-1: Town of Caledon Zoning By-law 2006-50 Parking Requirement

Building	Land Use	NFA	Town of Caledon ZBL 2006-50		Proposed Supply
			Parking Standard	Parking Required ⁽¹⁾	
1	Warehouse (>20,000 m ²)	113,275 m ²	168 spaces + 1 per 170 m ² of NFA over 20,000 m ²	717	717 (incl. 4 carpool spaces)
			Total	717	717
			Parking Rate (spaces per 100 m²)	0.63	0.63

Note: (1) – According to Town of Caledon By-law 2006-50, Section 5.2.4, where the minimum number of parking, loading or delivery spaces is calculated on the basis of a rate or ratio, the required number of parking, loading or delivery spaces shall be rounded to the next higher whole number.

Based on the minimum parking requirements under the Town of Caledon By-law 2006-50, the proposed development is required to provide a total of 717 parking spaces. The proposed supply satisfies the by-law requirements.

9.1.1 Accessible Parking

By-law 2015-058 stipulates a requirement for accessible parking spaces. If the number of required parking spaces is between 201 to 1,000 spaces, a minimum of 2 plus 2% of the total required parking spaces should be accessible. Parking spaces must comply with the minimum dimensions for an accessible parking space (Type A: 3.4 m in width, 6 m in length, and 3.0 m in vertical clearance, Type B: 2.75 m in width, 6 m in length, and 3.0 m in vertical clearance).

As the development is required to provide 717 total parking spaces, the number of accessible spaces required is 17. The site plan currently shows a total of 20 accessible parking spaces, satisfying the requirement.

9.1.2 EV Charging Parking Spaces

To support the climate change objectives of the Official Plan, the Town of Caledon Green Development Standard (GDS) Guidebook was reviewed for electric vehicle (EV) charging spaces. For institutional, commercial, and industrial land uses, the GDS suggests that a minimum of 20% of non-fleet parking spaces are EV-Ready and encourages a minimum of 5% to be equipped with EV Supply Equipment (EVSE). The EV parking spaces required as per the GDS and the proposed supply are summarized in **Table 9-2**.

Table 9-2: Town of Caledon Green Development Standard EV Charging Spaces

Number of Parking Spaces Provided	EV-Ready Requirement	EVSE Requirement	EV-Ready Supply	EVSE Supply
717 spaces	20% of non-fleet parking spaces: 144 spaces	5% of spaces: 36 spaces	0 spaces	36 spaces

Based on the GDS, a total of 144 spaces are required to be EV-ready while 36 spaces are required to be equipped with EVSE capabilities. It is understood that the GDS is currently in a one-year pilot phase for the implementation of metrics and is not mandated by the Town's zoning by-law. However, to support sustainability, a total of 36 spaces will be provided with EV charging capabilities meeting the Town's EVSE standard and is in line with LEED v4.1 requirements.

9.2 TRUCK TRAILER SPACES REVIEW

A total of 356 trailer spaces will be provided for the proposed development. To determine if the truck trailer spaces are appropriate for the proposed use, a review was conducted for a comparable industrial warehouse development proposal by the same developer. The proxy site is located southeast of the subject site at the intersection of Coleraine Drive & Countryside Drive in the City of Brampton (5515 & 5525 Countryside Drive) and consists of two (2) buildings totaling 113,363 m² of GFA and 171 trailer spaces. It is understood that the proposed development and proxy site will have similar industrial/warehousing operations.

Of note, the 5515 & 5525 Countryside Drive site plan was approved by the City of Brampton in November 2023. **Table 9-3** summarizes the truck trailer spaces at the proxy site.

Table 9-3: 5515 & 5525 Countryside Drive Proposed Truck Trailer Spaces

5515 & 5525 Countryside Drive	GFA	Truck Trailer Spaces	Rate per 100m ²
Building 2 (Industrial Warehouse)	90,624.73 m ²	143	0.16 sp./100 m ²
Building 3 (Industrial Warehouse)	22,738.30 m ²	28	0.12 sp./100 m ²
Total	113,363.03 m²	171	0.15 sp./100 m²

The proxy site is proposing a truck trailer rate of 0.15 spaces per 100 m². This rate was then applied to the subject site to estimate the anticipated future demand, as summarized in **Table 9-4**.

Table 9-4: Projected Future Trailer Spaces Required

Building	Land Use	GFA	Trailer Rate Source	Min. Trailer Rate	Trailer Spaces Required
1	Warehouse	144,266 m ²	Proxy Review	0.15 sp./100 m ²	218
Proposed Trailer Supply					356
Surplus Spaces					138

The proposed truck trailer supply of 356 spaces results in a surplus of 138 spaces and is therefore sufficient to accommodate the anticipated demand generated by the proposed land use.

9.3 BICYCLE PARKING REVIEW

The Town of Caledon Zoning By-law 2006-50 does not include bicycle parking requirements. However, short-term bicycle parking spaces will be provided to encourage cycling as a mode of transportation. The bike parking supply will follow the short-term bicycle parking requirements for industrial uses from Peel

Region's Healthy Development Assessment. **Table 9-5** summarizes the parking requirement and proposed supply.

Table 9-5: Peel Region Healthy Development Assessment Bicycle Parking Requirement

Land Use	Type	GFA	Peel Region Healthy Development Assessment		Proposed Supply
			Criteria	Parking Required	
Industrial	Short-Term	144,091 m ²	2 + 0.01 sp./100 m ²	17	17
Office	Short-Term	175 m ²	2 + 0.05 sp./100 m ²	3	3
Total				20	20

10 LOADING & FUNCTIONAL DESIGN REVIEW

10.1 LOADING REVIEW

The loading requirements are subject to Town of Caledon Zoning By-law 2006-50, *Section 5 - Parking, Loading and Delivery (Section 5.3.2 – Loading Space Requirements, Revised: July 20, 2023)*. The loading space requirements referenced in Section 5.3.2 of the By-law was applied to the proposed development as summarized in **Table 10-1**.

Table 10-1: Town of Caledon Zoning By-law 2006-50 Loading Requirement

Building	Land Use	NFA	Town of Caledon ZBL 2006-50		Proposed Supply
			Parking Standard	Loading Required ⁽¹⁾	
1	Warehouse (>7,441 m ²)	113,275 m ²	3 spaces + 1 per 9,300 m ² of NFA over 7,441 m ²	15	255
Total				15	255

Note: (1) – According to Town of Caledon By-law 2006-50, Section 5.2.4, where the minimum number of parking, loading or delivery spaces is calculated on the basis of a rate or ratio, the required number of parking, loading or delivery spaces shall be rounded to the next higher whole number.

According to the Zoning By-law, a total of 15 loading spaces are required. A total of 255 loading spaces are proposed for the overall development, satisfying the by-law requirements. Furthermore, all proposed loading spaces meet the required delivery space dimensions of at least 14 m long, 3.5 m wide, and 3.35 m in vertical clearance.

10.2 FUNCTIONAL DESIGN REVIEW

A review of the functionality and accessibility of the proposed loading and truck trailer spaces was completed to determine that the proposed spaces can be accessed and egressed by the appropriate vehicles. The functionality of the proposed parking spaces was also confirmed. Furthermore, a review of internal roads reveals that Fire and Emergency Service vehicles can safely access the site. The swept path diagrams are provided in **Appendix L**. The review finds that all design vehicles can be accommodated.

As per Tac 8.8.2, for a signalized intersection, arterial corner clearance to the nearest access driveway must be a minimum of 70 m. This requirement is met with a corner clearance of 340.46 m. In addition, as per MTO guidelines, low volume commercial or private road access should have a desirable minimum spacing of 85 m. This requirement is met with an access spacing of 358.39 m from Humber Station Road.

A sightline analysis was conducted for the proposed site accesses. The sightline analysis considered Stopping Sight Distance (SSD) and Intersection Sight Distance (ISD). The assessment was based on the methodology outlined in the Geometric Design Guide for Canadian Roads TAC manual. As demonstrated by the sightline analysis drawings in **Appendix L**, vehicles coming east and west meet the SSD requirement of 85 m. Furthermore, vehicles exiting onto George Bolton Parkway meet the ISD requirement of 110 m for right turns and 130 m for left turns resulting in clear sightlines of eastbound and southbound traffic. Therefore, the stopping sight distances and intersection sight distances are considered acceptable.

Furthermore, as per PAC 8.9.3, light industrial land use developments greater than 45,000 m² shall have a minimum throat length of 15 m for collector roads. This requirement is met with a 77.81 m and 82.77 m throat length for the west and east site accesses, respectively.

11 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a set of strategies which strive towards a more efficient transportation network by influencing travel behaviour. Effective TDM measures can reduce vehicle usage and encourage people to engage in more sustainable methods of travel. There are several opportunities to incorporate TDM measures that support alternative modes of transportation. The recommendations should enhance non-single occupant vehicle trips for existing and future employees of the development. In efforts to reduce single-occupant vehicle (SOV) trips for employees traveling to and from the subject site.

11.1 PEDESTRIAN-BASED STRATEGIES

Orient building entrances close to the street with direct connections to pedestrian pathways: The principle entrance is oriented facing the future extension of George Bolton Parkway. Internal walkways and crosswalks will be provided to facilitate a safe and convenient linkage for pedestrians accessing the building.

11.2 TRANSIT-BASED STRATEGIES

Provision of real-time transit schedule screens: Upon full build out of the George Bolton Parkway extension, it is recommended that screens be provided in the employees' lounges and main exits to display real-time data for transit services, including schedules and service alerts.

11.3 TRAVEL AND PARKING MANAGEMENT STRATEGIES

Signed Carpool Spaces: It is recommended that the proposed development include dedicated carpool spaces as a means to reduce SOV usage. These carpool spaces should be clearly signed and located conveniently close to the main entrances to provide a greater incentive for employees carpooling. Four (4) carpool spaces are proposed, located on the east and west side of the main parking lot.

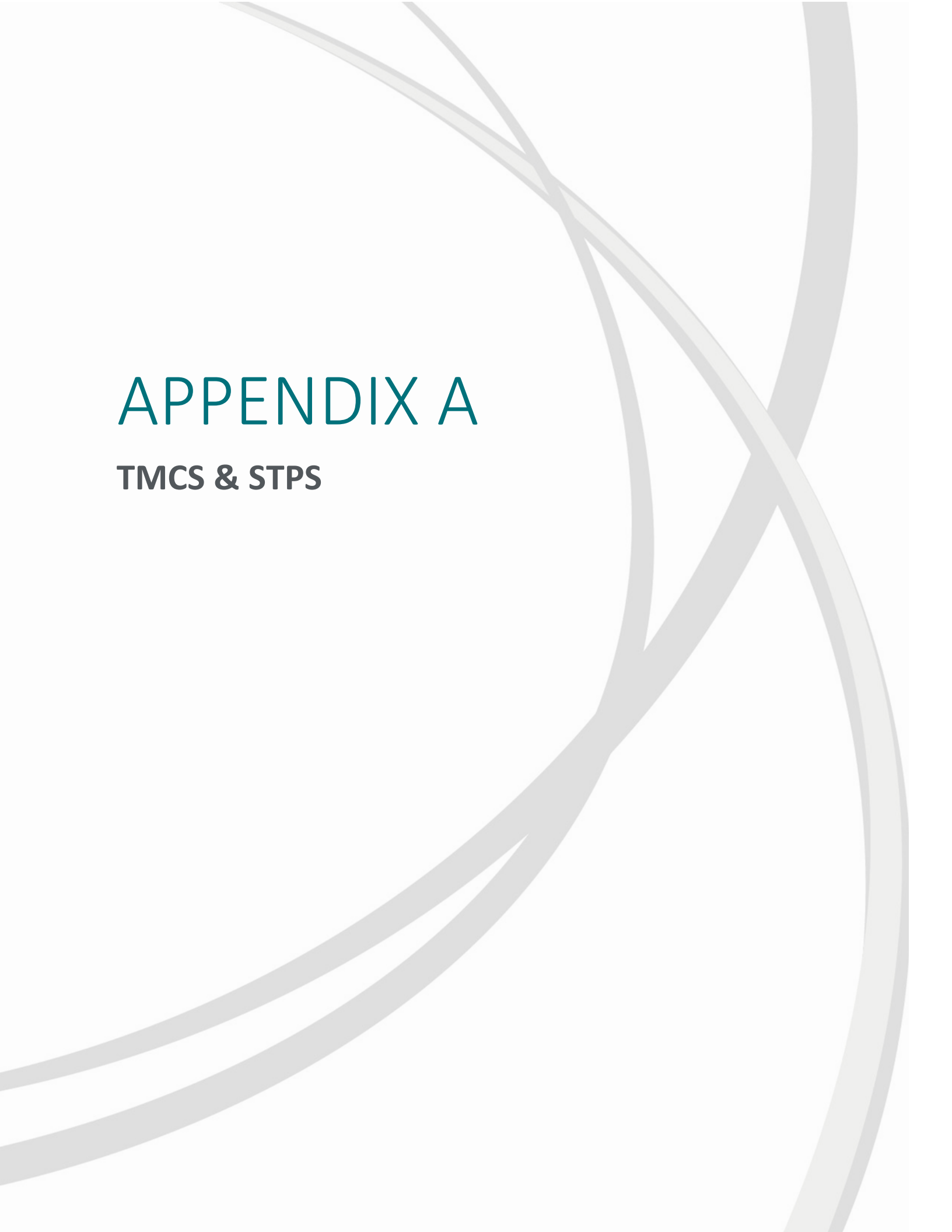
Smart Commute Membership: Once tenants are secured, it is recommended that future tenants/owners register with the Smart Commute program. Smart Commute provides the means for businesses to help provide an alternative option for their employees to get to and from work through ride matching. One benefit with Smart Commute is the Emergency Ride Home program that provides carpoolers with a sense of reassurance under urgent circumstances. The Owner could also help tenants in establishing an employer-based carpool program specifically for the employees that would be working on-site.

Communications Strategy: Once tenants are secured, it is recommended that future tenants/owners provide communications and distribute information to employees via information packages or through email regarding the different travel demand management measures and programs that are offered. Information on Smart Commute, Emergency Ride Home, or other incentives can be obtained from the Town or Region and be included as part of this material. The Region and/or Town should also be responsible for making Smart Commute information brochures, pedestrian/cycling maps, transit maps, and other general information available for distribution to the building occupant to help commuters become aware of the various travel alternatives.

12 CONCLUSION

- ▶ This Transportation Impact Study Update has been prepared in support of the Draft Plan of Subdivision, Zoning By-law Amendment, and Site Plan Approval applications for Phase 1 of the proposed industrial development located at 12519-12713 Humber Station Road, in the Town of Caledon. The master plan concept includes six (6) industrial buildings. This TIS has been prepared to support Phase 1 of the development which will introduce the first industrial building to the currently vacant site.
- ▶ Phase 1 of the development proposal consists of a 144,266 m² industrial building. It is understood that warehousing activities are proposed for the building. The proposed development will provide 717 parking spaces, 356 trailer parking spaces, and 255 loading docks at grade.
- ▶ As part of the development proposal, a partial extension of George Bolton Parkway from Humber Station Road to the Clarkway Tributary will be constructed. Access to the proposed development will be provided via two (2) full-movement accesses off the future George Bolton Parkway extension.
- ▶ Local transit service for the Bolton area is provided by Brampton Transit while inter-regional commuter bus service is operated by GO Transit between Malton and the area of Highway 50 & Columbia Way. Bike lanes are provided on both sides of George Bolton Parkway, east of Coleraine Drive. A multi-use path is also provided along the north side of George Bolton Parkway between the Clarkway Tributary and Nixon Road. However, no cycling facilities are available along the remaining study area roadways. The study area also exhibits poor pedestrian connectivity which will be addressed as the Secondary Plan area becomes urbanized through development.
- ▶ This assessment considers the 6-year and 11-year horizon from the existing year 2023. The future background conditions include traffic added to the network from other future developments, corridor growth, and road network improvements.
- ▶ The proposed development is anticipated to generate 295 two-way vehicle trips during the AM peak hour (219 inbound and 76 outbound) and 325 two-way vehicle trips during the PM peak hour (102 inbound and 223 outbound). This includes 31 two-way truck trips (16 inbound and 15 outbound) during the AM peak hour and 46 two-way truck trips (24 inbound and 22 outbound) during the PM peak hour.
- ▶ The intersection capacity analysis was conducted for the AM and PM peak hours under the existing, future background (2029 & 2034), and future total (2029 & 2034). With signal optimizations, the realignment of the Clarkway Drive/Humber Station Road & Mayfield Road intersection, and planned widenings along Mayfield Road, the intersection capacity analysis results indicate that site traffic is expected to have an acceptable impact on the surrounding road network. In addition, the proposed site accesses to the subject site are expected to operate sufficiently under future conditions. Furthermore, signalization is recommended at Humber Station Road & Healey Road by the 2029 horizon to accommodate future traffic growth, a recommendation which is irrespective of site traffic given that the intersection operates poorly under future background conditions.

- ▶ The proposed development is required to provide a total of 717 parking spaces under the Town of Caledon Zoning By-law 2006-50. The proposed supply of 717 spaces satisfies this requirement.
- ▶ A total of 356 truck trailer spaces are proposed to support the activities on-site. Based on a review of an approved comparable industrial warehouse development, a projected demand of 218 truck trailer spaces is anticipated (0.15 spaces per 100m²). The proposed supply of 356 spaces exceeds this project and is therefore, sufficient to accommodate the demand.
- ▶ No bicycle parking requirements are provided in Town of Caledon Zoning By-law 2006-50. However, 20 short-term bicycle parking spaces will be provided in line with the Peel Region Healthy Development Assessment guidelines. The provision of bicycle parking will encourage biking as a mode of transportation.
- ▶ The proposed development is required to provide a total of 15 loading spaces under the Town of Caledon Zoning By-law 2006-50. A total of 255 loading spaces will be provided on-site, satisfying the minimum requirements.
- ▶ A set of TDM measures have been recommended to reduce single-occupant vehicle trips and encourage multi-modal travel alternatives. Such measures include but are not limited to smart commute memberships, active transportation connections, and carpooling spaces.



APPENDIX A

TMCS & STPS

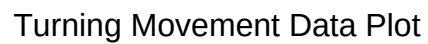


Count Name: 23347_Humber Station Rd &
Mayfield Rd-AM
Site Code: 23347
Start Date: 05/03/2023
Page No: 1

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	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	5	55	1	0	0	61	1	104	23	0	0	128	41	9	2	0	0	52	4	131	0	0	0	135	376
7:15 AM	0	52	0	0	0	52	0	99	18	0	0	117	25	13	2	0	0	40	4	155	1	0	0	160	369
7:30 AM	1	77	0	0	0	78	1	88	13	0	0	102	21	13	5	0	0	39	10	98	2	0	0	110	329
7:45 AM	2	63	1	0	0	66	2	92	13	0	0	107	25	12	2	0	0	39	10	139	5	0	0	154	366
Hourly Total	8	247	2	0	0	257	4	383	67	0	0	454	112	47	11	0	0	170	28	523	8	0	0	559	1440
8:00 AM	4	51	0	0	0	55	0	75	19	0	0	94	17	16	4	0	0	37	17	140	2	0	0	159	345
8:15 AM	3	77	0	0	0	80	0	82	11	0	0	93	15	11	2	0	0	28	16	129	1	0	0	146	347
8:30 AM	5	53	0	0	0	58	4	71	28	0	0	103	22	17	3	0	0	42	12	110	0	0	0	122	325
8:45 AM	2	27	3	0	0	32	0	77	15	0	0	92	24	7	3	0	0	34	11	128	1	0	0	140	298
Hourly Total	14	208	3	0	0	225	4	305	73	0	0	382	78	51	12	0	0	141	56	507	4	0	0	567	1315
9:00 AM	1	28	0	0	0	29	1	80	5	0	0	86	17	17	7	0	0	41	6	127	2	0	0	135	291
9:15 AM	2	35	1	0	0	38	2	56	6	0	0	64	7	7	1	0	0	15	6	107	5	0	0	118	235
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	25	518	6	0	0	549	11	824	151	0	0	986	214	122	31	0	0	367	96	1264	19	0	0	1379	3281
Approach %	4.6	94.4	1.1	0.0	-	-	1.1	83.6	15.3	0.0	-	-	58.3	33.2	8.4	0.0	-	-	7.0	91.7	1.4	0.0	-	-	-
Total %	0.8	15.8	0.2	0.0	-	16.7	0.3	25.1	4.6	0.0	-	30.1	6.5	3.7	0.9	0.0	-	11.2	2.9	38.5	0.6	0.0	-	42.0	-
Lights	20	515	4	0	-	539	8	606	138	0	-	752	208	117	23	0	-	348	84	1017	18	0	-	1119	2758
% Lights	80.0	99.4	66.7	-	-	98.2	72.7	73.5	91.4	-	-	76.3	97.2	95.9	74.2	-	-	94.8	87.5	80.5	94.7	-	-	81.1	84.1
Buses	2	1	1	0	-	4	1	3	1	0	-	5	0	3	3	0	-	6	0	11	1	0	-	12	27
% Buses	8.0	0.2	16.7	-	-	0.7	9.1	0.4	0.7	-	-	0.5	0.0	2.5	9.7	-	-	1.6	0.0	0.9	5.3	-	-	0.9	0.8
Trucks	3	2	1	0	-	6	2	215	12	0	-	229	6	2	5	0	-	13	12	236	0	0	-	248	496
% Trucks	12.0																								



Count Name: 23347_Humber Station Rd &
Mayfield Rd-AM
Site Code: 23347
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Count Name: 23347_Humber Station Rd &
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Page No: 3

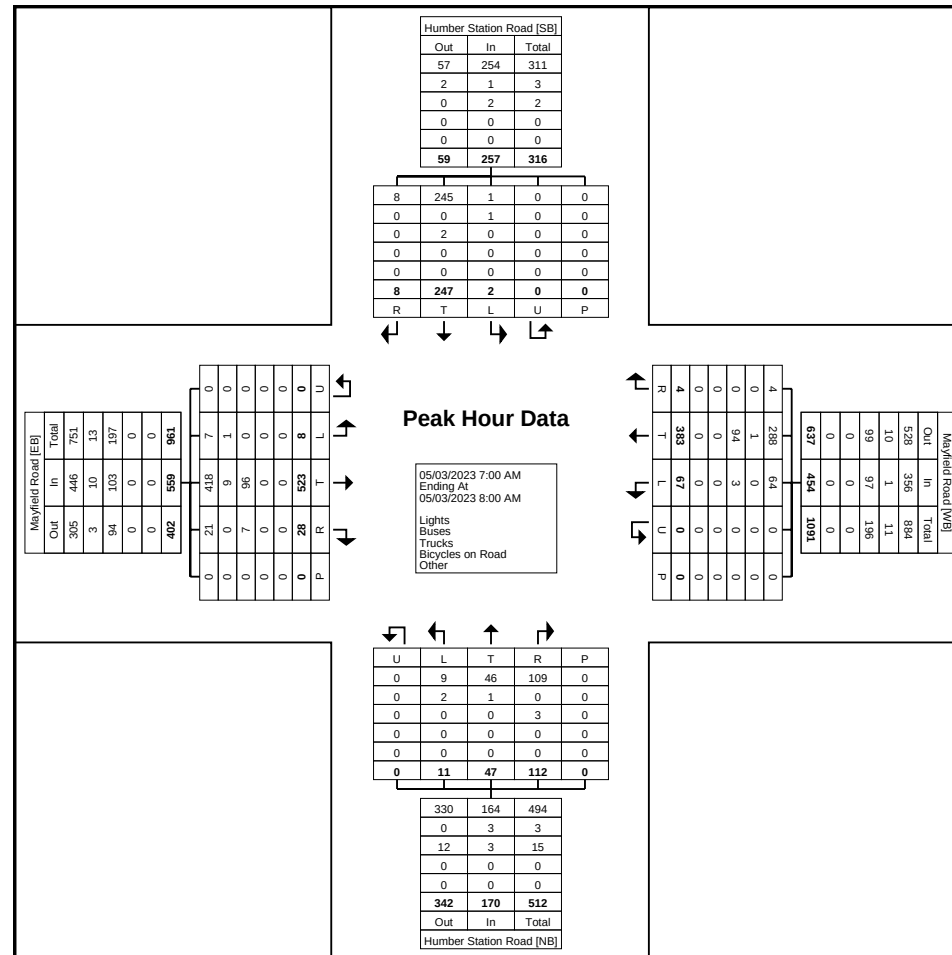
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Count Name: 23347_Humber Station Rd &
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Page No: 4



Turning Movement Peak Hour Data Plot (7:00 AM)



Count Name: 23347_Humber Station Rd &
Mayfield Rd-PM
Site Code: 23347
Start Date: 05/03/2023
Page No: 1

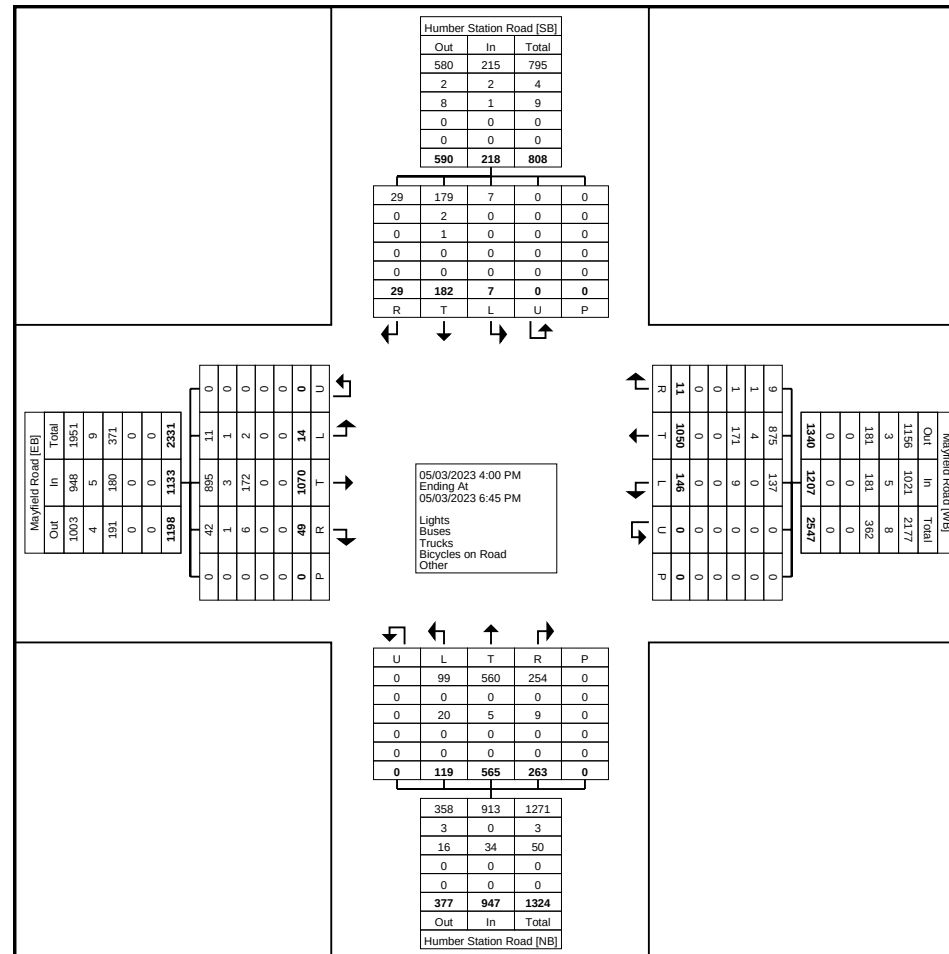
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4:00 PM	4	26	0	0	0	30	1	112	8	0	0	121	30	60	10	0	0	100	3	87	1	0	0	91	342
4:15 PM	2	26	2	0	0	30	1	122	11	0	0	134	20	50	7	0	0	77	7	99	0	0	0	106	347
4:30 PM	2	20	1	0	0	23	0	72	16	0	0	88	20	58	8	0	0	86	7	108	0	0	0	115	312
4:45 PM	2	12	1	0	0	15	0	93	20	0	0	113	24	63	16	0	0	103	6	112	0	0	0	118	349
Hourly Total	10	84	4	0	0	98	2	399	55	0	0	456	94	231	41	0	0	366	23	406	1	0	0	430	1350
5:00 PM	1	15	0	0	0	16	0	79	17	0	0	96	34	73	13	0	0	120	6	110	1	0	0	117	349
5:15 PM	5	18	0	0	0	23	0	115	19	0	0	134	31	48	15	0	0	94	4	108	2	0	0	114	365
5:30 PM	4	18	0	0	0	22	3	108	6	0	0	117	25	69	22	0	0	116	5	99	1	0	0	105	360
5:45 PM	2	11	0	0	0	13	1	127	10	0	0	138	19	55	9	0	0	83	4	131	6	0	0	141	375
Hourly Total	12	62	0	0	0	74	4	429	52	0	0	485	109	245	59	0	0	413	19	448	10	0	0	477	1449
6:00 PM	2	16	1	0	0	19	2	94	17	0	0	113	29	61	10	0	0	100	3	108	2	0	0	113	345
6:15 PM	5	20	2	0	0	27	3	128	22	0	0	153	31	28	9	0	0	68	4	108	1	0	0	113	361
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	29	182	7	0	0	218	11	1050	146	0	0	1207	263	565	119	0	0	947	49	1070	14	0	0	1133	3505
Approach %	13.3	83.5	3.2	0.0	-	-	0.9	87.0	12.1	0.0	-	-	27.8	59.7	12.6	0.0	-	-	4.3	94.4	1.2	0.0	-	-	-
Total %	0.8	5.2	0.2	0.0	-	6.2	0.3	30.0	4.2	0.0	-	34.4	7.5	16.1	3.4	0.0	-	27.0	1.4	30.5	0.4	0.0	-	32.3	-
Lights	29	179	7	0	-	215	9	875	137	0	-	1021	254	560	99	0	-	913	42	895	11	0	-	948	3097
% Lights	100.0	98.4	100.0	-	-	98.6	81.8	83.3	93.8	-	-	84.6	96.6	99.1	83.2	-	-	96.4	85.7	83.6	78.6	-	-	83.7	88.4
Buses	0	2	0	0	-	2	1	4	0	0	-	5	0	0	0	0	-	0	1	3	1	0	-	5	12
% Buses	0.0	1.1	0.0	-	-	0.9	9.1	0.4	0.0	-	-	0.4	0.0	0.0	0.0	-	-	0.0	2.0	0.3	7.1	-	-	0.4	0.3
Trucks	0	1	0	0	-	1	1	171	9	0	-	181	9	5	20	0									



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Count Name: 23347_Humber Station Rd &
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Site Code: 23347
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Turning Movement Data Plot



Count Name: 23347_Humber Station Rd &
Mayfield Rd-PM
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Count Name: 23347_Humber Station Rd &
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Markham, ON L3R 9R9

Project No.: 23347

Intersection: Humber Station Rd & Healey

Weather: Rain

Surveyor(s): ID

File Name : Humber Station Rd & Healey Rd - AM

Site Code : 00023347

Start Date : 2023-05-03

Page No : 1

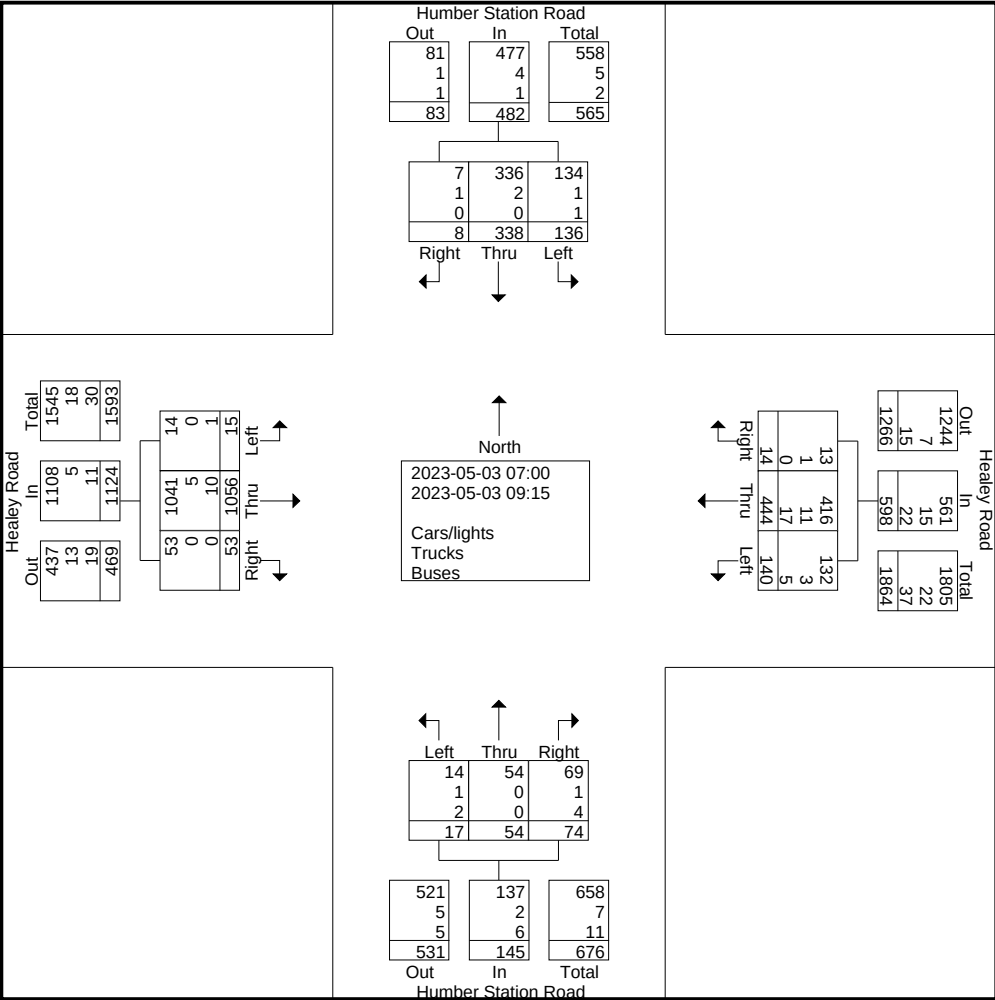
Groups Printed- Cars/lights - Trucks - Buses

	Humber Station Road Southbound					Healey Road Westbound					Humber Station Road Northbound					Healey Road Eastbound					Exclu. Total	Inclu. Total	Int. Total
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total			
07:00	15	34	0	[0]	49	23	46	0	[0]	69	0	3	4	[0]	7	2	131	2	[0]	135	0	260	260
07:15	21	46	2	[0]	69	18	60	0	[0]	78	2	7	8	[0]	17	1	129	3	[0]	133	0	297	297
07:30	15	43	1	[0]	59	21	60	2	[0]	83	2	2	10	[0]	14	0	117	10	[0]	127	0	283	283
07:45	21	39	1	[0]	61	11	44	2	[0]	57	2	4	9	[0]	15	1	122	4	[0]	127	0	260	260
Total	72	162	4	[0]	238	73	210	4	[0]	287	6	16	31	[0]	53	4	499	19	[0]	522	0	1100	1100
08:00	6	33	0	[0]	39	17	45	1	[0]	63	1	10	10	[0]	21	1	99	3	[0]	103	0	226	226
08:15	15	54	0	[0]	69	16	35	2	[0]	53	1	5	5	[0]	11	1	103	13	[0]	117	0	250	250
08:30	9	26	2	[0]	37	16	42	4	[0]	62	1	4	7	[0]	12	3	96	5	[0]	104	0	215	215
08:45	14	17	1	[0]	32	7	41	0	[0]	48	4	3	8	[0]	15	1	109	6	[0]	116	0	211	211
Total	44	130	3	[0]	177	56	163	7	[0]	226	7	22	30	[0]	59	6	407	27	[0]	440	0	902	902
09:00	10	22	0	[0]	32	3	31	2	[0]	36	0	9	8	[0]	17	4	79	2	[0]	85	0	170	170
09:15	10	24	1	[0]	35	8	40	1	[0]	49	4	7	5	[0]	16	1	71	5	[0]	77	0	177	177
Grand Total	136	338	8	[0]	482	140	444	14	[0]	598	17	54	74	[0]	145	15	1056	53	[0]	1124	0	2349	2349
Apprch %	28.2	70.1	1.7			23.4	74.2	2.3			11.7	37.2	51			1.3	94	4.7					
Total %	5.8	14.4	0.3		20.5	6	18.9	0.6		25.5	0.7	2.3	3.2		6.2	0.6	45	2.3		47.9	0	100	
Cars/lights	134	336	7		477	132	416	13		561	14	54	69		137	14	1041	53		1108	0	0	2283
% Cars/lights	98.5	99.4	87.5	0	99	94.3	93.7	92.9	0	93.8	82.4	100	93.2	0	94.5	93.3	98.6	100	0	98.6	0	0	97.2
Trucks	1	2	1		4	3	11	1		15	1	0	1		2	0	5	0		5	0	0	26
% Trucks	0.7	0.6	12.5	0	0.8	2.1	2.5	7.1	0	2.5	5.9	0	1.4	0	1.4	0	0.5	0	0	0.4	0	0	1.1
Buses	1	0	0		1	5	17	0		22	2	0	4		6	1	10	0		11	0	0	40
% Buses	0.7	0	0	0	0.2	3.6	3.8	0	0	3.7	11.8	0	5.4	0	4.1	6.7	0.9	0	0	1	0	0	1.7

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File Name : Humber Station Rd & Healey Rd - AM
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File Name : Humber Station Rd & Healey Rd - AM

Site Code : 00023347

Start Date : 2023-05-03

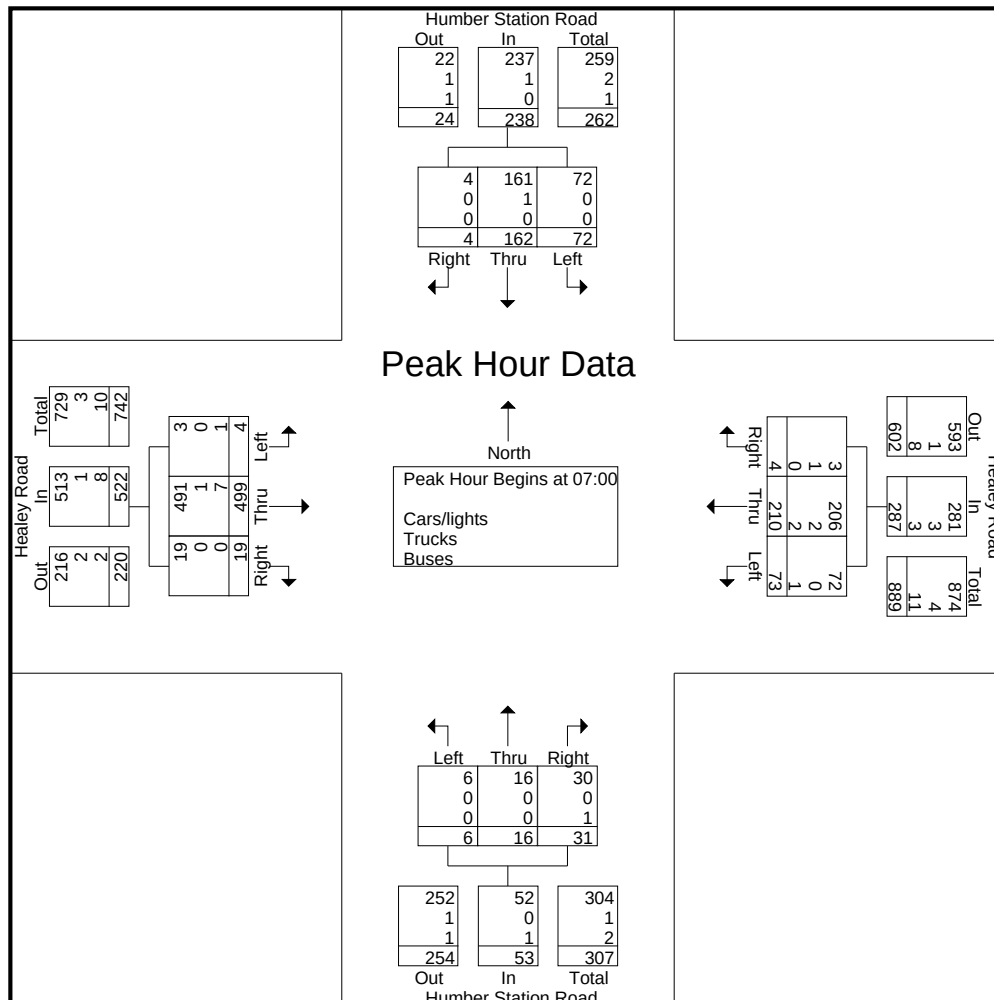
Page No : 3

	Humber Station Road Southbound				Healey Road Westbound				Humber Station Road Northbound				Healey Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 07:00 to 09:15 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:00

07:00	15	34	0	49	23	46	0	69	0	3	4	7	2	131	2	135	260
07:15	21	46	2	69	18	60	0	78	2	7	8	17	1	129	3	133	297
07:30	15	43	1	59	21	60	2	83	2	2	10	14	0	117	10	127	283
07:45	21	39	1	61	11	44	2	57	2	4	9	15	1	122	4	127	260
Total Volume	72	162	4	238	73	210	4	287	6	16	31	53	4	499	19	522	1100
% App. Total	30.3	68.1	1.7		25.4	73.2	1.4		11.3	30.2	58.5		0.8	95.6	3.6		
PHF	.857	.880	.500	.862	.793	.875	.500	.864	.750	.571	.775	.779	.500	.952	.475	.967	.926
Cars/lights	72	161	4	237	72	206	3	281	6	16	30	52	3	491	19	513	1083
% Cars/lights	100	99.4	100	99.6	98.6	98.1	75.0	97.9	100	100	96.8	98.1	75.0	98.4	100	98.3	98.5
Trucks	0	1	0	1	0	2	1	3	0	0	0	0	0	1	0	1	5
% Trucks	0	0.6	0	0.4	0	1.0	25.0	1.0	0	0	0	0	0	0.2	0	0.2	0.5
Buses	0	0	0	0	1	2	0	3	0	0	1	1	1	7	0	8	12
% Buses	0	0	0	0	1.4	1.0	0	1.0	0	0	3.2	1.9	25.0	1.4	0	1.5	1.1



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Markham, ON L3R 9R9

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625 Cochrane Drive, 5th Floor
Markham, ON L3R 9R9

Project No.: 23347

Intersection: Humber Station Rd & Healey

Weather: Rain

Surveyor(s): ID

File Name : Humber Station Rd & Healey Rd - PM

Site Code : 00023347

Start Date : 2023-05-03

Page No : 1

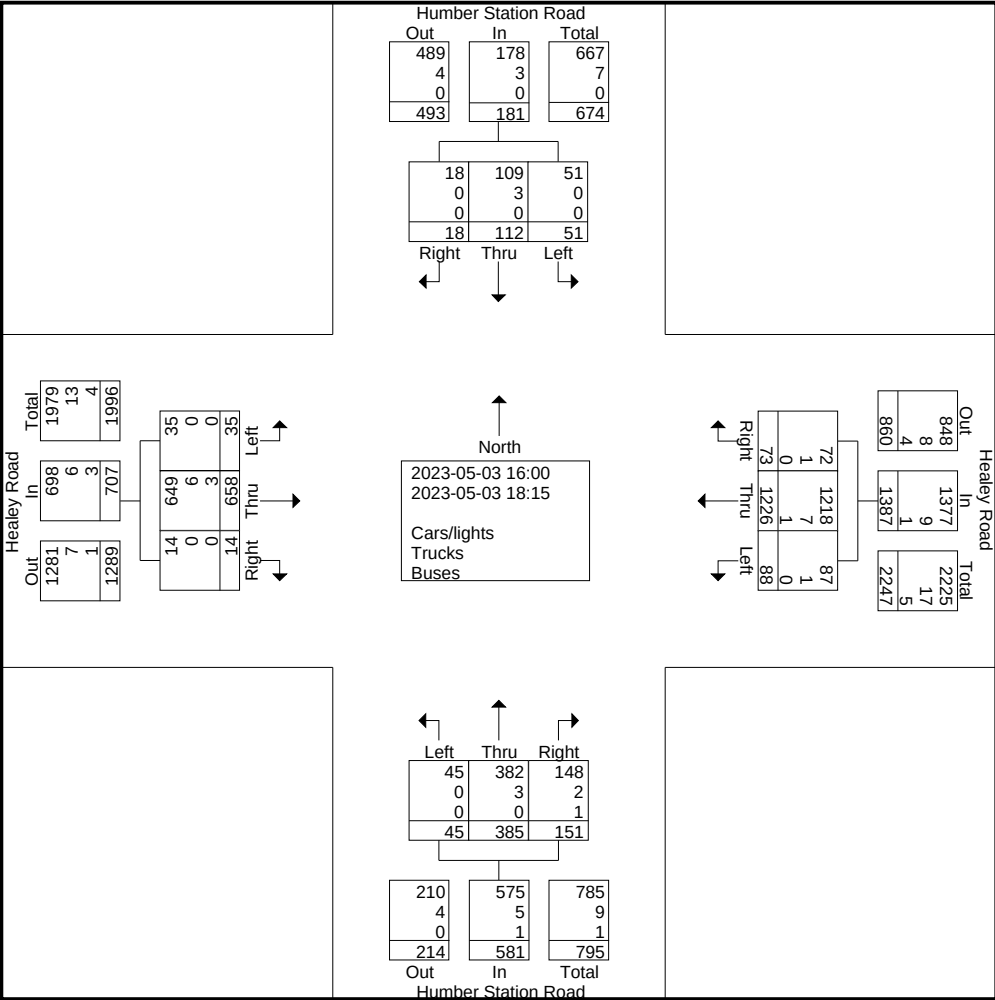
Groups Printed- Cars/lights - Trucks - Buses

	Humber Station Road Southbound					Healey Road Westbound					Humber Station Road Northbound					Healey Road Eastbound							
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Exclu. Total	Inclu. Total	Int. Total
16:00	5	14	5	[0]	24	9	109	11	[0]	129	11	37	11	[0]	59	1	69	2	[0]	72	0	284	284
16:15	3	16	0	[0]	19	12	121	7	[0]	140	7	34	16	[0]	57	6	64	3	[0]	73	0	289	289
16:30	5	11	2	[0]	18	9	129	8	[0]	146	4	38	14	[0]	56	0	60	2	[0]	62	0	282	282
16:45	6	6	1	[0]	13	7	123	14	[0]	144	4	35	18	[0]	57	2	73	0	[0]	75	0	289	289
Total	19	47	8	[0]	74	37	482	40	[0]	559	26	144	59	[0]	229	9	266	7	[0]	282	0	1144	1144
17:00	4	14	3	[0]	21	10	124	6	[0]	140	5	53	20	[0]	78	9	51	1	[0]	61	0	300	300
17:15	6	13	3	[0]	22	5	132	6	[0]	143	1	44	15	[0]	60	1	64	1	[0]	66	0	291	291
17:30	8	7	0	[0]	15	10	123	5	[0]	138	6	35	13	[0]	54	4	62	2	[0]	68	0	275	275
17:45	4	8	0	[0]	12	9	117	5	[0]	131	4	55	17	[0]	76	7	70	2	[0]	79	0	298	298
Total	22	42	6	[0]	70	34	496	22	[0]	552	16	187	65	[0]	268	21	247	6	[0]	274	0	1164	1164
18:00	2	9	1	[0]	12	10	135	7	[0]	152	2	34	18	[0]	54	1	63	0	[0]	64	0	282	282
18:15	8	14	3	[0]	25	7	113	4	[0]	124	1	20	9	[0]	30	4	82	1	[0]	87	0	266	266
Grand Total	51	112	18	[0]	181	88	1226	73	[0]	1387	45	385	151	[0]	581	35	658	14	[0]	707	0	2856	2856
Apprch %	28.2	61.9	9.9			6.3	88.4	5.3			7.7	66.3	26			5	93.1	2					
Total %	1.8	3.9	0.6		6.3	3.1	42.9	2.6		48.6	1.6	13.5	5.3		20.3	1.2	23	0.5		24.8	0	100	
Cars/lights	51	109	18		178	87	1218	72		1377	45	382	148		575	35	649	14		698	0	0	2828
% Cars/lights	100	97.3	100	0	98.3	98.9	99.3	98.6	0	99.3	100	99.2	98	0	99	100	98.6	100	0	98.7	0	0	99
Trucks	0	3	0		3	1	7	1		9	0	3	2		5	0	6	0		6	0	0	23
% Trucks	0	2.7	0	0	1.7	1.1	0.6	1.4	0	0.6	0	0.8	1.3	0	0.9	0	0.9	0	0	0.8	0	0	0.8
Buses	0	0	0		0	0	1	0		1	0	0	1		1	0	3	0		3	0	0	5
% Buses	0	0	0	0	0	0	0.1	0	0	0.1	0	0	0.7	0	0.2	0	0.5	0	0	0.4	0	0	0.2

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Markham, ON L3R 9R9

File Name : Humber Station Rd & Healey Rd - PM
Site Code : 00023347
Start Date : 2023-05-03
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625 Cochrane Drive, 5th Floor
Markham, ON L3R 9R9

File Name : Humber Station Rd & Healey Rd - PM

Site Code : 00023347

Start Date : 2023-05-03

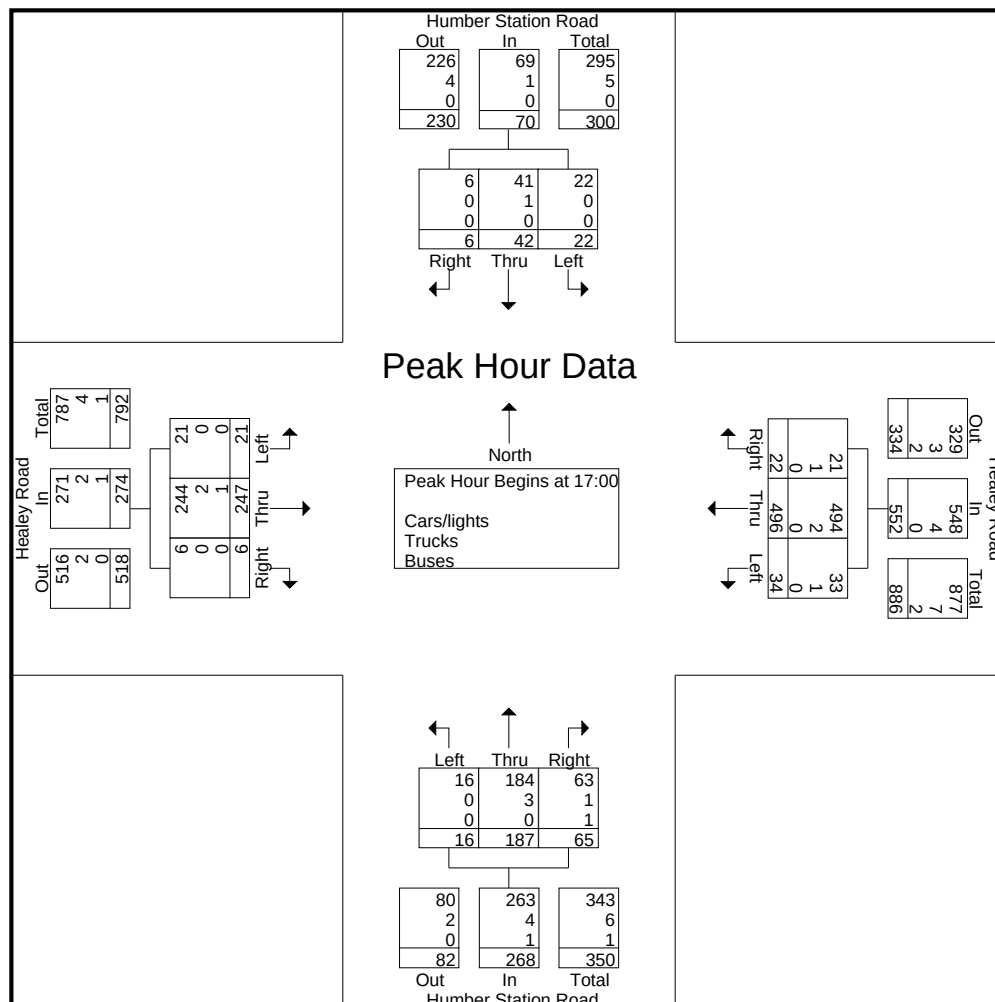
Page No : 3

	Humber Station Road Southbound				Healey Road Westbound				Humber Station Road Northbound				Healey Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 16:00 to 18:15 - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 17:00

17:00	4	14	3	21	10	124	6	140	5	53	20	78	9	51	1	61	300
17:15	6	13	3	22	5	132	6	143	1	44	15	60	1	64	1	66	291
17:30	8	7	0	15	10	123	5	138	6	35	13	54	4	62	2	68	275
17:45	4	8	0	12	9	117	5	131	4	55	17	76	7	70	2	79	298
Total Volume	22	42	6	70	34	496	22	552	16	187	65	268	21	247	6	274	1164
% App. Total	31.4	60	8.6		6.2	89.9	4		6	69.8	24.3		7.7	90.1	2.2		
PHF	.688	.750	.500	.795	.850	.939	.917	.965	.667	.850	.813	.859	.583	.882	.750	.867	.970
Cars/lights	22	41	6	69	33	494	21	548	16	184	63	263	21	244	6	271	1151
% Cars/lights	100	97.6	100	98.6	97.1	99.6	95.5	99.3	100	98.4	96.9	98.1	100	98.8	100	98.9	98.9
Trucks	0	1	0	1	1	2	1	4	0	3	1	4	0	2	0	2	11
% Trucks	0	2.4	0	1.4	2.9	0.4	4.5	0.7	0	1.6	1.5	1.5	0	0.8	0	0.7	0.9
Buses	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	2
% Buses	0	0	0	0	0	0	0	0	0	0	1.5	0.4	0	0.4	0	0.4	0.2



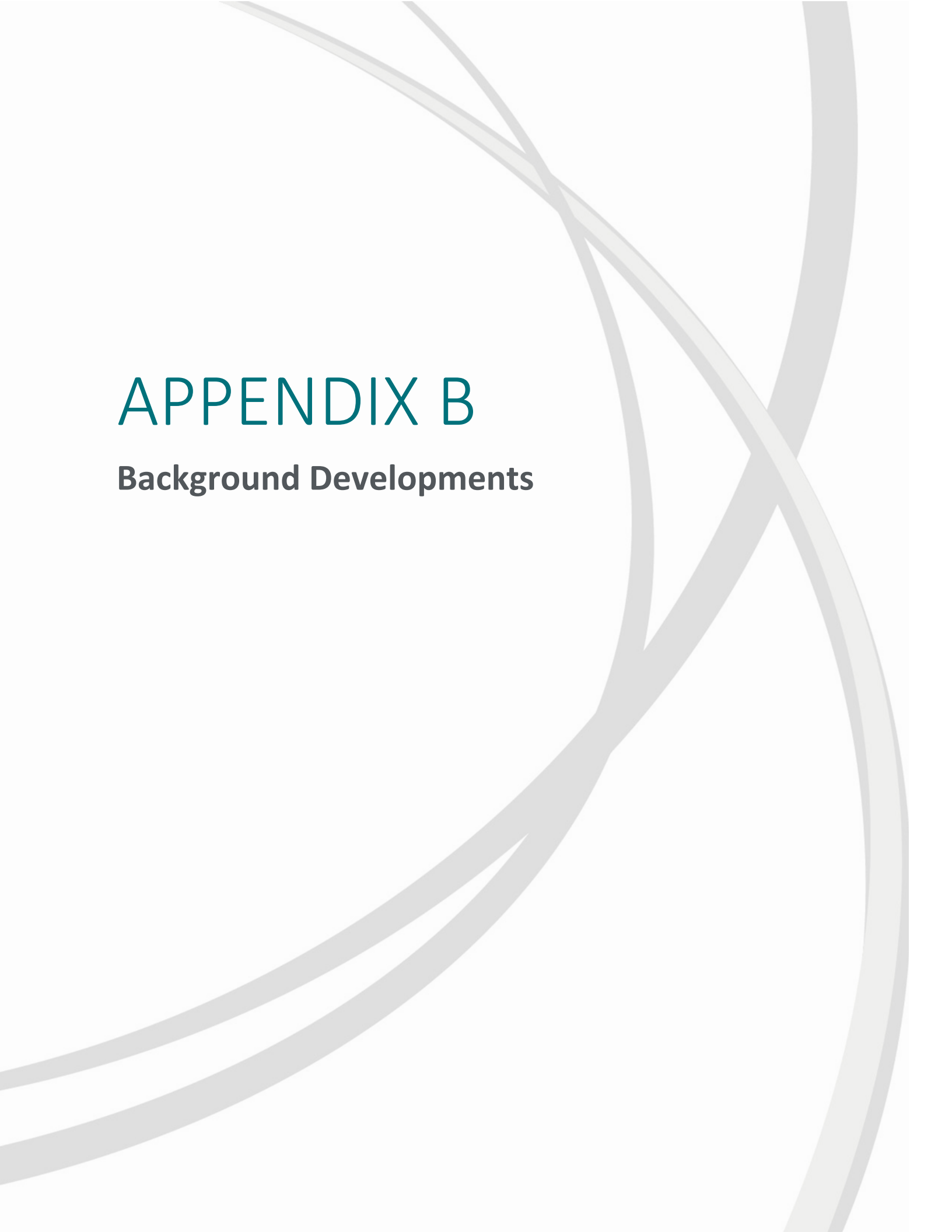
LEA Consulting Ltd.

625 Cochrane Drive, 5th Floor
Markham, ON L3R 9R9

REGIONAL MUNICIPALITY OF PEEL

Traffic Signal Timing Parameters

Database Date		June 27, 2023			Prepared Date		June 30, 2023		
Database Rev		Maxview			Completed By		TF		
Timing Card / Field rev		-			Checked By		MH		
LocationMayfield Road at Clarkway Drive / Humber Station Road									
Phase #	Street Name - Direction	Vehicle Minimum (s)	Pedestrian Minimum (s)		Amber (s)	All Red (s)	TIME PERIOD (s)		
			WALK	FDWALK			AM SPLITS	OFF SPLITS	PM SPLITS
1	Not In Use	-	-	-	-	-	-	-	-
2	Mayfield Road - EB	12.0	12.0	8.0	4.6	2.7	70.0	50.0	55.0
3	Humber Station Road - SB	8.0	12.0	7.0	4.2	2.8	30.0	20.0	20.0
4	Clarkway Drive - NB	8.0	12.0	7.0	4.2	2.8	20.0	30.0	45.0
5	Not In Use	-	-	-	-	-	-	-	-
6	Mayfield Road - WB	12.0	12.0	8.0	4.6	2.7	70.0	50.0	55.0
7	Not In Use	-	-	-	-	-	-	-	-
8	Computer Phase	8.0	12.0	7.0	4.2	2.8	50.0	50.0	65.0
System Control Yes Semi-Actuated Mode No				TIME (M-F)		PEAK	CYCLE LENGTH (s)		OFFSET (s)
				06:30 - 09:00		AM	120		31
				09:00 - 15:00		OFF	100		45
				15:00 - 19:30		PM	120		43



APPENDIX B

Background Developments

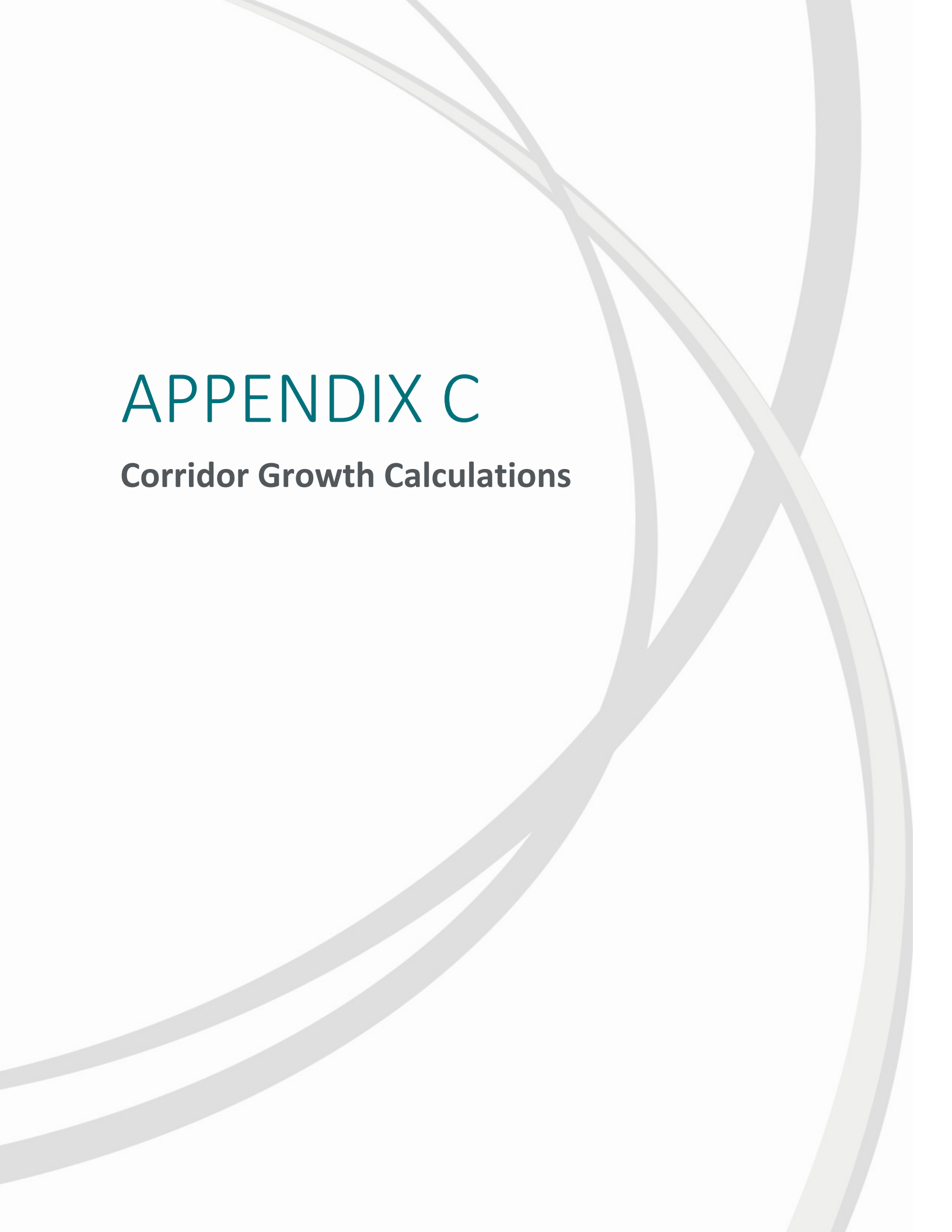


Triangle Lands Vehicle and Truck Trip Generation

Land Use	Description	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Triangle Lands							
ITE LUC 140 – Manufacturing 1066 Employees	Auto Trip Rate (/employee)	0.23	0.09	0.32	0.11	0.20	0.31
	Total ITE Auto Trips	249	92	341	122	208	330
	External Auto Trips (100%)	249	92	341	122	208	330
	Truck Trip Rate (/employee)	0.02	0.01	0.03	0.02	0.03	0.05
	Total ITE Auto Trips	19	13	32	20	34	54
	External Truck Trips (100%)	19	13	32	20	34	54

Coleraine Drive & Mayfield Road Block Plan Vehicle and Truck Trip Generation

Land Use	Description	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Coleraine Drive and Mayfield Road Block Plan (South Simpson Landowners Group)							
ITE LUC 140 – Manufacturing 598 Employees	Auto Trip Rate (/employee)	0.23	0.09	0.32	0.11	0.20	0.31
	Total ITE Auto Trips	140	52	192	69	117	186
	External Auto Trips (100%)	140	52	192	69	117	186
	Truck Trip Rate (/employee)	0.02	0.01	0.03	0.02	0.03	0.05
	Total ITE Auto Trips	11	7	18	11	19	30
	External Truck Trips (100%)	11	7	18	11	19	30



APPENDIX C

Corridor Growth Calculations

Intersection A

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Henderson Station Rd (Screenlines by Henderson Rd)	1	NB	30	30	101	101
	2					
	3					
	4	SB	542	542	730	730
	5					
	6					
	7	EB		0		
	8					
	9					
	10	WB		0		
	11					
	12					

AM					
Year	Street Name	Street Name	Street Name	Street Name	Overall
2021	NB	SB	EB	WB	572
2041	101	730	0	0	831

Calculated Growth Rates: 3.51% 1.29% #DIV/0! #DIV/0! 1.56%

Applied Growth Rates: 3.5% 0.0% 0.0% 0.0% 1.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Henderson Rd (Screenline west of Henderson Station Rd)	1	NB		0		0
	2					
	3					
	4	SB		0		0
	5					
	6					
	7	EB	193	193	616	616
	8					
	9					
	10	WB	4	4	21	21
	11					
	12					

AM					
Year	Street Name	Street Name	Street Name	Street Name	Overall
2021	NB	SB	EB	WB	197
2041	0	0	616	21	637

Calculated Growth Rates: #DIV/0! #DIV/0! 3.43% 4.05% 3.45%

Applied Growth Rates: 0.0% 0.0% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 George Bolton Pkwy (Screenline by Coliseum Dr)	1	NB		0		0
	2					
	3					
	4	SB		0		0
	5					
	6					
	7	EB	797	797	0	0
	8					
	9					
	10	WB	12	12	7	7
	11					
	12					

AM					
Year	Street Name	Street Name	Street Name	Street Name	Overall
2021	NB	SB	EB	WB	809
2041	0	0	797	12	809

Calculated Growth Rates: #DIV/0! #DIV/0! #DIV/0! -3.57% -572.86%

Applied Growth Rates: 0.0% 0.0% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Hwy 50 (Screenline South of George Bolton Pkwy)	1	NB	1089	1089	1452	1452
	2					
	3					
	4	SB	1126	1126	1164	1164
	5					
	6					
	7	EB		0	0	0
	8					
	9					
	10	WB		0	0	0
	11					
	12					

AM					
Year	Street Name	Street Name	Street Name	Street Name	Overall
2021	NB	SB	EB	WB	2215
2041	1089	1126	0	0	2616

Calculated Growth Rates: 1.25% 0.10% #DIV/0! #DIV/0! 0.77%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Coliseum Dr (Screenline South of George Bolton Pkwy)	1	NB	1029	1029	693	693
	2					
	3					
	4	SB	1226	1226	1084	1084
	5					
	6					
	7	EB		0	0	0
	8					
	9					
	10	WB		0	0	0
	11					
	12					

AM					
Year	Street Name	Street Name	Street Name	Street Name	Overall
2021	NB	SB	EB	WB	2255
2041	1029	1226	0	0	1777

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Henderson Station Rd (Screenline North of Henderson Rd)	1	NB	30	30	35	35
	2					
	3					
	4	SB	659	659	585	585
	5					
	6					
	7	EB		0	0	0
	8					
	9					
	10	WB		0	0	0
	11					
	12					

AM						Growth	
Year	Street Name	Street Name	Street Name	Street Name	Overall	NB	SB
2021	NB	SB	EB	WB	689		
2041	35	585	0	0	620		

Calculated Growth Rates: 0.71% -0.63% #DIV/0! #DIV/0! -0.56%

Applied Growth Rates: 1.0% 0.0% 0.0% 0.0% 1.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Henderson Rd (Screenline East of Henderson Station Rd)	1	NB		0		0
	2					
	3					
	4	SB		0		0
	5					
	6					
	7	EB	310	310	650	650
	8					
	9					
	10	WB	5	5	21	21
	11					
	12					

AM						Growth	
Year	Street Name	Street Name	Street Name	Street Name	Overall	EB	WB
2021	NB	SB	EB	WB	315		
2041	0	0	650	21	671		

Calculated Growth Rates: #DIV/0! #DIV/0! 2.62% 3.61% 2.65%

Applied Growth Rates: 0.0% 0.0% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 George Bolton Pkwy (Screenline by Hwy 50)	1	NB		0		0
	2					
	3					
	4	SB		0		0
	5					
	6					
	7	EB	2	2	0	0
	8					
	9					
	10	WB	12	12	0	0
	11					
	12					

AM					
Year	Street Name	Street Name	Street Name	Street Name	Overall
2021	NB	SB	EB	WB	14
2041	0	0	0	0	0

Calculated Growth Rates: #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0!

Applied Growth Rates: 0.0% 0.0% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Hwy 50 (Screenline North of George Bolton Pkwy)	2	NB	1087	1087	1486	1486
	3					
	4					
	5	SB	1135	1135	1217	1217
	6					
	7					
	8	EB	0	0		
	9					
	10					
	11	WB	0	0		
	12					

Calculated Growth Rates: -2.42% -0.65% #DIV/0! #DIV/0! -1.34%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Coltsville Dr (Screenline South of Hensley Rd)	1	NB	248	248	1075	1075
	2					
	3					
	4	SB	1279	1279	1346	1346
	5					
	6					
	7	EB		0	0	0
	8					
	9					
	10	WB		0	0	0
	11					
	12					

AM

Street Name		Street Name		Overall
Year	NB	SB	EB	
2021	248	1279	0	1527
2041	1075	1346	0	2421

Calculated Growth Rates: 3.85% 0.25% #DIV/0! #DIV/0! 1.85%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Mayfield Rd (Screenline East of Hensley Rd)	1	NB		0		0
	2					
	3					
	4	SB		0		0
	5					
	6					
	7	EB	1260	1260	2204	2204
	8					
	9					
	10	WB	402	402	910	910
	11					
	12					

AM

Street Name		Street Name		Overall
Year	NB	SB	EB	
2021	0	0	1260	1662
2041	0	0	2204	3114

Calculated Growth Rates: #DIV/0! #DIV/0! 2.14% 2.79% 2.33%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

Calculated Growth Rates: 3.38% -0.51% #DIV/0! #DIV/0! 1.05%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

2.00% 0.00%

2.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Coltsville Dr (Screenline North of Hensley Rd)	1	NB	243	243	386	386
	2					
	3					
	4	SB	1616	1616	1714	1714
	5					
	6					
	7	EB		0	0	0
	8					
	9					
	10	WB		0	0	0
	11					
	12					

AM

Street Name		Street Name		Overall
Year	NB	SB	EB	
2021	243	1616	0	1859
2041	386	1714	0	2100

Calculated Growth Rates: 1.85% 0.29% #DIV/0! #DIV/0! 0.57%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Mayfield Rd (Screenline West of Coltsville Dr)	1	NB		0		0
	2					
	3					
	4	SB		0		0
	5					
	6					
	7	EB	1124	1124	1832	1832
	8					
	9					
	10	WB	398	398	715	715
	11					
	12					

AM

Street Name		Street Name		Overall
Year	NB	SB	EB	
2021	0	0	1124	1522
2041	0	0	1832	2547

Calculated Growth Rates: #DIV/0! #DIV/0! 1.93% 2.22% 2.01%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

Intersection	Index	Movement	2021		2041	
			AM Peak	AM Corridor	AM Peak	AM Corridor
1 Mayfield Rd (Screenline East of Coltsville Dr)	1	NB		0		0
	2					
	3					
	4	SB		0		0
	5					
	6					
	7	EB	212	212	741	741
	8					
	9					
	10	WB	190	190	313	313
	11					
	12					

AM

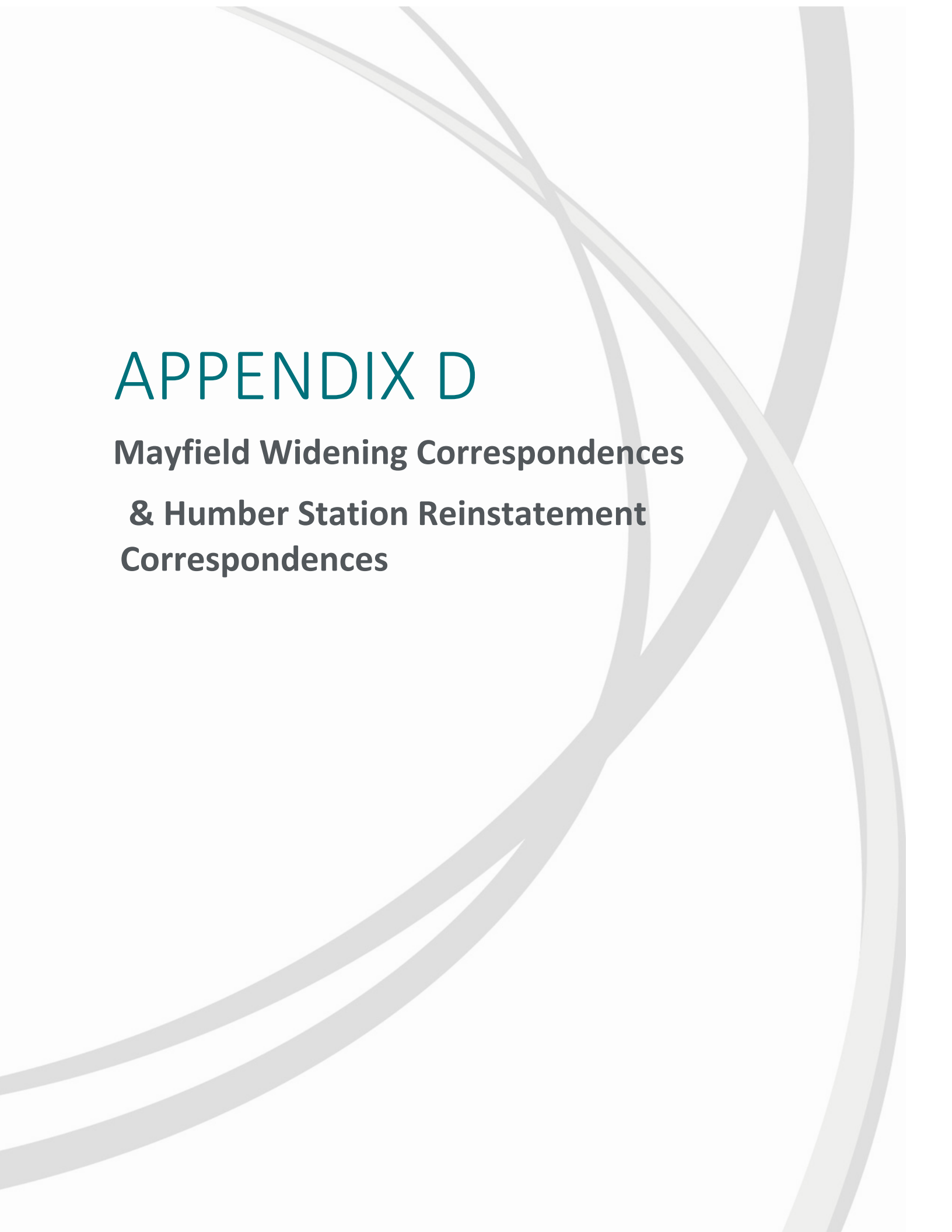
Street Name		Street Name		Overall	Growth	
Year	NB	SB	EB		EB	WB
2021	0	0	212	405		
2041	0	0	741	1054		

Calculated Growth Rates: #DIV/0! #DIV/0! 3.57% 1.92% 3.08%

Applied Growth Rates: 1.0% 0.5% 0.0% 0.0% 0.0%

3.00% 2.00%

3.0% 2.0%



APPENDIX D

**Mayfield Widening Correspondences
& Humber Station Reinstatement
Correspondences**

Christy Leung

From: Kabanov, Serguei <serguei.kabanov@peelregion.ca>
Sent: August 28, 2023 4:36 PM
To: Christy Leung
Cc: Marzo, Christina; Sadek, Sandra
Subject: RE: Option 6 Lands: Mayfield Widening Timing

External Sender

Good Afternoon Christy,

I'm the Regional PM looking after Mayfield Road Widening, from Airport to Coleraine. Christina forwarded me your email with questions.

1. Mayfield Road widening, between Humber Station Road and Coleraine is scheduled for construction in 2026. The project will start at Airport so chances are we won't be doing the stretch you are concerned about until 2027 or later. The stretch from Coleraine to Highway 50 is a separate project and, as of right now, it is scheduled for late 2026 or early 2027. My colleague Sandra, copied on this email, is looking after this project.
2. I can confirm that the jogged intersection at Humber Station Road & Mayfield Road will be addressed with the widening of Mayfield.

If you have any further questions, please do not hesitate to reach out directly.

Serguei Kabanov, CD, CET, rcca
Project Manager, Roads Design and Construction

From: Christy Leung <ChLeung@lea.ca>
Sent: August 28, 2023 2:48 PM
To: Marzo, Christina <christina.marzo@peelregion.ca>
Cc: Chris Sidlar <CSidlar@lea.ca>
Subject: Option 6 Lands: Mayfield Widening Timing

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Hi Christina,

If you recall, the Region met with our office earlier this month to discuss the road improvements surrounding the Option 6 lands in Caledon. Further to that discussion, I wanted to confirm timing of the Mayfield Road widening between Humber Station Road and Highway 50. As per the Region's Long Range Transportation Plan, Mayfield is planned to widen by 2031. Given the observed construction activity along this stretch of the roadway, has timing of this improvement moved up in schedule?

Can you also confirm that the jogged intersection at Humber Station Road & Mayfield Road will be addressed with the widening of Mayfield?

Thanks,

Christy Leung, B.E.S.

Transportation Planner

LEA Consulting Ltd.

40 University Avenue, Suite 503 | Toronto, ON | M5J 1T1

T: 905 470 0015 ext. 330 E: ChLeung@lea.ca W: www.LEA.ca

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Christy Leung

From: Scarpato, Alberino <alberino.scarpato@peelregion.ca>
Sent: November 6, 2024 2:18 PM
To: Koryun Shahbikian
Cc: Maxim Zemlyanoy; Mustafa Ghassan; Matthew Christie; Mercieca, Christopher
Subject: RE: status of projects - HBR -
Attachments: Pavement Investigation Memo.pdf

Hi Koryun,

Hope all is well. Please see responses in **RED** below.

Any questions or concerns, please let me know.

Regards,

Alberino Scarpato, P.Eng

Senior Project Manager, Water/Wastewater
Engineering Services Division
Public Works
Region of Peel
Cell: (437) 991-9422



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From: Koryun Shahbikian <kshahbikian@schaeffers.com>
Sent: Wednesday, November 6, 2024 10:13 AM
To: Scarpato, Alberino <alberino.scarpato@peelregion.ca>
Cc: Maxim Zemlyanoy <mzemlyanoy@schaeffers.com>; Mustafa Ghassan <mustafag@deltaurban.com>; Matthew Christie <matthewc@deltaurban.com>
Subject: status of projects - HBR -

CAUTION: EXTERNAL MAIL. DO NOT CLICK ON LINKS OR OPEN ATTACHMENTS YOU DO NOT TRUST.

Hi Alberino,
I hope this email finds you well.
Could you please kindly provide updates on the status of the following projects:

- 1- What is the status of the sanitary trunk sewer project on Humber Station Road and Haedy Road? **Project is out for tender; tender was released on November 4th and scheduled to close on December 4th. Construction will start early next year. Refer to link:**
<https://peelregion.bidsandtenders.ca/Module/Tenders/en/Tender/Detail/343990c7-1a3e-4000-ab8d-603650a93394/#Document>
- 2- What is the status of the water feeder main project along Humber Station Road and Haedy Road? **Refer to response above.**

Furthermore, can you be kind enough to confirm the following:

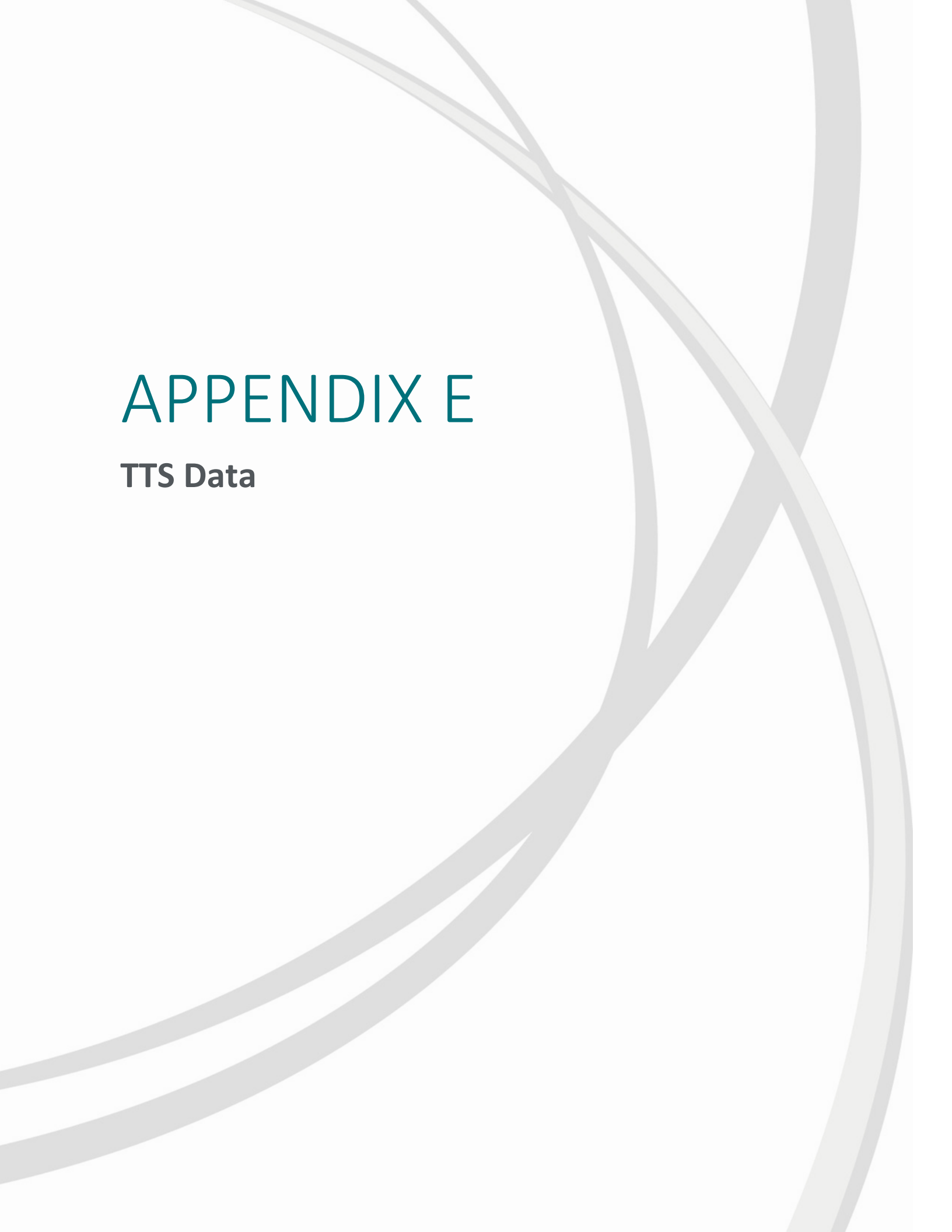
- 1- Is your contractor restoring the road (Humber Station Road and Healy Road) with the road makeup LEA provided for industrial traffic load? **The road is being restored to an interim condition, which will support truck loads for the next 5 years and 10 years for Humber Station Road and Healy Road, respectively, until the ultimate road widening happens. Please refer to attached report.**
- 2- If this is not included in the scope of our contractor, I suggest meeting to see how we can add that scope since it is not logical to re-excavate and rebuild the road in a very short period of time between your construction and then group works. **Please refer to response above.**

Koryun Shahbikian, LLB, LLM, M.Eng., P.Eng.
Partner



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APPENDIX E

TTS Data

AM IN

Fri Aug 30 2023 14:05:25 GMT-0400 (Eastern Daylight Time) - Run Time: 2622ms

Cross Tabulation Query Form - Trip - 2023-01-1

Row: 2023-01-01 of origin: g4040_01g
Column: 2023-01-01 of destination: g4040_01d

RowID:
C40401007
3191

Filters:
Departure: trip: start_time=000-000
and
Transportation: mode: P
and
Priority: road: mode: M P T

Top 2023
Table

51	25
72	43
124	12
149	21
160	21
163	34
173	24
178	23
179	23
181	16
184	11
222	12
223	17
255	13
261	15
261	7
265	6
281	13
363	26
365	52
371	32
376	25
382	20
386	8
386	8
461	45
463	18
463	17
468	27
461	20
461	15
542	14
568	16
569	21
574	22
5817	13
5820	21
5822	31
5833	53
5835	30
5837	13
5837	32
5838	15
5841	22
5845	33
5858	18
5857	16
5858	54
5858	14
5862	31
5869	18
5867	22
5868	27
5868	116
5868	16
5868	134
5868	53
5868	215
5868	111
5868	67
5868	280
5868	205
5868	96
5867	9
5868	50
5867	97
5868	39
5861	53
5862	50
5860	7
5862	12
5862	77
5864	85
5867	42
5873	34
5873	13
5874	24
5875	41
5876	63
5880	135
5886	59
5889	38
5893	12
5894	51
5892	14
5897	30
5898	14
5898	14
5898	18
5898	27
5895	36
5895	23
5895	26
5897	46
5898	149
5899	16
5899	35
5899	18
5898	6
5897	27
5895	18
5897	14
5898	58
5898	7
5894	10
5895	22
5899	7
5894	48
5871	19
5875	23
5881	12
5886	43
5888	8
5874	15
5877	41
5884	32
5890	69
5890	23
5892	14
5893	68
5896	56
5896	33
5896	68
5897	24
5892	18
5893	123
5893	5282

Fri Aug 30 2023 14:05:25 GMT-0400 (Eastern Daylight Time) - Run Time: 2737ms

Cross Tabulation Query Form - Trip - 2023-01-1

Row: Planning: district of origin: rd_01g
Column: 2023-01-01 of destination: g4040_01d

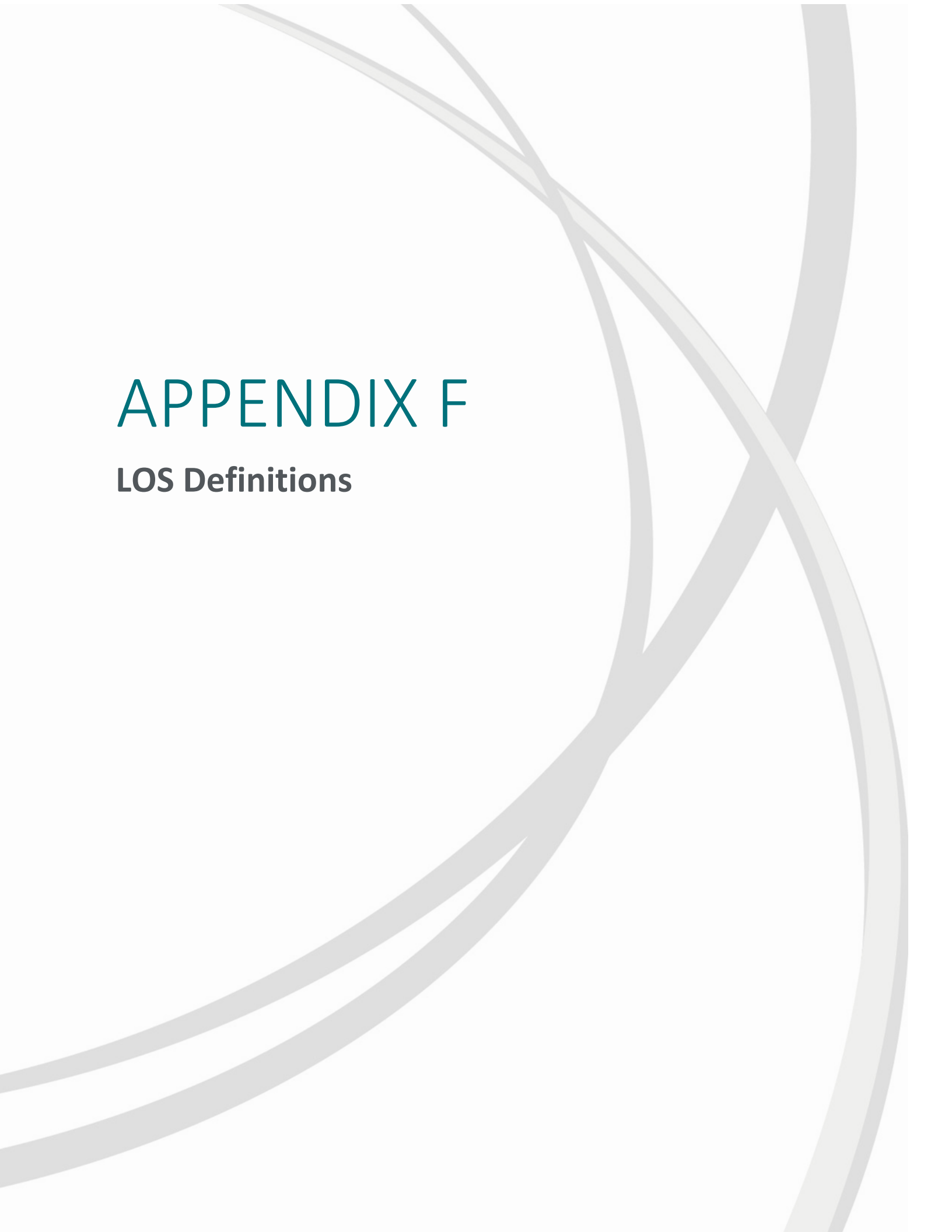
RowID:
C40401007
3191

Filters:
Departure: trip: start_time=000-000
and
Transportation: mode: P
and
Priority: road: mode: M P T

Top 2023
Table

Inbound Direction		Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8	Route 1	Route 2	Route 3	Route 4	Route 5	Route 6	Route 7	Route 8
PO 1 of Trips	68	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
PO 2 of Trips	12	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
PO 3 of Trips	146	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0%	0%	0%	0%	0%	0%	0%	0%
PO 4 of Trips	40	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
PO 5 of Trips	17	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
PO 6 of Trips	35	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
PO 7 of Trips	6	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
PO 8 of Trips	13	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
PO 9 of Trips	153	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	1%	1%	1%	1%	1%	1%	1%	1%
PO 10 of Trips	89	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2%	2%	2%	2%	2%	2%	2%	2%
PO 11 of Trips	44	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
PO 12 of Trips	20	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
PO 13 of Trips	15	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
PO 14 of Trips	14	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
PO 15 of Trips	16	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
Outbound	21	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
Geometry	27	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0%	0%	0%	0%	0%	0%	0%	0%
Albion	14	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
Richmond Hill	74	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	1%	1%	1%	1%	1%	1%	1%	1%
Markham	70	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2%	2%	2%	2%	2%	2%	2%	2%
King	71	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
Vaughan	210	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2%	2%	2%	2%	2%	2%	2%	2%
5850-108	118	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0%	0%	0%	0%	0%	0%	0%	0%
3860	16	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
3,850,104	134	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	1%	1%	1%	1%	1%	1%	1%	1%
3864	53	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0%	0%	0%	0%	0%	0%	0%	0%
3,850,105	215	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2%	2%	2%	2%	2%	2%	2%	2%
3,850,101	111	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
3860	67	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0%	0%	0%	0%	0%	0%	0%	0%
3,850,106	280	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	2%	2%	2%	2%	2%	2%	2%	2%
3,850,105	205	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2%	2%	2%	2%	2%	2%	2%	2%
3864	96	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0%	0%	0%	0%	0%	0%	0%	0%
3867	9	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
3868	50	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	25%	25%	25%	25%	25%	25%	25%	25%
3868	134	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	8%	8%	8%	8%	8%	8%	8%	8%
3868	433	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	1%	1%	1%	1%	1%	1%	1%	1%
3868	77	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
3868	91	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	1%	1%	1%	1%	1%	1%	1%	1%
3868	32	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	1%	1%	1%	1%	1%	1%	1%	1%
3868	91	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1%	1%	1%	1%	1%	1%	1%	1%
3868	14	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
3868	54	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	1%	1%	1%	1%	1%	1%	1%	1%
3868	370	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	1%	1%	1%	1%	1%	1%	1%	1%
3868	163	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	2%	2%	2%	2%	2%	2%	2%	2%
3868	42	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0%	0%	0%	0%	0%	0%	0%	0%
3868	21	0	0	0	0	0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%
5281	5281	0	0	0	0	0	0	0	0	18%	18%	18%	18%	18%	18%	18%	18%
5282	5282	0	0	0	0	0	0	0	0	100%	100%	100%	100%	100%	100%	100%	100%

Direction	Route	Percentage
N	Albion Vaughan Rd	8%
N	Colebourne Dr	14%
N	Humber Station Rd	2%
S	Clarkway Dr	18%
E	Healey Rd	2%
E	Healey Rd	6%
W	Healey Rd	13%
W	Mayfield Rd	25%
		100%



APPENDIX F

LOS Definitions

LEVELS OF SERVICE FOR SIGNALIZED INTERSECTIONS: METHODOLOGY

Signalized intersection analyses contained in this report were carried out using methodology described in the *Highway Capacity Manual, 2000 update*, by the Transportation Research Board and implemented using Synchro 11 software.

Analyses of signalized intersections compare the volume of traffic passing through an intersection with the capacity of each of the intersection's approaches. Volumes can be either observed or estimated whereas an intersection's capacity is a function of its geometry, the number of lanes per approach, speeds, signal timing, and other considerations. The level of service is evaluated in terms of the average control delay (seconds) per vehicle, which is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. Delay is a complex measure and is calculated as a function of a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group in question.

The criteria for each level of service are given below.

Level of Service	Features	Control Delay (sec/veh)
A	Very low control delay. Occurs when signal progression (i.e. coordination) is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not have to stop.	0.0 – 10.0
B	Occurs with good progression, short cycle length, or both. More vehicles stop than with LOS A.	10.1 – 20.0
C	Occurs with fair progression, longer cycle length, or both. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.	20.0 – 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles have to stop. Individual cycle failures are noticeable (i.e. some vehicles require more than one cycle to make it through the intersection).	35.0 – 55.0
E	Considered by many agencies to be the limit of acceptable delay. High delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.	55.0- 80.0
F	Considered to be unacceptable to most drivers and often occurs with oversaturation. It may also occur at high v/c ratios below 1.0 with many individual cycle failures.	80.1 +

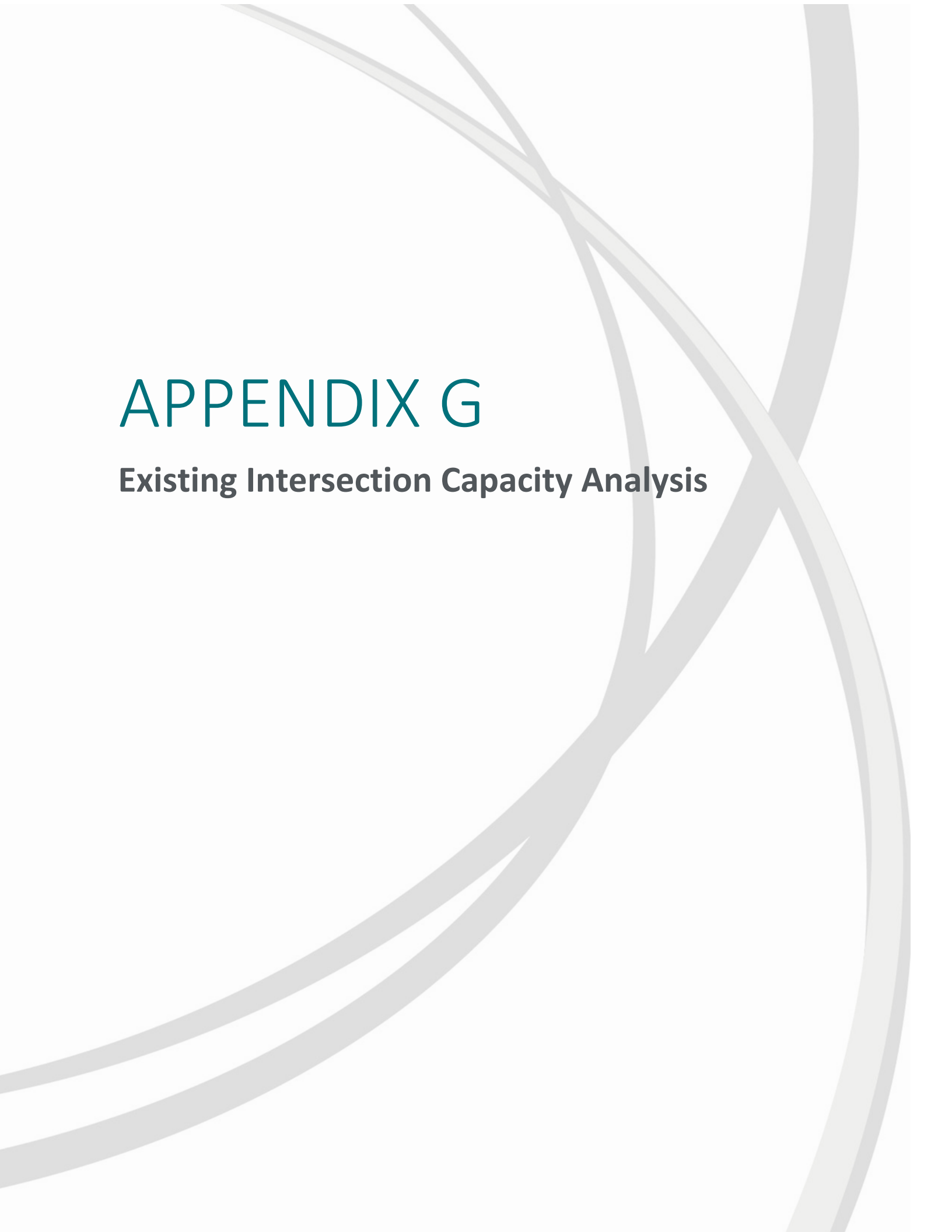
LEVELS OF SERVICE FOR UNSIGNALIZED INTERSECTIONS: METHODOLOGY

Unsignalized intersection analyses contained in this report were carried out using methodology described in the *Highway Capacity Manual (2000 edition)* by the Transportation Research Board and implemented using the Synchro 11 software.

Analyses of unsignalized intersections compare observed or estimated traffic volumes with the capacity of each of the intersection's approaches. The analysis derives an estimation of queue lengths and the resulting delays experienced by vehicles from the time they join a queue to the moment they cross the stop bar at the intersection. Queuing and delays at unsignalized approaches are a function of the volumes of all other conflicting movements and the characteristics of the intersection. Traffic volumes can be either observed or estimated while an intersection's capacity is a function of its geometry, lane configurations, speeds, and other operational considerations. The resulting statistic is termed "average total delay" for each approach and is measured in seconds per vehicle. The delay can then be assigned a letter grade, which provides a simple qualitative assessment of the Level of Service for any unsignalized intersection.

The Level of Service grading for unsignalized intersections is more sensitive than that used for signalized analyses: delays are more onerous at unsignalized intersections as drivers must remain attentive while waiting for acceptable conditions to complete their movement. As a result, the thresholds between grades are lower for unsignalized analyses.

Level of Service	Features	Average Total Delay (sec/veh)
A	Almost no delay occurs. Approaches appear clear and turns are made easily.	0.0 – 10.0
B	Short delays are experienced. Drivers find their movement becoming more restricted.	10.1 – 15.0
C	Longer delays occur. Operation of both the minor and major streets are generally stable but movements from the minor street become more difficult. This level is often used for urban intersection design standards.	15.1 – 25.0
D	Motorists encounter increasing traffic restrictions and substantial delays. Delays on the major street occur as turning traffic interferes with the flow of traffic. Traffic flows are approaching the capacity of the intersection.	25.1 - 35.0
E	At level "E", capacity is reached. There are long queues of vehicles waiting upstream for the approach to clear. Delays to vehicles reach frustrating levels.	35.1- 50.0
F	Intersection saturation occurs as vehicle demand has exceeded the capacity. Drivers will often accept less than ideal gap opportunities; safety is compromised.	50.1 +



APPENDIX G

Existing Intersection Capacity Analysis

Lanes, Volumes, Timings
2: Humber Station Road & Healey Road

Existing Conditions

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	499	19	73	210	4	6	16	31	72	162	4
Future Volume (vph)	4	499	19	73	210	4	6	16	31	72	162	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.998			0.920			0.998	
Flt Protected					0.987			0.995			0.985	
Satd. Flow (prot)	0	1872	0	0	1854	0	0	1728	0	0	1876	0
Flt Permitted					0.987			0.995			0.985	
Satd. Flow (perm)	0	1872	0	0	1854	0	0	1728	0	0	1876	0
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		489.5			1373.5			3061.3			476.2	
Travel Time (s)		29.4			82.4			137.8			21.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	25%	2%	0%	1%	2%	25%	0%	0%	3%	0%	1%	0%
Adj. Flow (vph)	4	537	20	78	226	4	6	17	33	77	174	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	561	0	0	308	0	0	56	0	0	255	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)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 72.4%	ICU Level of Service C											
Analysis Period (min) 15												

HCM 6th AWSC
2: Humber Station Road & Healey Road

Existing Conditions
AM Peak Hour

Intersection												
Intersection Delay, s/veh	30.2											
Intersection LOS	D											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	4	499	19	73	210	4	6	16	31	72	162	4
Future Vol, veh/h	4	499	19	73	210	4	6	16	31	72	162	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles, %	25	2	0	1	2	25	0	0	3	0	1	0
Mvmt Flow	4	537	20	78	226	4	6	17	33	77	174	4
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	46.8			15.7			10.9			15.5		
HCM LOS	E			C			B			C		
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %		11%	1%	25%	30%							
Vol Thru, %		30%	96%	73%	68%							
Vol Right, %		58%	4%	1%	2%							
Sign Control		Stop	Stop	Stop	Stop							
Traffic Vol by Lane		53	522	287	238							
LT Vol		6	4	73	72							
Through Vol		16	499	210	162							
RT Vol		31	19	4	4							
Lane Flow Rate		57	561	309	256							
Geometry Grp		1	1	1	1							
Degree of Util (X)		0.11	0.935	0.524	0.472							
Departure Headway (Hd)		6.929	5.999	6.11	6.637							
Convergence, Y/N		Yes	Yes	Yes	Yes							
Cap		515	606	593	543							
Service Time		4.998	4.012	4.128	4.687							
HCM Lane V/C Ratio		0.111	0.926	0.521	0.471							
HCM Control Delay		10.9	46.8	15.7	15.5							
HCM Lane LOS		B	E	C	C							
HCM 95th-tile Q		0.4	12.3	3	2.5							

Lanes, Volumes, Timings

3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	523	28	67	470	4	11	47	112	2	247	8
Future Volume (vph)	8	523	28	67	470	4	11	47	112	2	247	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.999			0.911			0.996	
Flt Protected		0.999			0.994			0.997				
Satd. Flow (prot)	0	1586	0	0	1561	0	0	1683	0	0	1888	0
Flt Permitted		0.992			0.856			0.962			0.987	
Satd. Flow (perm)	0	1575	0	0	1344	0	0	1624	0	0	1864	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		3										
Link Speed (k/h)		80			80			70			80	
Link Distance (m)		936.9			1387.4			281.8			3061.3	
Travel Time (s)		42.2			62.4			14.5			137.8	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	13%	20%	25%	4%	25%	0%	18%	2%	3%	50%	1%	0%
Adj. Flow (vph)	8	545	29	70	490	4	11	49	117	2	257	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	582	0	0	564	0	0	177	0	0	267	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)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			-28.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
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)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		6	6		2	2	

Lanes, Volumes, Timings

3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions

AM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		26.0	26.0		26.0	26.0	
Total Split (s)	68.0	68.0		68.0	68.0		26.0	26.0		26.0	26.0	
Total Split (%)	56.7%	56.7%		56.7%	56.7%		21.7%	21.7%		21.7%	21.7%	
Maximum Green (s)	61.0	61.0		61.0	61.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		7.0			7.0			7.0			7.0	
Lead/Lag							Lag	Lag		Lead	Lead	
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)	8.0	8.0		8.0	8.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		63.5			63.5			16.8			18.7	
Actuated g/C Ratio		0.53			0.53			0.14			0.16	
v/c Ratio		0.70			0.79			0.78			0.92	
Control Delay		27.2			28.6			72.7			86.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.2			28.6			72.7			86.1	
LOS		C			C			E			F	
Approach Delay		27.2			28.6			72.7			86.1	
Approach LOS		C			C			E			F	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 31 (26%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 42.7

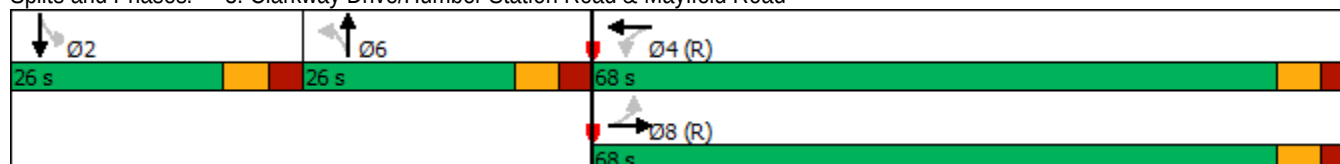
Intersection LOS: D

Intersection Capacity Utilization 93.4%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road

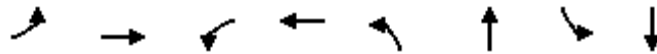


Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions

AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕		↕		↕
Traffic Volume (vph)	8	523	67	470	11	47	2	247
Future Volume (vph)	8	523	67	470	11	47	2	247
Lane Group Flow (vph)	0	582	0	564	0	177	0	267
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		8		4		6		2
Permitted Phases	8		4		6		2	
Detector Phase	8	8	4	4	6	6	2	2
Switch Phase								
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.0	27.0	27.0	27.0	26.0	26.0	26.0	26.0
Total Split (s)	68.0	68.0	68.0	68.0	26.0	26.0	26.0	26.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	21.7%	21.7%	21.7%	21.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		7.0		7.0		7.0		7.0
Lead/Lag					Lag	Lag	Lead	Lead
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio		0.70		0.79		0.78		0.92
Control Delay		27.2		28.6		72.7		86.1
Queue Delay		0.0		0.0		0.0		0.0
Total Delay		27.2		28.6		72.7		86.1
Queue Length 50th (m)		106.9		69.6		42.2		65.8
Queue Length 95th (m)		155.2		#102.9		#71.4		#116.3
Internal Link Dist (m)		912.9		1363.4		257.8		3037.3
Turn Bay Length (m)								
Base Capacity (vph)		835		711		257		295
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		0.70		0.79		0.69		0.91

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 31 (26%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green

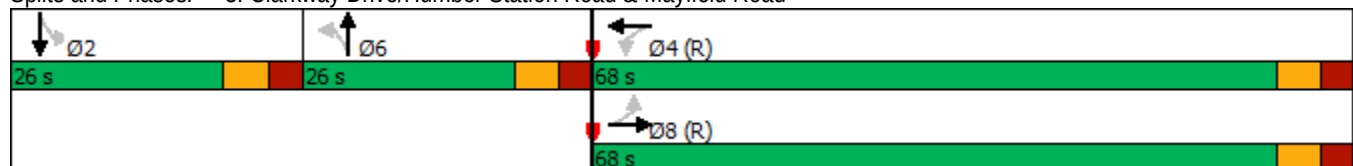
Natural Cycle: 100

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	523	28	67	470	4	11	47	112	2	247	8
Future Volume (veh/h)	8	523	28	67	470	4	11	47	112	2	247	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1707	1604	1530	1841	1530	1900	1633	1870	1856	1159	1885	1900
Adj Flow Rate, veh/h	8	545	29	70	490	4	11	49	117	2	257	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	13	20	25	4	25	0	18	2	3	50	1	0
Cap, veh/h	36	1086	57	135	884	7	40	83	177	31	285	9
Arrive On Green	0.73	0.73	0.73	0.73	0.73	0.73	0.16	0.16	0.16	0.16	0.16	0.16
Sat Flow, veh/h	7	1496	79	139	1217	10	51	526	1125	4	1814	56
Grp Volume(v), veh/h	582	0	0	564	0	0	177	0	0	267	0	0
Grp Sat Flow(s),veh/h/ln	1582	0	0	1366	0	0	1701	0	0	1873	0	0
Q Serve(g_s), s	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0
Cycle Q Clear(g_c), s	19.0	0.0	0.0	19.7	0.0	0.0	11.9	0.0	0.0	16.8	0.0	0.0
Prop In Lane	0.01		0.05	0.12		0.01	0.06		0.66	0.01		0.03
Lane Grp Cap(c), veh/h	1179	0	0	1026	0	0	299	0	0	324	0	0
V/C Ratio(X)	0.49	0.00	0.00	0.55	0.00	0.00	0.59	0.00	0.00	0.82	0.00	0.00
Avail Cap(c_a), veh/h	1179	0	0	1026	0	0	301	0	0	327	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	7.1	0.0	0.0	7.1	0.0	0.0	47.7	0.0	0.0	49.7	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	2.1	0.0	0.0	3.0	0.0	0.0	15.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	0.6	0.0	0.0	3.6	0.0	0.0	6.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.6	0.0	0.0	9.3	0.0	0.0	50.7	0.0	0.0	65.2	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	D	A	A	E	A	A
Approach Vol, veh/h	582			564			177			267		
Approach Delay, s/veh	8.6			9.3			50.7			65.2		
Approach LOS	A			A			D			E		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	25.8			94.2			25.8			94.2		
Change Period (Y+Rc), s	7.0			7.0			7.0			7.0		
Max Green Setting (Gmax), s	19.0			61.0			19.0			61.0		
Max Q Clear Time (g_c+l1), s	18.8			21.7			13.9			21.0		
Green Ext Time (p_c), s	0.0			5.9			0.4			5.7		
Intersection Summary												
HCM 6th Ctrl Delay	23.0											
HCM 6th LOS	C											

Lanes, Volumes, Timings
2: Humber Station Road & Healey Road

Existing Conditions

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	247	6	34	496	22	16	187	65	22	42	6
Future Volume (vph)	21	247	6	34	496	22	16	187	65	22	42	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997			0.995			0.967			0.989	
Flt Protected		0.996			0.997			0.997			0.984	
Satd. Flow (prot)	0	1891	0	0	1898	0	0	1814	0	0	1848	0
Flt Permitted		0.996			0.997			0.997			0.984	
Satd. Flow (perm)	0	1891	0	0	1898	0	0	1814	0	0	1848	0
Link Speed (k/h)		60			60			80			80	
Link Distance (m)		489.5			1373.5			3061.3			476.2	
Travel Time (s)		29.4			82.4			137.8			21.4	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	0%	1%	0%	3%	0%	5%	0%	2%	3%	0%	2%	0%
Adj. Flow (vph)	22	255	6	35	511	23	16	193	67	23	43	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	283	0	0	569	0	0	276	0	0	72	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)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	58.2%											
Analysis Period (min)	15											
	ICU Level of Service B											

HCM 6th AWSC
2: Humber Station Road & Healey Road

Existing Conditions
PM Peak Hour

Intersection												
Intersection Delay, s/veh	26.3											
Intersection LOS	D											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	21	247	6	34	496	22	16	187	65	22	42	6
Future Vol, veh/h	21	247	6	34	496	22	16	187	65	22	42	6
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles, %	0	1	0	3	0	5	0	2	3	0	2	0
Mvmt Flow	22	255	6	35	511	23	16	193	67	23	43	6
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB	WB			NB			SB				
Opposing Approach	WB	EB			SB			NB				
Opposing Lanes	1	1			1			1				
Conflicting Approach Left	SB	NB			EB			WB				
Conflicting Lanes Left	1	1			1			1				
Conflicting Approach Right	NB	SB			WB			EB				
Conflicting Lanes Right	1	1			1			1				
HCM Control Delay	14.7	39.2			15.5			11.4				
HCM LOS	B	E			C			B				
Lane	NBLn1	EBLn1	WBLn1	SBLn1								
Vol Left, %	6%	8%	6%	31%								
Vol Thru, %	70%	90%	90%	60%								
Vol Right, %	24%	2%	4%	9%								
Sign Control	Stop	Stop	Stop	Stop								
Traffic Vol by Lane	268	274	552	70								
LT Vol	16	21	34	22								
Through Vol	187	247	496	42								
RT Vol	65	6	22	6								
Lane Flow Rate	276	282	569	72								
Geometry Grp	1	1	1	1								
Degree of Util (X)	0.49	0.479	0.9	0.143								
Departure Headway (Hd)	6.38	6.102	5.696	7.149								
Convergence, Y/N	Yes	Yes	Yes	Yes								
Cap	564	590	643	499								
Service Time	4.433	4.153	3.696	5.222								
HCM Lane V/C Ratio	0.489	0.478	0.885	0.144								
HCM Control Delay	15.5	14.7	39.2	11.4								
HCM Lane LOS	C	B	E	B								
HCM 95th-tile Q	2.7	2.6	11.2	0.5								

Lanes, Volumes, Timings

3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions

PM Peak Hour

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	527	19	52	645	4	59	245	109	0	62	12
Future Volume (vph)	10	527	19	52	645	4	59	245	109	0	62	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.999			0.965			0.979	
Flt Protected		0.999			0.996			0.993				
Satd. Flow (prot)	0	1661	0	0	1651	0	0	1784	0	0	1850	0
Flt Permitted		0.985			0.899			0.939				
Satd. Flow (perm)	0	1638	0	0	1490	0	0	1687	0	0	1850	0
Right Turn on Red			Yes			Yes			No			No
Satd. Flow (RTOR)		2										
Link Speed (k/h)		80			80			70			80	
Link Distance (m)		936.9			1387.4			281.8			3061.3	
Travel Time (s)		42.2			62.4			14.5			137.8	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	20%	15%	11%	2%	17%	0%	12%	2%	1%	0%	2%	0%
Adj. Flow (vph)	10	543	20	54	665	4	61	253	112	0	64	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	573	0	0	723	0	0	426	0	0	76	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)		3.5			3.5			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			-28.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01	1.01	0.99	1.01
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
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)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
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)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Detector Phase	8	8		4	4		6	6		2	2	

Lanes, Volumes, Timings
3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions

PM Peak Hour

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0		8.0	8.0		8.0	8.0	
Minimum Split (s)	27.0	27.0		27.0	27.0		26.0	26.0		26.0	26.0	
Total Split (s)	55.0	55.0		55.0	55.0		39.0	39.0		26.0	26.0	
Total Split (%)	45.8%	45.8%		45.8%	45.8%		32.5%	32.5%		21.7%	21.7%	
Maximum Green (s)	48.0	48.0		48.0	48.0		32.0	32.0		19.0	19.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		7.0			7.0			7.0			7.0	
Lead/Lag							Lag	Lag		Lead	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Walk Time (s)	8.0	8.0		8.0	8.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effect Green (s)		55.5			55.5			35.9			10.6	
Actuated g/C Ratio		0.46			0.46			0.30			0.09	
v/c Ratio		0.75			1.05			0.85			0.47	
Control Delay		36.9			75.4			55.6			60.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		36.9			75.4			55.6			60.7	
LOS		D			E			E			E	
Approach Delay		36.9			75.4			55.6			60.7	
Approach LOS		D			E			E			E	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 43 (36%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 57.8

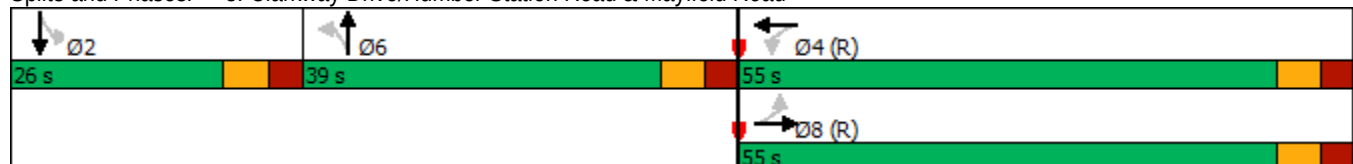
Intersection LOS: E

Intersection Capacity Utilization 103.9%

ICU Level of Service G

Analysis Period (min) 15

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road

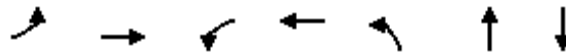


Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions

PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations		↕		↕		↕	↕
Traffic Volume (vph)	10	527	52	645	59	245	62
Future Volume (vph)	10	527	52	645	59	245	62
Lane Group Flow (vph)	0	573	0	723	0	426	76
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases		8		4		6	2
Permitted Phases	8		4		6		
Detector Phase	8	8	4	4	6	6	2
Switch Phase							
Minimum Initial (s)	12.0	12.0	12.0	12.0	8.0	8.0	8.0
Minimum Split (s)	27.0	27.0	27.0	27.0	26.0	26.0	26.0
Total Split (s)	55.0	55.0	55.0	55.0	39.0	39.0	26.0
Total Split (%)	45.8%	45.8%	45.8%	45.8%	32.5%	32.5%	21.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)		0.0		0.0		0.0	0.0
Total Lost Time (s)		7.0		7.0		7.0	7.0
Lead/Lag					Lag	Lag	Lead
Lead-Lag Optimize?					Yes	Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None
v/c Ratio		0.75		1.05		0.85	0.47
Control Delay		36.9		75.4		55.6	60.7
Queue Delay		0.0		0.0		0.0	0.0
Total Delay		36.9		75.4		55.6	60.7
Queue Length 50th (m)		123.5		~213.5		96.3	18.3
Queue Length 95th (m)		#197.1		#298.6		#150.8	33.6
Internal Link Dist (m)		912.9		1363.4		257.8	3037.3
Turn Bay Length (m)							
Base Capacity (vph)		759		689		510	292
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		0.75		1.05		0.84	0.26

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 43 (36%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

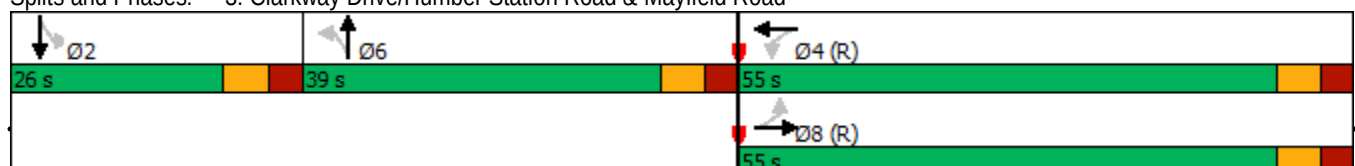
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



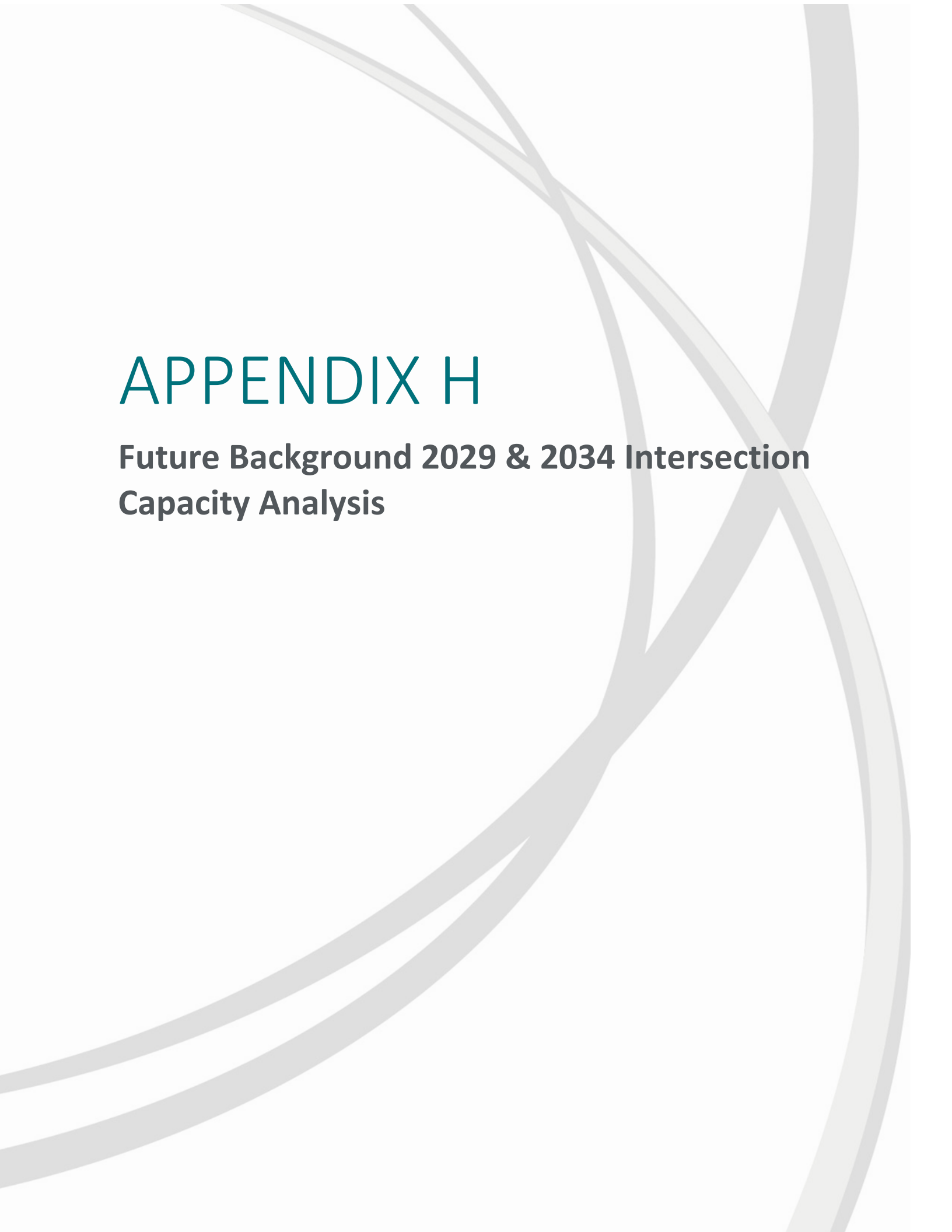
HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Existing Conditions

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	527	19	52	645	4	59	245	109	0	62	12
Future Volume (veh/h)	10	527	19	52	645	4	59	245	109	0	62	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1604	1678	1737	1870	1648	1900	1722	1870	1885	1900	1870	1900
Adj Flow Rate, veh/h	10	543	20	54	665	4	61	253	112	0	64	12
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	20	15	11	2	17	0	12	2	1	0	2	0
Cap, veh/h	37	983	36	84	906	5	85	280	118	0	403	75
Arrive On Green	0.62	0.62	0.62	0.62	0.62	0.62	0.26	0.26	0.26	0.00	0.26	0.26
Sat Flow, veh/h	11	1584	58	84	1460	9	194	1066	449	0	1532	287
Grp Volume(v), veh/h	573	0	0	723	0	0	426	0	0	0	0	76
Grp Sat Flow(s),veh/h/ln	1652	0	0	1552	0	0	1709	0	0	0	0	1819
Q Serve(g_s), s	0.0	0.0	0.0	14.0	0.0	0.0	23.1	0.0	0.0	0.0	0.0	3.9
Cycle Q Clear(g_c), s	23.8	0.0	0.0	37.8	0.0	0.0	29.3	0.0	0.0	0.0	0.0	3.9
Prop In Lane	0.02		0.03	0.07		0.01	0.14		0.26	0.00		0.16
Lane Grp Cap(c), veh/h	1055	0	0	995	0	0	484	0	0	0	0	478
V/C Ratio(X)	0.54	0.00	0.00	0.73	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.16
Avail Cap(c_a), veh/h	1055	0	0	995	0	0	490	0	0	0	0	478
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	13.2	0.0	0.0	15.6	0.0	0.0	43.3	0.0	0.0	0.0	0.0	34.0
Incr Delay (d2), s/veh	2.0	0.0	0.0	4.6	0.0	0.0	16.7	0.0	0.0	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.8	0.0	0.0	3.0	0.0	0.0	9.7	0.0	0.0	0.0	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.2	0.0	0.0	20.2	0.0	0.0	60.0	0.0	0.0	0.0	0.0	34.2
LnGrp LOS	B	A	A	C	A	A	E	A	A	A	A	C
Approach Vol, veh/h	573			723			426			76		
Approach Delay, s/veh	15.2			20.2			60.0			34.2		
Approach LOS	B			C			E			C		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	38.5			81.5			38.5			81.5		
Change Period (Y+Rc), s	7.0			7.0			7.0			7.0		
Max Green Setting (Gmax), s	19.0			48.0			32.0			48.0		
Max Q Clear Time (g_c+l1), s	5.9			39.8			31.3			25.8		
Green Ext Time (p_c), s	0.3			3.7			0.2			4.8		
Intersection Summary												
HCM 6th Ctrl Delay	28.6											
HCM 6th LOS	C											



APPENDIX H

Future Background 2029 & 2034 Intersection Capacity Analysis

Lanes, Volumes, Timings
2: Humber Station Road & Healey Road

Future Background (2029)

AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	633	35	73	276	23	18	79	177
Future Volume (vph)	4	633	35	73	276	23	18	79	177
Lane Group Flow (vph)	4	681	38	78	301	25	57	85	194
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.52	0.03	0.15	0.21	0.29	0.20	0.43	0.70
Control Delay	7.8	11.5	1.3	4.3	4.3	62.3	30.9	52.4	61.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	11.5	1.3	4.3	4.3	62.3	30.9	52.4	61.7
Queue Length 50th (m)	0.3	75.3	0.0	3.7	16.3	6.1	5.2	19.5	46.1
Queue Length 95th (m)	1.8	127.7	2.7	9.1	30.9	15.5	18.9	34.2	67.7
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	608	1322	1105	524	1460	122	376	276	388
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	0.52	0.03	0.15	0.21	0.20	0.15	0.31	0.50

Intersection Summary

Cycle Length: 120

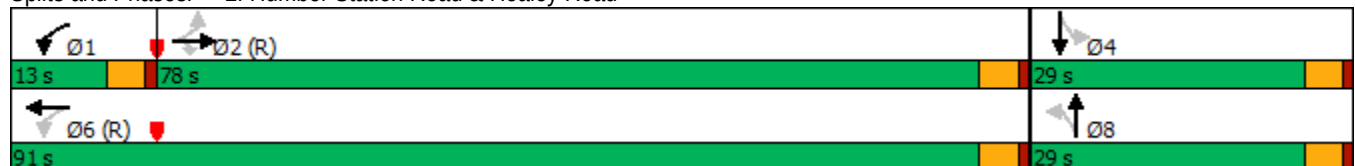
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



Queues 2: Humber Station Road & Healey Road

Future Background (2029)

AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	633	35	73	276	23	18	79	177
Future Volume (vph)	4	633	35	73	276	23	18	79	177
Lane Group Flow (vph)	4	681	38	78	301	25	57	85	194
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.52	0.03	0.15	0.21	0.29	0.20	0.43	0.70
Control Delay	7.8	11.5	1.3	4.3	4.3	62.3	30.9	52.4	61.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	11.5	1.3	4.3	4.3	62.3	30.9	52.4	61.7
Queue Length 50th (m)	0.3	75.3	0.0	3.7	16.3	6.1	5.2	19.5	46.1
Queue Length 95th (m)	1.8	127.7	2.7	9.1	30.9	15.5	18.9	34.2	67.7
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	608	1322	1105	524	1460	122	376	276	388
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	0.52	0.03	0.15	0.21	0.20	0.15	0.31	0.50

Intersection Summary

Cycle Length: 120

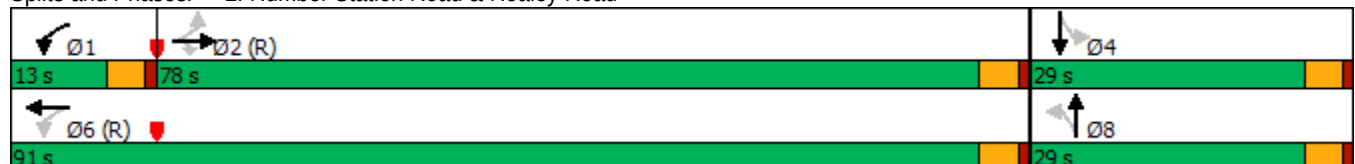
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary

2: Humber Station Road & Healey Road

Future Background (2029)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	633	35	73	276	4	23	18	35	79	177	4
Future Volume (veh/h)	4	633	35	73	276	4	23	18	35	79	177	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1870	1856	1885	1870	1530	1767	1900	1856	1900	1885	1900
Adj Flow Rate, veh/h	4	681	38	78	297	4	25	19	38	85	190	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	25	2	3	1	2	25	9	0	3	0	1	0
Cap, veh/h	686	1327	1116	531	1447	19	105	79	158	210	256	5
Arrive On Green	0.71	0.71	0.71	0.04	0.79	0.79	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	882	1870	1572	1795	1841	25	1123	565	1131	1368	1839	39
Grp Volume(v), veh/h	4	681	38	78	0	301	25	0	57	85	0	194
Grp Sat Flow(s),veh/h/ln	882	1870	1572	1795	0	1866	1123	0	1696	1368	0	1878
Q Serve(g_s), s	0.2	20.0	0.9	1.3	0.0	4.9	2.6	0.0	3.6	7.1	0.0	11.9
Cycle Q Clear(g_c), s	0.2	20.0	0.9	1.3	0.0	4.9	14.5	0.0	3.6	10.7	0.0	11.9
Prop In Lane	1.00		1.00	1.00		0.01	1.00		0.67	1.00		0.02
Lane Grp Cap(c), veh/h	686	1327	1116	531	0	1466	105	0	236	210	0	262
V/C Ratio(X)	0.01	0.51	0.03	0.15	0.00	0.21	0.24	0.00	0.24	0.41	0.00	0.74
Avail Cap(c_a), veh/h	686	1327	1116	589	0	1466	178	0	346	298	0	383
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.1	8.0	5.2	5.7	0.0	3.3	56.5	0.0	46.0	50.7	0.0	49.6
Incr Delay (d2), s/veh	0.0	1.4	0.1	0.1	0.0	0.3	1.2	0.0	0.5	1.3	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.7	0.1	0.0	0.0	0.1	0.6	0.0	1.2	2.0	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.1	9.4	5.2	5.8	0.0	3.6	57.7	0.0	46.5	52.0	0.0	53.9
LnGrp LOS	A	A	A	A	A	A	E	A	D	D	A	D
Approach Vol, veh/h	723			379			82			279		
Approach Delay, s/veh	9.1			4.1			49.9			53.3		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	1	2	4			6		8				
Phs Duration (G+Y+Rc), s	9.1	89.7	21.2			98.8		21.2				
Change Period (Y+Rc), s	4.5	4.5	4.5			4.5		4.5				
Max Green Setting (Gmax), s	8.5	73.5	24.5			86.5		24.5				
Max Q Clear Time (g_c+l1), s	3.3	22.0	13.9			6.9		16.5				
Green Ext Time (p_c), s	0.1	7.1	1.1			2.4		0.2				
Intersection Summary												
HCM 6th Ctrl Delay	18.5											
HCM 6th LOS	B											

Lanes, Volumes, Timings

Future Background (2029)

3: Clarkway Drive/Humber Station Road & Mayfield Road

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	8	769	28	102	581	21	11	53	23	262
Future Volume (vph)	8	769	28	102	581	21	11	53	23	262
Lane Group Flow (vph)	8	801	29	106	605	22	11	265	24	281
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.02	0.26	0.03	0.26	0.28	0.02	0.11	0.65	0.20	0.75
Control Delay	8.1	8.1	2.2	10.6	8.5	1.4	39.0	33.0	40.8	56.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	8.1	2.2	10.6	8.5	1.4	39.0	33.0	40.8	56.0
Queue Length 50th (m)	0.6	25.1	0.0	9.1	27.9	0.0	2.3	36.3	5.9	71.4
Queue Length 95th (m)	2.8	38.8	3.1	22.7	45.4	2.0	7.3	60.8	14.7	98.3
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	477	3121	885	405	2135	1005	215	755	257	806
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	0.02	0.26	0.03	0.26	0.28	0.02	0.05	0.35	0.09	0.35

Intersection Summary

Cycle Length: 120

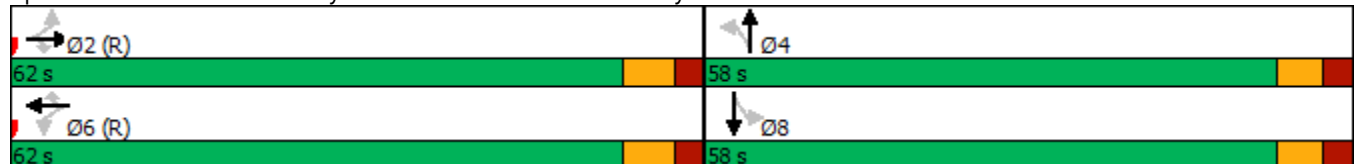
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

Future Background (2029)

3: Clarkway Drive/Humber Station Road & Mayfield Road

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		  			 			 		 
Traffic Volume (vph)	8	769	28	102	581	21	11	53	23	262
Future Volume (vph)	8	769	28	102	581	21	11	53	23	262
Lane Group Flow (vph)	8	801	29	106	605	22	11	265	24	281
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.02	0.26	0.03	0.26	0.28	0.02	0.11	0.65	0.20	0.75
Control Delay	8.1	8.1	2.2	10.6	8.5	1.4	39.0	33.0	40.8	56.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.1	8.1	2.2	10.6	8.5	1.4	39.0	33.0	40.8	56.0
Queue Length 50th (m)	0.6	25.1	0.0	9.1	27.9	0.0	2.3	36.3	5.9	71.4
Queue Length 95th (m)	2.8	38.8	3.1	22.7	45.4	2.0	7.3	60.8	14.7	98.3
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	477	3121	885	405	2135	1005	215	755	257	806
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	0.02	0.26	0.03	0.26	0.28	0.02	0.05	0.35	0.09	0.35

Intersection Summary

Cycle Length: 120

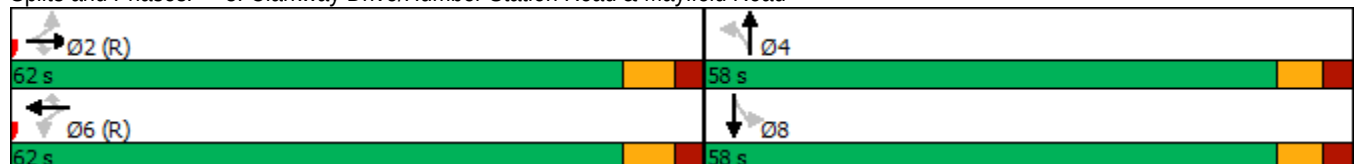
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Background (2029)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 							
Traffic Volume (veh/h)	8	769	28	102	581	21	11	53	202	23	262	8
Future Volume (veh/h)	8	769	28	102	581	21	11	53	202	23	262	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1707	1678	1530	1796	1648	1752	1633	1870	1841	1767	1885	1900
Adj Flow Rate, veh/h	8	801	29	106	605	22	11	55	210	24	273	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	13	15	25	7	17	10	18	2	4	9	1	0
Cap, veh/h	492	3076	870	453	2103	997	127	71	272	120	381	11
Arrive On Green	0.67	0.67	0.67	0.67	0.67	0.67	0.21	0.21	0.21	0.21	0.21	0.21
Sat Flow, veh/h	729	4580	1296	652	3131	1485	959	340	1297	1053	1822	53
Grp Volume(v), veh/h	8	801	29	106	605	22	11	0	265	24	0	281
Grp Sat Flow(s),veh/h/ln	729	1527	1296	652	1566	1485	959	0	1637	1053	0	1876
Q Serve(g_s), s	0.5	8.4	0.9	9.3	9.4	0.6	1.3	0.0	18.3	2.6	0.0	16.7
Cycle Q Clear(g_c), s	10.0	8.4	0.9	17.6	9.4	0.6	18.0	0.0	18.3	21.0	0.0	16.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.79	1.00		0.03
Lane Grp Cap(c), veh/h	492	3076	870	453	2103	997	127	0	343	120	0	393
V/C Ratio(X)	0.02	0.26	0.03	0.23	0.29	0.02	0.09	0.00	0.77	0.20	0.00	0.72
Avail Cap(c_a), veh/h	492	3076	870	453	2103	997	334	0	696	347	0	797
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.1	7.8	6.6	11.4	8.0	6.6	52.5	0.0	44.8	54.6	0.0	44.1
Incr Delay (d2), s/veh	0.1	0.2	0.1	1.2	0.3	0.0	0.3	0.0	3.7	0.8	0.0	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.8	0.1	0.7	1.0	0.1	0.3	0.0	6.0	0.6	0.0	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.1	8.1	6.7	12.6	8.4	6.6	52.8	0.0	48.5	55.5	0.0	46.6
LnGrp LOS	B	A	A	B	A	A	D	A	D	E	A	D
Approach Vol, veh/h	838			733			276			305		
Approach Delay, s/veh	8.0			8.9			48.7			47.3		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	87.9			32.1			87.9			32.1		
Change Period (Y+Rc), s	* 7.3			* 7			* 7.3			* 7		
Max Green Setting (Gmax), s	* 55			* 51			* 55			* 51		
Max Q Clear Time (g_c+I1), s	12.0			20.3			19.6			23.0		
Green Ext Time (p_c), s	8.5			2.2			7.3			2.2		

Intersection Summary

HCM 6th Ctrl Delay 19.1

HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Background (2029)

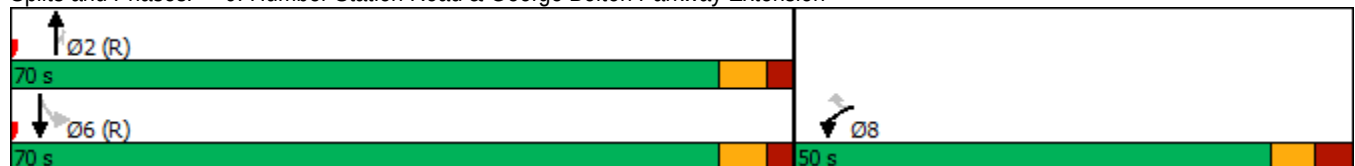
AM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	82	293	
Future Volume (vph)	82	293	
Lane Group Flow (vph)	82	293	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.04	0.15	
Control Delay	0.0	0.2	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.2	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1830	1902	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.04	0.15	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2029)

9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	82	293	
Future Volume (vph)	82	293	
Lane Group Flow (vph)	82	293	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.04	0.15	
Control Delay	0.0	0.2	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.2	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1830	1902	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.04	0.15	

Intersection Summary

Cycle Length: 120

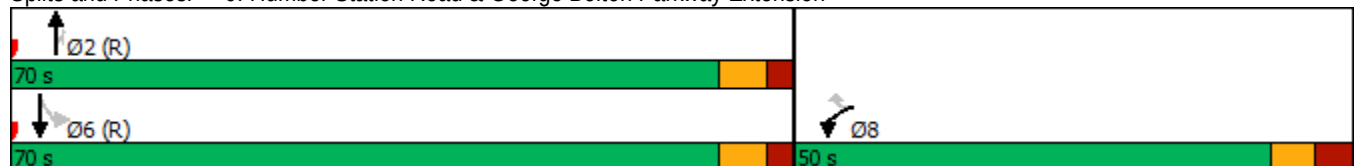
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary

9: Humber Station Road & George Bolton Parkway Extension

Future Background (2029)

AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	82	0	0	293
Future Volume (veh/h)	0	0	82	0	0	293
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1826	1900	1900	1885
Adj Flow Rate, veh/h	0	0	82	0	0	293
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	5	0	0	1
Cap, veh/h	2	1	1724	1520	60	1780
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	1826	1610	1337	1885
Grp Volume(v), veh/h	0	0	82	0	0	293
Grp Sat Flow(s),veh/h/ln	1810	1610	1826	1610	1337	1885
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	1.2
Cycle Q Clear(g_c), s	0.0	0.0	0.3	0.0	0.0	1.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	1724	1520	60	1780
V/C Ratio(X)	0.00	0.00	0.05	0.00	0.00	0.16
Avail Cap(c_a), veh/h	641	570	1724	1520	60	1780
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.2	0.0	0.0	0.4
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		82			293
Approach Delay, s/veh	0.0		0.2			0.4
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	2.3		3.2		0.0	
Green Ext Time (p_c), s	0.6		2.3		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.4			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	0	1027	1090
Stage 1	-	-	-	0	1028	-
Stage 2	-	-	-	0	-	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1635	-	-	-	1027	1090
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2	
Capacity (veh/h)	1635	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	0	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	-	1
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	3.3
Pot Cap-1 Maneuver	1635	-	-	-	0	1090
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	-	1090
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1635	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	-	0	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

Lanes, Volumes, Timings
2: Humber Station Road & Healey Road

Future Background (2029)

PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	21	315	14	34	652	54	211	25	48
Future Volume (vph)	21	315	14	34	652	54	211	25	48
Lane Group Flow (vph)	22	325	14	35	695	56	293	26	55
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.05	0.24	0.01	0.05	0.51	0.22	0.78	0.29	0.15
Control Delay	6.6	6.8	3.1	6.3	9.7	43.7	60.4	46.8	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	6.8	3.1	6.3	9.7	43.7	60.4	46.8	34.0
Queue Length 50th (m)	1.4	23.7	0.0	2.2	66.0	14.0	72.6	5.5	10.1
Queue Length 95th (m)	5.1	44.8	2.3	6.8	118.3	27.9	101.1	13.8	20.0
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	444	1363	1085	721	1369	471	701	171	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.24	0.01	0.05	0.51	0.12	0.42	0.15	0.08

Intersection Summary

Cycle Length: 120

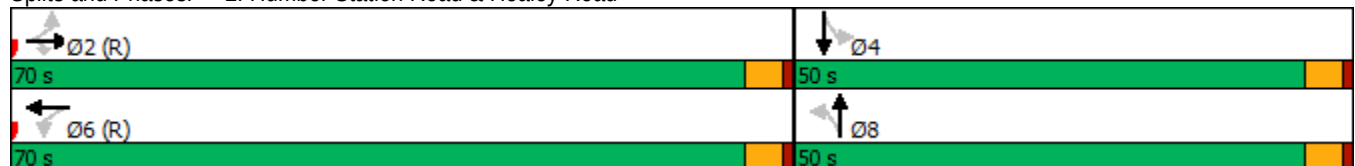
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



Queues

2: Humber Station Road & Healey Road

Future Background (2029)

PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	21	315	14	34	652	54	211	25	48
Future Volume (vph)	21	315	14	34	652	54	211	25	48
Lane Group Flow (vph)	22	325	14	35	695	56	293	26	55
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.05	0.24	0.01	0.05	0.51	0.22	0.78	0.29	0.15
Control Delay	6.6	6.8	3.1	6.3	9.7	43.7	60.4	46.8	34.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.6	6.8	3.1	6.3	9.7	43.7	60.4	46.8	34.0
Queue Length 50th (m)	1.4	23.7	0.0	2.2	66.0	14.0	72.6	5.5	10.1
Queue Length 95th (m)	5.1	44.8	2.3	6.8	118.3	27.9	101.1	13.8	20.0
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	444	1363	1085	721	1369	471	701	171	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.24	0.01	0.05	0.51	0.12	0.42	0.15	0.08

Intersection Summary

Cycle Length: 120

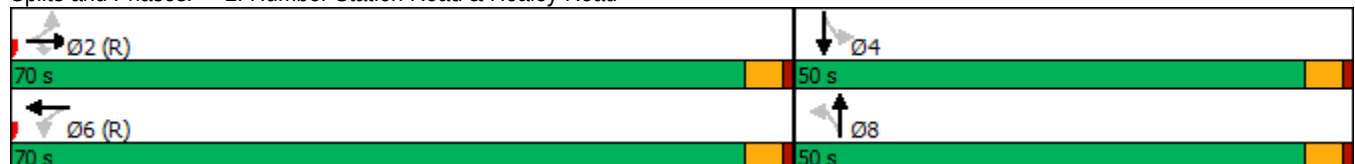
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary

2: Humber Station Road & Healey Road

Future Background (2029)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	315	14	34	652	22	54	211	73	25	48	6
Future Volume (veh/h)	21	315	14	34	652	22	54	211	73	25	48	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1796	1856	1885	1826	1767	1885	1856	1900	1870	1900
Adj Flow Rate, veh/h	22	325	14	35	672	23	56	218	75	26	49	6
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	7	3	1	5	9	1	3	0	2	0
Cap, veh/h	490	1359	1106	751	1316	45	281	266	92	107	324	40
Arrive On Green	0.73	0.73	0.73	0.73	0.73	0.73	0.20	0.20	0.20	0.20	0.20	0.20
Sat Flow, veh/h	761	1870	1522	1033	1812	62	1274	1341	461	1103	1634	200
Grp Volume(v), veh/h	22	325	14	35	0	695	56	0	293	26	0	55
Grp Sat Flow(s),veh/h/ln	761	1870	1522	1033	0	1874	1274	0	1802	1103	0	1834
Q Serve(g_s), s	1.6	6.9	0.3	1.4	0.0	19.3	4.6	0.0	18.7	2.8	0.0	3.0
Cycle Q Clear(g_c), s	20.9	6.9	0.3	8.3	0.0	19.3	7.5	0.0	18.7	21.4	0.0	3.0
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.26	1.00		0.11
Lane Grp Cap(c), veh/h	490	1359	1106	751	0	1362	281	0	358	107	0	364
V/C Ratio(X)	0.04	0.24	0.01	0.05	0.00	0.51	0.20	0.00	0.82	0.24	0.00	0.15
Avail Cap(c_a), veh/h	490	1359	1106	751	0	1362	511	0	683	307	0	696
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.7	5.4	4.5	6.8	0.0	7.1	42.9	0.0	46.0	56.3	0.0	39.7
Incr Delay (d2), s/veh	0.2	0.4	0.0	0.1	0.0	1.4	0.3	0.0	4.7	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	0.0	0.0	0.0	0.5	1.0	0.0	5.9	0.6	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.8	5.8	4.5	6.9	0.0	8.5	43.2	0.0	50.7	57.4	0.0	39.9
LnGrp LOS	B	A	A	A	A	A	D	A	D	E	A	D
Approach Vol, veh/h	361			730			349			81		
Approach Delay, s/veh	6.2			8.4			49.5			45.6		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	91.7			28.3			91.7			28.3		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	65.5			45.5			65.5			45.5		
Max Q Clear Time (g_c+I1), s	22.9			23.4			21.3			20.7		
Green Ext Time (p_c), s	2.8			0.4			7.2			2.4		
Intersection Summary												
HCM 6th Ctrl Delay	19.3											
HCM 6th LOS	B											

Lanes, Volumes, Timings

Future Background (2029)

3: Clarkway Drive/Humber Station Road & Mayfield Road

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		  			 			 		
Traffic Volume (vph)	10	704	19	135	847	42	59	277	11	66
Future Volume (vph)	10	704	19	135	847	42	59	277	11	66
Lane Group Flow (vph)	10	726	20	139	873	43	61	455	11	80
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.04	0.26	0.02	0.38	0.44	0.05	0.18	0.86	0.14	0.16
Control Delay	13.5	12.8	1.9	18.6	15.3	4.1	31.1	53.6	43.1	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	12.8	1.9	18.6	15.3	4.1	31.1	53.6	43.1	36.3
Queue Length 50th (m)	1.0	30.2	0.0	17.3	60.1	0.0	11.3	100.2	2.4	16.2
Queue Length 95th (m)	4.2	44.6	2.1	39.3	89.0	5.8	20.7	129.5	8.3	30.1
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	262	2803	868	366	1968	863	423	654	112	666
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	0.04	0.26	0.02	0.38	0.44	0.05	0.14	0.70	0.10	0.12

Intersection Summary

Cycle Length: 120

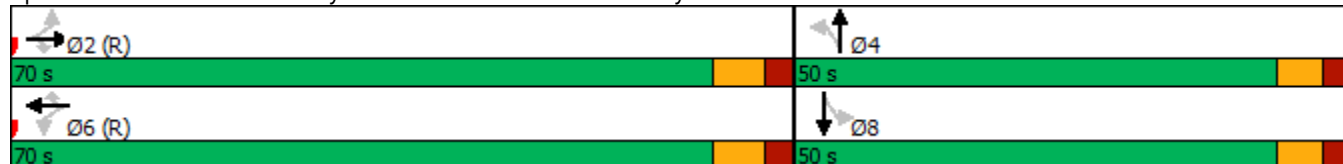
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

Future Background (2029)

3: Clarkway Drive/Humber Station Road & Mayfield Road

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	704	19	135	847	42	59	277	11	66
Future Volume (vph)	10	704	19	135	847	42	59	277	11	66
Lane Group Flow (vph)	10	726	20	139	873	43	61	455	11	80
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.04	0.26	0.02	0.38	0.44	0.05	0.18	0.86	0.14	0.16
Control Delay	13.5	12.8	1.9	18.6	15.3	4.1	31.1	53.6	43.1	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	12.8	1.9	18.6	15.3	4.1	31.1	53.6	43.1	36.3
Queue Length 50th (m)	1.0	30.2	0.0	17.3	60.1	0.0	11.3	100.2	2.4	16.2
Queue Length 95th (m)	4.2	44.6	2.1	39.3	89.0	5.8	20.7	129.5	8.3	30.1
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	262	2803	868	366	1968	863	423	654	112	666
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	0.04	0.26	0.02	0.38	0.44	0.05	0.14	0.70	0.10	0.12

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Background (2029)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 							
Traffic Volume (veh/h)	10	704	19	135	847	42	59	277	164	11	66	12
Future Volume (veh/h)	10	704	19	135	847	42	59	277	164	11	66	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1604	1737	1737	1767	1752	1722	1722	1885	1841	1767	1870	1900
Adj Flow Rate, veh/h	10	726	20	139	873	43	61	286	169	11	68	12
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	20	11	11	9	10	12	12	1	4	9	2	0
Cap, veh/h	295	2814	874	411	1975	866	369	319	189	96	445	78
Arrive On Green	0.59	0.59	0.59	0.59	0.59	0.59	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	523	4742	1472	675	3328	1459	1214	1111	656	884	1548	273
Grp Volume(v), veh/h	10	726	20	139	873	43	61	0	455	11	0	80
Grp Sat Flow(s),veh/h/ln	523	1581	1472	675	1664	1459	1214	0	1767	884	0	1821
Q Serve(g_s), s	1.3	8.8	0.7	14.9	17.3	1.5	4.7	0.0	29.7	1.5	0.0	3.9
Cycle Q Clear(g_c), s	18.6	8.8	0.7	23.7	17.3	1.5	8.7	0.0	29.7	31.1	0.0	3.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.15
Lane Grp Cap(c), veh/h	295	2814	874	411	1975	866	369	0	508	96	0	523
V/C Ratio(X)	0.03	0.26	0.02	0.34	0.44	0.05	0.17	0.00	0.90	0.12	0.00	0.15
Avail Cap(c_a), veh/h	295	2814	874	411	1975	866	455	0	633	158	0	653
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.6	11.7	10.1	17.4	13.4	10.2	35.1	0.0	41.0	56.0	0.0	31.9
Incr Delay (d2), s/veh	0.2	0.2	0.0	2.2	0.7	0.1	0.2	0.0	13.3	0.5	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.7	0.1	1.1	1.5	0.1	0.9	0.0	9.5	0.2	0.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.8	11.9	10.1	19.6	14.2	10.3	35.3	0.0	54.4	56.5	0.0	32.0
LnGrp LOS	B	B	B	B	B	B	D	A	D	E	A	C
Approach Vol, veh/h		756			1055			516			91	
Approach Delay, s/veh		12.0			14.7			52.1			35.0	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		78.5		41.5		78.5		41.5				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 63		* 43		* 63		* 43				
Max Q Clear Time (g_c+I1), s		20.6		31.7		25.7		33.1				
Green Ext Time (p_c), s		7.5		2.8		11.4		0.3				
Intersection Summary												
HCM 6th Ctrl Delay				22.6								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Background (2029)

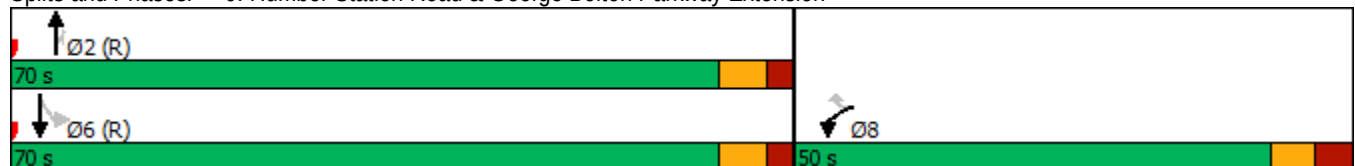
PM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	329	89	
Future Volume (vph)	329	89	
Lane Group Flow (vph)	329	89	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.18	0.05	
Control Delay	0.2	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.2	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1865	1883	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.18	0.05	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2029)

9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	329	89	
Future Volume (vph)	329	89	
Lane Group Flow (vph)	329	89	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.18	0.05	
Control Delay	0.2	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.2	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1865	1883	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.18	0.05	

Intersection Summary

Cycle Length: 120

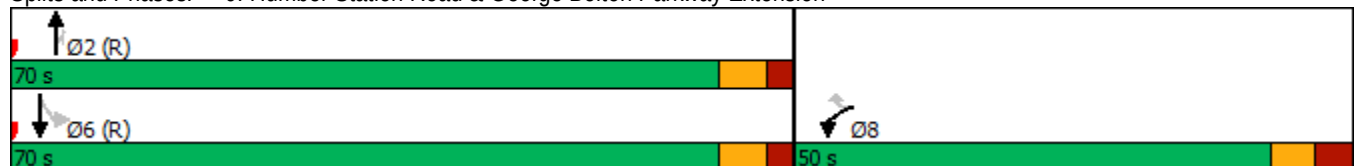
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary

9: Humber Station Road & George Bolton Parkway Extension

Future Background (2029)

PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	329	0	0	89
Future Volume (veh/h)	0	0	329	0	0	89
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1856	1900	1900	1870
Adj Flow Rate, veh/h	0	0	329	0	0	89
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	3	0	0	2
Cap, veh/h	2	1	1752	1520	60	1766
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	1856	1610	1068	1870
Grp Volume(v), veh/h	0	0	329	0	0	89
Grp Sat Flow(s),veh/h/ln	1810	1610	1856	1610	1068	1870
Q Serve(g_s), s	0.0	0.0	1.4	0.0	0.0	0.3
Cycle Q Clear(g_c), s	0.0	0.0	1.4	0.0	0.0	0.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	1752	1520	60	1766
V/C Ratio(X)	0.00	0.00	0.19	0.00	0.00	0.05
Avail Cap(c_a), veh/h	641	570	1752	1520	60	1766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.5	0.0	0.0	0.3
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		329			89
Approach Delay, s/veh	0.0		0.5			0.3
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	3.4		2.3		0.0	
Green Ext Time (p_c), s	2.6		0.6		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.4			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↰	↰		↰	↰
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	0	1027	1090
Stage 1	-	-	-	0	1028	-
Stage 2	-	-	-	0	-	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1635	-	-	-	1027	1090
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2	
Capacity (veh/h)	1635	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	0	0	
HCM Lane LOS	A	-	-	A	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

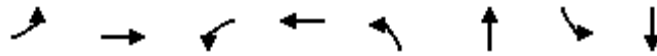
Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	-	1
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	3.3
Pot Cap-1 Maneuver	1635	-	-	-	0	1090
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	-	1090
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1635	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	-	0	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

Lanes, Volumes, Timings

2: Humber Station Road & Healey Road

Future Background (2034)

AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	728	73	332	23	20	79	186
Future Volume (vph)	4	728	73	332	23	20	79	186
Lane Group Flow (vph)	4	821	78	361	25	63	85	204
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.31	0.15	0.12	0.26	0.16	0.57	0.51
Control Delay	6.0	6.4	3.2	2.6	62.6	31.8	65.1	53.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	6.4	3.2	2.6	62.6	31.8	65.1	53.9
Queue Length 50th (m)	0.2	33.3	2.9	7.4	6.2	3.7	20.4	25.4
Queue Length 95th (m)	1.6	52.5	7.4	13.9	15.8	10.9	36.1	36.4
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	595	2626	546	2901	181	691	273	736
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	0.01	0.31	0.14	0.12	0.14	0.09	0.31	0.28

Intersection Summary

Cycle Length: 120

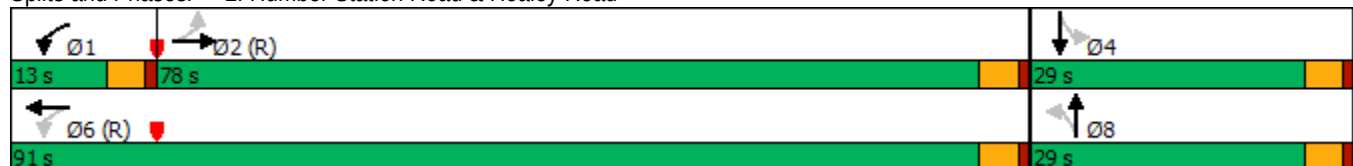
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road

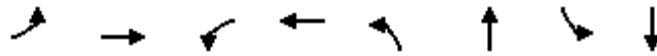


Queues

2: Humber Station Road & Healey Road

Future Background (2034)

AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	728	73	332	23	20	79	186
Future Volume (vph)	4	728	73	332	23	20	79	186
Lane Group Flow (vph)	4	821	78	361	25	63	85	204
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.31	0.15	0.12	0.26	0.16	0.57	0.51
Control Delay	6.0	6.4	3.2	2.6	62.6	31.8	65.1	53.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	6.4	3.2	2.6	62.6	31.8	65.1	53.9
Queue Length 50th (m)	0.2	33.3	2.9	7.4	6.2	3.7	20.4	25.4
Queue Length 95th (m)	1.6	52.5	7.4	13.9	15.8	10.9	36.1	36.4
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	595	2626	546	2901	181	691	273	736
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	0.01	0.31	0.14	0.12	0.14	0.09	0.31	0.28

Intersection Summary

Cycle Length: 120

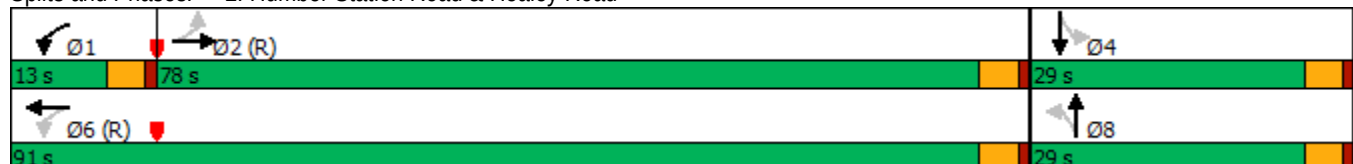
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary 2: Humber Station Road & Healey Road

Future Background (2034)
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	728	35	73	332	4	23	20	38	79	186	4
Future Volume (veh/h)	4	728	35	73	332	4	23	20	38	79	186	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No				No				No			
Adj Sat Flow, veh/h/ln	1530	1870	1856	1885	1870	1530	1767	1900	1856	1900	1885	1900
Adj Flow Rate, veh/h	4	783	38	78	357	4	25	22	41	85	200	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	25	2	3	1	2	25	9	0	3	0	1	0
Cap, veh/h	676	2545	123	573	2929	33	125	201	179	180	399	8
Arrive On Green	0.74	0.74	0.74	0.04	0.81	0.81	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	835	3450	167	1795	3600	40	1113	1805	1610	1360	3592	72
Grp Volume(v), veh/h	4	403	418	78	176	185	25	22	41	85	100	104
Grp Sat Flow(s),veh/h/ln	835	1777	1840	1795	1777	1863	1113	1805	1610	1360	1791	1872
Q Serve(g_s), s	0.2	9.2	9.2	1.1	2.5	2.5	2.6	1.3	2.8	7.3	6.3	6.3
Cycle Q Clear(g_c), s	0.2	9.2	9.2	1.1	2.5	2.5	8.9	1.3	2.8	10.1	6.3	6.3
Prop In Lane	1.00		0.09	1.00		0.02	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	676	1311	1358	573	1446	1516	125	201	179	180	199	208
V/C Ratio(X)	0.01	0.31	0.31	0.14	0.12	0.12	0.20	0.11	0.23	0.47	0.50	0.50
Avail Cap(c_a), veh/h	676	1311	1358	631	1446	1516	229	369	329	306	366	382
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.1	5.3	5.3	3.3	2.3	2.3	54.4	48.0	48.6	53.2	50.2	50.2
Incr Delay (d2), s/veh	0.0	0.6	0.6	0.1	0.2	0.2	0.8	0.2	0.6	1.9	1.9	1.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.3	0.0	0.1	0.1	0.6	0.5	0.9	2.1	2.3	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.2	5.9	5.9	3.4	2.5	2.5	55.2	48.2	49.3	55.2	52.1	52.1
LnGrp LOS	A	A	A	A	A	A	E	D	D	E	D	D
Approach Vol, veh/h	825				439				88			
Approach Delay, s/veh	5.9				2.6				50.7			
Approach LOS	A				A				D			
Timer - Assigned Phs	1	2	4			6		8				
Phs Duration (G+Y+Rc), s	9.1	93.0	17.8			102.2		17.8				
Change Period (Y+Rc), s	4.5	4.5	4.5			4.5		4.5				
Max Green Setting (Gmax), s	8.5	73.5	24.5			86.5		24.5				
Max Q Clear Time (g_c+l1), s	3.1	11.2	12.1			4.5		10.9				
Green Ext Time (p_c), s	0.1	7.6	1.3			2.7		0.3				
Intersection Summary												
HCM 6th Ctrl Delay	15.7											
HCM 6th LOS	B											

Lanes, Volumes, Timings

Future Background (2034)

3: Clarkway Drive/Humber Station Road & Mayfield Road

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	8	869	28	102	525	21	11	58	23	277
Future Volume (vph)	8	869	28	102	525	21	11	58	23	277
Lane Group Flow (vph)	8	905	29	106	547	22	11	283	24	297
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.02	0.28	0.03	0.29	0.25	0.02	0.08	0.79	0.28	0.46
Control Delay	7.8	7.6	2.2	10.9	7.7	1.4	37.7	49.1	48.1	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	7.6	2.2	10.9	7.7	1.4	37.7	49.1	48.1	42.9
Queue Length 50th (m)	0.6	27.3	0.0	8.8	23.2	0.0	2.3	49.9	6.0	38.7
Queue Length 95th (m)	2.8	44.1	3.1	23.8	40.5	2.0	7.1	74.8	14.9	51.5
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	521	3251	906	369	2148	1028	343	739	203	1531
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	0.02	0.28	0.03	0.29	0.25	0.02	0.03	0.38	0.12	0.19

Intersection Summary

Cycle Length: 120

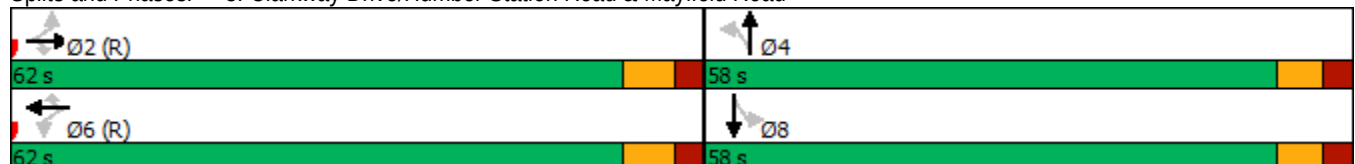
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

Future Background (2034)

3: Clarkway Drive/Humber Station Road & Mayfield Road

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		  			 			 		 
Traffic Volume (vph)	8	869	28	102	525	21	11	58	23	277
Future Volume (vph)	8	869	28	102	525	21	11	58	23	277
Lane Group Flow (vph)	8	905	29	106	547	22	11	283	24	297
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.02	0.28	0.03	0.29	0.25	0.02	0.08	0.79	0.28	0.46
Control Delay	7.8	7.6	2.2	10.9	7.7	1.4	37.7	49.1	48.1	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	7.6	2.2	10.9	7.7	1.4	37.7	49.1	48.1	42.9
Queue Length 50th (m)	0.6	27.3	0.0	8.8	23.2	0.0	2.3	49.9	6.0	38.7
Queue Length 95th (m)	2.8	44.1	3.1	23.8	40.5	2.0	7.1	74.8	14.9	51.5
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	521	3251	906	369	2148	1028	343	739	203	1531
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	0.02	0.28	0.03	0.29	0.25	0.02	0.03	0.38	0.12	0.19

Intersection Summary

Cycle Length: 120

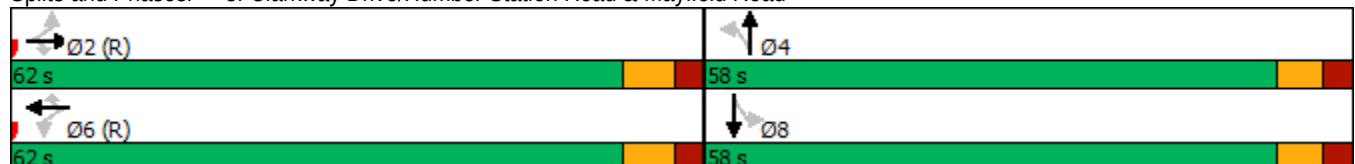
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Background (2034)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 			 	
Traffic Volume (veh/h)	8	869	28	102	525	21	11	58	214	23	277	8
Future Volume (veh/h)	8	869	28	102	525	21	11	58	214	23	277	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1707	1530	1796	1618	1752	1633	1870	1841	1767	1885	1900
Adj Flow Rate, veh/h	8	905	29	106	547	22	11	60	223	24	289	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	13	13	25	7	19	10	18	2	4	9	1	0
Cap, veh/h	512	3080	857	403	2032	981	203	76	284	119	783	22
Arrive On Green	0.66	0.66	0.66	0.66	0.66	0.66	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	769	4661	1296	592	3075	1485	945	347	1291	1035	3560	98
Grp Volume(v), veh/h	8	905	29	106	547	22	11	0	283	24	145	152
Grp Sat Flow(s),veh/h/ln	769	1554	1296	592	1537	1485	945	0	1638	1035	1791	1867
Q Serve(g_s), s	0.5	9.8	0.9	11.0	8.8	0.6	1.2	0.0	19.5	2.7	8.2	8.3
Cycle Q Clear(g_c), s	9.3	9.8	0.9	20.8	8.8	0.6	9.5	0.0	19.5	22.2	8.2	8.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.79	1.00		0.05
Lane Grp Cap(c), veh/h	512	3080	857	403	2032	981	203	0	360	119	394	411
V/C Ratio(X)	0.02	0.29	0.03	0.26	0.27	0.02	0.05	0.00	0.79	0.20	0.37	0.37
Avail Cap(c_a), veh/h	512	3080	857	403	2032	981	396	0	696	331	761	794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.3	8.6	7.1	12.9	8.4	7.0	43.8	0.0	44.1	54.6	39.7	39.7
Incr Delay (d2), s/veh	0.1	0.2	0.1	1.6	0.3	0.0	0.1	0.0	3.8	0.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.1	0.9	1.0	0.1	0.2	0.0	6.3	0.6	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	8.8	7.1	14.5	8.7	7.0	43.9	0.0	47.9	55.4	40.3	40.3
LnGrp LOS	B	A	A	B	A	A	D	A	D	E	D	D
Approach Vol, veh/h		942			675			294			321	
Approach Delay, s/veh		8.8			9.6			47.8			41.4	
Approach LOS		A			A			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		86.6		33.4		86.6		33.4				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 55		* 51		* 55		* 51				
Max Q Clear Time (g_c+I1), s		11.8		21.5		22.8		24.2				
Green Ext Time (p_c), s		9.8		2.3		6.8		2.2				

Intersection Summary

HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Background (2034)

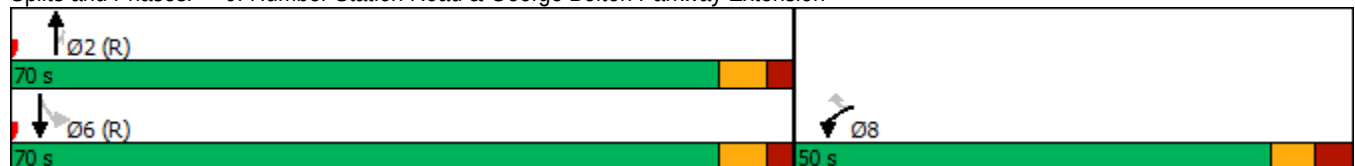
AM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	87	308	
Future Volume (vph)	87	308	
Lane Group Flow (vph)	87	308	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.03	0.09	
Control Delay	0.0	0.1	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.1	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3476	3614	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.03	0.09	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2034)

9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	87	308	
Future Volume (vph)	87	308	
Lane Group Flow (vph)	87	308	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.03	0.09	
Control Delay	0.0	0.1	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.1	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3476	3614	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.03	0.09	

Intersection Summary

Cycle Length: 120

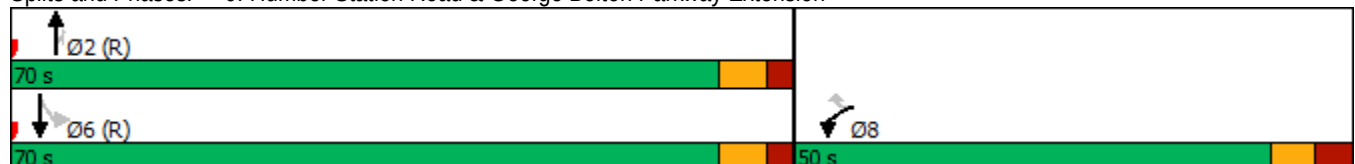
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary

9: Humber Station Road & George Bolton Parkway Extension

Future Background (2034)

AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	87	0	0	308
Future Volume (veh/h)	0	0	87	0	0	308
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1826	1900	1900	1885
Adj Flow Rate, veh/h	0	0	87	0	0	308
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	5	0	0	1
Cap, veh/h	2	1	3276	1520	60	3382
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	3561	1610	1331	3676
Grp Volume(v), veh/h	0	0	87	0	0	308
Grp Sat Flow(s),veh/h/ln	1810	1610	1735	1610	1331	1791
Q Serve(g_s), s	0.0	0.0	0.2	0.0	0.0	0.6
Cycle Q Clear(g_c), s	0.0	0.0	0.2	0.0	0.0	0.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	3276	1520	60	3382
V/C Ratio(X)	0.00	0.00	0.03	0.00	0.00	0.09
Avail Cap(c_a), veh/h	641	570	3276	1520	60	3382
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.2	0.0	0.0	0.3
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		87			308
Approach Delay, s/veh	0.0		0.2			0.3
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	2.2		2.6		0.0	
Green Ext Time (p_c), s	0.7		2.6		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.2			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1090
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1090
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
31: George Bolton Parkway Extension & Site Access 2

Future Background (2034)

AM Peak Hour

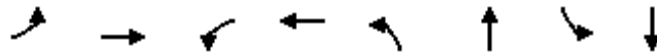
Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1090
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1090
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Lanes, Volumes, Timings

2: Humber Station Road & Healey Road

Future Background (2034)

PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	362	34	786	54	232	25	50
Future Volume (vph)	21	362	34	786	54	232	25	50
Lane Group Flow (vph)	22	387	35	833	56	323	26	58
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.04	0.14	0.05	0.29	0.36	0.68	0.35	0.13
Control Delay	3.3	3.0	3.2	3.7	49.3	45.7	59.3	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	3.0	3.2	3.7	49.3	45.7	59.3	41.0
Queue Length 50th (m)	0.9	9.1	1.5	22.8	14.3	38.5	6.0	6.1
Queue Length 95th (m)	3.2	15.5	4.4	35.8	28.8	54.5	15.3	12.2
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	490	2839	761	2872	468	1342	228	1341
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	0.04	0.14	0.05	0.29	0.12	0.24	0.11	0.04

Intersection Summary

Cycle Length: 120

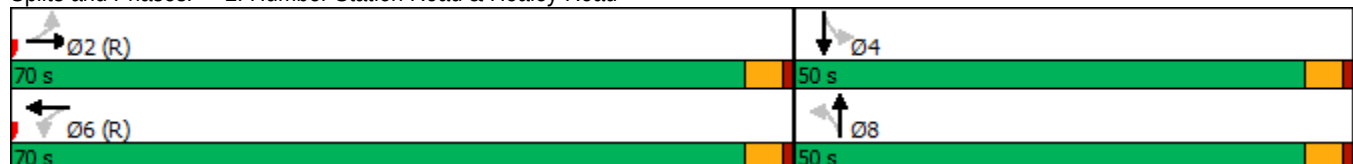
Actuated Cycle Length: 120

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

Natural Cycle: 50

Control Type: Actuated-Coordinated

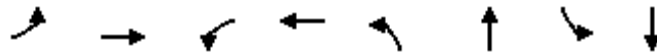
Splits and Phases: 2: Humber Station Road & Healey Road



Queues 2: Humber Station Road & Healey Road

Future Background (2034)

PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	362	34	786	54	232	25	50
Future Volume (vph)	21	362	34	786	54	232	25	50
Lane Group Flow (vph)	22	387	35	833	56	323	26	58
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.04	0.14	0.05	0.29	0.36	0.68	0.35	0.13
Control Delay	3.3	3.0	3.2	3.7	49.3	45.7	59.3	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	3.0	3.2	3.7	49.3	45.7	59.3	41.0
Queue Length 50th (m)	0.9	9.1	1.5	22.8	14.3	38.5	6.0	6.1
Queue Length 95th (m)	3.2	15.5	4.4	35.8	28.8	54.5	15.3	12.2
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	490	2839	761	2872	468	1342	228	1341
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	0.04	0.14	0.05	0.29	0.12	0.24	0.11	0.04

Intersection Summary

Cycle Length: 120

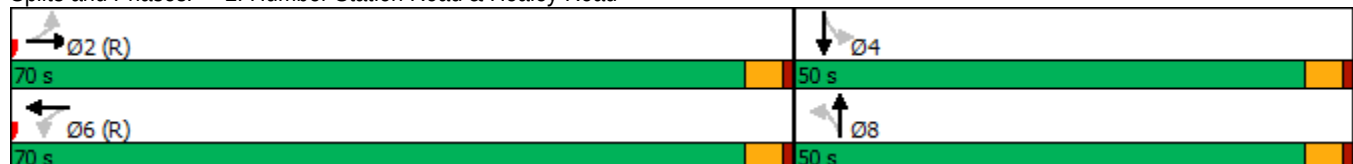
Actuated Cycle Length: 120

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

Natural Cycle: 50

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary 2: Humber Station Road & Healey Road

Future Background (2034)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	362	14	34	786	22	54	232	81	25	50	6
Future Volume (veh/h)	21	362	14	34	786	22	54	232	81	25	50	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1796	1856	1885	1826	1767	1885	1870	1900	1870	1900
Adj Flow Rate, veh/h	22	373	14	35	810	23	56	239	84	26	52	6
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	7	3	1	5	9	1	2	0	2	0
Cap, veh/h	548	2764	103	818	2814	80	212	350	120	107	430	49
Arrive On Green	0.79	0.79	0.79	0.79	0.79	0.79	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	669	3493	131	989	3557	101	1271	2618	896	1074	3217	365
Grp Volume(v), veh/h	22	189	198	35	408	425	56	161	162	26	28	30
Grp Sat Flow(s),veh/h/ln	669	1777	1847	989	1791	1867	1271	1791	1724	1074	1777	1805
Q Serve(g_s), s	1.1	3.0	3.0	1.0	7.4	7.4	4.9	10.3	10.7	2.8	1.7	1.7
Cycle Q Clear(g_c), s	8.5	3.0	3.0	4.0	7.4	7.4	6.6	10.3	10.7	13.6	1.7	1.7
Prop In Lane	1.00		0.07	1.00		0.05	1.00		0.52	1.00		0.20
Lane Grp Cap(c), veh/h	548	1406	1461	818	1417	1477	212	240	231	107	238	241
V/C Ratio(X)	0.04	0.13	0.14	0.04	0.29	0.29	0.26	0.67	0.70	0.24	0.12	0.12
Avail Cap(c_a), veh/h	548	1406	1461	818	1417	1477	523	679	654	371	674	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.5	2.9	2.9	3.4	3.4	3.4	48.7	49.5	49.7	56.2	45.8	45.8
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.1	0.5	0.5	0.7	3.3	3.8	1.2	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	0.0	0.2	0.2	1.1	3.3	3.4	0.6	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	3.1	3.1	3.5	3.9	3.9	49.3	52.8	53.5	57.3	46.0	46.0
LnGrp LOS	A	A	A	A	A	A	D	D	D	E	D	D
Approach Vol, veh/h	409			868			379			84		
Approach Delay, s/veh	3.2			3.9			52.6			49.5		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	99.4			20.6			99.4			20.6		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	65.5			45.5			65.5			45.5		
Max Q Clear Time (g_c+l1), s	10.5			15.6			9.4			12.7		
Green Ext Time (p_c), s	3.2			0.5			7.9			2.7		
Intersection Summary												
HCM 6th Ctrl Delay	16.5											
HCM 6th LOS	B											

Lanes, Volumes, Timings

Future Background (2034)

3: Clarkway Drive/Humber Station Road & Mayfield Road

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	695	19	135	650	42	59	304	11	69
Future Volume (vph)	10	695	19	135	650	42	59	304	11	69
Lane Group Flow (vph)	10	716	20	139	670	43	61	494	11	83
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.03	0.26	0.02	0.39	0.36	0.05	0.17	0.89	0.15	0.09
Control Delay	13.7	13.7	1.9	19.6	15.1	4.2	29.8	55.5	47.4	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	13.7	1.9	19.6	15.1	4.2	29.8	55.5	47.4	35.3
Queue Length 50th (m)	1.0	31.5	0.0	18.2	45.4	0.0	10.9	109.5	2.4	8.4
Queue Length 95th (m)	4.1	44.1	2.1	39.1	65.3	5.8	20.7	145.1	8.5	15.7
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	332	2703	846	358	1848	841	420	654	96	1276
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	0.03	0.26	0.02	0.39	0.36	0.05	0.15	0.76	0.11	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

Future Background (2034)

3: Clarkway Drive/Humber Station Road & Mayfield Road

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		  			 			 		 
Traffic Volume (vph)	10	695	19	135	650	42	59	304	11	69
Future Volume (vph)	10	695	19	135	650	42	59	304	11	69
Lane Group Flow (vph)	10	716	20	139	670	43	61	494	11	83
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.03	0.26	0.02	0.39	0.36	0.05	0.17	0.89	0.15	0.09
Control Delay	13.7	13.7	1.9	19.6	15.1	4.2	29.8	55.5	47.4	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	13.7	1.9	19.6	15.1	4.2	29.8	55.5	47.4	35.3
Queue Length 50th (m)	1.0	31.5	0.0	18.2	45.4	0.0	10.9	109.5	2.4	8.4
Queue Length 95th (m)	4.1	44.1	2.1	39.1	65.3	5.8	20.7	145.1	8.5	15.7
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	332	2703	846	358	1848	841	420	654	96	1276
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	0.03	0.26	0.02	0.39	0.36	0.05	0.15	0.76	0.11	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Background (2034)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 						 	
Traffic Volume (veh/h)	10	695	19	135	650	42	59	304	176	11	69	12
Future Volume (veh/h)	10	695	19	135	650	42	59	304	176	11	69	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1604	1722	1737	1767	1693	1722	1722	1885	1841	1767	1885	1900
Adj Flow Rate, veh/h	10	716	20	139	670	43	61	313	181	11	71	12
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	20	12	11	9	14	12	12	1	4	9	1	0
Cap, veh/h	352	2697	845	399	1845	837	412	344	199	93	945	156
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	632	4701	1472	682	3216	1459	1211	1121	648	853	3077	508
Grp Volume(v), veh/h	10	716	20	139	670	43	61	0	494	11	41	42
Grp Sat Flow(s),veh/h/ln	632	1567	1472	682	1608	1459	1211	0	1769	853	1791	1794
Q Serve(g_s), s	1.0	9.2	0.7	15.5	13.5	1.6	4.5	0.0	32.2	1.5	1.9	2.0
Cycle Q Clear(g_c), s	14.5	9.2	0.7	24.7	13.5	1.6	6.5	0.0	32.2	33.7	1.9	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.28
Lane Grp Cap(c), veh/h	352	2697	845	399	1845	837	412	0	543	93	550	551
V/C Ratio(X)	0.03	0.27	0.02	0.35	0.36	0.05	0.15	0.00	0.91	0.12	0.07	0.08
Avail Cap(c_a), veh/h	352	2697	845	399	1845	837	474	0	634	137	642	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.7	12.9	11.1	19.1	13.8	11.2	31.8	0.0	40.0	56.2	29.5	29.5
Incr Delay (d2), s/veh	0.1	0.2	0.1	2.4	0.6	0.1	0.2	0.0	15.7	0.6	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.9	0.1	1.2	1.4	0.2	0.8	0.0	10.5	0.2	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	13.1	11.1	21.5	14.3	11.3	32.0	0.0	55.7	56.8	29.5	29.6
LnGrp LOS	B	B	B	C	B	B	C	A	E	E	C	C
Approach Vol, veh/h		746			852			555			94	
Approach Delay, s/veh		13.1			15.3			53.1			32.7	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		76.1		43.9		76.1		43.9				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 63		* 43		* 63		* 43				
Max Q Clear Time (g_c+I1), s		16.5		34.2		26.7		35.7				
Green Ext Time (p_c), s		7.4		2.6		8.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				24.7								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Background (2034)

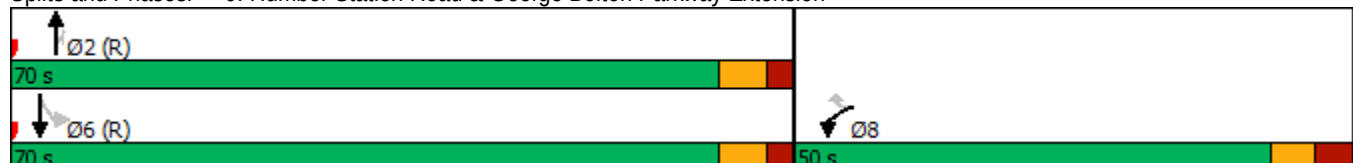
PM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	356	92	
Future Volume (vph)	356	92	
Lane Group Flow (vph)	356	92	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.10	0.03	
Control Delay	0.0	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	m0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3544	3579	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.10	0.03	

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2034)

9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	356	92	
Future Volume (vph)	356	92	
Lane Group Flow (vph)	356	92	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.10	0.03	
Control Delay	0.0	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	m0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3544	3579	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.10	0.03	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

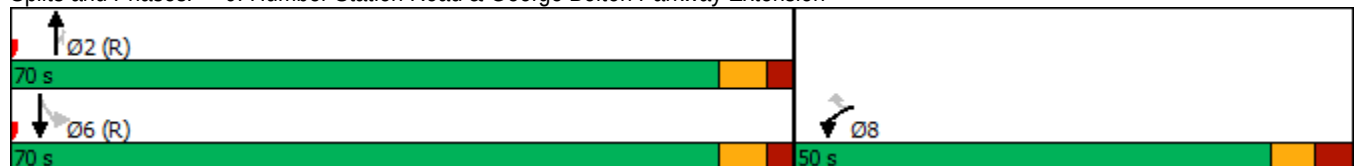
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary

9: Humber Station Road & George Bolton Parkway Extension

Future Background (2034)

PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	356	0	0	92
Future Volume (veh/h)	0	0	356	0	0	92
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1856	1900	1900	1870
Adj Flow Rate, veh/h	0	0	356	0	0	92
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	3	0	0	2
Cap, veh/h	2	1	3329	1520	60	3355
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	3618	1610	1042	3647
Grp Volume(v), veh/h	0	0	356	0	0	92
Grp Sat Flow(s),veh/h/ln	1810	1610	1763	1610	1042	1777
Q Serve(g_s), s	0.0	0.0	0.8	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.0	0.0	0.8	0.0	0.0	0.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	3329	1520	60	3355
V/C Ratio(X)	0.00	0.00	0.11	0.00	0.00	0.03
Avail Cap(c_a), veh/h	641	570	3329	1520	60	3355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.3	0.0	0.0	0.2
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		356			92
Approach Delay, s/veh	0.0		0.3			0.2
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	2.8		2.2		0.0	
Green Ext Time (p_c), s	3.1		0.7		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.3			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1090
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1090
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

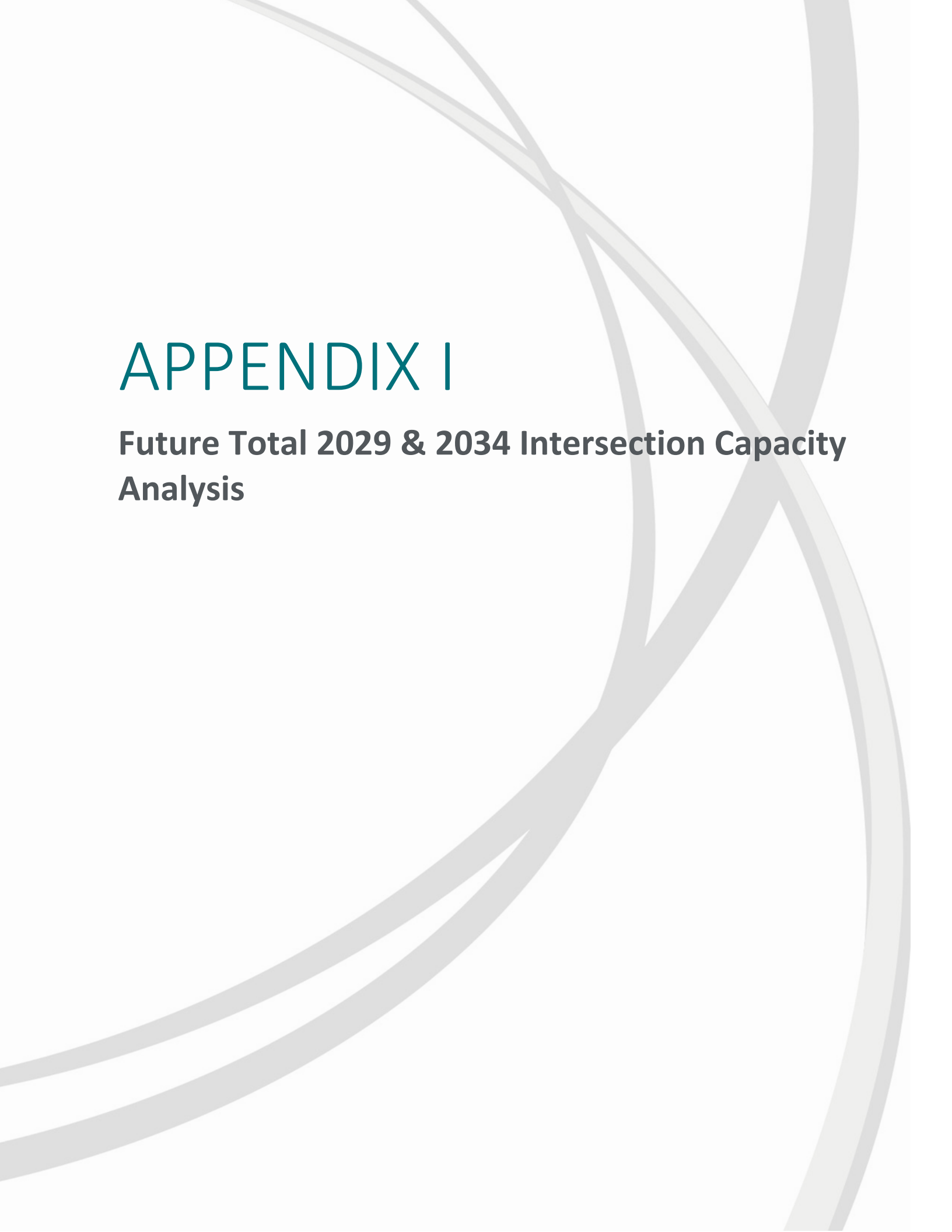
Control Type: Unsignalized

HCM 6th TWSC
31: George Bolton Parkway Extension & Site Access 2

Future Background (2034)

PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1090
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1090
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-



APPENDIX I

Future Total 2029 & 2034 Intersection Capacity Analysis

Lanes, Volumes, Timings

2: Humber Station Road & Healey Road

Future Total (2029)

AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	633	63	117	276	35	18	79	183
Future Volume (vph)	4	633	63	117	276	35	18	79	183
Lane Group Flow (vph)	4	681	68	126	301	38	72	85	201
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.54	0.07	0.26	0.21	0.45	0.25	0.43	0.71
Control Delay	8.2	12.8	3.2	5.1	4.4	61.2	18.0	51.9	61.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	12.8	3.2	5.1	4.4	61.2	18.0	51.9	61.8
Queue Length 50th (m)	0.3	78.3	1.0	6.3	16.6	9.1	4.8	19.4	47.8
Queue Length 95th (m)	1.8	131.9	6.9	13.9	31.5	21.4	19.7	34.1	69.9
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	585	1272	1045	500	1454	116	371	272	388
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	0.54	0.07	0.25	0.21	0.33	0.19	0.31	0.52

Intersection Summary

Cycle Length: 120

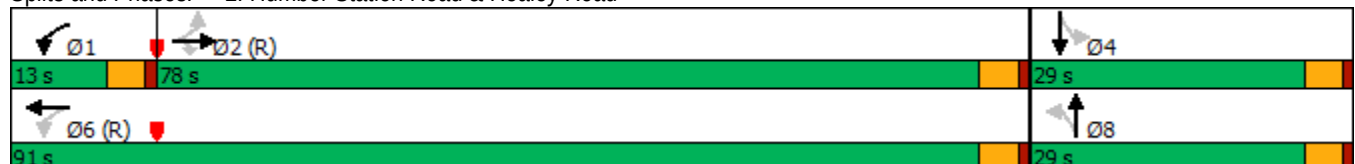
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



Queues

2: Humber Station Road & Healey Road

Future Total (2029)

AM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	4	633	63	117	276	35	18	79	183
Future Volume (vph)	4	633	63	117	276	35	18	79	183
Lane Group Flow (vph)	4	681	68	126	301	38	72	85	201
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2		1	6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	1	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lag	Lead					
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.54	0.07	0.26	0.21	0.45	0.25	0.43	0.71
Control Delay	8.2	12.8	3.2	5.1	4.4	61.2	18.0	51.9	61.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.2	12.8	3.2	5.1	4.4	61.2	18.0	51.9	61.8
Queue Length 50th (m)	0.3	78.3	1.0	6.3	16.6	9.1	4.8	19.4	47.8
Queue Length 95th (m)	1.8	131.9	6.9	13.9	31.5	21.4	19.7	34.1	69.9
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	585	1272	1045	500	1454	116	371	272	388
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	0.54	0.07	0.25	0.21	0.33	0.19	0.31	0.52

Intersection Summary

Cycle Length: 120

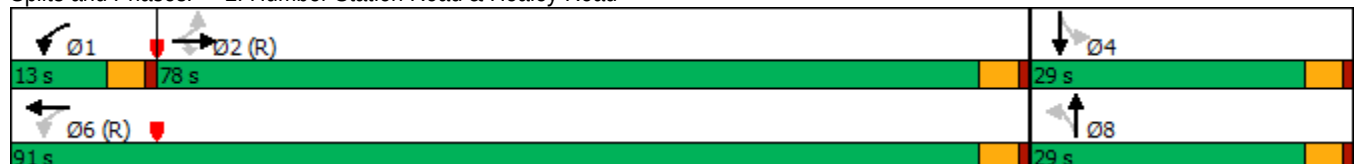
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary

2: Humber Station Road & Healey Road

Future Total (2029)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	633	63	117	276	4	35	18	49	79	183	4
Future Volume (veh/h)	4	633	63	117	276	4	35	18	49	79	183	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1870	1826	1856	1870	1530	1737	1900	1781	1900	1885	1900
Adj Flow Rate, veh/h	4	681	68	126	297	4	38	19	53	85	197	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	25	2	5	3	2	25	11	0	8	0	1	0
Cap, veh/h	671	1295	1071	498	1419	19	118	68	190	217	284	6
Arrive On Green	0.69	0.69	0.69	0.04	0.77	0.77	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	882	1870	1547	1767	1841	25	1097	443	1235	1349	1841	37
Grp Volume(v), veh/h	4	681	68	126	0	301	38	0	72	85	0	201
Grp Sat Flow(s),veh/h/ln	882	1870	1547	1767	0	1866	1097	0	1678	1349	0	1878
Q Serve(g_s), s	0.2	21.1	1.7	2.3	0.0	5.3	4.1	0.0	4.6	7.1	0.0	12.2
Cycle Q Clear(g_c), s	0.2	21.1	1.7	2.3	0.0	5.3	16.2	0.0	4.6	11.7	0.0	12.2
Prop In Lane	1.00		1.00	1.00		0.01	1.00		0.74	1.00		0.02
Lane Grp Cap(c), veh/h	671	1295	1071	498	0	1438	118	0	259	217	0	289
V/C Ratio(X)	0.01	0.53	0.06	0.25	0.00	0.21	0.32	0.00	0.28	0.39	0.00	0.69
Avail Cap(c_a), veh/h	671	1295	1071	550	0	1438	173	0	343	284	0	384
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	5.7	8.9	5.9	6.7	0.0	3.8	55.8	0.0	44.9	50.0	0.0	48.1
Incr Delay (d2), s/veh	0.0	1.5	0.1	0.3	0.0	0.3	1.6	0.0	0.6	1.2	0.0	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.0	0.0	0.0	0.1	0.9	0.0	1.3	1.7	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.7	10.5	6.1	7.0	0.0	4.1	57.3	0.0	45.4	51.2	0.0	51.6
LnGrp LOS	A	B	A	A	A	A	E	A	D	D	A	D
Approach Vol, veh/h	753				427				110			
Approach Delay, s/veh	10.0				4.9				49.5			
Approach LOS	B				A				D			
Timer - Assigned Phs	1	2	4			6			8			
Phs Duration (G+Y+Rc), s	9.4	87.6	23.0			97.0			23.0			
Change Period (Y+Rc), s	4.5	4.5	4.5			4.5			4.5			
Max Green Setting (Gmax), s	8.5	73.5	24.5			86.5			24.5			
Max Q Clear Time (g_c+l1), s	4.3	23.1	14.2			7.3			18.2			
Green Ext Time (p_c), s	0.1	7.3	1.1			2.4			0.2			
Intersection Summary												
HCM 6th Ctrl Delay	18.9											
HCM 6th LOS	B											

Lanes, Volumes, Timings
3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2029)

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	85	769	28	102	581	45	11	92	33	278
Future Volume (vph)	85	769	28	102	581	45	11	92	33	278
Lane Group Flow (vph)	89	801	29	106	605	47	11	306	34	322
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.19	0.27	0.03	0.28	0.29	0.05	0.11	0.67	0.29	0.78
Control Delay	10.8	9.5	2.6	12.5	10.0	3.0	36.2	34.0	37.2	50.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	9.5	2.6	12.5	10.0	3.0	36.2	34.0	37.2	50.7
Queue Length 50th (m)	7.9	27.7	0.0	10.1	30.8	0.0	2.2	45.5	6.9	80.7
Queue Length 95th (m)	19.5	42.8	3.4	25.1	50.0	5.1	7.0	70.6	18.3	108.9
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	474	2998	852	385	2051	979	192	767	224	783
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.27	0.03	0.28	0.29	0.05	0.06	0.40	0.15	0.41

Intersection Summary

Cycle Length: 120

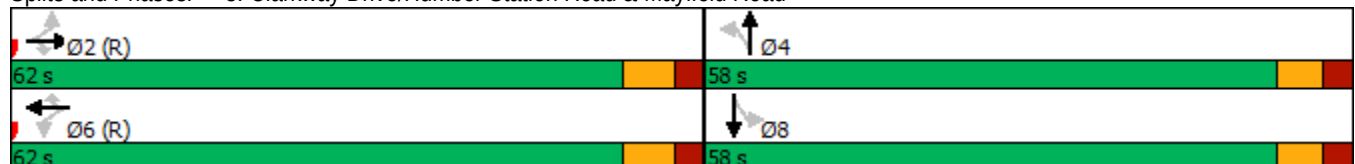
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2029)

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	85	769	28	102	581	45	11	92	33	278
Future Volume (vph)	85	769	28	102	581	45	11	92	33	278
Lane Group Flow (vph)	89	801	29	106	605	47	11	306	34	322
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.19	0.27	0.03	0.28	0.29	0.05	0.11	0.67	0.29	0.78
Control Delay	10.8	9.5	2.6	12.5	10.0	3.0	36.2	34.0	37.2	50.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	9.5	2.6	12.5	10.0	3.0	36.2	34.0	37.2	50.7
Queue Length 50th (m)	7.9	27.7	0.0	10.1	30.8	0.0	2.2	45.5	6.9	80.7
Queue Length 95th (m)	19.5	42.8	3.4	25.1	50.0	5.1	7.0	70.6	18.3	108.9
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	474	2998	852	385	2051	979	192	767	224	783
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.27	0.03	0.28	0.29	0.05	0.06	0.40	0.15	0.41

Intersection Summary

Cycle Length: 120

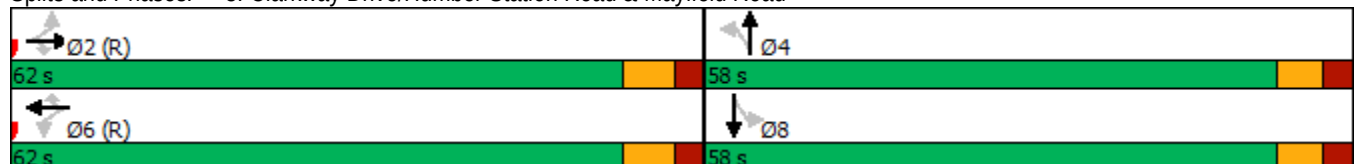
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2029)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 			 	
Traffic Volume (veh/h)	85	769	28	102	581	45	11	92	202	33	278	31
Future Volume (veh/h)	85	769	28	102	581	45	11	92	202	33	278	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1781	1678	1530	1796	1648	1767	1633	1856	1841	1722	1870	1707
Adj Flow Rate, veh/h	89	801	29	106	605	47	11	96	210	34	290	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	15	25	7	17	9	18	3	4	12	2	13
Cap, veh/h	470	2921	827	426	1997	955	136	126	275	130	402	44
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	743	4580	1296	652	3131	1497	924	518	1133	988	1655	183
Grp Volume(v), veh/h	89	801	29	106	605	47	11	0	306	34	0	322
Grp Sat Flow(s),veh/h/ln	743	1527	1296	652	1566	1497	924	0	1652	988	0	1837
Q Serve(g_s), s	7.3	9.2	1.0	10.2	10.4	1.4	1.3	0.0	20.7	4.0	0.0	19.3
Cycle Q Clear(g_c), s	17.7	9.2	1.0	19.4	10.4	1.4	20.6	0.0	20.7	24.6	0.0	19.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.69	1.00		0.10
Lane Grp Cap(c), veh/h	470	2921	827	426	1997	955	136	0	401	130	0	447
V/C Ratio(X)	0.19	0.27	0.04	0.25	0.30	0.05	0.08	0.00	0.76	0.26	0.00	0.72
Avail Cap(c_a), veh/h	470	2921	827	426	1997	955	304	0	702	310	0	781
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.7	9.5	8.0	13.8	9.8	8.1	51.2	0.0	42.2	53.6	0.0	41.7
Incr Delay (d2), s/veh	0.9	0.2	0.1	1.4	0.4	0.1	0.3	0.0	3.0	1.1	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.3	0.0	0.6	0.4	0.1	0.2	0.0	5.6	0.7	0.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.6	9.8	8.1	15.2	10.1	8.2	51.4	0.0	45.2	54.7	0.0	43.9
LnGrp LOS	B	A	A	B	B	A	D	A	D	D	A	D
Approach Vol, veh/h	919			758			317			356		
Approach Delay, s/veh	10.2			10.7			45.4			44.9		
Approach LOS	B			B			D			D		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	83.8			36.2			83.8			36.2		
Change Period (Y+Rc), s	* 7.3			* 7			* 7.3			* 7		
Max Green Setting (Gmax), s	* 55			* 51			* 55			* 51		
Max Q Clear Time (g_c+I1), s	19.7			22.7			21.4			26.6		
Green Ext Time (p_c), s	9.3			2.5			7.4			2.5		
Intersection Summary												
HCM 6th Ctrl Delay			20.4									
HCM 6th LOS			C									
Notes												

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029)

AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	26	82	140	79	293
Future Volume (vph)	50	26	82	140	79	293
Lane Group Flow (vph)	50	26	82	140	79	293
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.33	0.16	0.05	0.11	0.08	0.19
Control Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Length 50th (m)	11.7	0.0	5.3	0.0	3.3	12.9
Queue Length 95th (m)	24.8	9.0	9.6	9.1	8.2	28.8
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	526	492	1506	1253	1008	1565
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.05	0.05	0.11	0.08	0.19

Intersection Summary

Cycle Length: 120

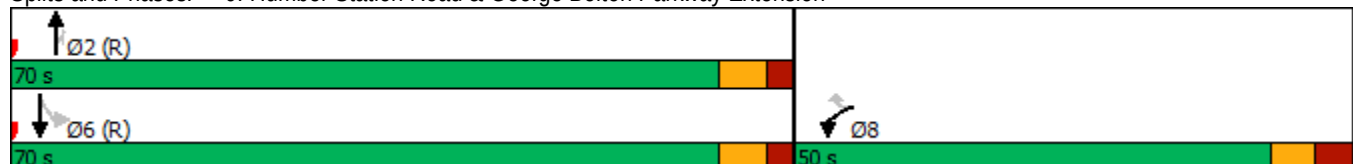
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029)

AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	26	82	140	79	293
Future Volume (vph)	50	26	82	140	79	293
Lane Group Flow (vph)	50	26	82	140	79	293
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.33	0.16	0.05	0.11	0.08	0.19
Control Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Length 50th (m)	11.7	0.0	5.3	0.0	3.3	12.9
Queue Length 95th (m)	24.8	9.0	9.6	9.1	8.2	28.8
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	526	492	1506	1253	1008	1565
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.05	0.05	0.11	0.08	0.19

Intersection Summary

Cycle Length: 120

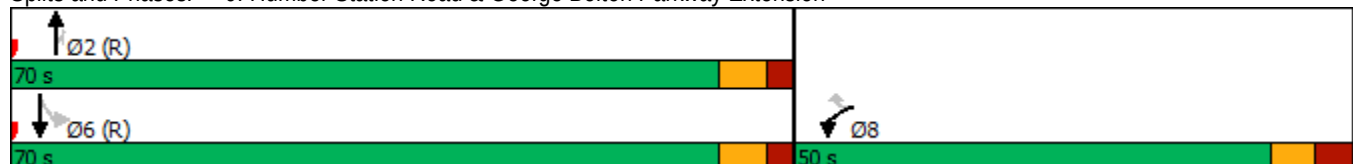
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029)
AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	50	26	82	140	79	293
Future Volume (veh/h)	50	26	82	140	79	293
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1604	1618	1826	1796	1781	1885
Adj Flow Rate, veh/h	50	26	82	140	79	293
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	20	19	5	7	8	1
Cap, veh/h	141	126	1442	1202	921	1489
Arrive On Green	0.09	0.09	0.79	0.79	0.79	0.79
Sat Flow, veh/h	1527	1372	1826	1522	1104	1885
Grp Volume(v), veh/h	50	26	82	140	79	293
Grp Sat Flow(s),veh/h/ln	1527	1372	1826	1522	1104	1885
Q Serve(g_s), s	3.7	2.1	1.2	2.6	2.0	4.6
Cycle Q Clear(g_c), s	3.7	2.1	1.2	2.6	3.2	4.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	141	126	1442	1202	921	1489
V/C Ratio(X)	0.36	0.21	0.06	0.12	0.09	0.20
Avail Cap(c_a), veh/h	541	486	1442	1202	921	1489
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.1	50.4	2.8	2.9	3.1	3.1
Incr Delay (d2), s/veh	1.5	0.8	0.1	0.2	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.6	0.0	0.1	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	52.7	51.2	2.9	3.1	3.3	3.4
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	76		222			372
Approach Delay, s/veh	52.2		3.0			3.4
Approach LOS	D		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	101.5		101.5		18.5	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	4.6		6.6		5.7	
Green Ext Time (p_c), s	1.3		2.8		0.3	
Intersection Summary						
HCM 6th Ctrl Delay			8.8			
HCM 6th LOS			A			



Lane Group	EBT	WBT	SBR
Lane Configurations	↔	↔	↔
Traffic Volume (vph)	98	34	42
Future Volume (vph)	98	34	42
Lane Group Flow (vph)	239	37	46
Sign Control	Free	Free	

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	4.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	121	98	34	0	0	42
Future Vol, veh/h	121	98	34	0	0	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	21	0	0	19
Mvmt Flow	132	107	37	0	0	46
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	37	0	-	0	408	37
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	371	-
Critical Hdwy	4.17	-	-	-	6.4	6.39
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.263	-	-	-	3.5	3.471
Pot Cap-1 Maneuver	1542	-	-	0	603	989
Stage 1	-	-	-	0	991	-
Stage 2	-	-	-	0	702	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1542	-	-	-	548	989
Mov Cap-2 Maneuver	-	-	-	-	548	-
Stage 1	-	-	-	-	901	-
Stage 2	-	-	-	-	702	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.2	0		8.8		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2	
Capacity (veh/h)	1542	-	-	-	989	
HCM Lane V/C Ratio	0.085	-	-	-	0.046	
HCM Control Delay (s)	7.6	0	-	0	8.8	
HCM Lane LOS	A	A	-	A	A	
HCM 95th %tile Q(veh)	0.3	-	-	-	0.1	



Lane Group	EBT	SBR
Lane Configurations		
Traffic Volume (vph)	0	34
Future Volume (vph)	0	34
Lane Group Flow (vph)	107	37
Sign Control	Free	

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
31: George Bolton Parkway Extension & Site Access 2

Future Total (2029)
AM Peak Hour

Intersection						
Int Delay, s/veh	7.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	98	0	0	0	0	34
Future Vol, veh/h	98	0	0	0	0	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	0	0	0	0	21
Mvmt Flow	107	0	0	0	0	37
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	-	1
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.17	-	-	-	-	6.41
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.263	-	-	-	-	3.489
Pot Cap-1 Maneuver	1589	-	-	-	0	1030
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1589	-	-	-	-	1030
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	7.4	0		8.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1589	-	-	-	-	1030
HCM Lane V/C Ratio	0.067	-	-	-	-	0.036
HCM Control Delay (s)	7.4	0	-	-	-	8.6
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1

Lanes, Volumes, Timings
2: Humber Station Road & Healey Road

Future Total (2029)

PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	21	315	27	55	652	90	211	25	51
Future Volume (vph)	21	315	27	55	652	90	211	25	51
Lane Group Flow (vph)	22	325	28	57	695	93	334	26	59
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.05	0.25	0.03	0.09	0.52	0.34	0.80	0.30	0.14
Control Delay	7.8	7.9	3.0	7.7	11.3	35.2	50.2	45.1	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	7.9	3.0	7.7	11.3	35.2	50.2	45.1	32.3
Queue Length 50th (m)	1.5	26.1	0.1	4.0	73.0	22.4	79.5	5.4	10.8
Queue Length 95th (m)	5.6	49.2	3.7	11.1	130.0	26.3	109.7	13.5	20.4
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	414	1320	982	642	1326	465	690	149	695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.25	0.03	0.09	0.52	0.20	0.48	0.17	0.08

Intersection Summary

Cycle Length: 120

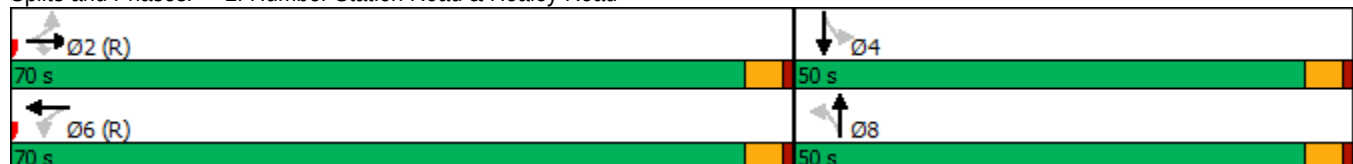
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



Queues

2: Humber Station Road & Healey Road

Future Total (2029)

PM Peak Hour

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	21	315	27	55	652	90	211	25	51
Future Volume (vph)	21	315	27	55	652	90	211	25	51
Lane Group Flow (vph)	22	325	28	57	695	93	334	26	59
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2			6		8		4
Permitted Phases	2		2	6		8		4	
Detector Phase	2	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.05	0.25	0.03	0.09	0.52	0.34	0.80	0.30	0.14
Control Delay	7.8	7.9	3.0	7.7	11.3	35.2	50.2	45.1	32.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	7.9	3.0	7.7	11.3	35.2	50.2	45.1	32.3
Queue Length 50th (m)	1.5	26.1	0.1	4.0	73.0	22.4	79.5	5.4	10.8
Queue Length 95th (m)	5.6	49.2	3.7	11.1	130.0	26.3	109.7	13.5	20.4
Internal Link Dist (m)		465.5			1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		30.0	60.0		30.0		30.0	
Base Capacity (vph)	414	1320	982	642	1326	465	690	149	695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.25	0.03	0.09	0.52	0.20	0.48	0.17	0.08

Intersection Summary

Cycle Length: 120

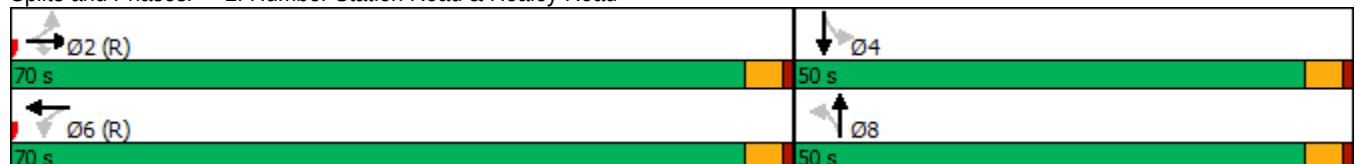
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary

2: Humber Station Road & Healey Road

Future Total (2029)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	315	27	55	652	22	90	211	113	25	51	6
Future Volume (veh/h)	21	315	27	55	652	22	90	211	113	25	51	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1678	1737	1885	1826	1752	1885	1826	1900	1841	1900
Adj Flow Rate, veh/h	22	325	28	57	672	23	93	218	116	26	53	6
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	15	11	1	5	10	1	5	0	4	0
Cap, veh/h	460	1312	997	670	1271	43	309	259	138	106	363	41
Arrive On Green	0.70	0.70	0.70	0.70	0.70	0.70	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	761	1870	1422	955	1812	62	1259	1158	616	1063	1624	184
Grp Volume(v), veh/h	22	325	28	57	0	695	93	0	334	26	0	59
Grp Sat Flow(s),veh/h/ln	761	1870	1422	955	0	1874	1259	0	1774	1063	0	1808
Q Serve(g_s), s	1.7	7.5	0.7	2.8	0.0	21.1	7.7	0.0	21.6	2.9	0.0	3.1
Cycle Q Clear(g_c), s	22.8	7.5	0.7	10.3	0.0	21.1	10.8	0.0	21.6	24.5	0.0	3.1
Prop In Lane	1.00		1.00	1.00		0.03	1.00		0.35	1.00		0.10
Lane Grp Cap(c), veh/h	460	1312	997	670	0	1314	309	0	397	106	0	404
V/C Ratio(X)	0.05	0.25	0.03	0.09	0.00	0.53	0.30	0.00	0.84	0.24	0.00	0.15
Avail Cap(c_a), veh/h	460	1312	997	670	0	1314	504	0	673	272	0	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.9	6.5	5.5	8.3	0.0	8.5	41.7	0.0	44.5	56.2	0.0	37.4
Incr Delay (d2), s/veh	0.2	0.5	0.1	0.3	0.0	1.5	0.5	0.0	4.9	1.2	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.2	0.0	0.1	0.0	0.6	1.6	0.0	6.5	0.6	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.1	6.9	5.5	8.6	0.0	10.0	42.3	0.0	49.4	57.4	0.0	37.5
LnGrp LOS	B	A	A	A	A	B	D	A	D	E	A	D
Approach Vol, veh/h	375			752			427			85		
Approach Delay, s/veh	7.2			9.9			47.8			43.6		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	88.6			31.4			88.6			31.4		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	65.5			45.5			65.5			45.5		
Max Q Clear Time (g_c+l1), s	24.8			26.5			23.1			23.6		
Green Ext Time (p_c), s	2.9			0.4			7.4			2.9		
Intersection Summary												
HCM 6th Ctrl Delay				20.9								
HCM 6th LOS				C								

Lanes, Volumes, Timings

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2029)

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	45	704	19	135	847	54	59	295	40	114
Future Volume (vph)	45	704	19	135	847	54	59	295	40	114
Lane Group Flow (vph)	46	726	20	139	873	56	61	473	41	202
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.18	0.26	0.02	0.39	0.45	0.07	0.22	0.88	0.47	0.38
Control Delay	16.4	13.4	1.9	19.3	16.0	3.9	31.5	55.0	49.8	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	13.4	1.9	19.3	16.0	3.9	31.5	55.0	49.8	25.6
Queue Length 50th (m)	5.1	31.2	0.0	17.9	62.1	0.0	11.2	104.9	10.3	39.0
Queue Length 95th (m)	14.1	44.6	2.1	39.4	89.0	6.5	21.3	137.7	23.1	68.2
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	250	2757	854	358	1935	833	340	646	106	629
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	0.18	0.26	0.02	0.39	0.45	0.07	0.18	0.73	0.39	0.32

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2029)

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	45	704	19	135	847	54	59	295	40	114
Future Volume (vph)	45	704	19	135	847	54	59	295	40	114
Lane Group Flow (vph)	46	726	20	139	873	56	61	473	41	202
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.18	0.26	0.02	0.39	0.45	0.07	0.22	0.88	0.47	0.38
Control Delay	16.4	13.4	1.9	19.3	16.0	3.9	31.5	55.0	49.8	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	13.4	1.9	19.3	16.0	3.9	31.5	55.0	49.8	25.6
Queue Length 50th (m)	5.1	31.2	0.0	17.9	62.1	0.0	11.2	104.9	10.3	39.0
Queue Length 95th (m)	14.1	44.6	2.1	39.4	89.0	6.5	21.3	137.7	23.1	68.2
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	250	2757	854	358	1935	833	340	646	106	629
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	0.18	0.26	0.02	0.39	0.45	0.07	0.18	0.73	0.39	0.32

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2029)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 							
Traffic Volume (veh/h)	45	704	19	135	847	54	59	295	164	40	114	81
Future Volume (veh/h)	45	704	19	135	847	54	59	295	164	40	114	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1574	1737	1737	1767	1752	1678	1722	1856	1841	1752	1841	1767
Adj Flow Rate, veh/h	46	726	20	139	873	56	61	304	169	41	118	84
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	22	11	11	9	10	15	12	3	4	10	4	9
Cap, veh/h	264	2653	824	384	1862	796	311	360	200	119	321	229
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	507	4742	1472	675	3328	1422	1087	1121	623	862	1000	712
Grp Volume(v), veh/h	46	726	20	139	873	56	61	0	473	41	0	202
Grp Sat Flow(s),veh/h/ln	507	1581	1472	675	1664	1422	1087	0	1743	862	0	1713
Q Serve(g_s), s	7.2	9.6	0.7	16.2	18.8	2.2	5.5	0.0	30.3	5.6	0.0	10.9
Cycle Q Clear(g_c), s	25.9	9.6	0.7	25.7	18.8	2.2	16.4	0.0	30.3	35.9	0.0	10.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		0.42
Lane Grp Cap(c), veh/h	264	2653	824	384	1862	796	311	0	560	119	0	550
V/C Ratio(X)	0.17	0.27	0.02	0.36	0.47	0.07	0.20	0.00	0.84	0.34	0.00	0.37
Avail Cap(c_a), veh/h	264	2653	824	384	1862	796	351	0	625	151	0	614
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	13.7	11.8	20.4	15.8	12.1	37.6	0.0	37.9	54.6	0.0	31.3
Incr Delay (d2), s/veh	1.4	0.3	0.1	2.6	0.8	0.2	0.3	0.0	9.5	1.7	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.0	0.1	1.3	2.2	0.2	1.0	0.0	8.8	0.9	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	14.0	11.9	23.1	16.6	12.3	37.9	0.0	47.4	56.3	0.0	31.7
LnGrp LOS	C	B	B	C	B	B	D	A	D	E	A	C
Approach Vol, veh/h	792		1068			534			243			
Approach Delay, s/veh	14.6		17.2			46.3			35.9			
Approach LOS	B		B			D			D			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	74.4		45.6		74.4		45.6					
Change Period (Y+Rc), s	* 7.3		* 7		* 7.3		* 7					
Max Green Setting (Gmax), s	* 63		* 43		* 63		* 43					
Max Q Clear Time (g_c+I1), s	27.9		32.3		27.7		37.9					
Green Ext Time (p_c), s	8.0		2.9		11.3		0.7					
Intersection Summary												
HCM 6th Ctrl Delay			24.1									
HCM 6th LOS			C									
Notes												

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029)

PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	148	75	329	65	37	89
Future Volume (vph)	148	75	329	65	37	89
Lane Group Flow (vph)	148	75	329	65	37	89
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.65	0.28	0.24	0.07	0.06	0.06
Control Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Length 50th (m)	35.3	0.0	32.6	1.2	2.5	5.9
Queue Length 95th (m)	54.9	13.3	62.9	m7.5	7.7	14.4
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	567	1383	978	629	1396
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.13	0.24	0.07	0.06	0.06

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

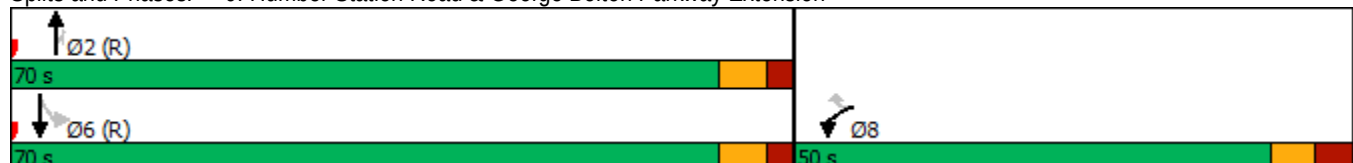
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029)

PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	148	75	329	65	37	89
Future Volume (vph)	148	75	329	65	37	89
Lane Group Flow (vph)	148	75	329	65	37	89
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.65	0.28	0.24	0.07	0.06	0.06
Control Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Length 50th (m)	35.3	0.0	32.6	1.2	2.5	5.9
Queue Length 95th (m)	54.9	13.3	62.9	m7.5	7.7	14.4
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	567	1383	978	629	1396
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.13	0.24	0.07	0.06	0.06

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

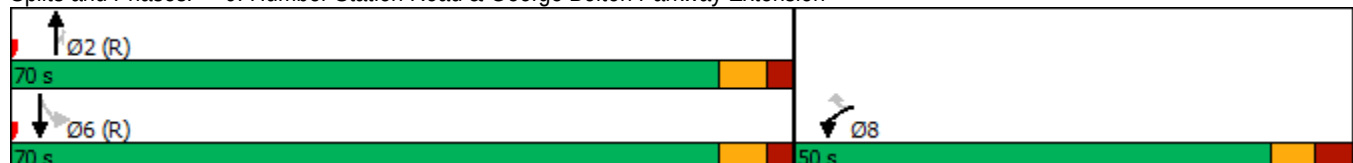
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension

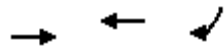


HCM 6th Signalized Intersection Summary

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029)
PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	148	75	329	65	37	89
Future Volume (veh/h)	148	75	329	65	37	89
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1752	1767	1856	1559	1544	1870
Adj Flow Rate, veh/h	148	75	329	65	37	89
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	9	3	23	24	2
Cap, veh/h	187	167	1429	1017	685	1440
Arrive On Green	0.11	0.11	0.77	0.77	0.77	0.77
Sat Flow, veh/h	1668	1497	1856	1321	868	1870
Grp Volume(v), veh/h	148	75	329	65	37	89
Grp Sat Flow(s),veh/h/ln	1668	1497	1856	1321	868	1870
Q Serve(g_s), s	10.4	5.6	6.0	1.4	1.5	1.4
Cycle Q Clear(g_c), s	10.4	5.6	6.0	1.4	7.4	1.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	187	167	1429	1017	685	1440
V/C Ratio(X)	0.79	0.45	0.23	0.06	0.05	0.06
Avail Cap(c_a), veh/h	591	530	1429	1017	685	1440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	49.8	3.9	3.3	4.9	3.3
Incr Delay (d2), s/veh	7.4	1.9	0.4	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.6	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	59.4	51.7	4.2	3.5	5.1	3.4
LnGrp LOS	E	D	A	A	A	A
Approach Vol, veh/h	223		394			126
Approach Delay, s/veh	56.8		4.1			3.9
Approach LOS	E		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	99.1		99.1		20.9	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	8.0		9.4		12.4	
Green Ext Time (p_c), s	3.0		0.9		1.0	
Intersection Summary						
HCM 6th Ctrl Delay			19.9			
HCM 6th LOS			B			



Lane Group	EBT	WBT	SBR
Lane Configurations	↩↑	↑	↗
Traffic Volume (vph)	46	100	123
Future Volume (vph)	46	100	123
Lane Group Flow (vph)	111	109	134
Sign Control	Free	Free	

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
30: George Bolton Parkway Extension & Site Access 1

Future Total (2029)
PM Peak Hour

Intersection						
Int Delay, s/veh	5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Traffic Vol, veh/h	56	46	100	0	0	123
Future Vol, veh/h	56	46	100	0	0	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	24	10	0	0	10
Mvmt Flow	61	50	109	0	0	134
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	109	0	-	0	281	109
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	172	-
Critical Hdwy	4.33	-	-	-	6.4	6.3
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.407	-	-	-	3.5	3.39
Pot Cap-1 Maneuver	1360	-	-	0	713	923
Stage 1	-	-	-	0	921	-
Stage 2	-	-	-	0	863	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	1360	-	-	-	680	923
Mov Cap-2 Maneuver	-	-	-	-	680	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	863	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.3	0		9.6		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	SBLn1	SBLn2	
Capacity (veh/h)	1360	-	-	-	923	
HCM Lane V/C Ratio	0.045	-	-	-	0.145	
HCM Control Delay (s)	7.8	0	-	0	9.6	
HCM Lane LOS	A	A	-	A	A	
HCM 95th %tile Q(veh)	0.1	-	-	-	0.5	



Lane Group	EBT	SBR
Lane Configurations		
Traffic Volume (vph)	0	100
Future Volume (vph)	0	100
Lane Group Flow (vph)	50	109
Sign Control	Free	

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
 31: George Bolton Parkway Extension & Site Access 2

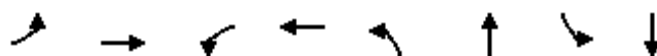
Future Total (2029)
 PM Peak Hour

Intersection						
Int Delay, s/veh	8.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	46	0	0	0	0	100
Future Vol, veh/h	46	0	0	0	0	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	24	0	0	0	0	10
Mvmt Flow	50	0	0	0	0	109
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	-	1
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.34	-	-	-	-	6.3
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.416	-	-	-	-	3.39
Pot Cap-1 Maneuver	1489	-	-	-	0	1061
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1489	-	-	-	-	1061
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	7.5	0		8.8		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1489	-	-	-	-	1061
HCM Lane V/C Ratio	0.034	-	-	-	-	0.102
HCM Control Delay (s)	7.5	0	-	-	-	8.8
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.3

Lanes, Volumes, Timings

2: Humber Station Road & Healey Road

Future Total (2034)
AM Peak Hour

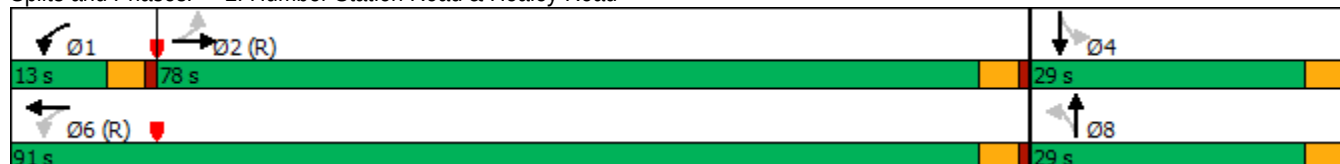


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	728	73	332	35	20	79	192
Future Volume (vph)	4	728	73	332	35	20	79	192
Lane Group Flow (vph)	4	851	78	361	38	63	85	210
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.33	0.15	0.12	0.40	0.16	0.57	0.52
Control Delay	6.0	6.5	3.3	2.7	60.4	22.0	64.9	54.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	6.5	3.3	2.7	60.4	22.0	64.9	54.2
Queue Length 50th (m)	0.2	34.5	2.9	7.4	9.6	3.1	20.4	26.2
Queue Length 95th (m)	1.6	54.7	7.4	13.9	21.3	10.5	36.1	37.3
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	595	2607	531	2899	174	691	273	736
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	0.01	0.33	0.15	0.12	0.22	0.09	0.31	0.29

Intersection Summary

Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road

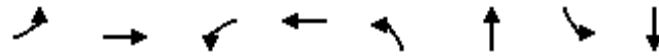


Queues

2: Humber Station Road & Healey Road

Future Total (2034)

AM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	4	728	73	332	35	20	79	192
Future Volume (vph)	4	728	73	332	35	20	79	192
Lane Group Flow (vph)	4	851	78	361	38	63	85	210
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	8.0	5.0	5.0
Minimum Split (s)	24.8	24.8	9.5	24.8	24.7	24.7	24.8	24.8
Total Split (s)	78.0	78.0	13.0	91.0	29.0	29.0	29.0	29.0
Total Split (%)	65.0%	65.0%	10.8%	75.8%	24.2%	24.2%	24.2%	24.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	None	C-Max	None	None	None	None
v/c Ratio	0.01	0.33	0.15	0.12	0.40	0.16	0.57	0.52
Control Delay	6.0	6.5	3.3	2.7	60.4	22.0	64.9	54.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	6.5	3.3	2.7	60.4	22.0	64.9	54.2
Queue Length 50th (m)	0.2	34.5	2.9	7.4	9.6	3.1	20.4	26.2
Queue Length 95th (m)	1.6	54.7	7.4	13.9	21.3	10.5	36.1	37.3
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	595	2607	531	2899	174	691	273	736
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	0.01	0.33	0.15	0.12	0.22	0.09	0.31	0.29

Intersection Summary

Cycle Length: 120

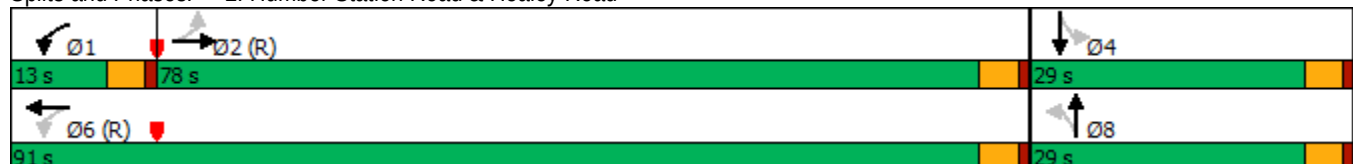
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary

2: Humber Station Road & Healey Road

Future Total (2034)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	728	63	73	332	4	35	20	38	79	192	4
Future Volume (veh/h)	4	728	63	73	332	4	35	20	38	79	192	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1530	1870	1826	1885	1870	1530	1737	1900	1856	1900	1885	1900
Adj Flow Rate, veh/h	4	783	68	78	357	4	38	22	41	85	206	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	25	2	5	1	2	25	11	0	3	0	1	0
Cap, veh/h	675	2440	212	558	2928	33	122	201	180	180	401	8
Arrive On Green	0.74	0.74	0.74	0.04	0.81	0.81	0.11	0.11	0.11	0.11	0.11	0.11
Sat Flow, veh/h	835	3308	287	1795	3600	40	1088	1805	1610	1360	3594	70
Grp Volume(v), veh/h	4	420	431	78	176	185	38	22	41	85	102	108
Grp Sat Flow(s),veh/h/ln	835	1777	1819	1795	1777	1863	1088	1805	1610	1360	1791	1873
Q Serve(g_s), s	0.2	9.8	9.8	1.1	2.5	2.5	4.1	1.3	2.8	7.3	6.5	6.5
Cycle Q Clear(g_c), s	0.2	9.8	9.8	1.1	2.5	2.5	10.6	1.3	2.8	10.1	6.5	6.5
Prop In Lane	1.00		0.16	1.00		0.02	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	675	1310	1341	558	1445	1516	122	201	180	180	200	209
V/C Ratio(X)	0.01	0.32	0.32	0.14	0.12	0.12	0.31	0.11	0.23	0.47	0.51	0.52
Avail Cap(c_a), veh/h	675	1310	1341	616	1445	1516	223	369	329	306	366	382
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.2	5.4	5.4	3.4	2.3	2.3	55.2	48.0	48.6	53.2	50.2	50.3
Incr Delay (d2), s/veh	0.0	0.6	0.6	0.1	0.2	0.2	1.4	0.2	0.6	1.9	2.0	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.2	0.2	0.0	0.1	0.1	0.8	0.4	0.8	1.8	2.1	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.2	6.1	6.1	3.5	2.5	2.5	56.7	48.2	49.2	55.1	52.3	52.2
LnGrp LOS	A	A	A	A	A	A	E	D	D	E	D	D
Approach Vol, veh/h	855			439			101			295		
Approach Delay, s/veh	6.1			2.7			51.8			53.1		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	1	2	4			6	8					
Phs Duration (G+Y+Rc), s	9.1	93.0	17.9			102.1	17.9					
Change Period (Y+Rc), s	4.5	4.5	4.5			4.5	4.5					
Max Green Setting (Gmax), s	8.5	73.5	24.5			86.5	24.5					
Max Q Clear Time (g_c+l1), s	3.1	11.8	12.1			4.5	12.6					
Green Ext Time (p_c), s	0.1	8.0	1.3			2.7	0.4					
Intersection Summary												
HCM 6th Ctrl Delay	16.1											
HCM 6th LOS	B											

Lanes, Volumes, Timings

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2034)

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	85	869	28	102	525	21	11	97	23	293
Future Volume (vph)	85	869	28	102	525	21	11	97	23	293
Lane Group Flow (vph)	89	905	29	106	547	22	11	324	24	337
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.17	0.29	0.03	0.30	0.26	0.02	0.07	0.81	0.28	0.46
Control Delay	9.8	8.9	2.5	12.6	9.0	1.6	35.1	49.1	43.1	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	8.9	2.5	12.6	9.0	1.6	35.1	49.1	43.1	37.8
Queue Length 50th (m)	7.3	30.1	0.0	9.8	25.6	0.0	2.2	59.7	5.1	43.0
Queue Length 95th (m)	18.8	48.0	3.3	26.1	44.1	2.2	6.9	84.7	14.8	55.7
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	525	3135	874	352	2071	992	319	750	179	1491
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	0.17	0.29	0.03	0.30	0.26	0.02	0.03	0.43	0.13	0.23

Intersection Summary

Cycle Length: 120

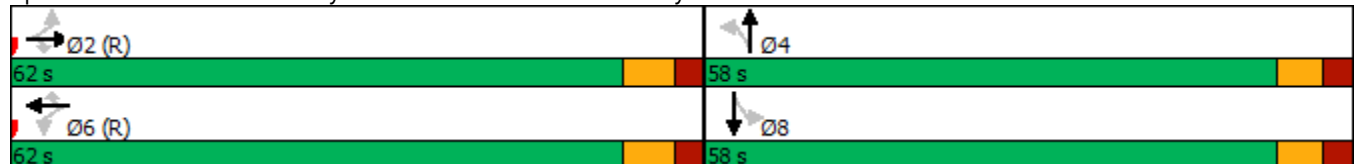
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2034)

AM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	85	869	28	102	525	21	11	97	23	293
Future Volume (vph)	85	869	28	102	525	21	11	97	23	293
Lane Group Flow (vph)	89	905	29	106	547	22	11	324	24	337
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.17	0.29	0.03	0.30	0.26	0.02	0.07	0.81	0.28	0.46
Control Delay	9.8	8.9	2.5	12.6	9.0	1.6	35.1	49.1	43.1	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	8.9	2.5	12.6	9.0	1.6	35.1	49.1	43.1	37.8
Queue Length 50th (m)	7.3	30.1	0.0	9.8	25.6	0.0	2.2	59.7	5.1	43.0
Queue Length 95th (m)	18.8	48.0	3.3	26.1	44.1	2.2	6.9	84.7	14.8	55.7
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	525	3135	874	352	2071	992	319	750	179	1491
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	0.17	0.29	0.03	0.30	0.26	0.02	0.03	0.43	0.13	0.23

Intersection Summary

Cycle Length: 120

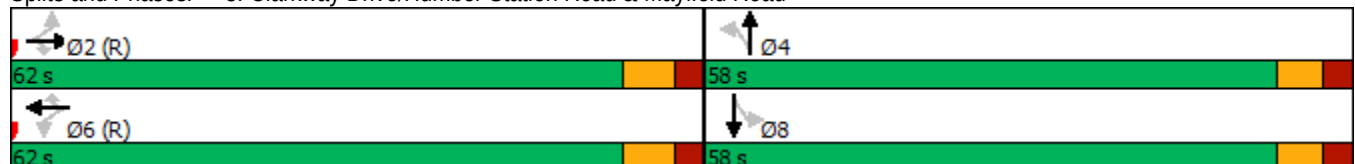
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2034)

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	869	28	102	525	21	11	97	214	23	293	31
Future Volume (veh/h)	85	869	28	102	525	21	11	97	214	23	293	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1781	1707	1530	1796	1618	1752	1633	1856	1841	1767	1870	1707
Adj Flow Rate, veh/h	89	905	29	106	547	22	11	101	223	24	305	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	13	25	7	19	10	18	3	4	9	2	13
Cap, veh/h	507	2965	825	385	1956	944	211	126	278	120	795	83
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	803	4661	1296	592	3075	1485	911	515	1136	997	3248	338
Grp Volume(v), veh/h	89	905	29	106	547	22	11	0	324	24	166	171
Grp Sat Flow(s),veh/h/ln	803	1554	1296	592	1537	1485	911	0	1651	997	1777	1809
Q Serve(g_s), s	6.6	10.5	1.0	11.8	9.4	0.7	1.2	0.0	22.1	2.8	9.3	9.5
Cycle Q Clear(g_c), s	16.1	10.5	1.0	22.3	9.4	0.7	10.7	0.0	22.1	24.9	9.3	9.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.69	1.00		0.19
Lane Grp Cap(c), veh/h	507	2965	825	385	1956	944	211	0	404	120	435	443
V/C Ratio(X)	0.18	0.31	0.04	0.28	0.28	0.02	0.05	0.00	0.80	0.20	0.38	0.39
Avail Cap(c_a), veh/h	507	2965	825	385	1956	944	375	0	702	300	755	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	9.9	8.1	14.9	9.7	8.1	42.3	0.0	42.6	54.3	37.8	37.8
Incr Delay (d2), s/veh	0.8	0.3	0.1	1.8	0.4	0.0	0.1	0.0	3.7	0.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.4	0.0	0.7	0.4	0.0	0.2	0.0	6.0	0.5	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	10.1	8.2	16.7	10.0	8.1	42.4	0.0	46.3	55.1	38.3	38.4
LnGrp LOS	B	B	A	B	B	A	D	A	D	E	D	D
Approach Vol, veh/h	1023			675			335			361		
Approach Delay, s/veh	10.4			11.0			46.2			39.5		
Approach LOS	B			B			D			D		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	83.6			36.4			83.6			36.4		
Change Period (Y+Rc), s	* 7.3			* 7			* 7.3			* 7		
Max Green Setting (Gmax), s	* 55			* 51			* 55			* 51		
Max Q Clear Time (g_c+I1), s	18.1			24.1			24.3			26.9		
Green Ext Time (p_c), s	10.6			2.6			6.7			2.4		
Intersection Summary												
HCM 6th Ctrl Delay			20.0									
HCM 6th LOS			B									
Notes												

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Total (2034)

AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	12	87	116	35	308
Future Volume (vph)	40	12	87	116	35	308
Lane Group Flow (vph)	40	12	87	116	35	308
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.27	0.08	0.03	0.09	0.04	0.10
Control Delay	55.1	24.3	3.4	1.7	1.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	24.3	3.4	1.7	1.9	1.8
Queue Length 50th (m)	9.3	0.0	2.8	0.0	1.2	6.1
Queue Length 95th (m)	20.9	6.3	4.1	6.4	2.1	6.1
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	526	491	2868	1252	992	2981
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.03	0.09	0.04	0.10

Intersection Summary

Cycle Length: 120

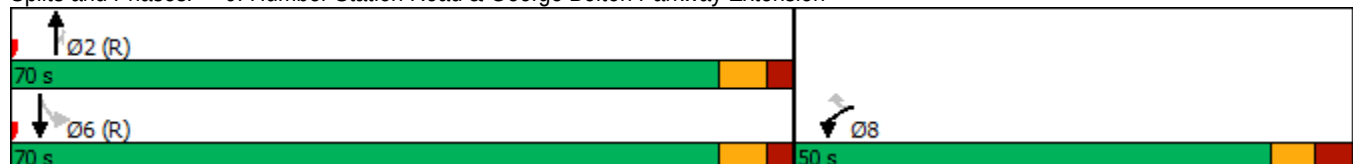
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2034)

AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	12	87	116	35	308
Future Volume (vph)	40	12	87	116	35	308
Lane Group Flow (vph)	40	12	87	116	35	308
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.27	0.08	0.03	0.09	0.04	0.10
Control Delay	55.1	24.3	3.4	1.7	1.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	24.3	3.4	1.7	1.9	1.8
Queue Length 50th (m)	9.3	0.0	2.8	0.0	1.2	6.1
Queue Length 95th (m)	20.9	6.3	4.1	6.4	2.1	6.1
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	526	491	2868	1252	992	2981
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.03	0.09	0.04	0.10

Intersection Summary

Cycle Length: 120

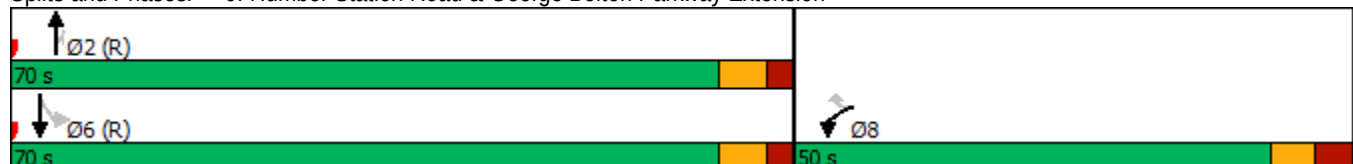
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary

9: Humber Station Road & George Bolton Parkway Extension

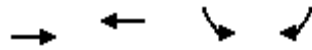
Future Total (2034)

AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	12	87	116	35	308
Future Volume (veh/h)	40	12	87	116	35	308
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1604	1648	1826	1796	1767	1885
Adj Flow Rate, veh/h	40	12	87	116	35	308
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	20	17	5	7	9	1
Cap, veh/h	126	115	2773	1217	945	2863
Arrive On Green	0.08	0.08	0.80	0.80	0.80	0.80
Sat Flow, veh/h	1527	1397	3561	1522	1114	3676
Grp Volume(v), veh/h	40	12	87	116	35	308
Grp Sat Flow(s),veh/h/ln	1527	1397	1735	1522	1114	1791
Q Serve(g_s), s	3.0	1.0	0.6	2.0	0.8	2.3
Cycle Q Clear(g_c), s	3.0	1.0	0.6	2.0	1.4	2.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	126	115	2773	1217	945	2863
V/C Ratio(X)	0.32	0.10	0.03	0.10	0.04	0.11
Avail Cap(c_a), veh/h	541	495	2773	1217	945	2863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	51.0	2.5	2.6	2.6	2.6
Incr Delay (d2), s/veh	1.4	0.4	0.0	0.2	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.3	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.3	51.4	2.5	2.8	2.7	2.7
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	52		203			343
Approach Delay, s/veh	52.9		2.7			2.7
Approach LOS	D		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	102.6		102.6		17.4	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	4.0		4.3		5.0	
Green Ext Time (p_c), s	1.3		2.8		0.2	
Intersection Summary						
HCM 6th Ctrl Delay			7.1			
HCM 6th LOS			A			

30: George Bolton Parkway Extension & Site Access 1

AM Peak Hour



Lane Group	EBT	WBT	SBL	SBR
Lane Configurations				
Traffic Volume (vph)	68	24	13	29
Future Volume (vph)	68	24	13	29
Lane Group Flow (vph)	164	67	14	32
Sign Control	Free	Free	Stop	

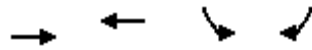
Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	68	24	38	13	29
Future Vol, veh/h	83	68	24	38	13	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	21	8	23	21
Mvmt Flow	90	74	26	41	14	32
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	67	0	-	0	301	47
Stage 1	-	-	-	-	47	-
Stage 2	-	-	-	-	254	-
Critical Hdwy	4.17	-	-	-	6.63	6.41
Critical Hdwy Stg 1	-	-	-	-	5.63	-
Critical Hdwy Stg 2	-	-	-	-	5.63	-
Follow-up Hdwy	2.263	-	-	-	3.707	3.489
Pot Cap-1 Maneuver	1503	-	-	-	649	971
Stage 1	-	-	-	-	924	-
Stage 2	-	-	-	-	742	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1503	-	-	-	609	971
Mov Cap-2 Maneuver	-	-	-	-	609	-
Stage 1	-	-	-	-	867	-
Stage 2	-	-	-	-	742	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.1	0		9.5		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1503	-	-	-	609	971
HCM Lane V/C Ratio	0.06	-	-	-	0.023	0.032
HCM Control Delay (s)	7.5	0	-	-	11.1	8.8
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.1

31: George Bolton Parkway Extension & Site Access 2

AM Peak Hour



Lane Group	EBT	WBT	SBL	SBR
Lane Configurations				
Traffic Volume (vph)	13	38	11	24
Future Volume (vph)	13	38	11	24
Lane Group Flow (vph)	88	74	12	26
Sign Control	Free	Free	Stop	

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
31: George Bolton Parkway Extension & Site Access 2

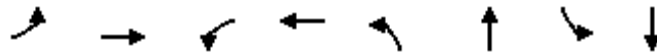
Future Total (2034)
AM Peak Hour

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	13	38	30	11	24
Future Vol, veh/h	68	13	38	30	11	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	23	8	7	18	21
Mvmt Flow	74	14	41	33	12	26
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	74	0	-	0	220	58
Stage 1	-	-	-	-	58	-
Stage 2	-	-	-	-	162	-
Critical Hdwy	4.17	-	-	-	6.58	6.41
Critical Hdwy Stg 1	-	-	-	-	5.58	-
Critical Hdwy Stg 2	-	-	-	-	5.58	-
Follow-up Hdwy	2.263	-	-	-	3.662	3.489
Pot Cap-1 Maneuver	1494	-	-	-	734	957
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	830	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1494	-	-	-	697	957
Mov Cap-2 Maneuver	-	-	-	-	697	-
Stage 1	-	-	-	-	879	-
Stage 2	-	-	-	-	830	-
Approach	EB	WB		SB		
HCM Control Delay, s	6.3	0		9.3		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1494	-	-	-	697	957
HCM Lane V/C Ratio	0.049	-	-	-	0.017	0.027
HCM Control Delay (s)	7.5	0	-	-	10.3	8.9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.1

Lanes, Volumes, Timings
2: Humber Station Road & Healey Road

Future Total (2034)

PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	362	34	786	90	232	25	53
Future Volume (vph)	21	362	34	786	90	232	25	53
Lane Group Flow (vph)	22	401	35	833	93	323	26	61
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.05	0.14	0.05	0.29	0.59	0.66	0.33	0.13
Control Delay	3.6	3.2	3.5	3.8	51.0	36.6	56.9	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	3.2	3.5	3.8	51.0	36.6	56.9	40.6
Queue Length 50th (m)	0.9	9.3	1.5	22.8	23.8	38.1	6.0	6.4
Queue Length 95th (m)	3.5	17.2	4.7	38.6	41.9	53.7	14.9	12.5
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	487	2794	748	2859	462	1342	233	1319
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	0.05	0.14	0.05	0.29	0.20	0.24	0.11	0.05

Intersection Summary

Cycle Length: 120

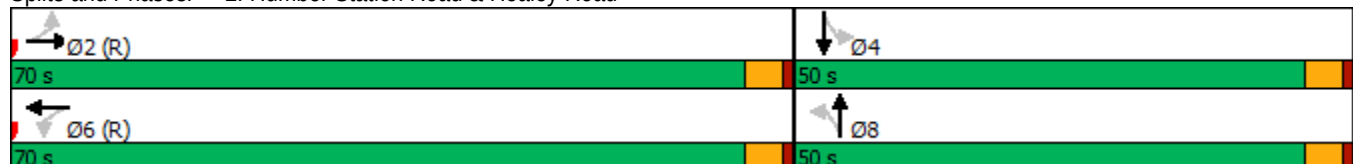
Actuated Cycle Length: 120

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

Natural Cycle: 50

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road

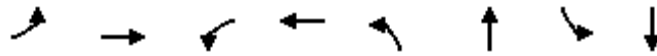


Queues

2: Humber Station Road & Healey Road

Future Total (2034)

PM Peak Hour



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	362	34	786	90	232	25	53
Future Volume (vph)	21	362	34	786	90	232	25	53
Lane Group Flow (vph)	22	401	35	833	93	323	26	61
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	24.8	24.8	24.8	24.8	24.7	24.7	24.7	24.7
Total Split (s)	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.05	0.14	0.05	0.29	0.59	0.66	0.33	0.13
Control Delay	3.6	3.2	3.5	3.8	51.0	36.6	56.9	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.6	3.2	3.5	3.8	51.0	36.6	56.9	40.6
Queue Length 50th (m)	0.9	9.3	1.5	22.8	23.8	38.1	6.0	6.4
Queue Length 95th (m)	3.5	17.2	4.7	38.6	41.9	53.7	14.9	12.5
Internal Link Dist (m)		465.5		1349.5		1464.0		452.2
Turn Bay Length (m)	30.0		60.0		30.0		30.0	
Base Capacity (vph)	487	2794	748	2859	462	1342	233	1319
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	0.05	0.14	0.05	0.29	0.20	0.24	0.11	0.05

Intersection Summary

Cycle Length: 120

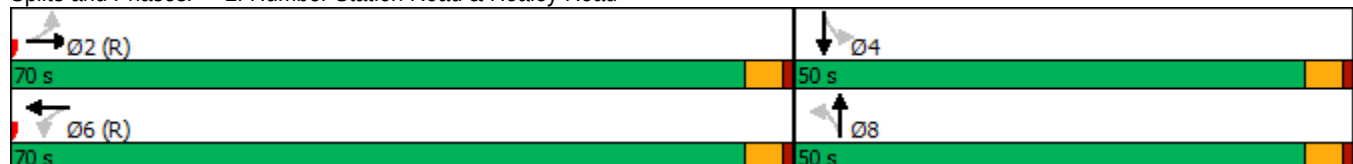
Actuated Cycle Length: 120

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

Natural Cycle: 50

Control Type: Actuated-Coordinated

Splits and Phases: 2: Humber Station Road & Healey Road



HCM 6th Signalized Intersection Summary

2: Humber Station Road & Healey Road

Future Total (2034)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	362	27	34	786	22	90	232	81	25	53	6
Future Volume (veh/h)	21	362	27	34	786	22	90	232	81	25	53	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1900	1870	1678	1856	1885	1826	1752	1885	1870	1900	1841	1900
Adj Flow Rate, veh/h	22	373	28	35	810	23	93	239	84	26	55	6
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	2	15	3	1	5	10	1	2	0	4	0
Cap, veh/h	548	2651	198	806	2814	80	209	351	120	108	427	46
Arrive On Green	0.79	0.79	0.79	0.79	0.79	0.79	0.13	0.13	0.13	0.13	0.13	0.13
Sat Flow, veh/h	669	3352	250	976	3557	101	1256	2618	896	1074	3186	342
Grp Volume(v), veh/h	22	197	204	35	408	425	93	161	162	26	30	31
Grp Sat Flow(s),veh/h/ln	669	1777	1825	976	1791	1867	1256	1791	1724	1074	1749	1779
Q Serve(g_s), s	1.1	3.1	3.2	1.0	7.4	7.4	8.5	10.3	10.7	2.8	1.8	1.9
Cycle Q Clear(g_c), s	8.5	3.1	3.2	4.2	7.4	7.4	10.3	10.3	10.7	13.6	1.8	1.9
Prop In Lane	1.00		0.14	1.00		0.05	1.00		0.52	1.00		0.19
Lane Grp Cap(c), veh/h	548	1406	1444	806	1417	1477	209	240	231	108	234	238
V/C Ratio(X)	0.04	0.14	0.14	0.04	0.29	0.29	0.45	0.67	0.70	0.24	0.13	0.13
Avail Cap(c_a), veh/h	548	1406	1444	806	1417	1477	517	679	654	371	663	675
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	4.5	2.9	2.9	3.4	3.4	3.4	50.4	49.5	49.7	56.2	45.8	45.8
Incr Delay (d2), s/veh	0.1	0.2	0.2	0.1	0.5	0.5	1.5	3.3	3.8	1.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	0.0	0.2	0.2	1.9	3.3	3.4	0.6	0.5	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	4.7	3.2	3.2	3.5	3.9	3.9	51.8	52.7	53.5	57.3	46.0	46.1
LnGrp LOS	A	A	A	A	A	A	D	D	D	E	D	D
Approach Vol, veh/h	423			868			416			87		
Approach Delay, s/veh	3.2			3.9			52.8			49.4		
Approach LOS	A			A			D			D		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	99.4			20.6			99.4			20.6		
Change Period (Y+Rc), s	4.5			4.5			4.5			4.5		
Max Green Setting (Gmax), s	65.5			45.5			65.5			45.5		
Max Q Clear Time (g_c+l1), s	10.5			15.6			9.4			12.7		
Green Ext Time (p_c), s	3.4			0.5			7.9			2.9		
Intersection Summary												
HCM 6th Ctrl Delay	17.3											
HCM 6th LOS	B											

Lanes, Volumes, Timings
3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2034)

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		  			 			 		 
Traffic Volume (vph)	45	695	19	135	650	42	59	322	11	117
Future Volume (vph)	45	695	19	135	650	42	59	322	11	117
Lane Group Flow (vph)	46	716	20	139	670	43	61	513	11	205
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.14	0.27	0.02	0.40	0.37	0.05	0.19	0.89	0.14	0.19
Control Delay	15.8	14.4	1.9	20.5	15.8	4.3	29.6	55.8	34.3	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	14.4	1.9	20.5	15.8	4.3	29.6	55.8	34.3	20.0
Queue Length 50th (m)	5.3	32.6	0.0	18.9	47.0	0.0	10.8	113.8	2.6	18.5
Queue Length 95th (m)	13.2	44.1	2.1	39.2	65.3	5.8	21.0	153.3	9.2	26.8
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	318	2650	830	350	1812	825	374	650	93	1212
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	0.27	0.02	0.40	0.37	0.05	0.16	0.79	0.12	0.17

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2034)

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	45	695	19	135	650	42	59	322	11	117
Future Volume (vph)	45	695	19	135	650	42	59	322	11	117
Lane Group Flow (vph)	46	716	20	139	670	43	61	513	11	205
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.14	0.27	0.02	0.40	0.37	0.05	0.19	0.89	0.14	0.19
Control Delay	15.8	14.4	1.9	20.5	15.8	4.3	29.6	55.8	34.3	20.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	14.4	1.9	20.5	15.8	4.3	29.6	55.8	34.3	20.0
Queue Length 50th (m)	5.3	32.6	0.0	18.9	47.0	0.0	10.8	113.8	2.6	18.5
Queue Length 95th (m)	13.2	44.1	2.1	39.2	65.3	5.8	21.0	153.3	9.2	26.8
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	318	2650	830	350	1812	825	374	650	93	1212
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	0.27	0.02	0.40	0.37	0.05	0.16	0.79	0.12	0.17

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2034)

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 						 	
Traffic Volume (veh/h)	45	695	19	135	650	42	59	322	176	11	117	81
Future Volume (veh/h)	45	695	19	135	650	42	59	322	176	11	117	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1574	1722	1737	1767	1693	1722	1722	1870	1841	1767	1841	1767
Adj Flow Rate, veh/h	46	716	20	139	670	43	61	332	181	11	121	84
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	22	12	11	9	14	12	12	2	4	9	4	9
Cap, veh/h	338	2647	829	390	1811	822	354	362	197	91	647	418
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	620	4701	1472	682	3216	1459	1084	1138	621	838	2036	1316
Grp Volume(v), veh/h	46	716	20	139	670	43	61	0	513	11	103	102
Grp Sat Flow(s),veh/h/ln	620	1567	1472	682	1608	1459	1084	0	1759	838	1749	1604
Q Serve(g_s), s	5.3	9.4	0.7	15.8	13.8	1.6	5.2	0.0	33.7	1.5	5.1	5.6
Cycle Q Clear(g_c), s	19.1	9.4	0.7	25.3	13.8	1.6	10.8	0.0	33.7	35.2	5.1	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	1.00		0.82
Lane Grp Cap(c), veh/h	338	2647	829	390	1811	822	354	0	559	91	556	510
V/C Ratio(X)	0.14	0.27	0.02	0.36	0.37	0.05	0.17	0.00	0.92	0.12	0.18	0.20
Avail Cap(c_a), veh/h	338	2647	829	390	1811	822	398	0	630	125	627	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	13.5	11.6	20.0	14.5	11.8	33.8	0.0	39.4	56.4	29.7	29.8
Incr Delay (d2), s/veh	0.8	0.3	0.1	2.5	0.6	0.1	0.2	0.0	17.3	0.6	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	0.1	1.3	1.5	0.2	0.9	0.0	11.0	0.2	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	13.8	11.7	22.6	15.1	11.9	34.0	0.0	56.8	57.0	29.8	30.0
LnGrp LOS	C	B	B	C	B	B	C	A	E	E	C	C
Approach Vol, veh/h	782				852				574			
Approach Delay, s/veh	14.1				16.1				54.3			
Approach LOS	B				B				D			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	74.9		45.1		74.9		45.1					
Change Period (Y+Rc), s	* 7.3		* 7		* 7.3		* 7					
Max Green Setting (Gmax), s	* 63		* 43		* 63		* 43					
Max Q Clear Time (g_c+I1), s	21.1		35.7		27.3		37.2					
Green Ext Time (p_c), s	7.9		2.4		8.7		0.6					
Intersection Summary												
HCM 6th Ctrl Delay			25.9									
HCM 6th LOS			C									
Notes												

Lanes, Volumes, Timings
9: Humber Station Road & George Bolton Parkway Extension

Future Total (2034)

PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	36	356	54	16	92
Future Volume (vph)	119	36	356	54	16	92
Lane Group Flow (vph)	119	36	356	54	16	92
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.59	0.17	0.13	0.05	0.03	0.03
Control Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Length 50th (m)	28.5	0.0	17.4	1.4	0.5	1.4
Queue Length 95th (m)	46.3	9.7	m31.8	m5.0	3.3	5.9
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	532	2683	988	613	2709
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.13	0.05	0.03	0.03

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

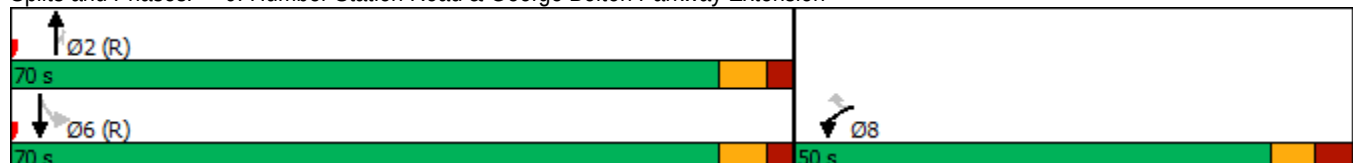
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2034)

PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	36	356	54	16	92
Future Volume (vph)	119	36	356	54	16	92
Lane Group Flow (vph)	119	36	356	54	16	92
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.59	0.17	0.13	0.05	0.03	0.03
Control Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Length 50th (m)	28.5	0.0	17.4	1.4	0.5	1.4
Queue Length 95th (m)	46.3	9.7	m31.8	m5.0	3.3	5.9
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	532	2683	988	613	2709
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.13	0.05	0.03	0.03

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

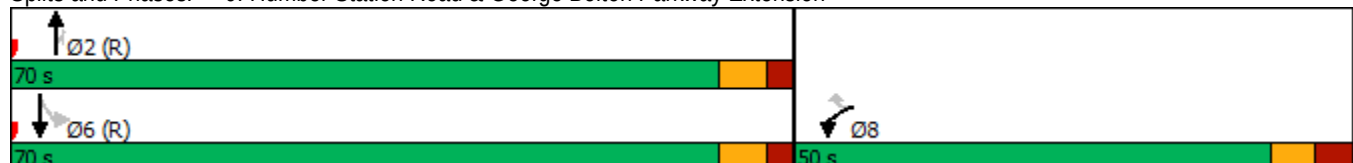
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

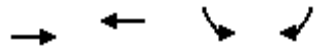
Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary 9: Humber Station Road & George Bolton Parkway Extension

Future Total (2034)
 PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	119	36	356	54	16	92
Future Volume (veh/h)	119	36	356	54	16	92
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1752	1737	1856	1544	1530	1870
Adj Flow Rate, veh/h	119	36	356	54	16	92
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	11	3	24	25	2
Cap, veh/h	166	146	2758	1024	695	2780
Arrive On Green	0.10	0.10	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1668	1472	3618	1309	838	3647
Grp Volume(v), veh/h	119	36	356	54	16	92
Grp Sat Flow(s),veh/h/ln	1668	1472	1763	1309	838	1777
Q Serve(g_s), s	8.3	2.7	2.9	1.1	0.6	0.7
Cycle Q Clear(g_c), s	8.3	2.7	2.9	1.1	3.5	0.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	166	146	2758	1024	695	2780
V/C Ratio(X)	0.72	0.25	0.13	0.05	0.02	0.03
Avail Cap(c_a), veh/h	591	521	2758	1024	695	2780
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	49.9	3.2	3.0	3.6	2.9
Incr Delay (d2), s/veh	5.7	0.9	0.1	0.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.8	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	58.1	50.7	3.3	3.1	3.6	2.9
LnGrp LOS	E	D	A	A	A	A
Approach Vol, veh/h	155		410			108
Approach Delay, s/veh	56.4		3.2			3.0
Approach LOS	E		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	100.6		100.6		19.4	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	4.9		5.5		10.3	
Green Ext Time (p_c), s	3.4		0.9		0.7	
Intersection Summary						
HCM 6th Ctrl Delay	15.4					
HCM 6th LOS	B					



Lane Group	EBT	WBT	SBL	SBR
Lane Configurations				
Traffic Volume (vph)	31	69	38	84
Future Volume (vph)	31	69	38	84
Lane Group Flow (vph)	76	93	41	91
Sign Control	Free	Free	Stop	

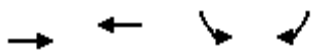
Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	5.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	31	69	17	38	84
Future Vol, veh/h	39	31	69	17	38	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	23	10	24	11	10
Mvmt Flow	42	34	75	18	41	91
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	93	0	-	0	202	84
Stage 1	-	-	-	-	84	-
Stage 2	-	-	-	-	118	-
Critical Hdwy	4.33	-	-	-	6.51	6.3
Critical Hdwy Stg 1	-	-	-	-	5.51	-
Critical Hdwy Stg 2	-	-	-	-	5.51	-
Follow-up Hdwy	2.407	-	-	-	3.599	3.39
Pot Cap-1 Maneuver	1379	-	-	-	767	954
Stage 1	-	-	-	-	917	-
Stage 2	-	-	-	-	885	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1379	-	-	-	743	954
Mov Cap-2 Maneuver	-	-	-	-	743	-
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	885	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.3	0		9.5		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1379	-	-	-	743	954
HCM Lane V/C Ratio	0.031	-	-	-	0.056	0.096
HCM Control Delay (s)	7.7	0	-	-	10.1	9.2
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.3

31: George Bolton Parkway Extension & Site Access 2

PM Peak Hour



Lane Group	EBT	WBT	SBL	SBR
Lane Configurations				
Traffic Volume (vph)	38	17	31	69
Future Volume (vph)	38	17	31	69
Lane Group Flow (vph)	75	33	34	75
Sign Control	Free	Free	Stop	

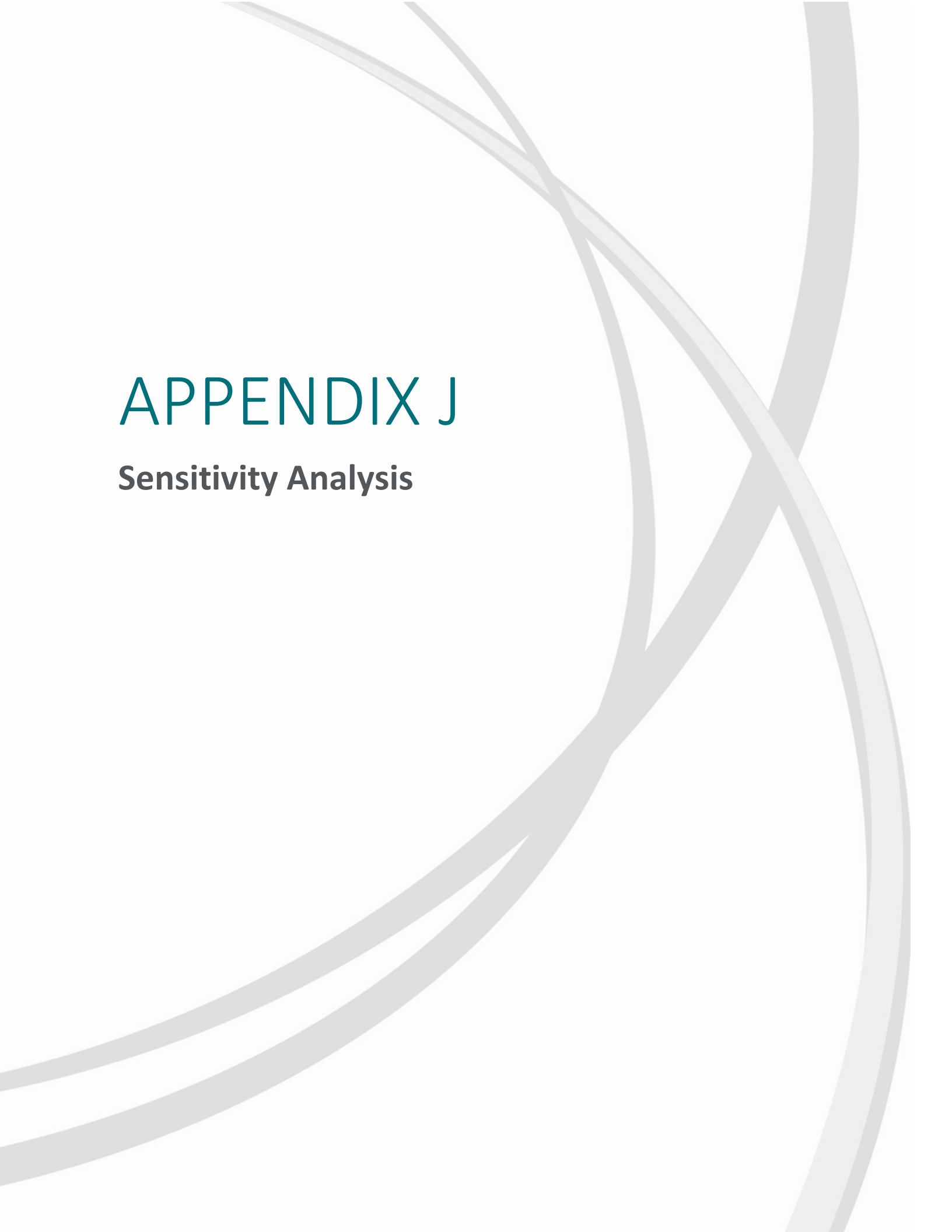
Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
31: George Bolton Parkway Extension & Site Access 2

Future Total (2034)
PM Peak Hour

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	31	38	17	14	31	69
Future Vol, veh/h	31	38	17	14	31	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	11	24	21	10	10
Mvmt Flow	34	41	18	15	34	75
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	33	0	-	0	135	26
Stage 1	-	-	-	-	26	-
Stage 2	-	-	-	-	109	-
Critical Hdwy	4.33	-	-	-	6.5	6.3
Critical Hdwy Stg 1	-	-	-	-	5.5	-
Critical Hdwy Stg 2	-	-	-	-	5.5	-
Follow-up Hdwy	2.407	-	-	-	3.59	3.39
Pot Cap-1 Maneuver	1453	-	-	-	840	1027
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	896	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1453	-	-	-	820	1027
Mov Cap-2 Maneuver	-	-	-	-	820	-
Stage 1	-	-	-	-	953	-
Stage 2	-	-	-	-	896	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.4	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1453	-	-	-	820	1027
HCM Lane V/C Ratio	0.023	-	-	-	0.041	0.073
HCM Control Delay (s)	7.5	0	-	-	9.6	8.8
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2



APPENDIX J

Sensitivity Analysis

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	82	293	
Future Volume (vph)	82	293	
Lane Group Flow (vph)	82	293	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.04	0.15	
Control Delay	0.0	0.2	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.2	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1830	1902	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.04	0.15	

Intersection Summary

Cycle Length: 120

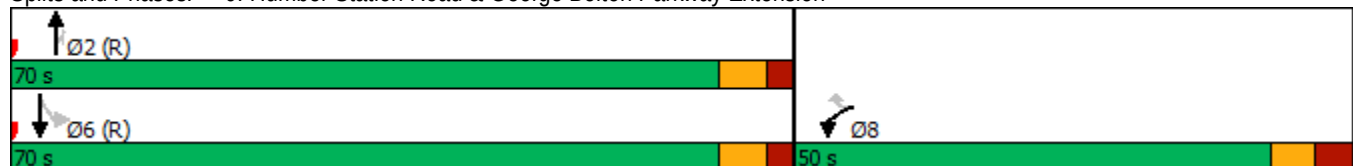
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2029) - with 4-lane George Bolton

9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	82	293	
Future Volume (vph)	82	293	
Lane Group Flow (vph)	82	293	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.04	0.15	
Control Delay	0.0	0.2	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.2	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1830	1902	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.04	0.15	

Intersection Summary

Cycle Length: 120

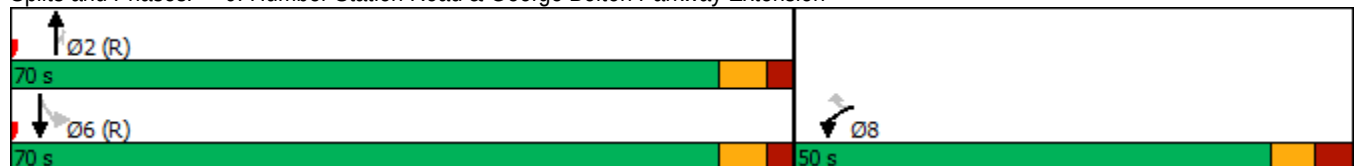
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary - Future Background (2029) - with 4-lane George Bolton 9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	82	0	0	293
Future Volume (veh/h)	0	0	82	0	0	293
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1826	1900	1900	1885
Adj Flow Rate, veh/h	0	0	82	0	0	293
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	5	0	0	1
Cap, veh/h	2	1	1724	1520	60	1780
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	1826	1610	1337	1885
Grp Volume(v), veh/h	0	0	82	0	0	293
Grp Sat Flow(s),veh/h/ln	1810	1610	1826	1610	1337	1885
Q Serve(g_s), s	0.0	0.0	0.3	0.0	0.0	1.2
Cycle Q Clear(g_c), s	0.0	0.0	0.3	0.0	0.0	1.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	1724	1520	60	1780
V/C Ratio(X)	0.00	0.00	0.05	0.00	0.00	0.16
Avail Cap(c_a), veh/h	641	570	1724	1520	60	1780
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.2	0.0	0.0	0.4
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		82			293
Approach Delay, s/veh	0.0		0.2			0.4
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	2.3		3.2		0.0	
Green Ext Time (p_c), s	0.6		2.3		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.4			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	0
Stage 1	-	-	1
Stage 2	-	-	0
Critical Hdwy	4.1	-	6.8
Critical Hdwy Stg 1	-	-	5.8
Critical Hdwy Stg 2	-	-	5.8
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1635	-	1027
Stage 1	-	-	1027
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1635	-	1027
Mov Cap-2 Maneuver	-	-	1027
Stage 1	-	-	1027
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕			↕
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	- 0 - 1
Stage 1	-	-	- - -
Stage 2	-	-	- - -
Critical Hdwy	4.1	-	- - 6.9
Critical Hdwy Stg 1	-	-	- - -
Critical Hdwy Stg 2	-	-	- - -
Follow-up Hdwy	2.2	-	- - 3.3
Pot Cap-1 Maneuver	1635	-	- 0 1089
Stage 1	-	-	- 0 -
Stage 2	-	-	- 0 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1635	-	- - 1089
Mov Cap-2 Maneuver	-	-	- - -
Stage 1	-	-	- - -
Stage 2	-	-	- - -

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1635	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	329	89	
Future Volume (vph)	329	89	
Lane Group Flow (vph)	329	89	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.18	0.05	
Control Delay	0.2	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.2	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1865	1883	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.18	0.05	

Intersection Summary

Cycle Length: 120

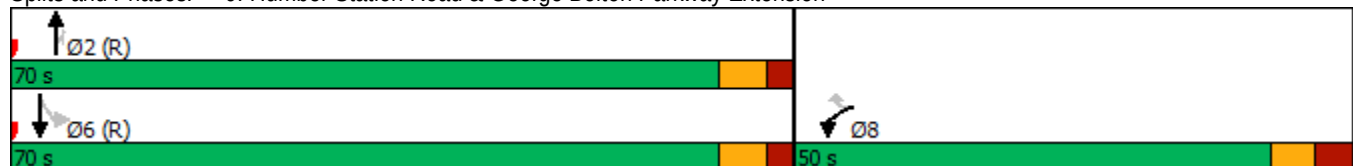
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2029) - with 4-lane George Bolton

9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑	↑	
Traffic Volume (vph)	329	89	
Future Volume (vph)	329	89	
Lane Group Flow (vph)	329	89	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.18	0.05	
Control Delay	0.2	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.2	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	1865	1883	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.18	0.05	

Intersection Summary

Cycle Length: 120

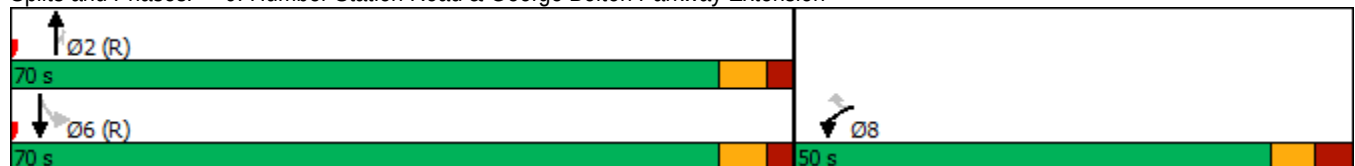
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary Future Background (2029) - with 4-lane George Bolton 9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	329	0	0	89
Future Volume (veh/h)	0	0	329	0	0	89
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1856	1900	1900	1870
Adj Flow Rate, veh/h	0	0	329	0	0	89
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	3	0	0	2
Cap, veh/h	2	1	1752	1520	60	1766
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	1856	1610	1068	1870
Grp Volume(v), veh/h	0	0	329	0	0	89
Grp Sat Flow(s),veh/h/ln	1810	1610	1856	1610	1068	1870
Q Serve(g_s), s	0.0	0.0	1.4	0.0	0.0	0.3
Cycle Q Clear(g_c), s	0.0	0.0	1.4	0.0	0.0	0.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	1752	1520	60	1766
V/C Ratio(X)	0.00	0.00	0.19	0.00	0.00	0.05
Avail Cap(c_a), veh/h	641	570	1752	1520	60	1766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.2	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.5	0.0	0.0	0.3
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		329			89
Approach Delay, s/veh	0.0		0.5			0.3
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+11), s	3.4		2.3		0.0	
Green Ext Time (p_c), s	2.6		0.6		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.4			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection

Int Delay, s/veh 0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	0
Stage 1	-	-	1
Stage 2	-	-	0
Critical Hdwy	4.1	-	6.8
Critical Hdwy Stg 1	-	-	5.8
Critical Hdwy Stg 2	-	-	5.8
Follow-up Hdwy	2.2	-	3.5
Pot Cap-1 Maneuver	1635	-	1027
Stage 1	-	-	1027
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1635	-	1027
Mov Cap-2 Maneuver	-	-	1027
Stage 1	-	-	1027
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

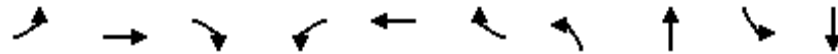
Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔			↔
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	-	1
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.1	-	-	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.2	-	-	-	-	3.3
Pot Cap-1 Maneuver	1635	-	-	-	0	1089
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	-	1089
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1635	-	-	-	-	
HCM Lane V/C Ratio	-	-	-	-	-	
HCM Control Delay (s)	0	-	-	-	0	
HCM Lane LOS	A	-	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	-	

Queues

Future Background (2034) - with 4-lane George Bolton

3: Clarkway Drive/Humber Station Road & Mayfield Road

AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↰	↑↑↑	↰	↰	↑↑	↰	↰	↑	↰	↑↑
Traffic Volume (vph)	8	869	28	102	525	21	11	58	23	277
Future Volume (vph)	8	869	28	102	525	21	11	58	23	277
Lane Group Flow (vph)	8	905	29	106	547	22	11	283	24	297
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.02	0.28	0.03	0.29	0.25	0.02	0.08	0.79	0.28	0.46
Control Delay	7.8	7.6	2.2	10.9	7.7	1.4	37.7	49.1	48.1	42.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	7.6	2.2	10.9	7.7	1.4	37.7	49.1	48.1	42.9
Queue Length 50th (m)	0.6	27.3	0.0	8.8	23.2	0.0	2.3	49.9	6.0	38.7
Queue Length 95th (m)	2.8	44.1	3.1	23.8	40.5	2.0	7.1	74.8	14.9	51.5
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	521	3251	906	369	2148	1028	343	739	203	1531
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	0.02	0.28	0.03	0.29	0.25	0.02	0.03	0.38	0.12	0.19

Intersection Summary

Cycle Length: 120

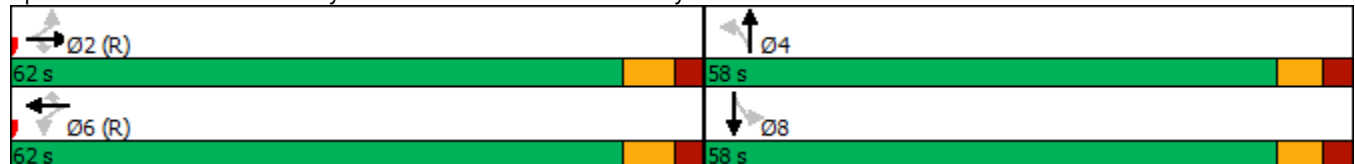
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	869	28	102	525	21	11	58	214	23	277	8
Future Volume (veh/h)	8	869	28	102	525	21	11	58	214	23	277	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1707	1707	1530	1796	1618	1752	1633	1870	1841	1767	1885	1900
Adj Flow Rate, veh/h	8	905	29	106	547	22	11	60	223	24	289	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	13	13	25	7	19	10	18	2	4	9	1	0
Cap, veh/h	512	3080	857	403	2032	981	203	76	284	119	783	22
Arrive On Green	0.66	0.66	0.66	0.66	0.66	0.66	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	769	4661	1296	592	3075	1485	945	347	1291	1035	3560	98
Grp Volume(v), veh/h	8	905	29	106	547	22	11	0	283	24	145	152
Grp Sat Flow(s),veh/h/ln	769	1554	1296	592	1537	1485	945	0	1638	1035	1791	1867
Q Serve(g_s), s	0.5	9.8	0.9	11.0	8.8	0.6	1.2	0.0	19.5	2.7	8.2	8.3
Cycle Q Clear(g_c), s	9.3	9.8	0.9	20.8	8.8	0.6	9.5	0.0	19.5	22.2	8.2	8.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.79	1.00		0.05
Lane Grp Cap(c), veh/h	512	3080	857	403	2032	981	203	0	360	119	394	411
V/C Ratio(X)	0.02	0.29	0.03	0.26	0.27	0.02	0.05	0.00	0.79	0.20	0.37	0.37
Avail Cap(c_a), veh/h	512	3080	857	403	2032	981	396	0	696	331	761	794
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	10.3	8.6	7.1	12.9	8.4	7.0	43.8	0.0	44.1	54.6	39.7	39.7
Incr Delay (d2), s/veh	0.1	0.2	0.1	1.6	0.3	0.0	0.1	0.0	3.8	0.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	0.5	0.1	0.0	0.2	0.0	5.4	0.5	2.4	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.4	8.8	7.1	14.5	8.7	7.0	43.9	0.0	47.9	55.4	40.3	40.3
LnGrp LOS	B	A	A	B	A	A	D	A	D	E	D	D
Approach Vol, veh/h	942		675				294		321			
Approach Delay, s/veh	8.8		9.6				47.8		41.4			
Approach LOS	A		A				D		D			
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	86.6		33.4		86.6		33.4					
Change Period (Y+Rc), s	* 7.3		* 7		* 7.3		* 7					
Max Green Setting (Gmax), s	* 55		* 51		* 55		* 51					
Max Q Clear Time (g_c+I1), s	11.8		21.5		22.8		24.2					
Green Ext Time (p_c), s	9.8		2.3		6.8		2.2					
Intersection Summary												
HCM 6th Ctrl Delay	18.8											
HCM 6th LOS	B											
Notes												

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	87	308	
Future Volume (vph)	87	308	
Lane Group Flow (vph)	87	308	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.03	0.09	
Control Delay	0.0	0.1	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.1	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3476	3614	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.03	0.09	

Intersection Summary

Cycle Length: 120

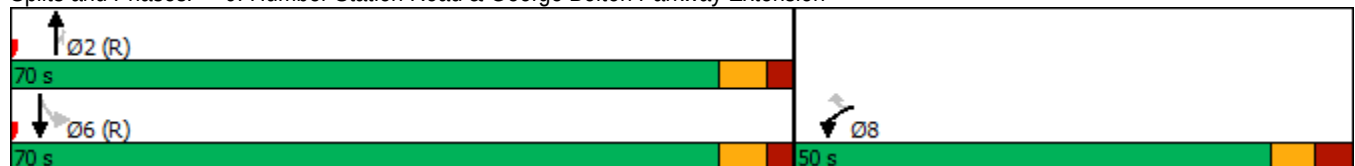
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2034) - with 4-lane George Bolton

9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	87	308	
Future Volume (vph)	87	308	
Lane Group Flow (vph)	87	308	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.03	0.09	
Control Delay	0.0	0.1	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.1	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3476	3614	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.03	0.09	

Intersection Summary

Cycle Length: 120

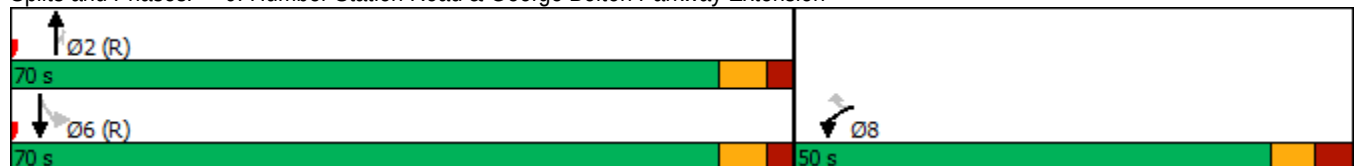
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary Future Background (2034) - with 4-lane George Bolton 9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	87	0	0	308
Future Volume (veh/h)	0	0	87	0	0	308
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1826	1900	1900	1885
Adj Flow Rate, veh/h	0	0	87	0	0	308
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	5	0	0	1
Cap, veh/h	2	1	3276	1520	60	3382
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	3561	1610	1331	3676
Grp Volume(v), veh/h	0	0	87	0	0	308
Grp Sat Flow(s),veh/h/ln	1810	1610	1735	1610	1331	1791
Q Serve(g_s), s	0.0	0.0	0.2	0.0	0.0	0.6
Cycle Q Clear(g_c), s	0.0	0.0	0.2	0.0	0.0	0.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	3276	1520	60	3382
V/C Ratio(X)	0.00	0.00	0.03	0.00	0.00	0.09
Avail Cap(c_a), veh/h	641	570	3276	1520	60	3382
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.2	0.0	0.0	0.3
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		87			308
Approach Delay, s/veh	0.0		0.2			0.3
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	2.2		2.6		0.0	
Green Ext Time (p_c), s	0.7		2.6		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.2			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
30: George Bolton Parkway Extension & Site Access 1

Future Background (2034) - with 4-lane George Bolton

AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1089
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1089
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1089
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1089
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Queues

Future Background (2034) - with 4-lane George Bolton

3: Clarkway Drive/Humber Station Road & Mayfield Road

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	10	695	19	135	650	42	59	304	11	69
Future Volume (vph)	10	695	19	135	650	42	59	304	11	69
Lane Group Flow (vph)	10	716	20	139	670	43	61	494	11	83
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.03	0.26	0.02	0.39	0.36	0.05	0.17	0.89	0.15	0.09
Control Delay	13.7	13.7	1.9	19.6	15.1	4.2	29.8	55.5	47.4	35.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	13.7	1.9	19.6	15.1	4.2	29.8	55.5	47.4	35.3
Queue Length 50th (m)	1.0	31.5	0.0	18.2	45.4	0.0	10.9	109.5	2.4	8.4
Queue Length 95th (m)	4.1	44.1	2.1	39.1	65.3	5.8	20.7	145.1	8.5	15.7
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	332	2703	846	358	1848	841	420	654	96	1276
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	0.03	0.26	0.02	0.39	0.36	0.05	0.15	0.76	0.11	0.07

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary Future Background (2034) - with 4-lane George Bolton 3: Clarkway Drive/Humber Station Road & Mayfield Road PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 			 	
Traffic Volume (veh/h)	10	695	19	135	650	42	59	304	176	11	69	12
Future Volume (veh/h)	10	695	19	135	650	42	59	304	176	11	69	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1604	1722	1737	1767	1693	1722	1722	1885	1841	1767	1885	1900
Adj Flow Rate, veh/h	10	716	20	139	670	43	61	313	181	11	71	12
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	20	12	11	9	14	12	12	1	4	9	1	0
Cap, veh/h	352	2697	845	399	1845	837	412	344	199	93	945	156
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	632	4701	1472	682	3216	1459	1211	1121	648	853	3077	508
Grp Volume(v), veh/h	10	716	20	139	670	43	61	0	494	11	41	42
Grp Sat Flow(s),veh/h/ln	632	1567	1472	682	1608	1459	1211	0	1769	853	1791	1794
Q Serve(g_s), s	1.0	9.2	0.7	15.5	13.5	1.6	4.5	0.0	32.2	1.5	1.9	2.0
Cycle Q Clear(g_c), s	14.5	9.2	0.7	24.7	13.5	1.6	6.5	0.0	32.2	33.7	1.9	2.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.37	1.00		0.28
Lane Grp Cap(c), veh/h	352	2697	845	399	1845	837	412	0	543	93	550	551
V/C Ratio(X)	0.03	0.27	0.02	0.35	0.36	0.05	0.15	0.00	0.91	0.12	0.07	0.08
Avail Cap(c_a), veh/h	352	2697	845	399	1845	837	474	0	634	137	642	643
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.7	12.9	11.1	19.1	13.8	11.2	31.8	0.0	40.0	56.2	29.5	29.5
Incr Delay (d2), s/veh	0.1	0.2	0.1	2.4	0.6	0.1	0.2	0.0	15.7	0.6	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.9	0.1	1.2	1.4	0.2	0.8	0.0	10.5	0.2	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.8	13.1	11.1	21.5	14.3	11.3	32.0	0.0	55.7	56.8	29.5	29.6
LnGrp LOS	B	B	B	C	B	B	C	A	E	E	C	C
Approach Vol, veh/h		746			852			555			94	
Approach Delay, s/veh		13.1			15.3			53.1			32.7	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		76.1		43.9		76.1		43.9				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 63		* 43		* 63		* 43				
Max Q Clear Time (g_c+I1), s		16.5		34.2		26.7		35.7				
Green Ext Time (p_c), s		7.4		2.6		8.7		0.2				
Intersection Summary												
HCM 6th Ctrl Delay				24.7								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	356	92	
Future Volume (vph)	356	92	
Lane Group Flow (vph)	356	92	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.10	0.03	
Control Delay	0.0	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	m0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3544	3579	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.10	0.03	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

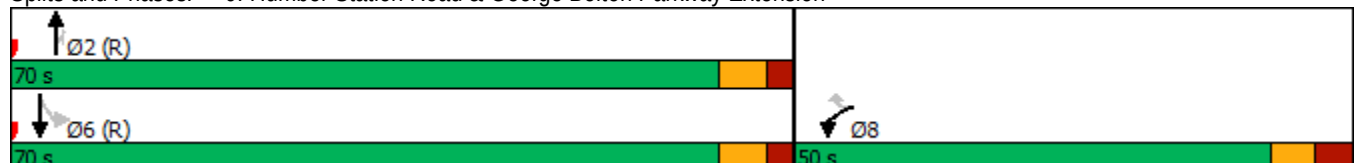
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

Future Background (2034) - with 4-lane George Bolton
9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour

	↑	↓	
Lane Group	NBT	SBT	Ø8
Lane Configurations	↑↑	↑↑	
Traffic Volume (vph)	356	92	
Future Volume (vph)	356	92	
Lane Group Flow (vph)	356	92	
Turn Type	NA	NA	
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	
Switch Phase			
Minimum Initial (s)	12.0	12.0	12.0
Minimum Split (s)	32.7	32.7	29.5
Total Split (s)	70.0	70.0	50.0
Total Split (%)	58.3%	58.3%	42%
Yellow Time (s)	4.2	4.2	4.0
All-Red Time (s)	2.5	2.5	3.5
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	6.7	6.7	
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
v/c Ratio	0.10	0.03	
Control Delay	0.0	0.0	
Queue Delay	0.0	0.0	
Total Delay	0.0	0.0	
Queue Length 50th (m)	0.0	0.0	
Queue Length 95th (m)	m0.0	0.0	
Internal Link Dist (m)	1542.4	1464.0	
Turn Bay Length (m)			
Base Capacity (vph)	3544	3579	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.10	0.03	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

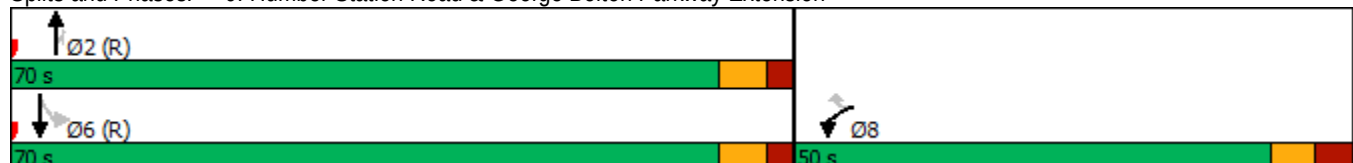
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary Future Background (2034) - with 4-lane George Bolton 9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	0	356	0	0	92
Future Volume (veh/h)	0	0	356	0	0	92
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1900	1900	1856	1900	1900	1870
Adj Flow Rate, veh/h	0	0	356	0	0	92
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	3	0	0	2
Cap, veh/h	2	1	3329	1520	60	3355
Arrive On Green	0.00	0.00	0.94	0.00	0.00	0.94
Sat Flow, veh/h	1810	1610	3618	1610	1042	3647
Grp Volume(v), veh/h	0	0	356	0	0	92
Grp Sat Flow(s),veh/h/ln	1810	1610	1763	1610	1042	1777
Q Serve(g_s), s	0.0	0.0	0.8	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.0	0.0	0.8	0.0	0.0	0.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	2	1	3329	1520	60	3355
V/C Ratio(X)	0.00	0.00	0.11	0.00	0.00	0.03
Avail Cap(c_a), veh/h	641	570	3329	1520	60	3355
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	0.0	0.2	0.0	0.0	0.2
Incr Delay (d2), s/veh	0.0	0.0	0.1	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	0.0	0.3	0.0	0.0	0.2
LnGrp LOS	A	A	A	A	A	A
Approach Vol, veh/h	0		356			92
Approach Delay, s/veh	0.0		0.3			0.2
Approach LOS			A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	120.0		120.0		0.0	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	2.8		2.2		0.0	
Green Ext Time (p_c), s	3.1		0.7		0.0	
Intersection Summary						
HCM 6th Ctrl Delay			0.3			
HCM 6th LOS			A			

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
30: George Bolton Parkway Extension & Site Access 1

Future Background (2034) - with 4-lane George Bolton

PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1089
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1089
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Lane Group

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Lane Group Flow (vph)

Sign Control

Intersection Summary

Control Type: Unsignalized

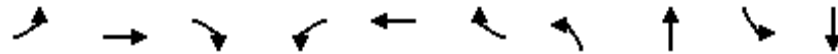
Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↔	↔↔		↔	↔
Traffic Vol, veh/h	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	0	0	0	0
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	1	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	0	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1027	1089
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	1027	1089
Mov Cap-2 Maneuver	-	-	-	-	1027	-
Stage 1	-	-	-	-	1027	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		0		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1635	-	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	-	0	0
HCM Lane LOS	A	-	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	-	-	-

Queues

Future Total (2029) - with 4-lane George Bolton

3: Clarkway Drive/Humber Station Road & Mayfield Road

AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	85	769	28	102	581	45	11	92	33	278
Future Volume (vph)	85	769	28	102	581	45	11	92	33	278
Lane Group Flow (vph)	89	801	29	106	605	47	11	306	34	322
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.19	0.27	0.03	0.28	0.29	0.05	0.11	0.67	0.29	0.78
Control Delay	10.8	9.5	2.6	12.5	10.0	3.0	36.2	34.0	37.2	50.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	9.5	2.6	12.5	10.0	3.0	36.2	34.0	37.2	50.7
Queue Length 50th (m)	7.9	27.7	0.0	10.1	30.8	0.0	2.2	45.5	6.9	80.7
Queue Length 95th (m)	19.5	42.8	3.4	25.1	50.0	5.1	7.0	70.6	18.3	108.9
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	474	2998	852	385	2051	979	192	767	224	783
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.27	0.03	0.28	0.29	0.05	0.06	0.40	0.15	0.41

Intersection Summary

Cycle Length: 120

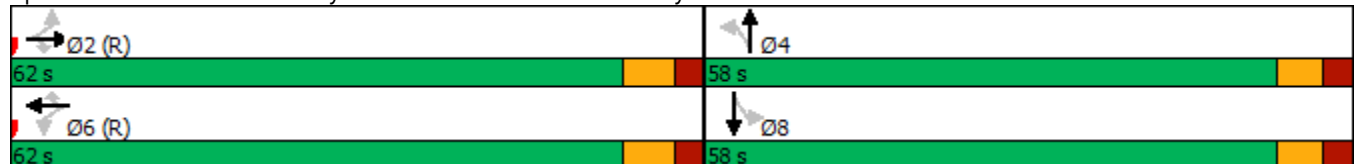
Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary Future Total (2029) - with 4-lane George Bolton 3: Clarkway Drive/Humber Station Road & Mayfield Road AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 				
Traffic Volume (veh/h)	85	769	28	102	581	45	11	92	202	33	278	31
Future Volume (veh/h)	85	769	28	102	581	45	11	92	202	33	278	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1678	1530	1796	1648	1767	1633	1856	1841	1722	1870	1707
Adj Flow Rate, veh/h	89	801	29	106	605	47	11	96	210	34	290	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	15	25	7	17	9	18	3	4	12	2	13
Cap, veh/h	470	2921	827	426	1997	955	136	126	275	130	402	44
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	743	4580	1296	652	3131	1497	924	518	1133	988	1655	183
Grp Volume(v), veh/h	89	801	29	106	605	47	11	0	306	34	0	322
Grp Sat Flow(s),veh/h/ln	743	1527	1296	652	1566	1497	924	0	1652	988	0	1837
Q Serve(g_s), s	7.3	9.2	1.0	10.2	10.4	1.4	1.3	0.0	20.7	4.0	0.0	19.3
Cycle Q Clear(g_c), s	17.7	9.2	1.0	19.4	10.4	1.4	20.6	0.0	20.7	24.6	0.0	19.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.69	1.00		0.10
Lane Grp Cap(c), veh/h	470	2921	827	426	1997	955	136	0	401	130	0	447
V/C Ratio(X)	0.19	0.27	0.04	0.25	0.30	0.05	0.08	0.00	0.76	0.26	0.00	0.72
Avail Cap(c_a), veh/h	470	2921	827	426	1997	955	304	0	702	310	0	781
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.7	9.5	8.0	13.8	9.8	8.1	51.2	0.0	42.2	53.6	0.0	41.7
Incr Delay (d2), s/veh	0.9	0.2	0.1	1.4	0.4	0.1	0.3	0.0	3.0	1.1	0.0	2.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.3	0.0	0.6	0.4	0.1	0.2	0.0	5.6	0.7	0.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.6	9.8	8.1	15.2	10.1	8.2	51.4	0.0	45.2	54.7	0.0	43.9
LnGrp LOS	B	A	A	B	B	A	D	A	D	D	A	D
Approach Vol, veh/h		919			758			317			356	
Approach Delay, s/veh		10.2			10.7			45.4			44.9	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.8		36.2		83.8		36.2				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 55		* 51		* 55		* 51				
Max Q Clear Time (g_c+I1), s		19.7		22.7		21.4		26.6				
Green Ext Time (p_c), s		9.3		2.5		7.4		2.5				
Intersection Summary												
HCM 6th Ctrl Delay				20.4								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	26	82	140	79	293
Future Volume (vph)	50	26	82	140	79	293
Lane Group Flow (vph)	50	26	82	140	79	293
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.33	0.16	0.05	0.11	0.08	0.19
Control Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Length 50th (m)	11.7	0.0	5.3	0.0	3.3	12.9
Queue Length 95th (m)	24.8	9.0	9.6	9.1	8.2	28.8
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	526	492	1506	1253	1008	1565
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.05	0.05	0.11	0.08	0.19

Intersection Summary

Cycle Length: 120

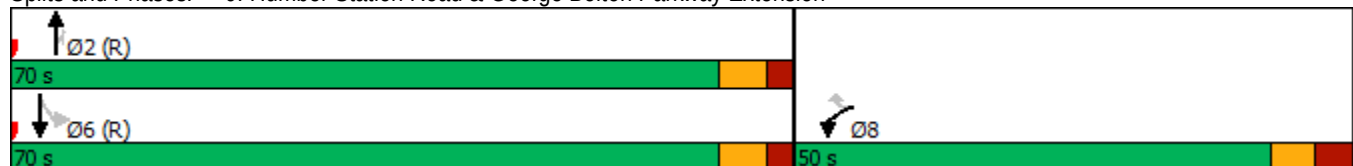
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029) - with 4-lane George Bolton

AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	50	26	82	140	79	293
Future Volume (vph)	50	26	82	140	79	293
Lane Group Flow (vph)	50	26	82	140	79	293
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.33	0.16	0.05	0.11	0.08	0.19
Control Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	19.9	3.7	1.9	3.3	3.3
Queue Length 50th (m)	11.7	0.0	5.3	0.0	3.3	12.9
Queue Length 95th (m)	24.8	9.0	9.6	9.1	8.2	28.8
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	526	492	1506	1253	1008	1565
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.05	0.05	0.11	0.08	0.19

Intersection Summary

Cycle Length: 120

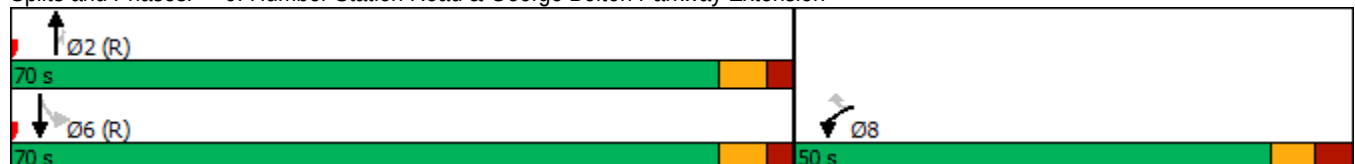
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



HCM 6th Signalized Intersection Summary Future Total (2029) - with 4-lane George Bolton 9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	50	26	82	140	79	293
Future Volume (veh/h)	50	26	82	140	79	293
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1604	1618	1826	1796	1781	1885
Adj Flow Rate, veh/h	50	26	82	140	79	293
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	20	19	5	7	8	1
Cap, veh/h	141	126	1442	1202	921	1489
Arrive On Green	0.09	0.09	0.79	0.79	0.79	0.79
Sat Flow, veh/h	1527	1372	1826	1522	1104	1885
Grp Volume(v), veh/h	50	26	82	140	79	293
Grp Sat Flow(s),veh/h/ln	1527	1372	1826	1522	1104	1885
Q Serve(g_s), s	3.7	2.1	1.2	2.6	2.0	4.6
Cycle Q Clear(g_c), s	3.7	2.1	1.2	2.6	3.2	4.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	141	126	1442	1202	921	1489
V/C Ratio(X)	0.36	0.21	0.06	0.12	0.09	0.20
Avail Cap(c_a), veh/h	541	486	1442	1202	921	1489
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.1	50.4	2.8	2.9	3.1	3.1
Incr Delay (d2), s/veh	1.5	0.8	0.1	0.2	0.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.6	0.0	0.1	0.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	52.7	51.2	2.9	3.1	3.3	3.4
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	76		222			372
Approach Delay, s/veh	52.2		3.0			3.4
Approach LOS	D		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	101.5		101.5		18.5	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	4.6		6.6		5.7	
Green Ext Time (p_c), s	1.3		2.8		0.3	
Intersection Summary						
HCM 6th Ctrl Delay			8.8			
HCM 6th LOS			A			



Lane Group	EBT	WBT	SBR
Lane Configurations			
Traffic Volume (vph)	98	34	42
Future Volume (vph)	98	34	42
Lane Group Flow (vph)	239	37	46
Sign Control	Free	Free	

Intersection Summary

Control Type: Unsignalized

HCM 6th TWSC
 30: George Bolton Parkway Extension & Site Access 1

Future Total (2029) - with 4-lane George Bolton

AM Peak Hour

Intersection						
Int Delay, s/veh	4.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑	↑
Traffic Vol, veh/h	121	98	34	0	0	42
Future Vol, veh/h	121	98	34	0	0	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	21	0	0	19
Mvmt Flow	132	107	37	0	0	46
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	37	0	-	0	355	19
Stage 1	-	-	-	-	37	-
Stage 2	-	-	-	-	318	-
Critical Hdwy	4.24	-	-	-	6.8	7.28
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.27	-	-	-	3.5	3.49
Pot Cap-1 Maneuver	1536	-	-	-	622	1002
Stage 1	-	-	-	-	987	-
Stage 2	-	-	-	-	716	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1536	-	-	-	565	1002
Mov Cap-2 Maneuver	-	-	-	-	565	-
Stage 1	-	-	-	-	897	-
Stage 2	-	-	-	-	716	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.2	0		8.8		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1536	-	-	-	-	1002
HCM Lane V/C Ratio	0.086	-	-	-	-	0.046
HCM Control Delay (s)	7.6	0.1	-	-	0	8.8
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	-	-	0.1



Lane Group	EBT	SBR
Lane Configurations		
Traffic Volume (vph)	0	34
Future Volume (vph)	0	34
Lane Group Flow (vph)	107	37
Sign Control	Free	

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	7.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕			↕
Traffic Vol, veh/h	98	0	0	0	0	34
Future Vol, veh/h	98	0	0	0	0	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	0	0	0	0	21
Mvmt Flow	107	0	0	0	0	37
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	1	0	-	0	-	1
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	4.24	-	-	-	-	7.32
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	2.27	-	-	-	-	3.51
Pot Cap-1 Maneuver	1585	-	-	-	0	1024
Stage 1	-	-	-	-	0	-
Stage 2	-	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1585	-	-	-	-	1024
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB	WB		SB		
HCM Control Delay, s	7.4	0		8.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1585	-	-	-	-	1024
HCM Lane V/C Ratio	0.067	-	-	-	-	0.036
HCM Control Delay (s)	7.4	0	-	-	-	8.6
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1

Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2029) - with 4-lane George Bolton

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations		  			 			 		 
Traffic Volume (vph)	45	704	19	135	847	54	59	295	40	114
Future Volume (vph)	45	704	19	135	847	54	59	295	40	114
Lane Group Flow (vph)	46	726	20	139	873	56	61	473	41	202
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.18	0.26	0.02	0.39	0.45	0.07	0.22	0.88	0.47	0.38
Control Delay	16.4	13.4	1.9	19.3	16.0	3.9	31.5	55.0	64.8	41.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	13.4	1.9	19.3	16.0	3.9	31.5	55.0	64.8	41.0
Queue Length 50th (m)	5.1	31.2	0.0	17.9	62.1	0.0	11.2	104.9	10.4	44.5
Queue Length 95th (m)	14.1	44.6	2.1	39.4	89.0	6.5	21.3	137.7	21.8	64.5
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	250	2757	854	358	1935	833	340	646	106	629
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	0.18	0.26	0.02	0.39	0.45	0.07	0.18	0.73	0.39	0.32

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary Future Total (2029) - with 4-lane George Bolton 3: Clarkway Drive/Humber Station Road & Mayfield Road PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 				
Traffic Volume (veh/h)	45	704	19	135	847	54	59	295	164	40	114	81
Future Volume (veh/h)	45	704	19	135	847	54	59	295	164	40	114	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1574	1737	1737	1767	1752	1678	1722	1856	1841	1752	1841	1767
Adj Flow Rate, veh/h	46	726	20	139	873	56	61	304	169	41	118	84
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	22	11	11	9	10	15	12	3	4	10	4	9
Cap, veh/h	264	2653	824	384	1862	796	311	360	200	119	321	229
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	507	4742	1472	675	3328	1422	1087	1121	623	862	1000	712
Grp Volume(v), veh/h	46	726	20	139	873	56	61	0	473	41	0	202
Grp Sat Flow(s),veh/h/ln	507	1581	1472	675	1664	1422	1087	0	1743	862	0	1713
Q Serve(g_s), s	7.2	9.6	0.7	16.2	18.8	2.2	5.5	0.0	30.3	5.6	0.0	10.9
Cycle Q Clear(g_c), s	25.9	9.6	0.7	25.7	18.8	2.2	16.4	0.0	30.3	35.9	0.0	10.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.36	1.00		0.42
Lane Grp Cap(c), veh/h	264	2653	824	384	1862	796	311	0	560	119	0	550
V/C Ratio(X)	0.17	0.27	0.02	0.36	0.47	0.07	0.20	0.00	0.84	0.34	0.00	0.37
Avail Cap(c_a), veh/h	264	2653	824	384	1862	796	351	0	625	151	0	614
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	23.5	13.7	11.8	20.4	15.8	12.1	37.6	0.0	37.9	54.6	0.0	31.3
Incr Delay (d2), s/veh	1.4	0.3	0.1	2.6	0.8	0.2	0.3	0.0	9.5	1.7	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	1.0	0.1	1.3	2.2	0.2	1.0	0.0	8.8	0.9	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.0	14.0	11.9	23.1	16.6	12.3	37.9	0.0	47.4	56.3	0.0	31.7
LnGrp LOS	C	B	B	C	B	B	D	A	D	E	A	C
Approach Vol, veh/h		792			1068			534			243	
Approach Delay, s/veh		14.6			17.2			46.3			35.9	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		74.4		45.6		74.4		45.6				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 63		* 43		* 63		* 43				
Max Q Clear Time (g_c+I1), s		27.9		32.3		27.7		37.9				
Green Ext Time (p_c), s		8.0		2.9		11.3		0.7				
Intersection Summary												
HCM 6th Ctrl Delay				24.1								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	148	75	329	65	37	89
Future Volume (vph)	148	75	329	65	37	89
Lane Group Flow (vph)	148	75	329	65	37	89
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.65	0.28	0.24	0.07	0.06	0.06
Control Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Length 50th (m)	35.3	0.0	32.6	1.2	2.5	5.9
Queue Length 95th (m)	54.9	13.3	62.9	m7.5	7.7	14.4
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	567	1383	978	629	1396
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.13	0.24	0.07	0.06	0.06

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

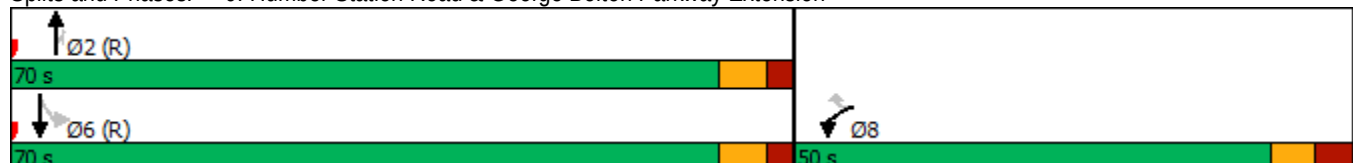
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2029) - with 4-lane George Bolton

PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	148	75	329	65	37	89
Future Volume (vph)	148	75	329	65	37	89
Lane Group Flow (vph)	148	75	329	65	37	89
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.65	0.28	0.24	0.07	0.06	0.06
Control Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	12.1	10.1	5.9	6.3	5.8
Queue Length 50th (m)	35.3	0.0	32.6	1.2	2.5	5.9
Queue Length 95th (m)	54.9	13.3	62.9	m7.5	7.7	14.4
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	567	1383	978	629	1396
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.13	0.24	0.07	0.06	0.06

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

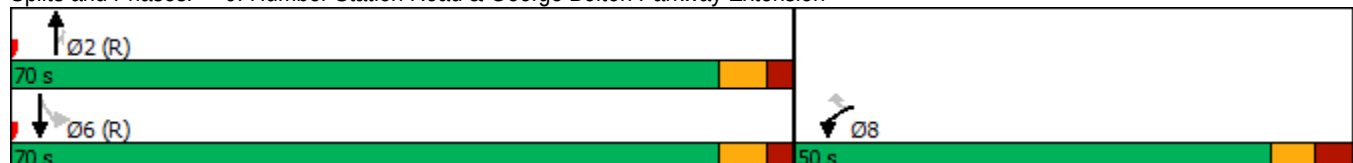
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



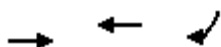
HCM 6th Signalized Intersection Summary Future Total (2029) - with 4-lane George Bolton

9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↶	↷	↰	↶
Traffic Volume (veh/h)	148	75	329	65	37	89
Future Volume (veh/h)	148	75	329	65	37	89
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1752	1767	1856	1559	1544	1870
Adj Flow Rate, veh/h	148	75	329	65	37	89
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	9	3	23	24	2
Cap, veh/h	187	167	1429	1017	685	1440
Arrive On Green	0.11	0.11	0.77	0.77	0.77	0.77
Sat Flow, veh/h	1668	1497	1856	1321	868	1870
Grp Volume(v), veh/h	148	75	329	65	37	89
Grp Sat Flow(s),veh/h/ln	1668	1497	1856	1321	868	1870
Q Serve(g_s), s	10.4	5.6	6.0	1.4	1.5	1.4
Cycle Q Clear(g_c), s	10.4	5.6	6.0	1.4	7.4	1.4
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	187	167	1429	1017	685	1440
V/C Ratio(X)	0.79	0.45	0.23	0.06	0.05	0.06
Avail Cap(c_a), veh/h	591	530	1429	1017	685	1440
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	49.8	3.9	3.3	4.9	3.3
Incr Delay (d2), s/veh	7.4	1.9	0.4	0.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	1.6	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	59.4	51.7	4.2	3.5	5.1	3.4
LnGrp LOS	E	D	A	A	A	A
Approach Vol, veh/h	223		394			126
Approach Delay, s/veh	56.8		4.1			3.9
Approach LOS	E		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	99.1		99.1		20.9	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	8.0		9.4		12.4	
Green Ext Time (p_c), s	3.0		0.9		1.0	
Intersection Summary						
HCM 6th Ctrl Delay			19.9			
HCM 6th LOS			B			



Lane Group	EBT	WBT	SBR
Lane Configurations	↔↑	↑↔	↗
Traffic Volume (vph)	46	100	123
Future Volume (vph)	46	100	123
Lane Group Flow (vph)	111	109	134
Sign Control	Free	Free	

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	4.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕	↕
Traffic Vol, veh/h	56	46	100	0	0	123
Future Vol, veh/h	56	46	100	0	0	123
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	24	10	0	0	10
Mvmt Flow	61	50	109	0	0	134
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	109	0	-	0	256	55
Stage 1	-	-	-	-	109	-
Stage 2	-	-	-	-	147	-
Critical Hdwy	4.56	-	-	-	6.8	7.1
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.43	-	-	-	3.5	3.4
Pot Cap-1 Maneuver	1338	-	-	-	716	975
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	871	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1338	-	-	-	682	975
Mov Cap-2 Maneuver	-	-	-	-	682	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	871	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.3	0		9.3		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1338	-	-	-	-	975
HCM Lane V/C Ratio	0.045	-	-	-	-	0.137
HCM Control Delay (s)	7.8	0.1	-	-	0	9.3
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	-	-	0.5



Lane Group	EBT	SBR
Lane Configurations		
Traffic Volume (vph)	0	100
Future Volume (vph)	0	100
Lane Group Flow (vph)	50	109
Sign Control	Free	

Intersection Summary

Control Type: Unsignalized

Intersection

Int Delay, s/veh 8.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑	↔↑			↔↑
Traffic Vol, veh/h	46	0	0	0	0	100
Future Vol, veh/h	46	0	0	0	0	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	24	0	0	0	0	10
Mvmt Flow	50	0	0	0	0	109

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	1	0	0
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	4.58	-	-
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	2.44	-	-
Pot Cap-1 Maneuver	1474	-	0
Stage 1	-	-	0
Stage 2	-	-	0
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1474	-	-
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	7.5	0	8.8
HCM LOS			A

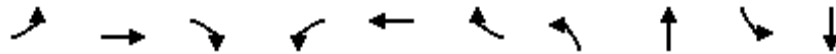
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1474	-	-	-	1057
HCM Lane V/C Ratio	0.034	-	-	-	0.103
HCM Control Delay (s)	7.5	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

Phasings

Future Total (2034) - with 4-lane George Bolton

3: Clarkway Drive/Humber Station Road & Mayfield Road

AM Peak Hour



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Protected Phases	2		6		6		4		8	
Permitted Phases	2		2	6		6	4		8	
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.5	27.5	27.5	26.0	26.0	27.5	27.5
Total Split (s)	62.0	62.0	62.0	62.0	62.0	62.0	58.0	58.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Maximum Green (s)	54.7	54.7	54.7	54.7	54.7	54.7	51.0	51.0	51.0	51.0
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lead/Lag										
Lead-Lag Optimize?										
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
Walk Time (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Flash Dont Walk (s)	8.0	8.0	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0
90th %ile Green (s)	71.0	71.0	71.0	71.0	71.0	71.0	34.7	34.7	34.7	34.7
90th %ile Term Code	Coord	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Hold	Hold
70th %ile Green (s)	76.9	76.9	76.9	76.9	76.9	76.9	28.8	28.8	28.8	28.8
70th %ile Term Code	Coord	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Hold	Hold
50th %ile Green (s)	81.1	81.1	81.1	81.1	81.1	81.1	24.6	24.6	24.6	24.6
50th %ile Term Code	Coord	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Hold	Hold
30th %ile Green (s)	85.2	85.2	85.2	85.2	85.2	85.2	20.5	20.5	20.5	20.5
30th %ile Term Code	Coord	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Hold	Hold
10th %ile Green (s)	91.1	91.1	91.1	91.1	91.1	91.1	14.6	14.6	14.6	14.6
10th %ile Term Code	Coord	Coord	Coord	Coord	Coord	Coord	Gap	Gap	Hold	Hold

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Control Type: Actuated-Coordinated

HCM 6th Signalized Intersection Summary Future Total (2034) - with 4-lane George Bolton 3: Clarkway Drive/Humber Station Road & Mayfield Road AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	869	28	102	525	21	11	97	214	23	293	31
Future Volume (veh/h)	85	869	28	102	525	21	11	97	214	23	293	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1781	1707	1530	1796	1618	1752	1633	1856	1841	1767	1870	1707
Adj Flow Rate, veh/h	89	905	29	106	547	22	11	101	223	24	305	32
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	8	13	25	7	19	10	18	3	4	9	2	13
Cap, veh/h	507	2965	825	385	1956	944	211	126	278	120	795	83
Arrive On Green	0.64	0.64	0.64	0.64	0.64	0.64	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	803	4661	1296	592	3075	1485	911	515	1136	997	3248	338
Grp Volume(v), veh/h	89	905	29	106	547	22	11	0	324	24	166	171
Grp Sat Flow(s),veh/h/ln	803	1554	1296	592	1537	1485	911	0	1651	997	1777	1809
Q Serve(g_s), s	6.6	10.5	1.0	11.8	9.4	0.7	1.2	0.0	22.1	2.8	9.3	9.5
Cycle Q Clear(g_c), s	16.1	10.5	1.0	22.3	9.4	0.7	10.7	0.0	22.1	24.9	9.3	9.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.69	1.00		0.19
Lane Grp Cap(c), veh/h	507	2965	825	385	1956	944	211	0	404	120	435	443
V/C Ratio(X)	0.18	0.31	0.04	0.28	0.28	0.02	0.05	0.00	0.80	0.20	0.38	0.39
Avail Cap(c_a), veh/h	507	2965	825	385	1956	944	375	0	702	300	755	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.2	9.9	8.1	14.9	9.7	8.1	42.3	0.0	42.6	54.3	37.8	37.8
Incr Delay (d2), s/veh	0.8	0.3	0.1	1.8	0.4	0.0	0.1	0.0	3.7	0.8	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.4	0.0	0.7	0.4	0.0	0.2	0.0	6.0	0.5	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.0	10.1	8.2	16.7	10.0	8.1	42.4	0.0	46.3	55.1	38.3	38.4
LnGrp LOS	B	B	A	B	B	A	D	A	D	E	D	D
Approach Vol, veh/h		1023			675			335			361	
Approach Delay, s/veh		10.4			11.0			46.2			39.5	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		83.6		36.4		83.6		36.4				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 55		* 51		* 55		* 51				
Max Q Clear Time (g_c+I1), s		18.1		24.1		24.3		26.9				
Green Ext Time (p_c), s		10.6		2.6		6.7		2.4				
Intersection Summary												
HCM 6th Ctrl Delay				20.0								
HCM 6th LOS				B								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

Lanes, Volumes, Timings

Future Total (2034) - with 4-lane George Bolton

9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	40	12	87	116	35	308
Future Volume (vph)	40	12	87	116	35	308
Lane Group Flow (vph)	40	12	87	116	35	308
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.27	0.08	0.03	0.09	0.04	0.10
Control Delay	55.1	24.3	3.4	1.7	1.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	24.3	3.4	1.7	1.9	1.8
Queue Length 50th (m)	9.3	0.0	2.8	0.0	1.2	6.1
Queue Length 95th (m)	20.9	6.3	4.1	6.4	2.1	6.1
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	526	491	2868	1252	992	2981
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.02	0.03	0.09	0.04	0.10

Intersection Summary

Cycle Length: 120

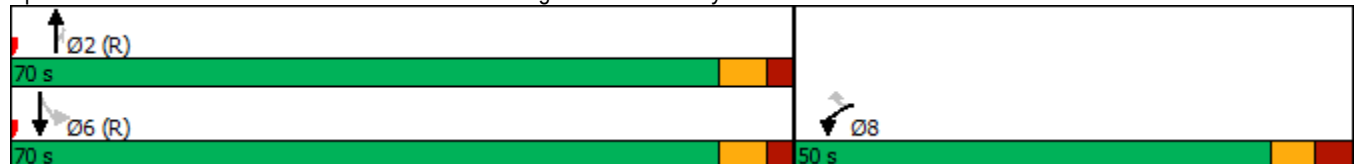
Actuated Cycle Length: 120

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

Natural Cycle: 65

Control Type: Actuated-Coordinated

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Phasings

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2034) - with 4-lane George Bolton

AM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Maximum Green (s)	42.5	42.5	63.3	63.3	63.3	63.3
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	15.0	15.0	19.0	19.0	19.0	19.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
90th %ile Green (s)	12.1	12.1	93.7	93.7	93.7	93.7
90th %ile Term Code	Gap	Gap	Coord	Coord	Coord	Coord
70th %ile Green (s)	12.0	12.0	93.8	93.8	93.8	93.8
70th %ile Term Code	Min	Min	Coord	Coord	Coord	Coord
50th %ile Green (s)	12.0	12.0	93.8	93.8	93.8	93.8
50th %ile Term Code	Min	Min	Coord	Coord	Coord	Coord
30th %ile Green (s)	12.0	12.0	93.8	93.8	93.8	93.8
30th %ile Term Code	Min	Min	Coord	Coord	Coord	Coord
10th %ile Green (s)	0.0	0.0	113.3	113.3	113.3	113.3
10th %ile Term Code	Skip	Skip	Coord	Coord	Coord	Coord

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

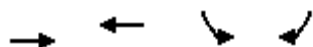
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Control Type: Actuated-Coordinated

HCM 6th Signalized Intersection Summary Future Total (2034) - with 4-lane George Bolton 9: Humber Station Road & George Bolton Parkway Extension

AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	12	87	116	35	308
Future Volume (veh/h)	40	12	87	116	35	308
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1604	1648	1826	1796	1767	1885
Adj Flow Rate, veh/h	40	12	87	116	35	308
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	20	17	5	7	9	1
Cap, veh/h	126	115	2773	1217	945	2863
Arrive On Green	0.08	0.08	0.80	0.80	0.80	0.80
Sat Flow, veh/h	1527	1397	3561	1522	1114	3676
Grp Volume(v), veh/h	40	12	87	116	35	308
Grp Sat Flow(s),veh/h/ln	1527	1397	1735	1522	1114	1791
Q Serve(g_s), s	3.0	1.0	0.6	2.0	0.8	2.3
Cycle Q Clear(g_c), s	3.0	1.0	0.6	2.0	1.4	2.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	126	115	2773	1217	945	2863
V/C Ratio(X)	0.32	0.10	0.03	0.10	0.04	0.11
Avail Cap(c_a), veh/h	541	495	2773	1217	945	2863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	51.0	2.5	2.6	2.6	2.6
Incr Delay (d2), s/veh	1.4	0.4	0.0	0.2	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.3	0.0	0.1	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	53.3	51.4	2.5	2.8	2.7	2.7
LnGrp LOS	D	D	A	A	A	A
Approach Vol, veh/h	52		203			343
Approach Delay, s/veh	52.9		2.7			2.7
Approach LOS	D		A			A
Timer - Assigned Phs	2		6		8	
Phs Duration (G+Y+Rc), s	102.6		102.6		17.4	
Change Period (Y+Rc), s	6.7		6.7		7.5	
Max Green Setting (Gmax), s	63.3		63.3		42.5	
Max Q Clear Time (g_c+l1), s	4.0		4.3		5.0	
Green Ext Time (p_c), s	1.3		2.8		0.2	
Intersection Summary						
HCM 6th Ctrl Delay			7.1			
HCM 6th LOS			A			

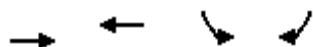


Lane Group	EBT	WBT	SBL	SBR
Lane Configurations				
Traffic Volume (vph)	68	24	13	29
Future Volume (vph)	68	24	13	29
Lane Group Flow (vph)	164	67	14	32
Sign Control	Free	Free	Stop	

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	4.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑	↔↑		↔	↔
Traffic Vol, veh/h	83	68	24	38	13	29
Future Vol, veh/h	83	68	24	38	13	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	7	21	8	23	21
Mvmt Flow	90	74	26	41	14	32
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	67	0	-	0	264	34
Stage 1	-	-	-	-	47	-
Stage 2	-	-	-	-	217	-
Critical Hdwy	4.24	-	-	-	7.26	7.32
Critical Hdwy Stg 1	-	-	-	-	6.26	-
Critical Hdwy Stg 2	-	-	-	-	6.26	-
Follow-up Hdwy	2.27	-	-	-	3.73	3.51
Pot Cap-1 Maneuver	1497	-	-	-	648	973
Stage 1	-	-	-	-	911	-
Stage 2	-	-	-	-	739	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1497	-	-	-	607	973
Mov Cap-2 Maneuver	-	-	-	-	607	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	739	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.2	0		9.5		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1497	-	-	-	607	973
HCM Lane V/C Ratio	0.06	-	-	-	0.023	0.032
HCM Control Delay (s)	7.6	0.1	-	-	11.1	8.8
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.1



Lane Group	EBT	WBT	SBL	SBR
Lane Configurations				
Traffic Volume (vph)	13	38	11	24
Future Volume (vph)	13	38	11	24
Lane Group Flow (vph)	88	74	12	26
Sign Control	Free	Free	Stop	

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	4.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	13	38	30	11	24
Future Vol, veh/h	68	13	38	30	11	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	7	23	8	7	18	21
Mvmt Flow	74	14	41	33	12	26
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	74	0	-	0	213	37
Stage 1	-	-	-	-	58	-
Stage 2	-	-	-	-	155	-
Critical Hdwy	4.24	-	-	-	7.16	7.32
Critical Hdwy Stg 1	-	-	-	-	6.16	-
Critical Hdwy Stg 2	-	-	-	-	6.16	-
Follow-up Hdwy	2.27	-	-	-	3.68	3.51
Pot Cap-1 Maneuver	1488	-	-	-	713	969
Stage 1	-	-	-	-	912	-
Stage 2	-	-	-	-	811	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1488	-	-	-	677	969
Mov Cap-2 Maneuver	-	-	-	-	677	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	811	-
Approach	EB	WB		SB		
HCM Control Delay, s	6.3	0		9.3		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1488	-	-	-	677	969
HCM Lane V/C Ratio	0.05	-	-	-	0.018	0.027
HCM Control Delay (s)	7.5	0	-	-	10.4	8.8
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1	0.1

Queues

3: Clarkway Drive/Humber Station Road & Mayfield Road

Future Total (2034) - with 4-lane George Bolton

PM Peak Hour

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations										
Traffic Volume (vph)	45	695	19	135	650	42	59	322	11	117
Future Volume (vph)	45	695	19	135	650	42	59	322	11	117
Lane Group Flow (vph)	46	716	20	139	670	43	61	513	11	205
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2			6			4		8
Permitted Phases	2		2	6		6	4		8	
Detector Phase	2	2	2	6	6	6	4	4	8	8
Switch Phase										
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0	8.0	8.0	8.0	8.0
Minimum Split (s)	27.3	27.3	27.3	27.3	27.3	27.3	26.0	26.0	26.0	26.0
Total Split (s)	70.0	70.0	70.0	70.0	70.0	70.0	50.0	50.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.6	4.6	4.6	4.6	4.6	4.6	4.2	4.2	4.2	4.2
All-Red Time (s)	2.7	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.3	7.3	7.3	7.3	7.3	7.3	7.0	7.0	7.0	7.0
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None
v/c Ratio	0.14	0.27	0.02	0.40	0.37	0.05	0.19	0.89	0.14	0.19
Control Delay	15.8	14.4	1.9	20.5	15.8	4.3	29.6	55.8	41.0	29.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	14.4	1.9	20.5	15.8	4.3	29.6	55.8	41.0	29.1
Queue Length 50th (m)	5.3	32.6	0.0	18.9	47.0	0.0	10.8	113.8	2.6	18.5
Queue Length 95th (m)	13.2	44.1	2.1	39.2	65.3	5.8	21.0	153.3	7.7	25.8
Internal Link Dist (m)		1635.6			199.2			1951.8		1542.4
Turn Bay Length (m)	150.0		105.0	150.0		115.0	75.0		105.0	
Base Capacity (vph)	318	2650	830	350	1812	825	374	650	93	1212
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	0.27	0.02	0.40	0.37	0.05	0.16	0.79	0.12	0.17

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

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

Natural Cycle: 55

Control Type: Actuated-Coordinated

Splits and Phases: 3: Clarkway Drive/Humber Station Road & Mayfield Road



HCM 6th Signalized Intersection Summary Future Total (2034) - with 4-lane George Bolton 3: Clarkway Drive/Humber Station Road & Mayfield Road PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		  			 			 			 	
Traffic Volume (veh/h)	45	695	19	135	650	42	59	322	176	11	117	81
Future Volume (veh/h)	45	695	19	135	650	42	59	322	176	11	117	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1574	1722	1737	1767	1693	1722	1722	1870	1841	1767	1841	1767
Adj Flow Rate, veh/h	46	716	20	139	670	43	61	332	181	11	121	84
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	22	12	11	9	14	12	12	2	4	9	4	9
Cap, veh/h	338	2647	829	390	1811	822	354	362	197	91	647	418
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	620	4701	1472	682	3216	1459	1084	1138	621	838	2036	1316
Grp Volume(v), veh/h	46	716	20	139	670	43	61	0	513	11	103	102
Grp Sat Flow(s),veh/h/ln	620	1567	1472	682	1608	1459	1084	0	1759	838	1749	1604
Q Serve(g_s), s	5.3	9.4	0.7	15.8	13.8	1.6	5.2	0.0	33.7	1.5	5.1	5.6
Cycle Q Clear(g_c), s	19.1	9.4	0.7	25.3	13.8	1.6	10.8	0.0	33.7	35.2	5.1	5.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.35	1.00		0.82
Lane Grp Cap(c), veh/h	338	2647	829	390	1811	822	354	0	559	91	556	510
V/C Ratio(X)	0.14	0.27	0.02	0.36	0.37	0.05	0.17	0.00	0.92	0.12	0.18	0.20
Avail Cap(c_a), veh/h	338	2647	829	390	1811	822	398	0	630	125	627	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.7	13.5	11.6	20.0	14.5	11.8	33.8	0.0	39.4	56.4	29.7	29.8
Incr Delay (d2), s/veh	0.8	0.3	0.1	2.5	0.6	0.1	0.2	0.0	17.3	0.6	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	0.1	1.3	1.5	0.2	0.9	0.0	11.0	0.2	1.3	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	13.8	11.7	22.6	15.1	11.9	34.0	0.0	56.8	57.0	29.8	30.0
LnGrp LOS	C	B	B	C	B	B	C	A	E	E	C	C
Approach Vol, veh/h		782			852			574			216	
Approach Delay, s/veh		14.1			16.1			54.3			31.3	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		74.9		45.1		74.9		45.1				
Change Period (Y+Rc), s		* 7.3		* 7		* 7.3		* 7				
Max Green Setting (Gmax), s		* 63		* 43		* 63		* 43				
Max Q Clear Time (g_c+I1), s		21.1		35.7		27.3		37.2				
Green Ext Time (p_c), s		7.9		2.4		8.7		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				25.9								
HCM 6th LOS				C								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	36	356	54	16	92
Future Volume (vph)	119	36	356	54	16	92
Lane Group Flow (vph)	119	36	356	54	16	92
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.59	0.17	0.13	0.05	0.03	0.03
Control Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Length 50th (m)	28.5	0.0	17.4	1.4	0.5	1.4
Queue Length 95th (m)	46.3	9.7	m31.8	m5.0	3.3	5.9
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	532	2683	988	613	2709
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.13	0.05	0.03	0.03

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

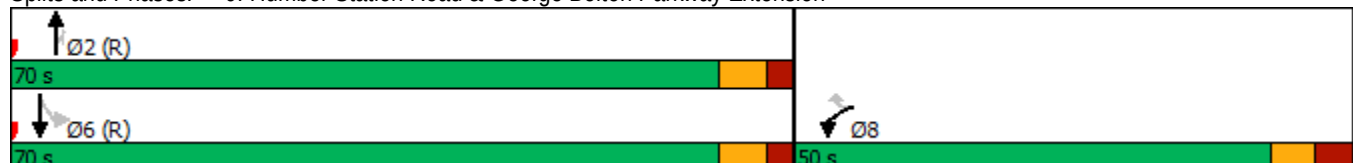
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension



Queues

9: Humber Station Road & George Bolton Parkway Extension

Future Total (2034) - with 4-lane George Bolton

PM Peak Hour

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	119	36	356	54	16	92
Future Volume (vph)	119	36	356	54	16	92
Lane Group Flow (vph)	119	36	356	54	16	92
Turn Type	Prot	Perm	NA	Perm	Perm	NA
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	12.0	12.0	12.0	12.0	12.0	12.0
Minimum Split (s)	29.5	29.5	32.7	32.7	32.7	32.7
Total Split (s)	50.0	50.0	70.0	70.0	70.0	70.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	58.3%
Yellow Time (s)	4.0	4.0	4.2	4.2	4.2	4.2
All-Red Time (s)	3.5	3.5	2.5	2.5	2.5	2.5
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	6.7	6.7	6.7	6.7
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.59	0.17	0.13	0.05	0.03	0.03
Control Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.2	15.6	8.7	5.7	4.8	3.9
Queue Length 50th (m)	28.5	0.0	17.4	1.4	0.5	1.4
Queue Length 95th (m)	46.3	9.7	m31.8	m5.0	3.3	5.9
Internal Link Dist (m)	339.3		1542.4			1464.0
Turn Bay Length (m)	30.0			30.0	50.0	
Base Capacity (vph)	574	532	2683	988	613	2709
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.07	0.13	0.05	0.03	0.03

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

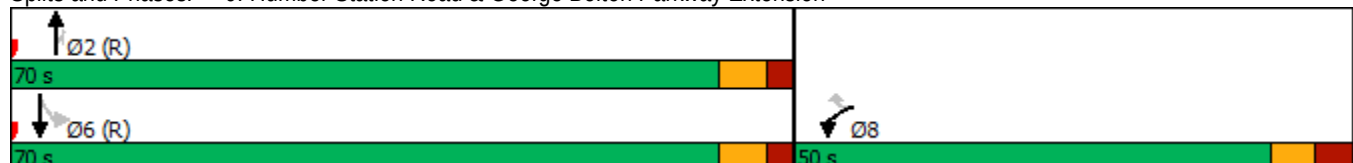
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

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

Splits and Phases: 9: Humber Station Road & George Bolton Parkway Extension

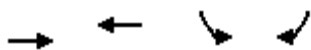


HCM 6th Signalized Intersection Summary Future Total (2034) - with 4-lane George Bolton 9: Humber Station Road & George Bolton Parkway Extension

PM Peak Hour



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	119	36	356	54	16	92
Future Volume (veh/h)	119	36	356	54	16	92
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1752	1737	1856	1544	1530	1870
Adj Flow Rate, veh/h	119	36	356	54	16	92
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	11	3	24	25	2
Cap, veh/h	166	146	2758	1024	695	2780
Arrive On Green	0.10	0.10	0.78	0.78	0.78	0.78
Sat Flow, veh/h	1668	1472	3618	1309	838	3647
Grp Volume(v), veh/h	119	36	356	54	16	92
Grp Sat Flow(s),veh/h/ln	1668	1472	1763	1309	838	1777
Q Serve(g_s), s	8.3	2.7	2.9	1.1	0.6	0.7
Cycle Q Clear(g_c), s	8.3	2.7	2.9	1.1	3.5	0.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	166	146	2758	1024	695	2780
V/C Ratio(X)	0.72	0.25	0.13	0.05	0.02	0.03
Avail Cap(c_a), veh/h	591	521	2758	1024	695	2780
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	49.9	3.2	3.0	3.6	2.9
Incr Delay (d2), s/veh	5.7	0.9	0.1	0.1	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.8	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	58.1	50.7	3.3	3.1	3.6	2.9
LnGrp LOS	E	D	A	A	A	A
Approach Vol, veh/h	155		410			108
Approach Delay, s/veh	56.4		3.2			3.0
Approach LOS	E		A			A
Timer - Assigned Phs		2			6	8
Phs Duration (G+Y+Rc), s		100.6			100.6	19.4
Change Period (Y+Rc), s		6.7			6.7	7.5
Max Green Setting (Gmax), s		63.3			63.3	42.5
Max Q Clear Time (g_c+l1), s		4.9			5.5	10.3
Green Ext Time (p_c), s		3.4			0.9	0.7
Intersection Summary						
HCM 6th Ctrl Delay			15.4			
HCM 6th LOS			B			

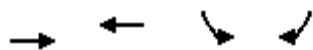


Lane Group	EBT	WBT	SBL	SBR
Lane Configurations				
Traffic Volume (vph)	31	69	38	84
Future Volume (vph)	31	69	38	84
Lane Group Flow (vph)	76	93	41	91
Sign Control	Free	Free	Stop	

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	5.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↑↑	↔↑↑		↔↓	↔↓
Traffic Vol, veh/h	39	31	69	17	38	84
Future Vol, veh/h	39	31	69	17	38	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	23	10	24	11	10
Mvmt Flow	42	34	75	18	41	91
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	93	0	-	0	185	47
Stage 1	-	-	-	-	84	-
Stage 2	-	-	-	-	101	-
Critical Hdwy	4.56	-	-	-	7.02	7.1
Critical Hdwy Stg 1	-	-	-	-	6.02	-
Critical Hdwy Stg 2	-	-	-	-	6.02	-
Follow-up Hdwy	2.43	-	-	-	3.61	3.4
Pot Cap-1 Maneuver	1359	-	-	-	762	987
Stage 1	-	-	-	-	904	-
Stage 2	-	-	-	-	886	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1359	-	-	-	738	987
Mov Cap-2 Maneuver	-	-	-	-	738	-
Stage 1	-	-	-	-	876	-
Stage 2	-	-	-	-	886	-
Approach	EB	WB		SB		
HCM Control Delay, s	4.3	0		9.4		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1359	-	-	-	738	987
HCM Lane V/C Ratio	0.031	-	-	-	0.056	0.093
HCM Control Delay (s)	7.7	0	-	-	10.2	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.3

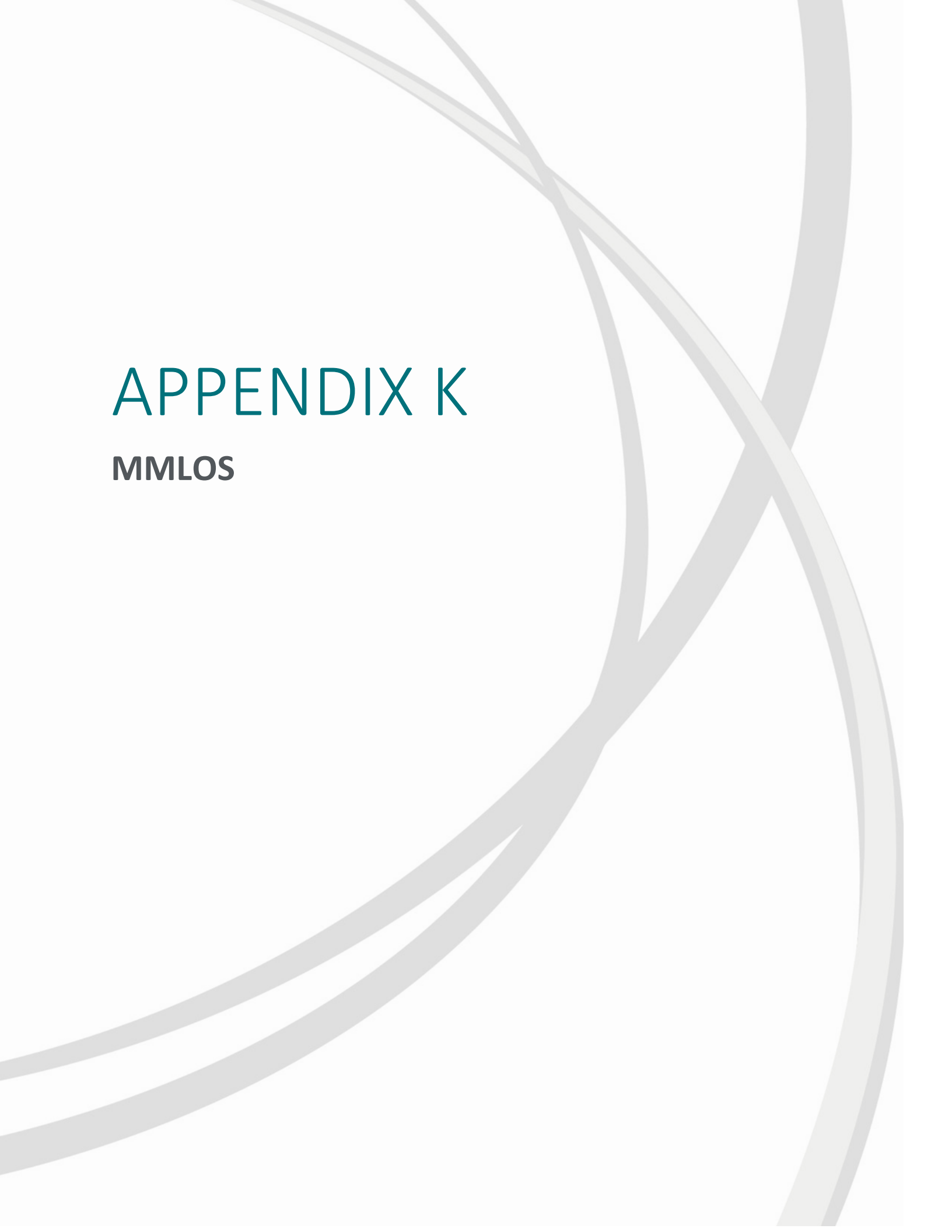


Lane Group	EBT	WBT	SBL	SBR
Lane Configurations	↔↔	↔↔	↔	↔
Traffic Volume (vph)	38	17	31	69
Future Volume (vph)	38	17	31	69
Lane Group Flow (vph)	75	33	34	75
Sign Control	Free	Free	Stop	

Intersection Summary

Control Type: Unsignalized

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔↕	↕↔		↕	↕
Traffic Vol, veh/h	31	38	17	14	31	69
Future Vol, veh/h	31	38	17	14	31	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	30	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	23	11	24	21	10	10
Mvmt Flow	34	41	18	15	34	75
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	33	0	-	0	115	17
Stage 1	-	-	-	-	26	-
Stage 2	-	-	-	-	89	-
Critical Hdwy	4.56	-	-	-	7	7.1
Critical Hdwy Stg 1	-	-	-	-	6	-
Critical Hdwy Stg 2	-	-	-	-	6	-
Follow-up Hdwy	2.43	-	-	-	3.6	3.4
Pot Cap-1 Maneuver	1437	-	-	-	846	1032
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	901	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1437	-	-	-	826	1032
Mov Cap-2 Maneuver	-	-	-	-	826	-
Stage 1	-	-	-	-	947	-
Stage 2	-	-	-	-	901	-
Approach	EB	WB		SB		
HCM Control Delay, s	3.4	0		9		
HCM LOS	A					
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1437	-	-	-	826	1032
HCM Lane V/C Ratio	0.023	-	-	-	0.041	0.073
HCM Control Delay (s)	7.6	0	-	-	9.5	8.8
HCM Lane LOS	A	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.1	0.2



APPENDIX K

MMLOS

Pedestrian Level of Service - Existing Conditions

Segment	From	To	Side	Sidewalk Width	Blvd Width	AADT per lane	Parking?	Speed	Segment PLOS
Healey Road	Humber Station Road	Coleraine Drive	North	No Sidewalk	0	>3000	No	60	F
			South	No Sidewalk	0	>3000	No	60	F
Humber Station Road	Healey Road	Mayfield Road	East	No Sidewalk	0	>3000	No	80	F
			West	No Sidewalk	0	>3000	No	80	F
Mayfield Road	Humber Station Road	Coleraine Drive	North	No Sidewalk	0	>3000	No	80	F
			South	No Sidewalk	0	>3000	No	80	F

Bicycle Level of Service - Existing Conditions

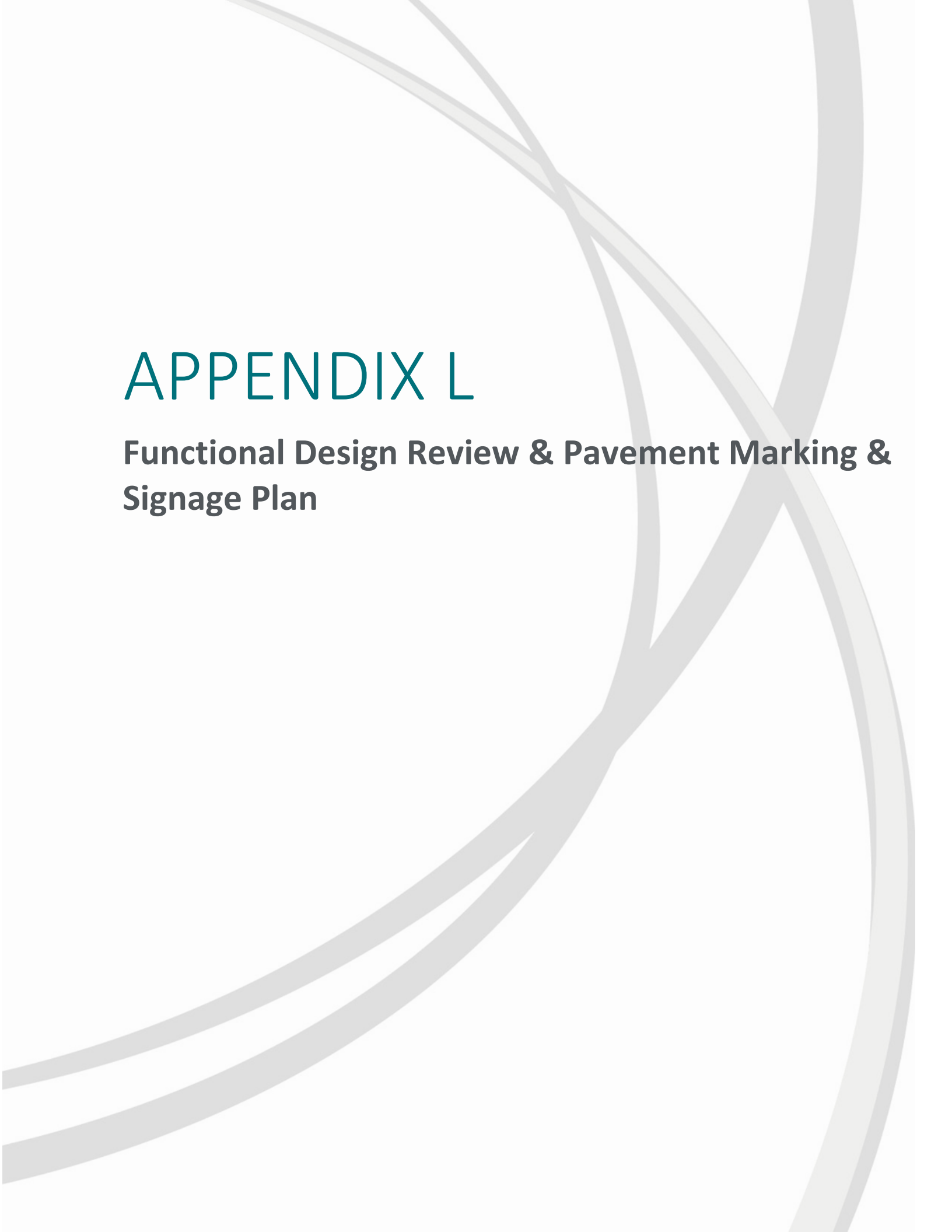
Segment	From	To	Side	Type	No. of Lanes	Bike Lane Width	Operating Speed	Centreline?	Segment BLOS
Healey Road	Humber Station Road	Coleraine Drive	North	Mixed	2 travel lanes	-	60	Yes	F
			South	Mixed	2 travel lanes	-	60	Yes	F
Humber Station Road	Healey Road	Mayfield Road	East	Mixed	2 travel lanes	-	80	Yes	F
			West	Mixed	2 travel lanes	-	80	Yes	F
Mayfield Road	Humber Station Road	Coleraine Drive	North	Mixed	2 travel lanes	-	80	Yes	F
			South	Mixed	2 travel lanes	-	80	Yes	F

Pedestrian Level of Service - Future Conditions

Segment	From	To	Side	Sidewalk Width	Blvd Width	AADT per lane	Parking?	Speed	Segment PLOS
Healey Road	Humber Station Road	Coleraine Drive	North	3	1	>3000	No	60	D
			South	3	1	>3000	No	60	D
Humber Station Road	Healey Road	Mayfield Road	East	3	1	>3000	No	60	D
			West	3	1	>3000	No	60	D
Mayfield Road	Humber Station Road	Coleraine Drive	North	1.5	3	>3000	No	80	E
			South	3	3	>3000	No	80	D
George Bolton Parkway	Humber Station Road	Coleraine Drive	North	3	4	>3000	No	50	B
			South	1.8	4	>3000	No	50	C

Bicycle Level of Service - Future Conditions

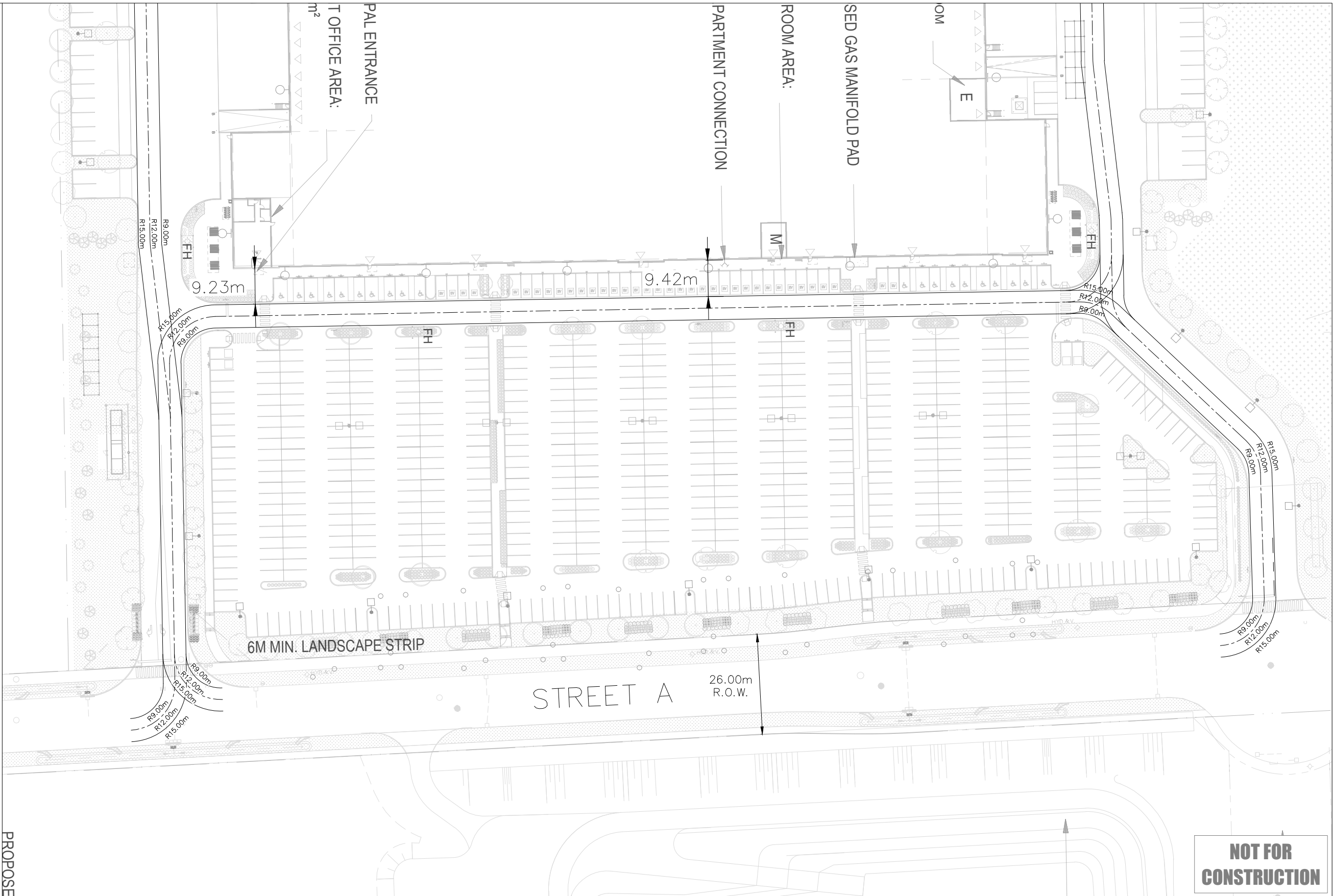
Segment	From	To	Side	Type	No. of Lanes	Bike Lane Width	Operating Speed	Centreline?	Segment BLOS
Healey Road	Humber Station Road	Coleraine Drive	North	Physically Separated	4 travel lanes	TBD	60	Yes	A
			South	Physically Separated	4 travel lanes	TBD	60	Yes	A
Humber Station Road	Healey Road	Mayfield Road	East	Physically Separated	4 travel lanes	TBD	60	Yes	A
			West	Physically Separated	4 travel lanes	TBD	60	Yes	A
Mayfield Road	Humber Station Road	Coleraine Drive	North	Physically Separated	4 travel lanes	TBD	80	Yes	A
			South	Physically Separated	4 travel lanes	TBD	80	Yes	A
George Bolton Parkway	Humber Station Road	Coleraine Drive	North	Physically Separated	2 travel lanes	TBD	50	Yes	A
			South	Physically Separated	2 travel lanes	TBD	50	Yes	A



APPENDIX L

Functional Design Review & Pavement Marking & Signage Plan

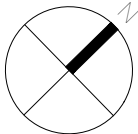
- NOTES:
- AS PER THE ONTARIO BUILDING CODE 3.2.5
- 5.1 LOCATION OF ACCESS ROUTES — ACCESS ROUTES SHALL BE LOCATED SO THAT THE PRINCIPAL ENTRANCE AND EVERY ACCESS OPENING ARE LOCATED NOT LESS THAN 3m AND NOT MORE THAN 15m FROM THE CLOSEST PORTION OF THE ACCESS ROUTE
 - 6.1 ACCESS ROUTE DESIGN — A PORTION OF A ROADWAY PROVIDED AS A REQUIRED ACCESS ROUTE FOR FIRE DEPARTMENT USE SHALL:
 - 6.1.a HAVE A CLEAR WIDTH NOT LESS THAN 6m,
 - 6.1.b HAVE A CENTRELINE RADIUS NOT LESS THAN 12m
 - 6.1.c HAVE AN OH CLEARANCE OF NOT LESS THAN 5m
 - 6.1.d BE CONNECTED WITH A PUBLIC THOROUGHFARE



PROPOSE

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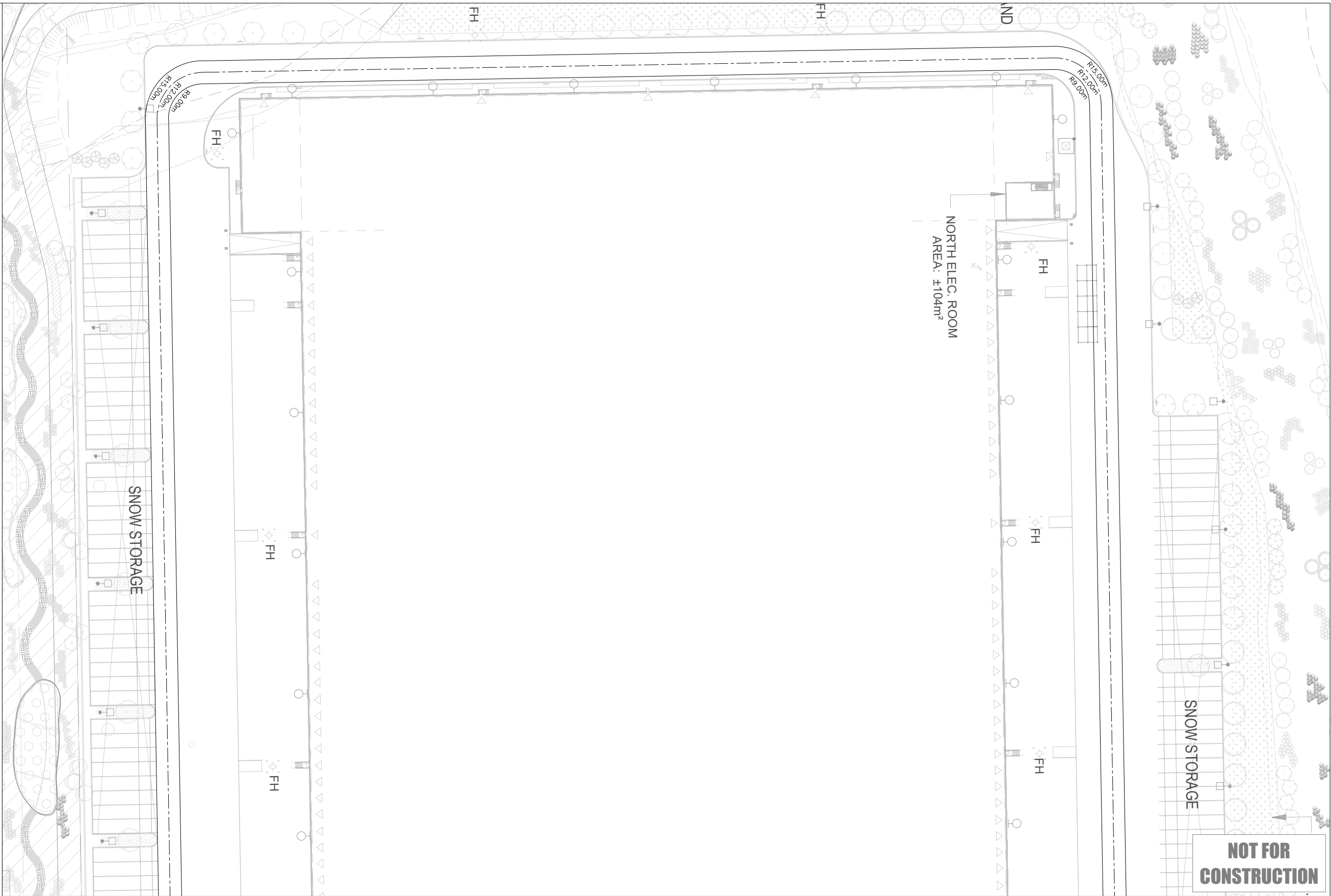
Project No.
25134
Date
AUG. 06, 25

12519-12712 HUMBER ST. ROAD
CALEDON ONTARIO
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FIRE ROUTE REVIEW
SOUTH SIDE

Drawing No.
001

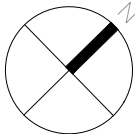
- NOTES:
- AS PER THE ONTARIO BUILDING CODE 3.2.5
- 5.1 LOCATION OF ACCESS ROUTES — ACCESS ROUTES SHALL BE LOCATED SO THAT THE PRINCIPAL ENTRANCE AND EVERY ACCESS OPENING ARE LOCATED NOT LESS THAN 3m AND NOT MORE THAN 15m FROM THE CLOSEST PORTION OF THE ACCESS ROUTE
 - 6.1 ACCESS ROUTE DESIGN — A PORTION OF A ROADWAY PROVIDED AS A REQUIRED ACCESS ROUTE FOR FIRE DEPARTMENT USE SHALL:
 - 6.1.a HAVE A CLEAR WIDTH NOT LESS THAN 6m,
 - 6.1.b HAVE A CENTRELINE RADIUS NOT LESS THAN 12m
 - 6.1.c HAVE AN OH CLEARANCE OF NOT LESS THAN 5m
 - 6.1.d BE CONNECTED WITH A PUBLIC THOROUGHFARE



PLOT DATE: August 6, 2025

DRAWN BY: HSAMI

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25134

Date
AUG. 06, 25

12519–12712 HUMBER ST. ROAD
CALEDON ONTARIO

10 0 10 20 30m

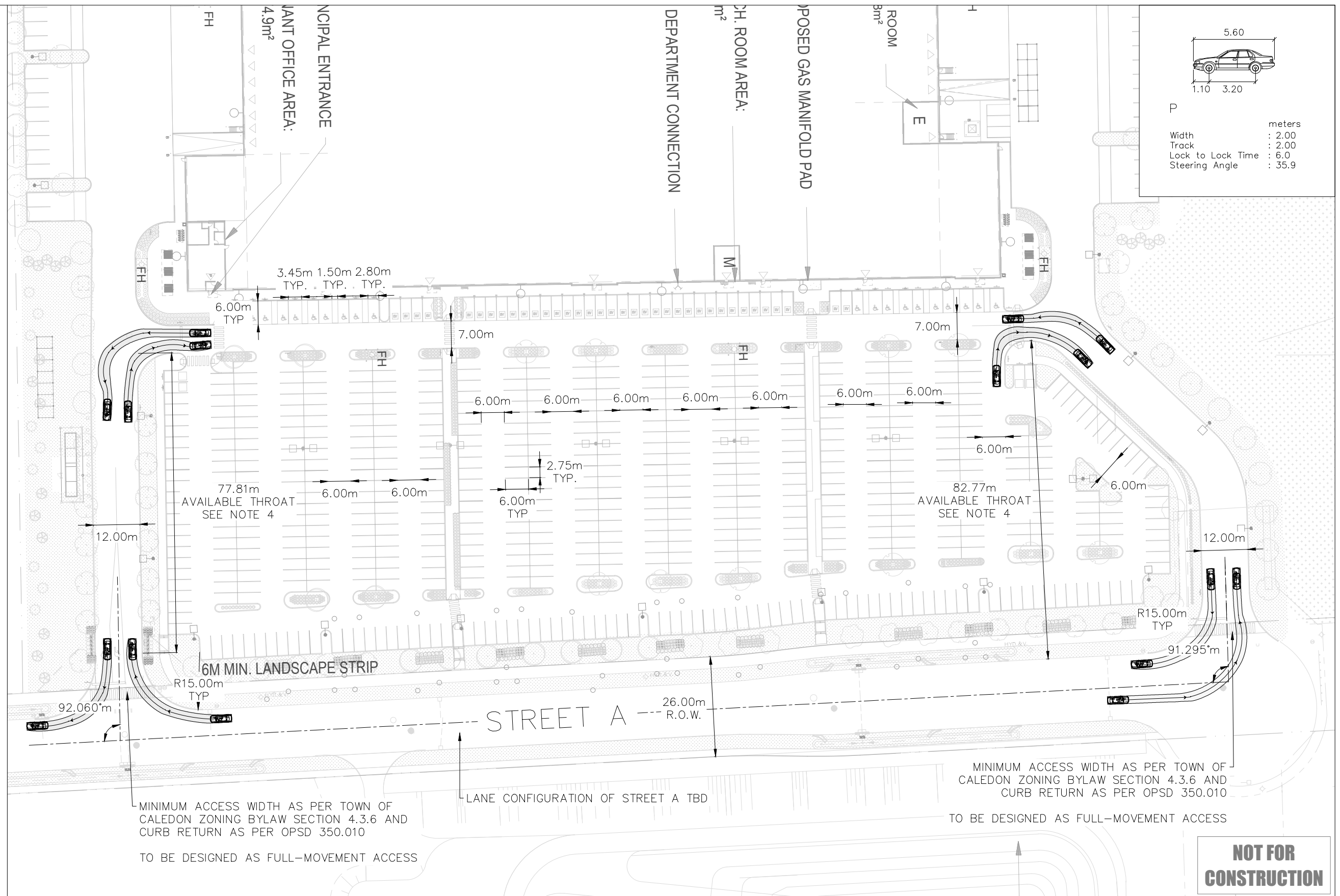
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FIRE ROUTE REVIEW
NORTH SIDE

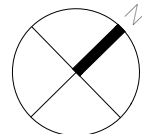
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002

AS PER TOWN OF CALEDON ZONING
BY-LAW

1. THE MINIMUM ENTRANCE WIDTHS FOR INSTITUTIONAL, COMMERCIAL AND INDUSTRIAL ZONES SHALL BE 9m FOR A TWO-WAY ENTRANCE AND 6m FOR A ONE-WAY ENTRANCE AND FOR ALL OTHER ZONES THE MINIMUM WIDTH SHALL BE 3m.
2. WHERE PARKING SPACES ARE PROVIDED IN A SURFACE PARKING AREA, EACH PARKING SPACE SHALL HAVE WIDTH OF NOT LESS THAN 2.75m AND LENGTH OF NOT LESS THAN 6.0m
3. THE MINIMUM WIDTH OF AN AISLE PROVIDING ACCESS TO A PARKING SPACE WITHIN A PARKING AREA SHALL BE 6.0m, EXCEPT IN THE CASE OF ANGLED OFF-STREET PARKING ACCESSED BY A ONE-WAY AISLE, WHICH SHALL BE A MINIMUM WIDTH OF 4.5m.
4. AS PER TAC 8.9.3, LIGHT INDUSTRIAL LAND USE DEVELOPMENT GREATER THAN 45,000m² SHALL HAVE MINIMUM THROAT LENGTH OF 15m FOR COLLECTOR ROAD, AND 60m FOR ARTERIAL ROAD

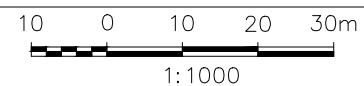


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Project No.	25134
Date	AUG. 06, 25

12519-12712 HUMBER ST. ROAD
CALEDON ONTARIO

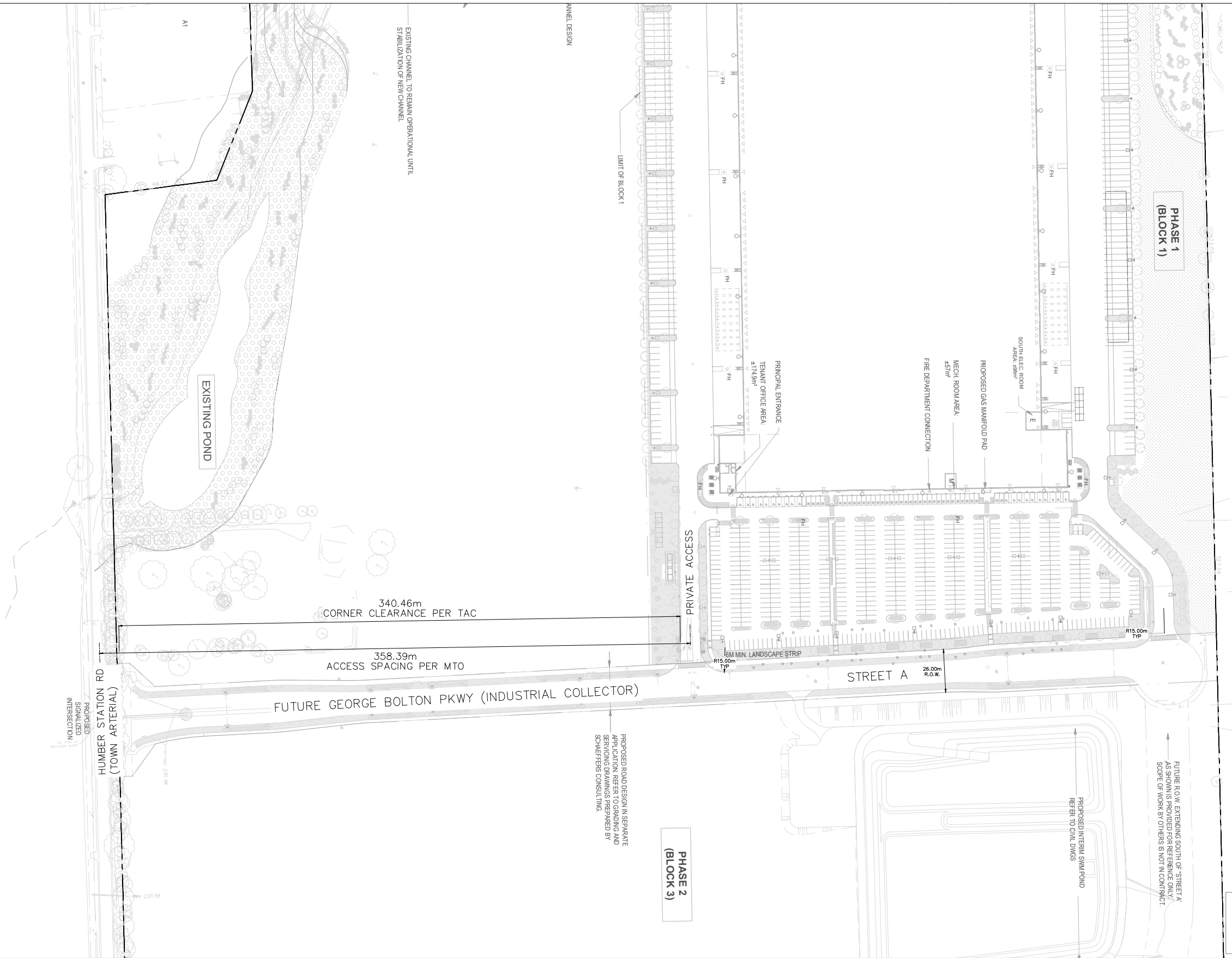


PARKING AND ACCESS REVIEW

Drawing No.

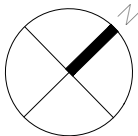
003

- NOTES:
1. AS PER TAC 8.8.2: FOR A SIGNALIZED INTERSECTION, ARTERIAL CORNER CLEARANCE TO NEAREST ACCESS DRIVEWAY TO BE MINIMUM 70m, AND COLLECTOR TO BE MINIMUM 55m.
 2. AS PER MTO HCMM SECTION 4.6.5:
 - 2.1. LOW VOLUME COMMERCIAL/PRIVATE ROAD ACCESS TO HAVE MINIMUM 45m SPACING, WHILE DESIRABLE SPACING IS 85m.
 - 2.2. MEDIUM/HIGH VOLUME COMMERCIAL PRIVATE ROAD ACCESS TO HAVE MINIMUM 400m SPACING.



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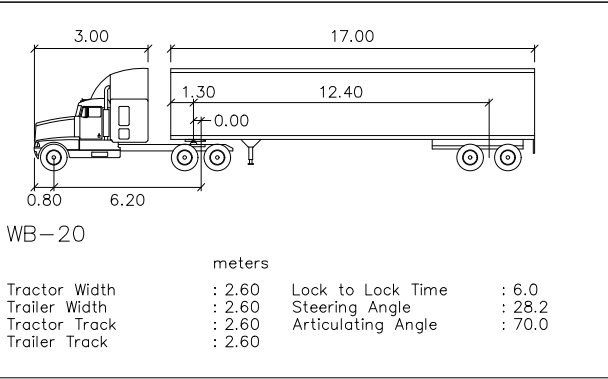
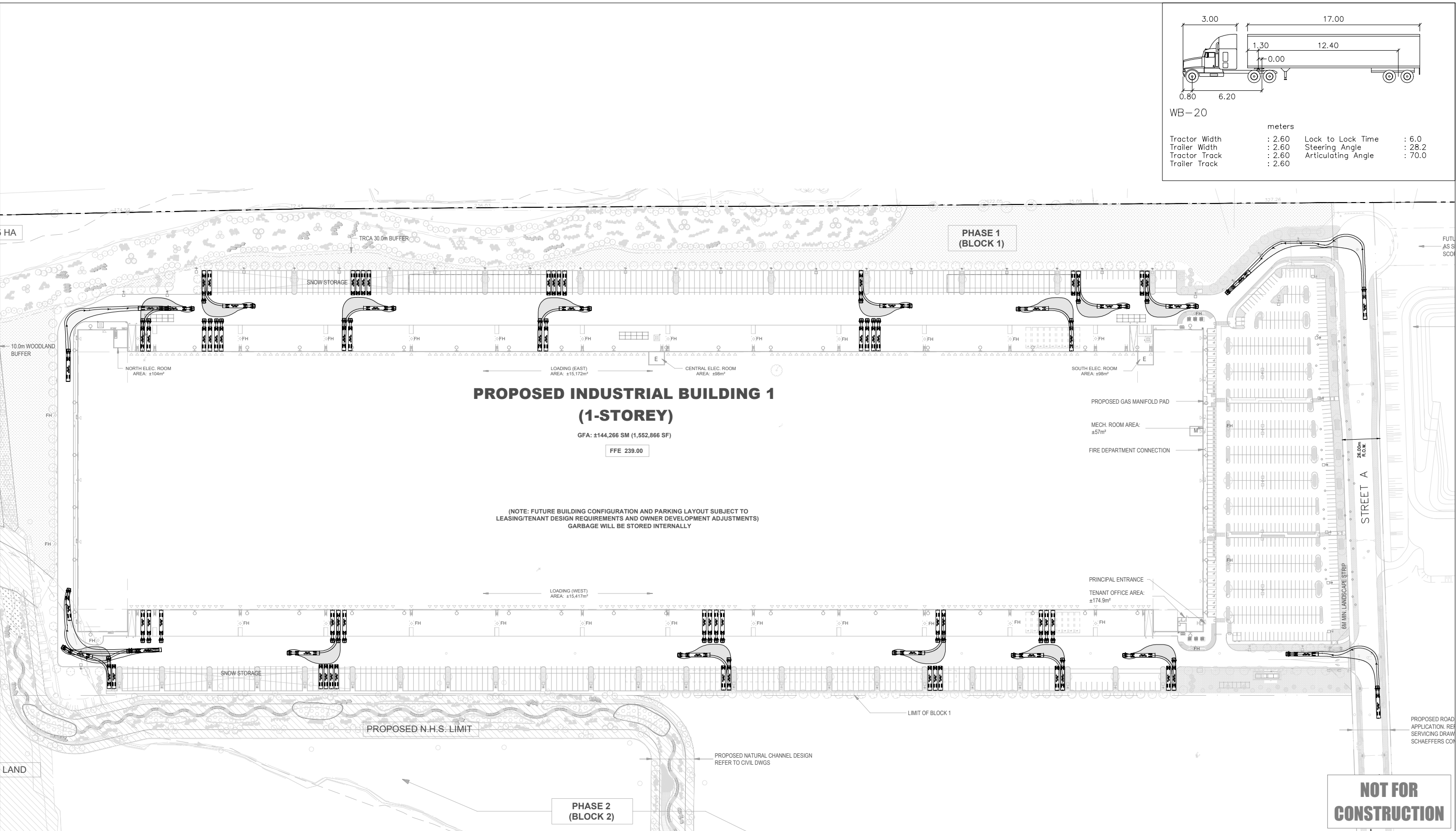


Project No.
25134
Date
AUG. 06, 25

12519-12712 HUMBER ST. ROAD
CALEDON ONTARIO
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CORNER CLEARANCE REVIEW

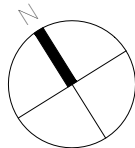
Drawing No.
004



PLOT DATE: August 6, 2025

DRAWN BY: HSAMI

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Project No.
25134

Date
AUG. 06, 25

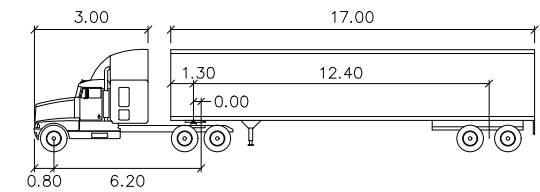
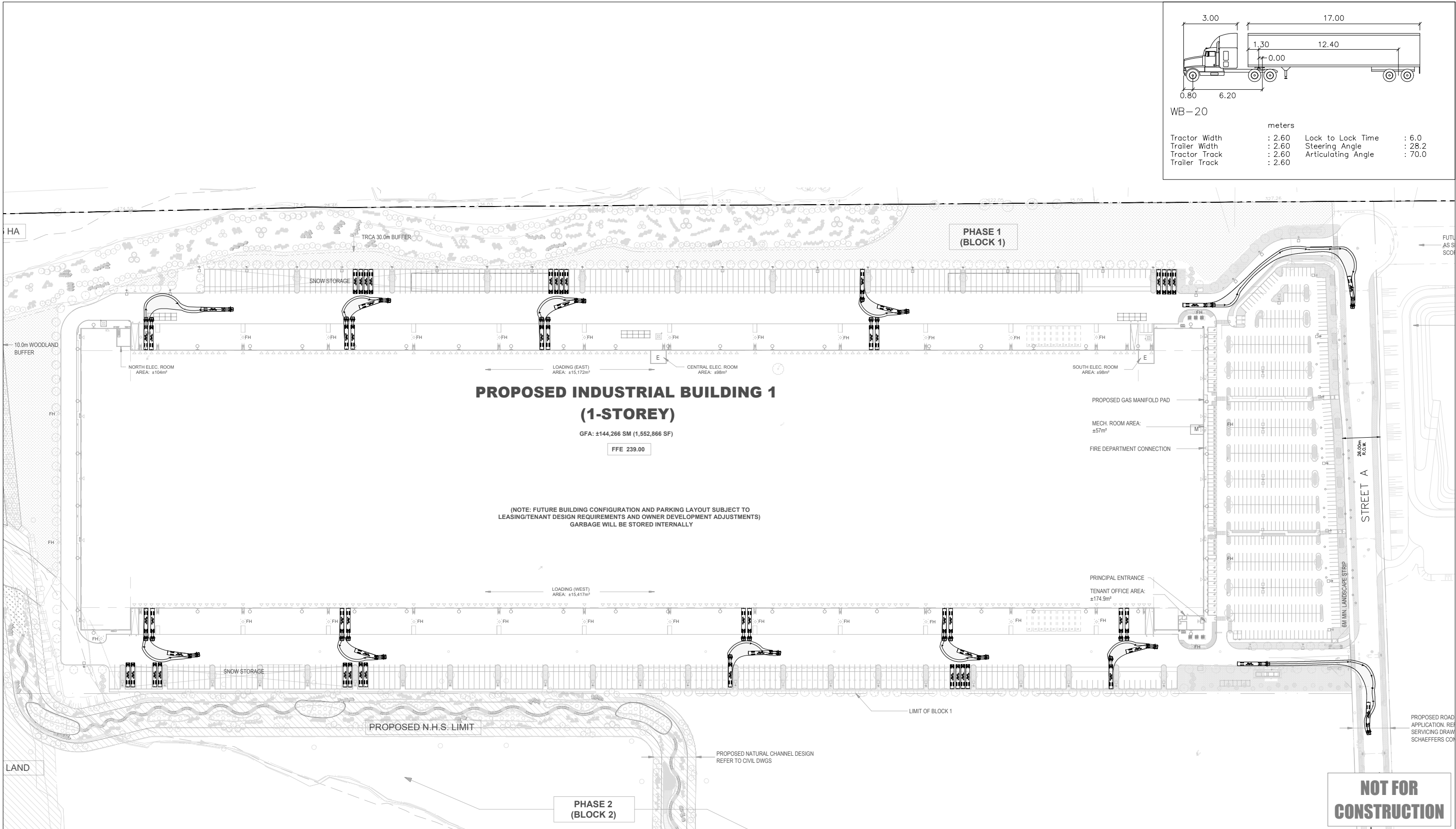
12519-12712 HUMBER ST. ROAD
CALEDON ONTARIO

25 0 25 50 75m

1: 2500

LOADING REVIEW
WB-20 SWEEP PATHS
ENTRY PATH

Drawing No.
005

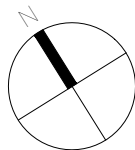


WB-20			
meters			
Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 28.2
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

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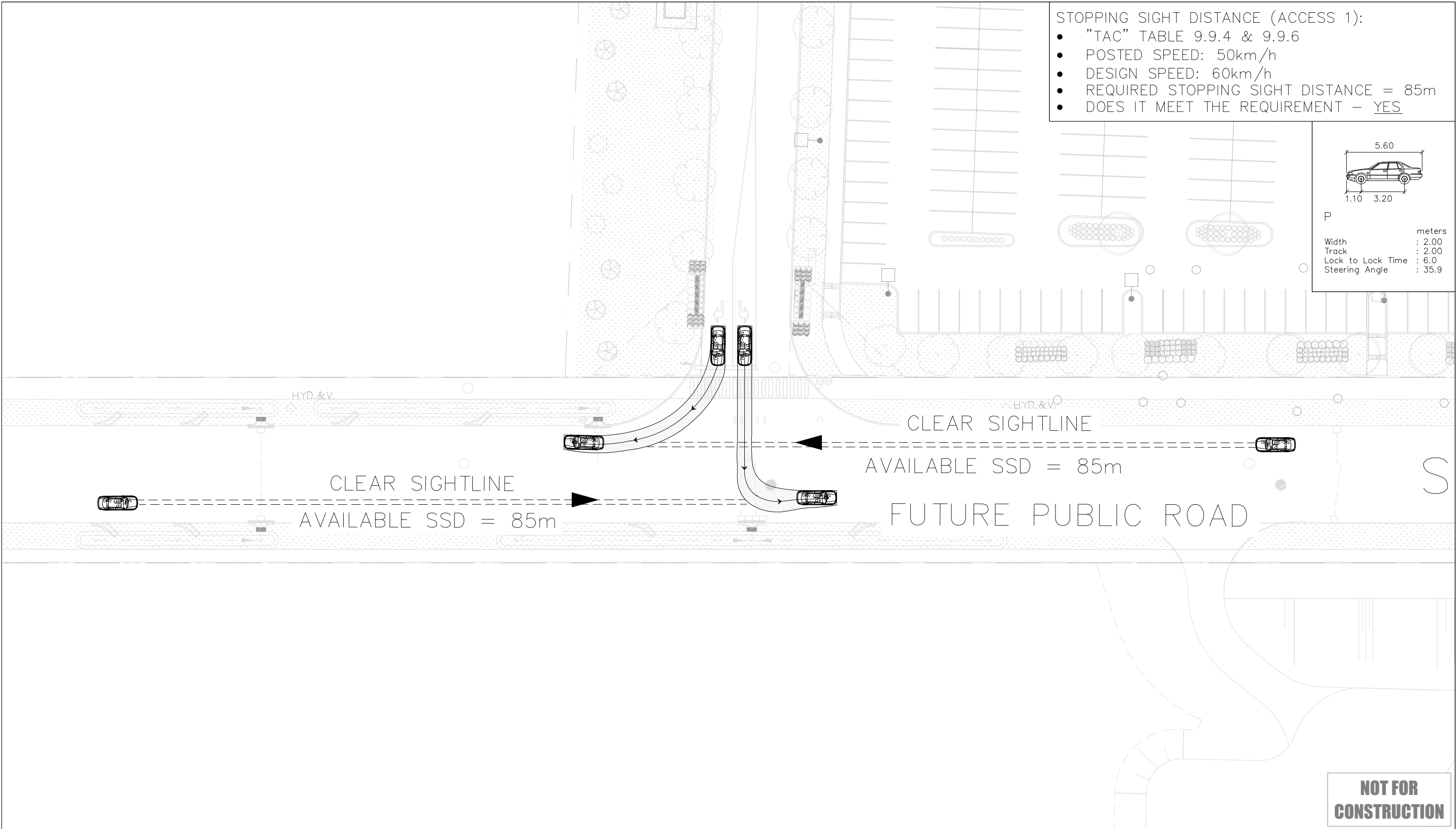


Project No.
25134
Date
AUG. 06, 25

12519-12712 HUMBER ST. ROAD
CALEDON ONTARIO
25 0 25 50 75m
1: 2500

LOADING REVIEW
WB-20 SWEEP PATHS
EXIT PATH

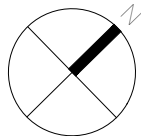
Drawing No.
006



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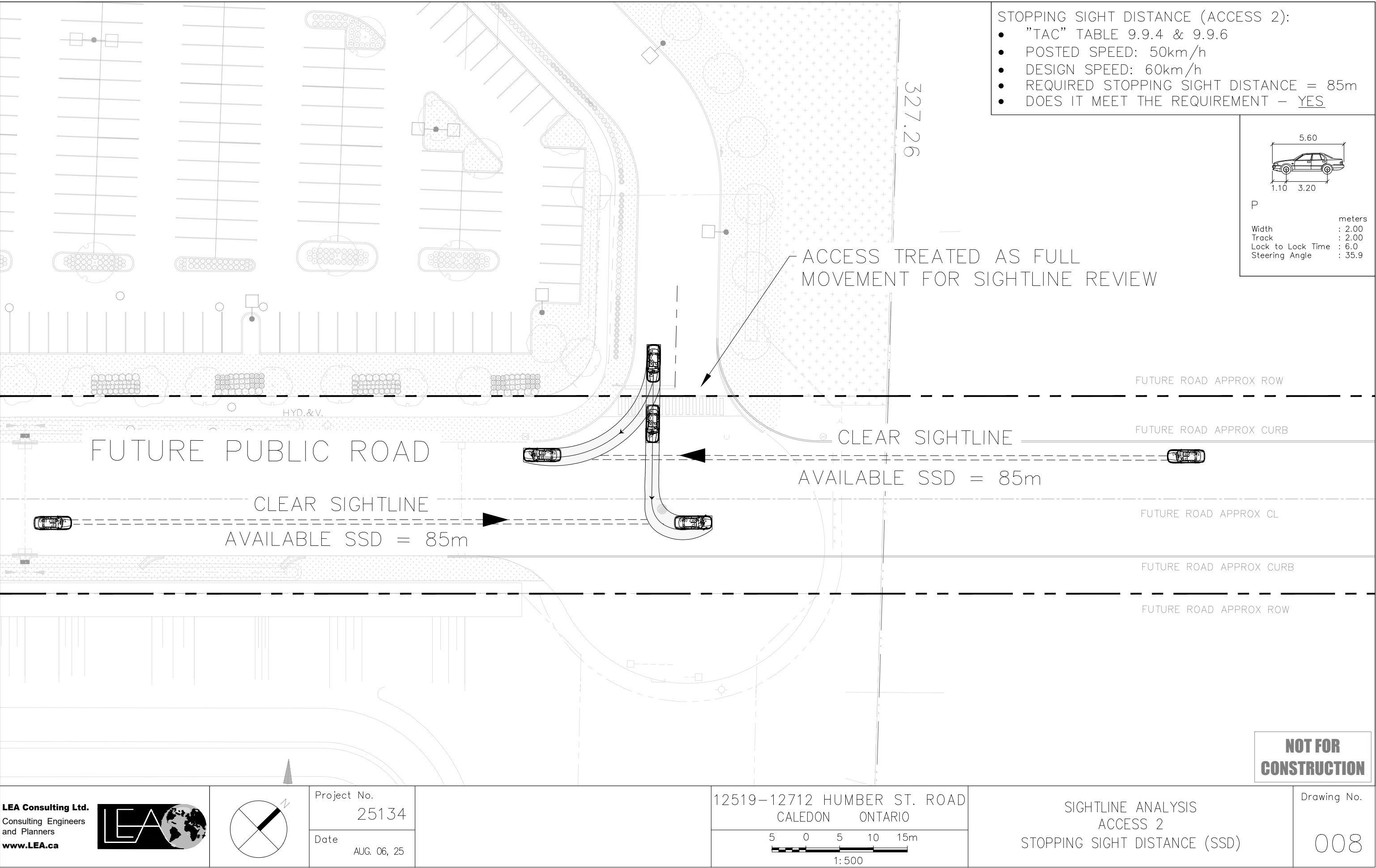


Project No.
25134
Date
AUG. 06, 25

12519-12712 HUMBER ST. ROAD
CALEDON ONTARIO
5 0 5 10 15m
1:500

SIGHTLINE ANALYSIS
ACCESS 1
STOPPING SIGHT DISTANCE (SSD)

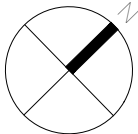
Drawing No.
007



PLOT DATE: August 6, 2025

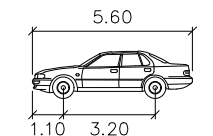
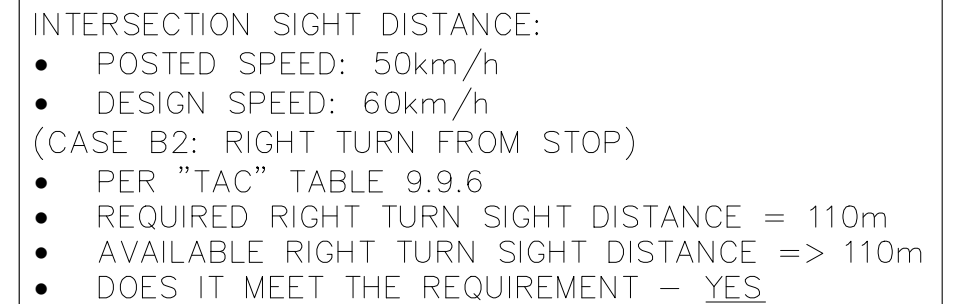
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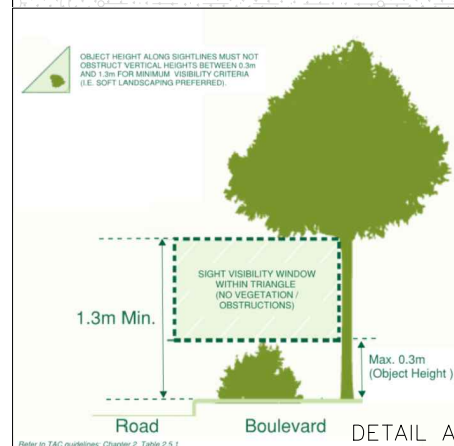
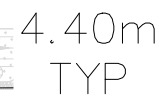


Project No.
25134

Date
AUG. 06, 25



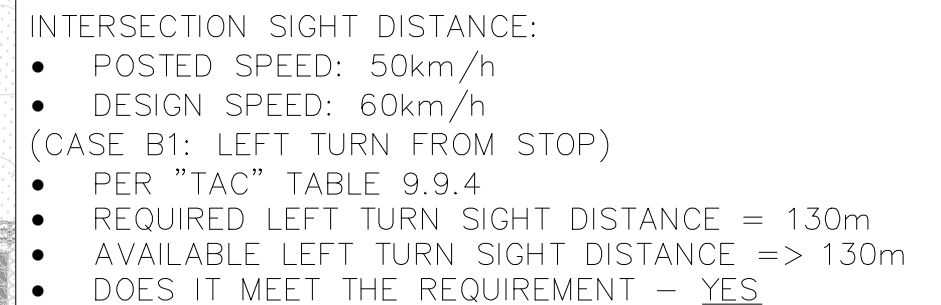
P	
	meters
Width	: 2.00
Track	: 2.00
Lock to Lock Time	: 6.0
Steering Angle	: 35.9



CLEAR SIGHTLINE

AVAILABLE ISD = 110m

STREET A

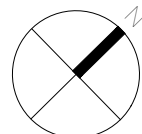


AVAILABLE ISD = 130m

4.40m
TYP

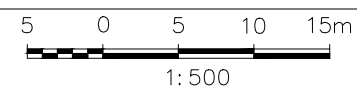
**NOT FOR
CONSTRUCTION**

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Project No.	25134
Date	AUG. 06, 25

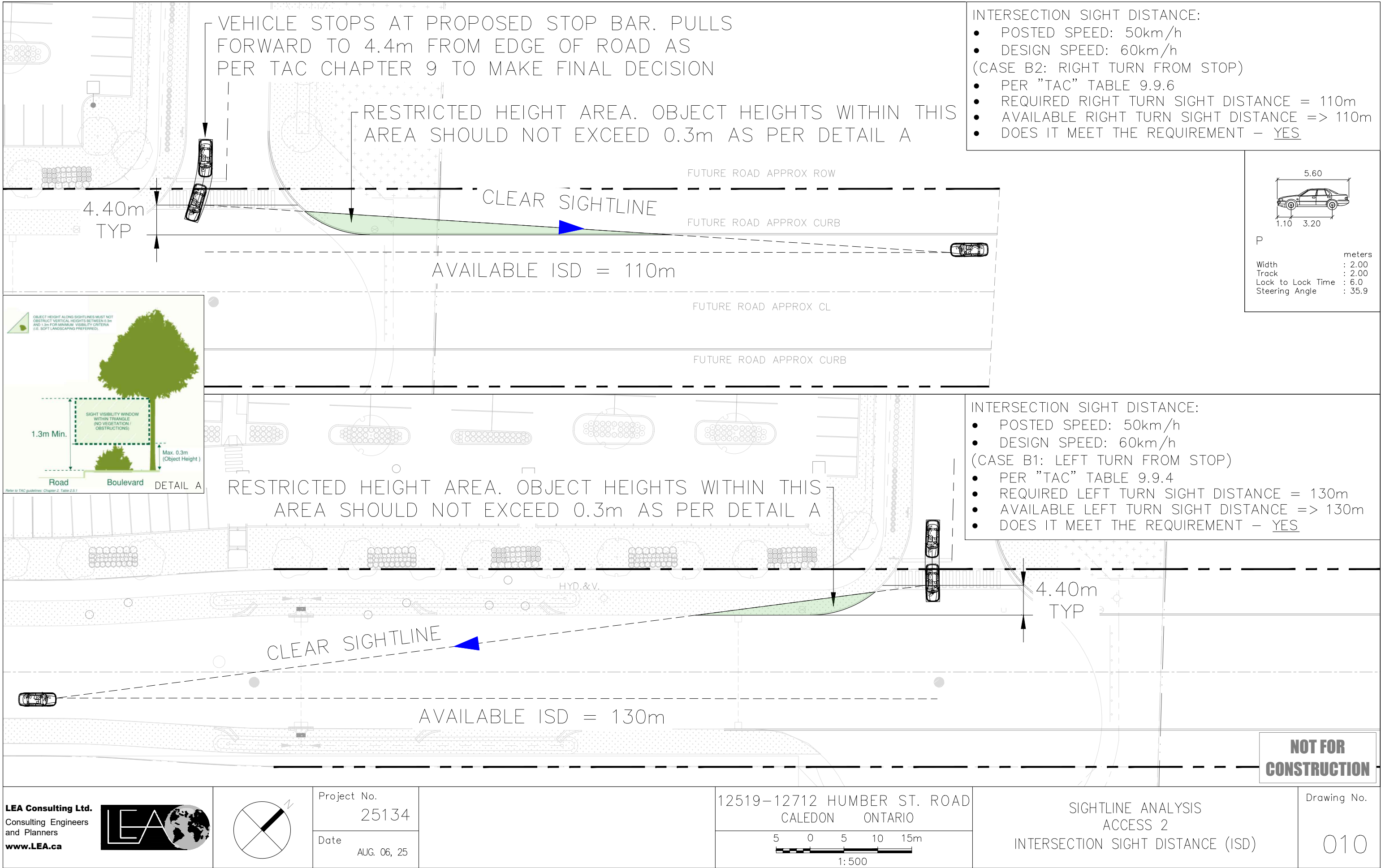
12519-12712 HUMBER ST. ROAD
CALEDON ONTARIO



SIGHTLINE ANALYSIS
ACCESS 1
INTERSECTION SIGHT DISTANCE (ISD)

Drawing No.

009



TRAFFIC SIGNS SCHEDULE				
SIGN	LOCATION	QUANTITY REQUIRED	COLOURS	REMARKS
	1	4	Ra-1 (600x600) LEGEND & BORDER - WHITE REFL. BACKGROUND - RED REFL.	
	2	14	(300x450) BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND. AS PER SCHEDULE "M" BY-LAW 2015-0058	
	3	20	Pb-93 (300x450) BLACK LEGEND, BORDER & LETTER P, WHITE REFL. BACKGROUND, RED REFL. INTERDICTIONARY SYMBOL, INTERDICTIONARY SYMBOL - BLUE REFL. BACKGROUND & OUTLINE	
	4	1	(300x450) CUSTOM RED REFL. INTERDICTIONARY SYMBOL, BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND.	
	5	1	(300x450) CUSTOM RED REFL. INTERDICTIONARY SYMBOL, BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND.	
	6	4	Ra-5R (600x750) SYMBOL & BORDER - BLACK BACKGROUND - WHITE REFL.	
	7	4	Ra-4t (600x450) BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND.	SIGN Ra-4t TO BE MOUNTED ON THE SAME POST OF SIGNS Ra-5R & Ra-5L, AND BELOW IT.
	8	4	(300x450) CUSTOM BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND.	
	9	36	(300x450) CUSTOM BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND.	

PAVEMENT MARKING & SIGNAGE

1 SOLID WHITE, 60cm
2 SOLID YELLOW, 10cm
3 SOLID WHITE, 10cm
4 BROKEN WHITE 3-3-3
5 HATCHING/SYMBOL
AS SHOWN (TYP.)
X SIGN NUMBER

PAVEMENT MARKING DETAILS

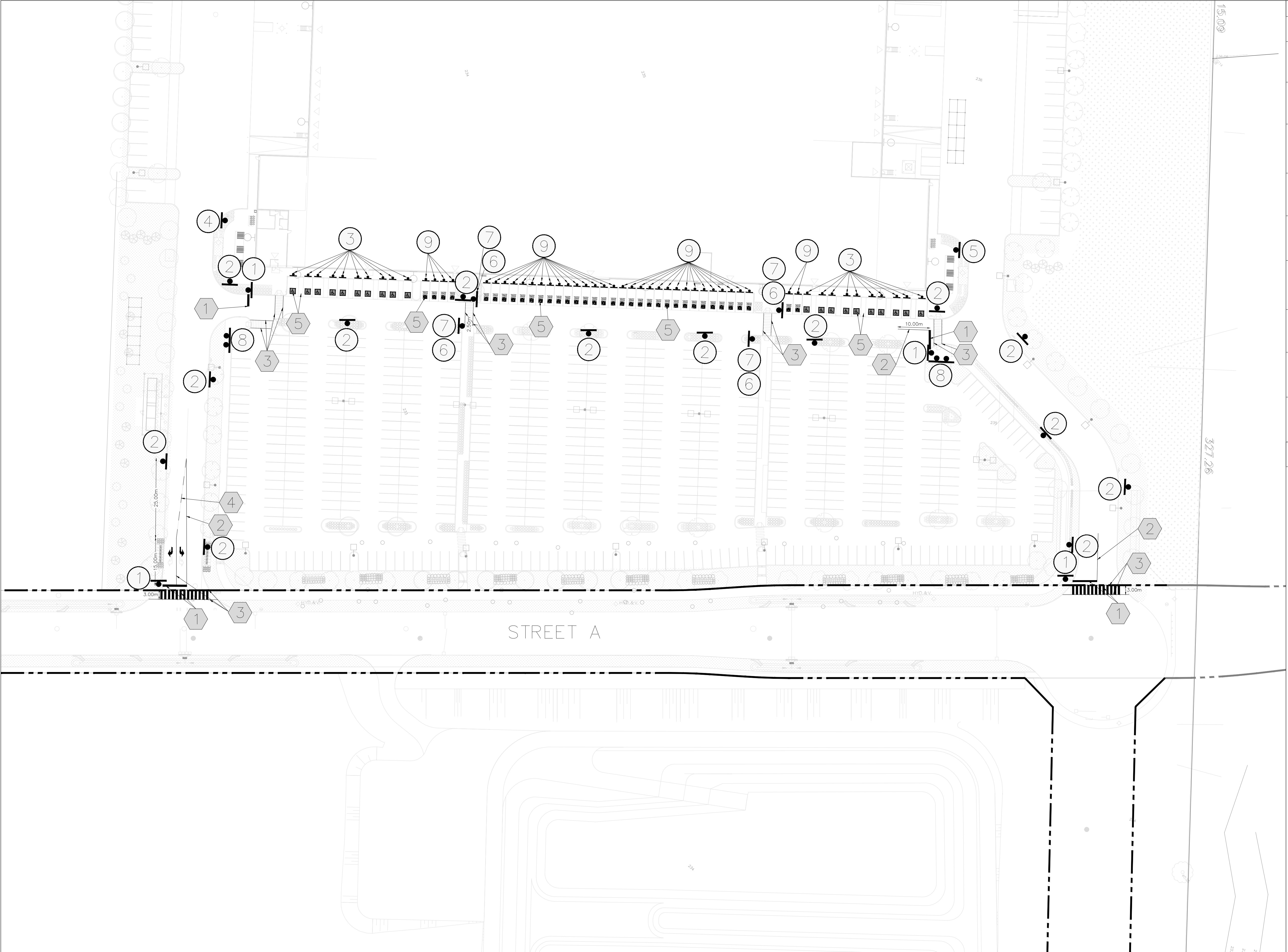
A-STOP BAR

B-PEDESTRIAN CROSS-WALK

POST-MOUNTED SIGN

WALL-MOUNTED SIGN

- NOTES:
- ALL SIGNS ARE STEEL POST-MOUNTED, UNLESS OTHERWISE INDICATED.
 - UNDERSIDES OF ALL SIGNS TO BE LOCATED MIN. 2.0m ABOVE TOP OF PAVEMENT OR TOP OF SIDEWALK. ALL SIGNS ARE PER "ONTARIO TRAFFIC MANUAL", LATEST EDITION.
 - ALL PAVEMENT MARKINGS SHALL BE MADE IN ACCORDANCE WITH ONTARIO TRAFFIC MANUAL, BOOK 5, 6, 11, 15, AND 18.



TRAFFIC SIGNS SCHEDULE				
SIGN	LOCATION	QUANTITY REQUIRED	COLOURS	REMARKS
	2	12	(300x450) BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND, AS PER SCHEDULE "M" BY-LAW 2015-0058	
	4	1	(300x450) CUSTOM RED REFL. INTERDICTIONARY SYMBOL, BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND.	
	5	1	(300x450) CUSTOM RED REFL. INTERDICTIONARY SYMBOL, BLACK LEGEND & BORDER, WHITE REFL. BACKGROUND.	

PAVEMENT MARKING & SIGNAGE

1

SOLID WHITE, 60cm

2

SOLID YELLOW, 10cm

3

SOLID WHITE, 10cm

4

BROKEN WHITE 3-3-3

5

HATCHING/SYMBOL AS SHOWN (TYP.)

X

SIGN NUMBER

●

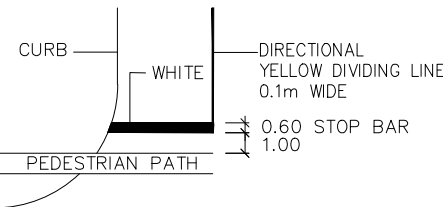
POST-MOUNTED SIGN

—

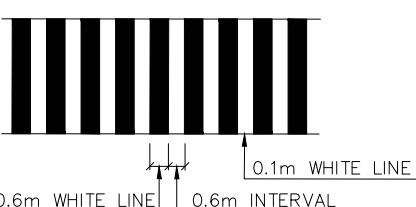
WALL-MOUNTED SIGN

PAVEMENT MARKING DETAILS

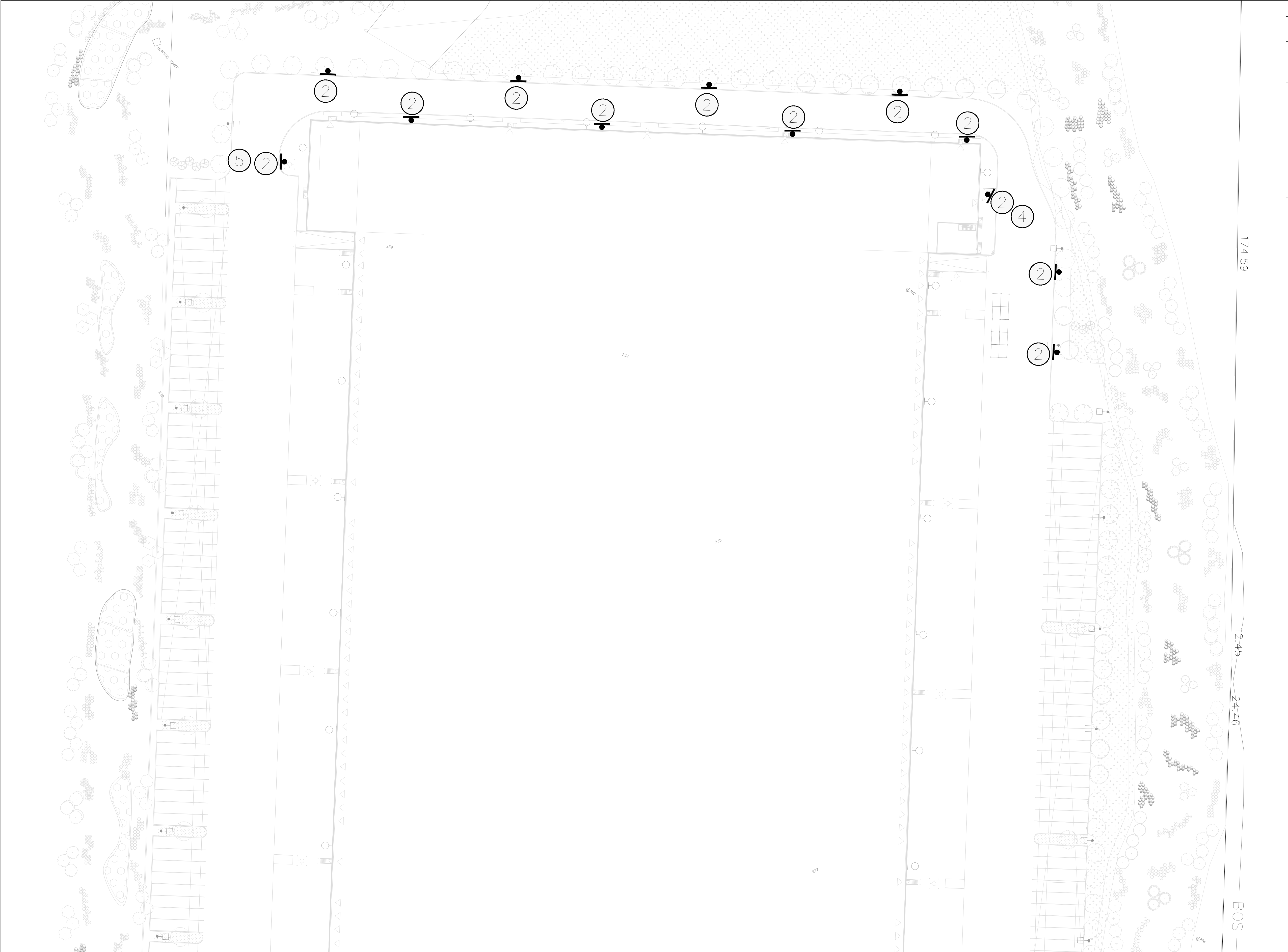
A-STOP BAR



B-PEDESTRIAN CROSS-WALK



- NOTES:
- ALL SIGNS ARE STEEL POST-MOUNTED, UNLESS OTHERWISE INDICATED.
 - UNDERSIDES OF ALL SIGNS TO BE LOCATED MIN. 2.0m ABOVE TOP OF PAVEMENT OR TOP OF SIDEWALK. ALL SIGNS ARE PER "ONTARIO TRAFFIC MANUAL", LATEST EDITION.
 - ALL PAVEMENT MARKINGS SHALL BE MADE IN ACCORDANCE WITH ONTARIO TRAFFIC MANUAL, BOOK 5, 6, 11, 15, AND 18.



DRAWN BY: HSAMI

PLOT DATE: August 6, 2025

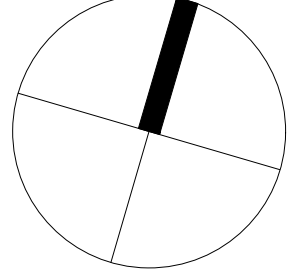
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N



Project No.

23347

Date

Aug 6, 2025

NOT FOR CONSTRUCTION

HUMBER STATION – GEORGE BOLTON PARKWAY

CALEDON ONTARIO

SCALE 1:600

PAVEMENT MARKING AND SIGNAGE

Drawing No.

012

DRAWING NAME: F:\23347\7. Drafting\23347WF025.dwg

