

SITE STATISTICS			
Category	Area (sq. ft.)	Area (sq. ft.)	Area (sq. ft.)
Site Area	1,234,567	1,234,567	1,234,567
Building Footprint	123,456	123,456	123,456
Parking	234,567	234,567	234,567
Hydro Lands	345,678	345,678	345,678
Other	456,789	456,789	456,789

Traffic Impact Study

Halton Business Community

3rd Submission

December 2023 | Milton, Ontario

Orlando Corporation



TYLin

EXECUTIVE SUMMARY

TYLin was retained by Orlando Corporation to prepare a Traffic Impact Study (TIS) for the proposed Halton Business Community industrial warehouse development located on 113 hectares of land that consists of two separate parcels of land within the North Milton Business Park Tertiary Plan in Milton, Ontario. The properties are generally located north of James Snow Parkway, west of Esquesing Line, south of 5 Side Road, and east of the CN railway line (located west of Boston Church Road).

The report estimates the site traffic volumes generated by the proposed development during the critical weekday a.m. and p.m. peak hours to assess the impact of site traffic on roadways within the study area and to recommend improvements to accommodate the projected traffic if any are needed. These impacts are based on projected future background traffic and road network conditions derived for 2024, 2029, and 2034 planning horizon years (full build-out, and five and ten years after full build-out in 2024).

As per Orlando's Concept Plan dated December 14, 2023, the proposed development consists of seven industrial buildings having a combined gross floor area (G.F.A.) of 4,915,588 ft² (456,674 m²). The total proposed G.F.A. is divided as follows:

- ▶ Three industrial buildings (west of Boston Church Road) with a combined G.F.A. of 1,401,511 ft² (130,205 m²)
- ▶ Four industrial buildings (east of Boston Church Road) with a combined G.F.A. of 3,514,077 ft² (326,469 m²)

Of note, compared to the G.F.A. values used in the 2nd submission of the TIS, the latest concept plan reduces the G.F.A. of Building G from 349,845 ft² (32,302 m²) to 326,605 ft² (30,342 m²), a difference of 23,240 ft² (1,960 m²). The magnitude of the reduction in Building G's G.F.A. is small enough that it will not have a significant impact on the results and conclusions of the analysis. Accordingly, the enclosed subject site trip generation estimates remain the same as the previous submission.

The site traffic generated by the proposed industrial warehouse development was estimated using ITE Trip Generation Code 150 (Warehousing) and resulted in a total of 838 new two-way vehicle trips during the weekday a.m. peak hour, consisting of 645 inbound and 193 outbound trips. During the weekday p.m. peak hour, the proposed development expected to generate a total of 939 new two-way vehicle trips, consisting of 254 inbound and 685 outbound trips. 2016 TTS data, the 2009 Escarpment Business Community study, and expected travel patterns based on site operations were used to assign the site trips to the study area road network.

Based on pre-consultation with Town of Milton Staff, an annual growth rate of 2% has been applied to Town Roads (5 Side Road, Boston Church Road, and Esquesing Line).

Halton Region Staff provided detailed information regarding annual growth rates and anticipated changes to the annual growth rates based on capital construction projects within the study area and the Region's EMME model forecasts. An annual growth rate of 2% was applied to all Regional roads (James Snow Parkway, Regional Road 25 (RR 25), and Steeles Avenue) prior to planned widening of the roadways. An annual growth rate of 3% was applied to RR 25 from 2024 onwards. Similarly, annual growth rates of 4% and 6% were applied to Steeles Avenue and James Snow Parkway, respectively, from 2029 onwards.

The annual background growth rates were applied to existing traffic counts to forecast future background traffic for the 2024, 2029, and 2034 horizon years. No specific background developments were identified within the vicinity of the study area. Growth rates provided by the Region account for the background development traffic generated in the vicinity of the subject site.

All study intersections (signalized and unsignalized) are expected to have acceptable overall operating characteristics with reserve capacity. The 2024, 2029, and 2034 future background and future total traffic analysis confirms that the incremental impact of the estimated site traffic is minimal and does not contribute to any significant increases in v/c ratios and levels of service. There are no recommended physical improvements to the existing study area intersections due to the impact of introducing site traffic to the study area road network.

Despite not technically warranting traffic signals according to the Ontario Traffic Manual (OTM) Book 12 Justification 7 signal warrant procedure for existing and future traffic volumes, signals are recommended for implementation at the following locations, at the specified study horizon years, due to traffic capacity and safety concerns:

- ▶ Esquesing Line and 5 Side Road (2024 onward – triggered by existing over-capacity conditions)
- ▶ James Snow Parkway and East Access 2 (2024 onward)
- ▶ James Snow Parkway and East Access 3 (2024 onward)

Left-turn and right-turn lane warrants were conducted at all eight future site access locations, as per MTO and Halton Region guidelines. Turn lanes are recommended at the following locations:

- ▶ 5 Side Road and West Access 1 (left-turn lane)
- ▶ James Snow Parkway and East Access 2 (left-turn and right-turn lanes)
- ▶ James Snow Parkway and East Access 3 (left-turn and right-turn lanes)

Right-turn lanes are recommended to be provided for site operation and safety purposes to facilitate the movement of heavy trucks to/from the site.

Although the previous version of the TIS (2nd submission) recommended a northbound right-turn lane at the intersection of Boston Church Road and East Access 1, TYLin recommends that the

proposed right-turn lane be removed/reverted to a shared through/right-turn lane. The new recommendation of implementing a shared through/right-turn lane instead of a dedicated right-turn is to allow for consistent and predictable pavement markings/lane alignment along Boston Church Road. Through preparing different iterations of the pavement marking and signage plan, TYLin found that the inclusion of a northbound right-turn lane at East Access 1 within the planned asphalt width would lead to potentially confusing drivers with abnormal pavement markings and lane alignment.

TYLin also confirmed that the intersection of Boston Church and East Access 1 is expected to operate below capacity, with no concerns related to delays or queues under ultimate 2034 future total traffic conditions, should the northbound through/right-turn lane be implemented in place of the previously proposed dedicated right-turn lane.

TYLin's 2nd Submission of the TIS recommended two full moves accesses on 5 Side Road to allow for flexible internal site circulation and to prevent the need to widen the road to accommodate an exclusive westbound left-turn lane. Comments on the 2nd Submission of the TIS from the Town of Milton and its peer reviewer suggested reducing the number of site accesses on Side Road from two accesses to one. The enclosed updated traffic analysis maintained two accesses to 5 Side Road, however, the site access closest to the intersection of Boston Church Road and 5 Side Road (West Access 2) was analyzed as a right-in/right-out restricted movements access. The second access to 5 Side Road, West Access 1, was analyzed as a full moves access with an auxiliary westbound left-turn lane.

The 2024, 2029, and 2034 future total traffic analysis confirms that all signalized and unsignalized site accesses at full, 5-year, & 10-year post build-out are expected to operate with acceptable levels of service during the weekday a.m. and p.m. peak hours and there are no site related queuing issues.

At Esquesing Line and 5 Side Road, a westbound left-turn lane and a southbound left-turn lane were included from the 2024 horizon year onwards under future background and future total traffic conditions for safety and operational considerations. TYLin recommends monitoring queues after signalization of the intersection to determine if the construction of turn lanes is required should the predicted level of future traffic growth be realized.

Based on the forecasted 2034 total traffic volumes, TYLin is of the opinion that from a traffic perspective, any road improvements to Boston Church Road that are specifically triggered by the subject development do not require an additional lane of traffic along the full length of Boston Church Road. However, the developer proposes to reconstruct the existing rural section of Boston Church Road between James Snow Parkway and 5 Side Road to its ultimate 26.0 metre ROW width based on Town Standard E-5, on lands they currently control and exclusive of lands owned by

others. The 26.0 metre ROW width will be implemented where feasible, exclusive of lands owned by others. The current 20.0 metre ROW and additional 3.0 metre widening within the subject lands will adhere to Town standard E-5 including boulevard treatments such as sidewalks, landscaping and utilities. On-street bike lanes can be provided as required by the Town.

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TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	Retainer and Objective	1
1.2	Study Background.....	1
2	SITE CHARACTERISTICS.....	3
2.1	Site Location	3
2.2	Study Area.....	4
2.3	Site Plan.....	4
2.4	Heritage House located at 8350 Esquesing Line.....	6
2.5	Proposed Site Accesses.....	6
2.6	Access Circulation Analysis	9
2.7	Subdivision Design Review	9
2.7.1	Right-of-Way.....	10
2.7.2	Intersection Spacing and Daylighting.....	11
2.7.3	Intersection Angle	12
2.7.4	Sight Distance	12
2.8	Parking Review	13
3	EXISTING CONDITIONS	14
3.1	Road Network.....	14
3.2	Pedestrian Routes	15
3.3	Cycling Routes	15
3.4	Transit Services.....	15
3.5	Existing Traffic Data.....	16
4	FUTURE BACKGROUND CONDITIONS	20
4.1	Study Horizon Years.....	20
4.2	Roadway Improvements.....	20
4.3	Background Growth.....	21
4.4	Background Developments.....	22
4.5	Background Traffic Volumes.....	22
5	SITE TRIP GENERATION	26
5.1	Site Trip Generation	26
5.2	Site Trip Distribution and Assignment.....	31

6	FUTURE TOTAL TRAFFIC	37
7	INTERSECTION CONTROL WARRANT SUMMARY	41
7.1	MTO Left Turn Lane Requirement	41
7.2	TAC and Halton Region Right Turn Lane Requirement	45
7.3	Traffic Signal Warrant	46
8	INTERSECTION CAPACITY ANALYSIS	48
8.1	Existing Intersections	49
8.1.1	Regional Road 25 and 5 Side Road	49
8.1.2	Regional Road 25 and James Snow Parkway	55
8.1.3	Boston Church Road and James Snow Parkway	59
8.1.4	Esquesing Line and James Snow Parkway.....	62
8.1.5	James Snow Parkway and Steeles Avenue.....	65
8.1.6	Boston Church Road / Third Line and 5 Side Road	70
8.1.7	Esquesing Line / Fourth Line and 5 Side Road	71
8.2	Future Intersections	75
8.2.1	West Site Access 1 and 5 Side Road	75
8.2.2	West Site Access 2 and 5 Side Road	75
8.2.3	Boston Church Road and West Site Access 3	76
8.2.4	Boston Church Road and West Site Access 4	77
8.2.5	Boston Church Road and West Site Access 5	78
8.2.6	Boston Church Road and East Site Access 1	78
8.2.7	James Snow Parkway and East Site Access 2	79
8.2.8	James Snow Parkway and East Site Access 3	80
9	QUEUING ANALYSIS	83
9.1	2021 Baseline	83
9.2	2024, 2029, and 2034 Future Background	85
9.2.1	Regional Road 25 and 5 Side Road	86
9.2.2	Regional Road 25 and James Snow Parkway	87
9.2.3	Boston Church Road and James Snow Parkway	87
9.2.4	Esquesing Line and James Snow Parkway.....	88
9.2.5	James Snow Parkway and Steeles Avenue.....	88
9.2.6	Boston Church Road and 5 Side Road	88
9.2.7	Esquesing Line and 5 Sideroad	88

9.3	2024, 2029, and 2034 Future Total.....	89
9.3.1	Regional Road 25 and 5 Side Road	91
9.3.2	Regional Road 25 and James Snow Parkway	92
9.3.3	Boston Church Road and James Snow Parkway	92
9.3.4	Esquesing Line and James Snow Parkway.....	92
9.3.5	James Snow Parkway and Steeles Avenue.....	93
9.3.6	Boston Church Road and 5 Side Road	93
9.3.7	Esquesing Line/Fourth Line and 5 Side Road	93
9.3.8	Proposed Site Accesses.....	93
10	TRANSPORTATION DEMAND MANAGEMENT	95
10.1	Introduction of Alternate Travel Modes.....	95
10.2	Core Commuter Information and Assistance	95
10.3	Financial Incentives	96
10.4	Supporting Infrastructure and Services.....	96
10.5	TDM Program Support	96
10.6	TDM Measure Checklist.....	97
11	RECOMMENDATIONS.....	99

APPENDICES

Appendix A	Pre-Study Consultation
Appendix B	Concept Plan, Draft Plans and Site Circulation Review
Appendix C	Milton Cross Sections
Appendix D	Existing Traffic Data
Appendix E	Halton Region Capital Budget Report
Appendix F	Background Traffic Forecast Report
Appendix G	Escarpment Business Community 2009 Study- 2019 Traffic Distribution
Appendix H	Intersection Control Warrants and Conceptual Designs
Appendix I	Synchro and ARCADY Capacity Analysis
Appendix J	SimTraffic Queuing Analysis

LIST OF FIGURES

Figure 2-1	Site Location.....	3
Figure 2-2	Halton Business Community Concept Plan.....	5
Figure 2-3	Proposed Site Access Locations	9
Figure 3-1	Transit Service	16
Figure 3-2	2019 Traffic Volumes	18
Figure 3-3	2021 Baseline Traffic Volumes	19
Figure 4-1	2024 Future Background Traffic Volumes	23
Figure 4-2	2029 Future Background Traffic Volumes	24
Figure 4-3	2034 Future Background Traffic Volumes	25
Figure 5-1	Site Traffic Volumes.....	34
Figure 5-2	Automobile Site Traffic Volumes.....	35
Figure 5-3	Heavy Vehicle Site Traffic Volumes.....	36
Figure 6-1	2024 Future Total Traffic Volumes.....	38
Figure 6-2	2029 Future Total Traffic Volumes.....	39
Figure 6-3	2034 Future Total Traffic Volumes.....	40

LIST OF TABLES

Table 2-1	Intersection Spacing and Daylighting	12
Table 4-1	Annual Growth Rate as per Study Horizon Year	22
Table 5-1	Site Trip Generation - West Parcel Buildings.....	28
Table 5-2	Site Trip Generation-East Parcel Buildings	29
Table 5-3	Site Trip Generation - East and West Parcels Combined.....	30
Table 5-4	Site Trip Distribution-Automobiles	32
Table 5-5	Site Trip Distribution-Heavy Vehicles.....	33
Table 7-1	MTO Left Turn Warrant Summary	42
Table 7-2	TAC based Left Turn Lane Total Storage Length Summary	44
Table 8-1	Regional Road 25 and 5 Side Road Capacity Analysis.....	49
Table 8-2	2029 Future Background Roundabout Capacity Analysis Summary	52
Table 8-3	2034 Future Background Roundabout Capacity Analysis Summary	53
Table 8-4	2029 Future Total Roundabout Capacity Analysis Summary	54
Table 8-5	2034 Future Total Roundabout Capacity Analysis Summary	55
Table 8-6	Regional Road 25 and James Snow Parkway	56
Table 8-7	Boston Church and James Snow Parkway	59
Table 8-8	Esquesing Line and James Snow Parkway Capacity Analysis	62
Table 8-9	James Snow Parkway and Steeles Avenue Capacity Analysis	65
Table 8-10	Boston Church Road / Third Line and 5 Side Road Capacity Analysis.....	70
Table 8-11	Esquesing Line and 5 Side Road / Fourth Line Capacity Analysis	72
Table 8-12	West Site Access 1 and 5 Side Road Capacity Analysis.....	75
Table 8-13	West Site Access 2 and 5 Side Road Capacity Analysis.....	76
Table 8-14	Boston Church Road and West Site Access 3 Capacity Analysis.....	76
Table 8-15	Boston Church Road and West Site Access 4 Capacity Analysis.....	77
Table 8-16	Boston Church Road and West Site Access 5 Capacity Analysis.....	78
Table 8-17	Boston Church Road and East Site Access 1 Capacity Analysis.....	78
Table 8-18	James Snow Parkway and East Site Access 2 Capacity Analysis.....	80
Table 8-19	James Snow Parkway and East Site Access 3 Capacity Analysis.....	82
Table 9-1	95 th Percentile Queues: 2021 Baseline	83
Table 9-2	95 th percentile Queues: 2024, 2029 & 2034 Future Background.....	85
Table 9-3	95 th Percentile Queues: 2024, 2029, & 2034 Future Total	89
Table 10-1	TDM Measure Checklist.....	97
Table 11-1	Recommendations Summary	102

1 INTRODUCTION

1.1 Retainer and Objective

TYLin was retained by Orlando Corporation to prepare a Traffic Impact Study (TIS) in support of a rezoning application, Regional Official Plan Amendment (ROPA), Local Official Plan Amendment (LOPA), and Draft Plan of Subdivision Applications (West and East) for the proposed industrial warehouse development located on 113 hectares of land that consists of two separate parcels of land north of James Snow Parkway, west of Esquesing Line, south of 5 Side Road, and east of the CN railway line (west of Boston Church Road) in the Town of Milton. The study objectives are as follows:

- ▶ Establish existing baseline traffic conditions for the study area and update the baseline conditions to derive the future background volumes at all study intersections for the 2024, 2029, and 2034 planning horizons.
- ▶ Analyze future build-out and 5 and 10-year post build-out operating conditions for all study intersections for 2024, 2029, and 2034 planning horizons.
- ▶ Based on the composition of the site, apply the estimated site trip generation and distribution to the study area road network and determine the future impacts in the context of all local transportation modes.

1.2 Study Background

The proposed development will consist of three industrial buildings on the parcel of land west of Boston Church Road, and four industrial buildings on the parcel of land to the east.

Traffic assessment procedures will comply with the Town of Milton's and Region of Halton's guidelines where applicable, and traffic impacts will be assessed at all identified study intersections for all study horizon years.

A detailed terms of reference was submitted to the Town and Region by TYLin for review. Comments were received from the Town and Region and have informed the general work program for the enclosed study. TYLin's submitted terms of reference and pre-consultation correspondence with the agencies is provided in **Appendix A**.

As per pre-consultation with Town and Region Staff, future study horizons 5 and 10 years beyond the anticipated full build-out year (2024) were examined. This study establishes the baseline traffic volumes, estimates the background 2024, 2029, and 2034 traffic growth on the road network in the study area, estimates and assigns new subject site traffic volumes onto the adjacent road network,

and documents the expected site (and non-site) related impacts under the 2024, 2029, and 2034 future horizons.

This second submission of the TIS incorporates comments from Town and Region Staff on the first version of the TIS that was submitted in May of 2021.

2 SITE CHARACTERISTICS

2.1 Site Location

The proposed industrial warehouse development is located on 113 hectares of land within the North Milton Business Park Tertiary Plan in Milton, Ontario. The subject lands consist of two parcels of land bisected by Boston Church Road. The combined site is generally bounded by Esquesing Line to the east, the CN Rail corridor to the west, James Snow Parkway to the south, and 5 Side Road to the north. The land adjacent to the subject site consists of agricultural uses and isolated residential use to the north and the east. Predominantly industrial uses are located to the south and the west of the subject lands. The location of the site and the surrounding road network is illustrated in **Figure 2-1**.

Figure 2-1 Site Location



2.2 Study Area

The following study intersections were selected through pre-consultation discussions with the Town and Region:

- ▶ Regional Road 25 at James Snow Parkway (Regional Road 4) – Signalized
- ▶ Boston Church Road at James Snow Parkway (Regional Road 4) – Signalized
- ▶ Esquesing Line at James Snow Parkway (Regional Road 4) – Signalized
- ▶ Steeles Avenue (Regional Road 8) at James Snow Parkway (Regional Road 4) – Signalized
- ▶ Regional Road 25 at 5 Side Road – Signalized
- ▶ Boston Church Road at 5 Side Road
- ▶ Esquesing Line at 5 Side Road
- ▶ Two Site West Accesses at 5 Side Road (Future Condition)
- ▶ Three West Site Accesses at Boston Church Road (Future Condition)
- ▶ One East Site Access at Boston Church Road (Future Condition)
- ▶ Two East Site Accesses via proposed public road intersections at James Snow Parkway (Future Condition)

2.3 Site Plan

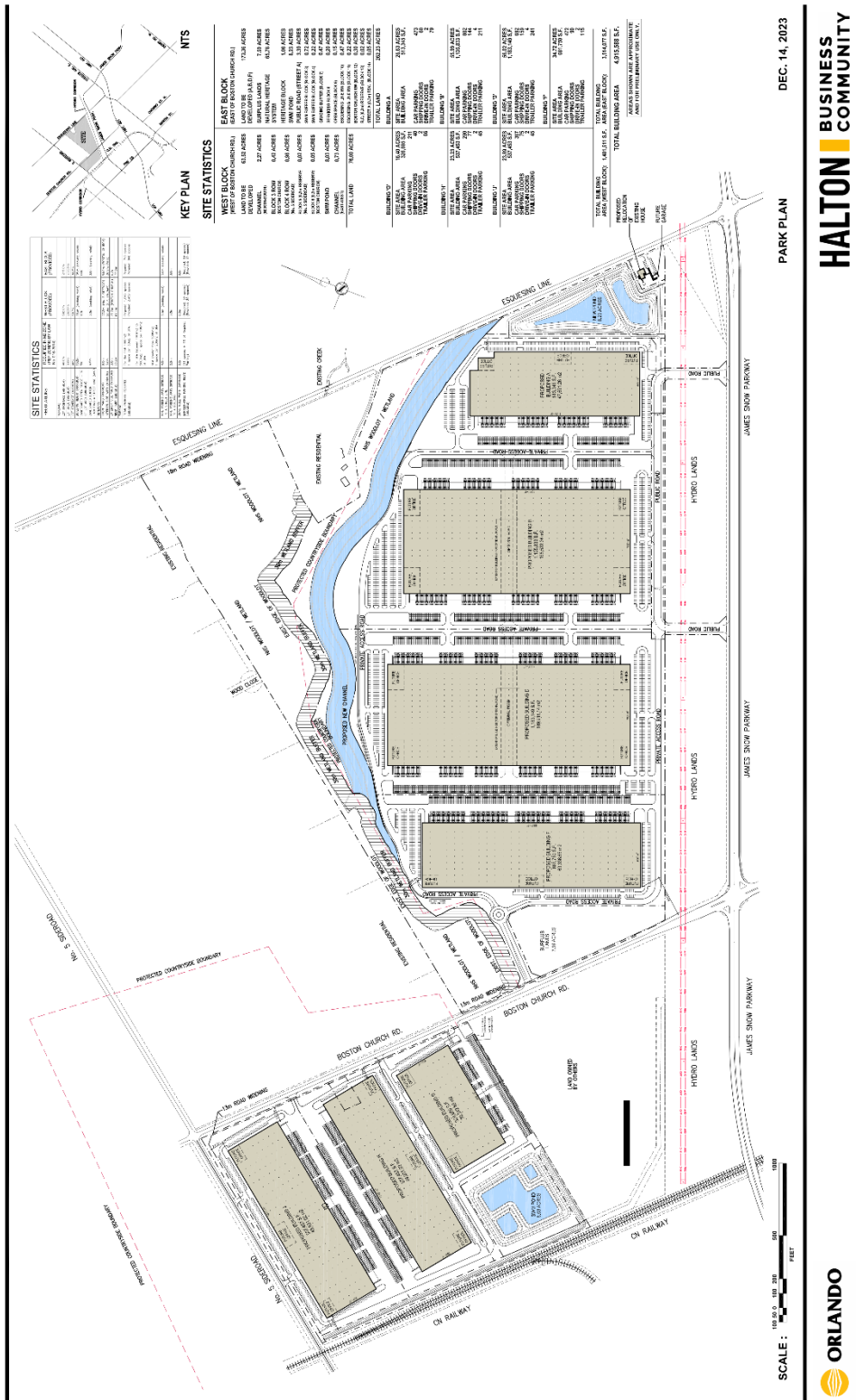
The December 14, 2023 concept plan proposes a total of seven buildings with a combined gross floor area (G.F.A.) of 456,674 m² (4,915,588 ft²). Three of the buildings are located on the west parcel, totaling 130,205 m² (1,401,511 ft²) G.F.A., and the remaining four buildings located on the east parcel have a total G.F.A. of 326,469 m² (3,514,077 ft²).

Access to the east lands is proposed via three full-moves intersections. One access to Boston Church Road is proposed in addition to two full-moves intersections to James Snow Parkway. via the construction of a new crescent public road that will cross the hydro corridor north of James Snow Parkway, immediately south of the subject site.

Access to the west lands is proposed via four full-moves and one right-in and right-out access driveways. The easterly connection to 5 Side Road is proposed to allow only right-in and right-out movements while the westerly connection to 5 Side Road and three connections to Boston Church Road are proposed as full-moves.

The proposed site accesses are shown on the concept plan, provided as **Figure 2-2** and in **Appendix B**.

Figure 2-2 Halton Business Community Concept Plan



2.4 Heritage House located at 8350 Esquesing Line

Representatives of the owner of the property municipally described as 8350 Esquesing Line (Orlando Corporation lands) approached the Town with a request to facilitate the creation of a block of approximately one acre on the south-east corner of the site, intended to facilitate the relocation of the Aitken-Snow Heritage House approximately 100 metres south from its present location on the west side of Esquesing Line north of James Snow Parkway.

As adopted through LOPA 67 (approved by the Region), it is understood Town Staff, “reviewed the request and considers the “Business Commercial Area” land use designation appropriate for this block. Staff anticipates that the block and building will be occupied by an adaptive re-use, respectful of the heritage and architectural value of the house, consisting of a business and professional office or service commercial use.”

It is to be noted that the proposed driveway from the Business Commercial Block to Esquesing Line services only the Heritage House and not the industrial warehouse buildings located on the east and west parcels of the development.

It is TYLin’s opinion the relocation of the Heritage House and changes to the Blocks Land Use designation will have nominal impact to traffic operations in the study area. Therefore, it has not been analyzed in this study at this point of time.

2.5 Proposed Site Accesses

A total of eight site accesses are proposed to provide access for automobile and heavy vehicle traffic to the east and west parcels of the development. The west parcel proposes five unsignalized accesses; two located on 5 Side Road and three located on Boston Church Road. As per comments received from Town of Milton and discussion with Orlando Group, the easterly access on 5 Side Road (West Access 2) is proposed to allow only right-in and right-out movements while the westerly 5 Side Road access (West Access 1) is proposed to operate as a full moves access.

The east parcel proposes three accesses; one located on Boston Church Road (unsignalized), and two located on James Snow Parkway (both signalized from the 2024 horizon year onwards). The two “accesses” to James Snow Parkway are planned as the two ends of a single crescent public road through the hydro corridor north of James Snow Parkway. Additionally, an access is proposed from the Business Commercial Block to Esquesing Line which services only the Heritage House and not the industrial warehouse buildings located on the east and west parcels of the development. The trips to/from this Esquesing Line access have not been included in analysis efforts at this point of time, as their impact on traffic operations is considered to be negligible.

To address the comment from the Region of Halton staff, approval from the Hydro One Networks

Inc. (HONI) for proposing access through their corridor was requested by TYLin. HONI provided conditional approval on February 3, 2023, after reviewing the proposed roadway crossings of the Hydro corridor, located between Boston Church Road and Esquesing Line. The technical approval was obtained based on the set of drawings i.e., Engineering Drawings, Landscape Plans, and Lighting Plan prepared for the Halton Business Community. The approval letter from HONI stating their terms and conditions is provided in the **Appendix B** attached.

Both site accesses to James Snow Parkway are proposed to be signalized from the 2024 horizon year onwards. This is partly because Long Combination Vehicles (LCVs) are expected to access the site using both connections to James Snow Parkway, and the signalization of these accesses will better accommodate LCV turning movements. Additionally, planning for both connections to be signalized from 2024 horizon onwards is more time and cost efficient in the overall development process.

The reasons for proposing two accesses on James Snow Parkway include, but are not limited to:

- ▶ It is critical to the function and operation of the proposed development of the site.
- ▶ The east parcel of the subject lands proposes to contain four industrial buildings with a total gross floor area of 3,514,077 ft². The proposed private driveway access to Boston Church Road is not sufficient to service an industrial business park of this size.
- ▶ The Town of Milton will not support a public road to the subject lands from Boston Church Road, as such this access driveway will serve as secondary access only, primarily utilized by Building F. A primary access from James Snow Parkway will be required to adequately service the majority of lands and buildings to the east of Building F.
- ▶ A “looped” municipal connection or public crescent and accesses onto James Snow Parkway allow for the buildings located east of Building F to have legal frontage onto a municipal right-of-way. This is critical for the planned and orderly development of the subdivision and potential future severance of each building into separate properties or lots.
- ▶ It is understood the Town prefers, when feasible, new public road be designed avoiding dead-ends terminating as a cul-de-sac to facilitate the movement of general traffic and service vehicles.
- ▶ Halton Region Engineering requires services for the development to be provided in a public right-of-way and will not support services in a private easement. The ‘looped’ road design allows for municipal services to be provided in a public right-of way to the subject lands/buildings and back out onto James Snow Parkway in an efficient manner.
- ▶ Two access points to the development via James Snow Parkway are advantageous in an emergency response situation to allow for reduced response time, and will also allow for

a secondary access point should one access/intersection be blocked at the time of the emergency.

Thus, TYLin recommends providing two access driveways and a crescent as it creates an efficient servicing and traffic circulation pattern while avoiding a dead-end public right-of-way.

Although only one access is required on 5 Side Road from traffic volume perspective, the TIS has been updated to include two accesses on 5 Side Road to mitigate/lessen the impact of site traffic on 5 Side Road. The access closest to the intersection of Boston Church Road and 5 Side Road (West Access 2) is proposed to allow only right-in and right-out movements while the other 5 Side Road access (West Access 1) is proposed to operate as a full moves access with an auxiliary westbound left turn lane.

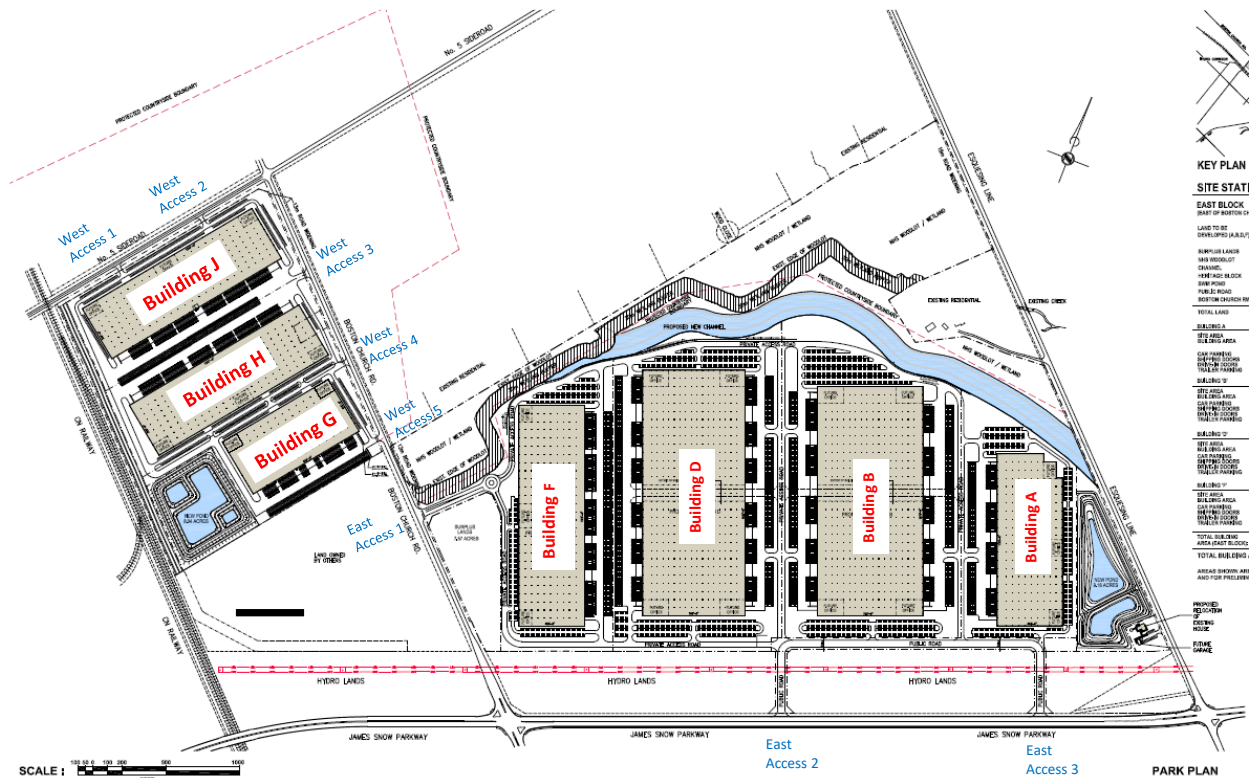
The reasons for proposing two accesses on 5 Side Road include, but are not limited to:

- ▶ It is critical to the function and operation of the proposed development of the site.
- ▶ Two access points to the development via 5 Side Road are advantageous in an emergency response situation to allow for reduced response time and will also allow for a secondary access point should one access/intersection be blocked at the time of the emergency.
- ▶ It is recommended by the client for the ease of internal traffic operations at the site.
- ▶ It provides flexibility in the future operations of the development (such as multiple tenants occupying the same building).

Thus, TYLin recommends providing two access driveways on 5 Side Road as it allows for efficient and flexible traffic circulation to/from 5 Side Road.

Figure 2-3 provides the names and locations of all seven buildings and the eight proposed accesses to the development. These names were used for analysis and reporting purposes.

Figure 2-3 Proposed Site Access Locations



2.6 Access Circulation Analysis

Note that the site circulation analysis was only completed at the site accesses at the public roads, as shown in **Appendix B**. Internal circulation of the design vehicle within the site will be addressed during the specific site plan approvals for each individual building development application. The circulation analysis protects for a LCV design vehicle with a length of 41 metres. The design vehicle can navigate in and out of the proposed site accesses and new public intersections without conflict, contingent on the forthcoming adoption of proposed changes to the curb radii of the accesses and public road, as shown in the **Appendix B**.

2.7 Subdivision Design Review

This section provides a review of design elements for proposed industrial warehouse development. Transportation Association of Canada (TAC) Geometric Design Guidelines and applicable engineering standards for the Town of Milton and Halton Region were referenced where appropriate.

2.7.1 Right-of-Way

2.7.1.1 Major Arterial

Through LOPA 67, lands identified a Specific Policy Area No. 42, inclusion of the subject site, shall be subject to additional development application requirements including:

'James Snow Parkway from Highway 401 to No. 5 Side Road is planned to be widened to six lanes from Highway 401 to Tremaine Road per the Region's Transportation Master Plan. The proposed start of construction is currently scheduled for 2030 but is subject to change. Should network improvements in the area be required through a Transportation Impact Study as a result of new development prior to the completion of road widening, the applicant will be responsible for the financing and construction of such improvements.'

James Snow Parkway is under Region of Halton jurisdiction and is classified as a C(4) Urban Corridor with an ultimate right-of-way (ROW) with of 47 metres.

As discussed in **Section 4.2**, it was assumed for analysis purposes that the widening of James Snow Parkway would be completed by the 2034 planning horizon, and operations were assessed with an additional travel lane in both directions.

2.7.1.2 Collector Roads

Both Boston Church Road and Esquesing Line are identified as Collector roadways in the Town's LOPA Schedule C.2.A). The Town's Official Plan identifies that Collector roads not listed in Table 2A of the Official Plan require a 26 metre ROW. As a result, the Draft Plan of Subdivision (prepared by GSAI) for lands east and west of Boston Church Road identify protection for a 26 metre ROW for both Boston Church Road and Esquesing Line. The Draft Plans of Subdivision are located in **Appendix B**.

Site trip distribution resulted in a nominal amount of passenger car, and no heavy truck site-related traffic assigned to Esquesing Line, therefore, it is our opinion the need to widen and/or upgrade Esquesing Line is not required at this time to accommodate build-out of the subject lands.

Based on the forecasted 2034 total traffic volumes (see **Figure 6-3** and capacity analysis in **Section 8.2**), TYLin is of the opinion that from a traffic perspective any road improvements to Boston Church Road that are specifically triggered by the subject development do not require an additional lane of traffic along the full length of Boston Church Road. However, the developer proposes to reconstruct the existing rural section of Boston Church Road between James Snow Parkway and 5 Side Road to its ultimate 26.0 metre ROW width based on Town Standard E-5, on lands they currently control and exclusive of lands owned by others. Reconstruction will include the full 16.8 metre roadbed width (measured from back of curb to back of curb) per Town standard to ensure the pavement structure will accommodate heavy truck traffic.

The 26.0 metre ROW width will be implemented where feasible, exclusive of lands owned by others. The developer proposes to accommodate the 3.0m metre widening required on either side of Boston Church Road within the subject lands. The outstanding 3.0 metre widening of the ultimate 26.0 metre ROW, located on lands owned by others, will be completed through future development.

The current 20.0 metre ROW and additional 3.0 metre widening within the subject lands will adhere to Town standard E-5 including boulevard treatments such as sidewalks, landscaping and utilities. On-street bike lanes can be provided as required by the Town.

The roads are to be consistent with Town of Milton engineering design standards for a single or double loaded major collector local road. Town of Milton Standard Drawing E-5 is provided in **Appendix C**.

2.7.1.3 Minor Collector Road

The public road, identified within the Draft Plan east of Boston Church Road and north of James Snow Parkway, is proposed as a 24 metre internal public road providing two connections to James Snow Parkway, consistent with Town of Milton engineering design standards for a single or double loaded minor collector local road. Town of Milton Standard Drawing E-4 is provided in **Appendix C**. The road connections traversing the hydro corridor adjacent to the James Snow Parkway are proposed as part of the new development and supported by the Transportation Impact Study herein.

2.7.2 Intersection Spacing and Daylighting

2.7.2.1 Town of Milton

Town of Milton Engineering and Park Standards Manual states the geometric design of municipal roads shall conform with the standards set out in the latest edition of the Transportation Association of Canada (TAC) Manual. TAC requires a minimum 400 metre full movement signalized access spacing. Should traffic signals be warranted in the future, the proposed Street 'A' on Boston Church Road protects for the above requirements north of the existing signalized James Snow Parkway intersection.

Additionally, the proposed private driveway accesses proposed to service Phase 1 satisfy TAC minimum access spacing requirements.

Table 1.2 of the Town of Milton Engineering and Park Standards Manual identifies the daylighting requirements at each intersection. The intersection characteristics per the Town's requirements are summarized in **Table 2-1**.

Table 2-1 Intersection Spacing and Daylighting

Intersection	Daylighting (m)	Minimum Intersection Spacing (m)
Local / Laneway	5 – Radius	60
Local / Local	5 – Radius	60
Local / Collector	7.5 - Triangle	60
Collector / Collector	10 - Triangle	60

Note: Three-legged intersections may be spaced a minimum of 40 m (TAC Section 2.3.1.7)

The proposed subdivision road network satisfies the requirements detailed in **Table 2-1**.

2.7.2.2 Halton Region

Table 1 of the Region’s Access Management Guideline outlines the minimum spacing requirements for access and road connections to Regional roads. James Snow Parkway is classified as a C (4) Urban Corridor and requires a minimum 300 metre full movement access spacing. The proposed subdivision road network along James Snow Parkway satisfies the above requirements.

The Region’s Official Plan requires daylighting triangles measured 15m by 15m at the intersection of a Major Arterial Road with another highway (common and public road). The proposed public road intersections at James Snow Parkway will satisfy this requirement and the Adopted LOPA 67 policy 4.11 (b).

2.7.3 Intersection Angle

Intersection angle requirements are provided in Table 1.1 of the Town of Milton Engineering and Park Standards Manual. Intersection angles within the subdivision are provided at 90 degrees which satisfies Town guideline requirements.

It is desirable as per Section 5.4 of the Region’s Access Management Guideline that the centerline of the new driveway and the centerline of the Regional Road meet at or nearly at right angles to ensure safe sight visibility when maneuvering to and from the site. The proposed subdivision road network satisfies the above requirements.

2.7.4 Sight Distance

The minimum safe stopping sight distance based on the Town of Milton Engineering and Park Standards Manual for the road network is as follows:

- ▶ Laneway (40 km/h design speed): 45 metres
- ▶ Local (50 km/h design speed): 65 metres
- ▶ Collector (50 or 60 km/h design speed): 65 or 85 metres
- ▶ Arterial (60 or 80 km/h design speed): 85 or 140 metres

The smaller numbers are for minor roads and the larger numbers are for major roads.

As per the Region's Access Management Guideline:

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

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

Stopping sight distances were reviewed at potential critical locations along the study area road network, and based on the intersection angles noted in Section **2.7.3** and the straight vertical and horizontal alignments of Boston Church Road and James Snow Parkway, none were identified as substandard to the above guidelines.

2.8 Parking Review

As per the latest concept plan dated February 22, 2023 proposed parking supply for each building satisfies the Town of Milton Zoning By-Law parking requirements for zone M2 – General Industrial Zone.

3 EXISTING CONDITIONS

3.1 Road Network

The following describes the existing road network within the study area.

James Snow Parkway (Regional Road 4) is an urban roadway under the jurisdiction of Halton Region and currently has four travel lanes and runs in a general east-west direction north of Highway 401 in the study area. James Snow Parkway currently extends from Britannia Road in the south to north of Highway 401 through the Milton 401 Business Park area and further extends from roadway 's previous westerly limit (approximately 900 metres west of Regional Road 25) to the Dublin roundabout (which was completed in 2020). Within the study area, a posted speed limit of 70 km/h is present along the frontage of the site and transitions to a posted speed limit of 60 km/h at Holgate Crescent, west of the CNR corridor.

Regional Road 25 is a north-south urban roadway under the jurisdiction of the Region of Halton and has two lanes in each direction of travel with a posted speed limit of 70 km/h within the study area. Regional Road 25 has three northbound travel lanes between Highway 401 westbound off-ramp and James Snow Parkway.

5 Side Road is an east-west rural roadway under the jurisdiction of the Town of Milton with a paved two-lane cross-section. Within the study area, 5 Side Road has a posted speed limit of 60 km/h.

Boston Church Road is a north-south rural roadway under the jurisdiction of the Town of Milton with an existing 20 metre ROW width. Within the study area, Boston Church Road is a paved two-lane roadway with a posted speed limit of 70 km/h south of 5 Side Road that transitions to 60 km/h approximately 130 metres north of James Snow Parkway.

Esquesing Line is a north-south rural roadway under the jurisdiction of the Town of Milton with an existing 20 metre ROW width. Within the study area, Esquesing Line is a paved two-lane roadway with a posted speed limit of 60 km/h.

Steeles Avenue (Regional Road 8) is an urban roadway under the jurisdiction of Halton Region and currently has four travel lanes and runs in a general east-west direction north of Highway 401. Within Halton Region, Steeles Avenue currently extends from its terminus at Appleby Line in the west to Winston Churchill Boulevard in the east. Within the study area, posted speed limits of 60 and 70 km/h are present west and east of James Snow Parkway, respectively.

3.2 Pedestrian Routes

The existing rural cross-sections of 5 Side Road, Boston Church Road, and Esquesing Line within the study area do not provide sidewalks. Sidewalks are not provided along Regional Road 25 between James Snow Parkway and 5 Side Road.

Directly south of the subject site, a multi-use path is provided on the south side of the James Snow Parkway. The multi-use path continues westward to Holgate Crescent (west leg) and then transitions to a standard sidewalk as it approaches Regional Road 25. Boston Church Road has a sidewalk on the west side of the road, south of James Snow Parkway.

Along Steeles Avenue, a multi-use path is present on the south side of the road, while a sidewalk is present on the north side, west of James Snow Parkway.

All signalized intersections within the study area have crosswalks with pedestrian signals.

3.3 Cycling Routes

Dedicated bicycle lanes are not currently provided within the study area, however, the multi-use paths along the south side of James Snow Parkway and Steeles Avenue act as cycling route connections through the area. As per Town of Milton Transportation Master Plan (March 2018) Map 6b, there is a long-term plan (year 2031 and beyond) of implementing on-road bike lanes on the section of James Snow Parkway from Dublin Line to the north of Highway 401 exit ramp. As part of medium-term plan (between 2021-2031) a bike lane is proposed on the section of Steeles Avenue between James Snow Parkway and Thompson Road North and an in-boulevard multi-use trail on both sides of road is proposed on the section of Steeles Avenue between Thompson Road North and Regional Road 25. A paved shoulder is also proposed on 5 Side Road by year 2021.

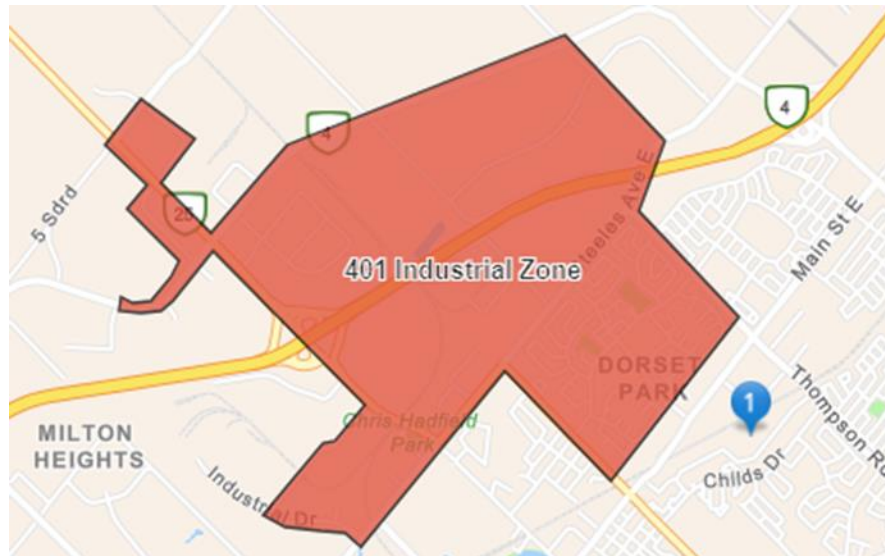
3.4 Transit Services

At the time of reporting, Milton Transit operates Routes 1A (Industrial west to east) and 1B (Industrial east to west) within the vicinity of the subject site. The only stop currently serving the site would be at Boston Church Road and James Snow Parkway, located south of the intersection. Bus Routes 1A and 1B provide connections to a GO Transit Bus stop at a carpool lot located at the Highway 401 and Regional Road 25 interchange. The Industrial bus routes also provide a connection to the Milton GO Train Station.

As of September 7, 2021, the industrial routes 1A, B, C, and Trans-Cab will be replaced by the Milton Transit OnDemand service in the 401 Industrial Service Area, which will provide weekday and Saturday transit service without a fixed route or schedule via a mobile app. The transit will connect passengers "to/from available fixed route service at key transfer locations" in the town, via

smaller-sized full accessible Milton Transit buses. The service will operate weekdays from 5:15 a.m. to 10:11 p.m., and Saturdays from 7:10 a.m. – 7:40 p.m.. The 401 Industrial Service Area is shown in **Figure 3-1**, with the Milton Go Station marked as transfer location #1.

Figure 3-1 Transit Service



It is anticipated that future transit route(s) and/or expanded services will be proposed within the vicinity of the subject site upon full development and occupation of the remaining Milton 401 Industrial/Business Park lands that are adjacent to the subject site to the west and the south.

3.5 Existing Traffic Data

Weekday turning movement counts were undertaken by TYLin at existing study intersections (with the exception of James Snow Parkway at Steeles Avenue) on April 16, 2019 during the a.m. and p.m. peak periods. Counts were collected for the a.m. peak period from 7:00 to 10:00 a.m., and the p.m. peak period data was collected from 4:00 to 7:00 p.m.

Based on communication with regional Staff in early 2021, it was requested that the intersection of James Snow Parkway and Steeles Avenue be added to the proposed study area. Accordingly, TYLin requested historical counts from the Region's database, as new turning movement counts collected at the time of the request would be considered atypical due to the ongoing impacts of the COVID-19 Pandemic on traffic volumes and patterns.

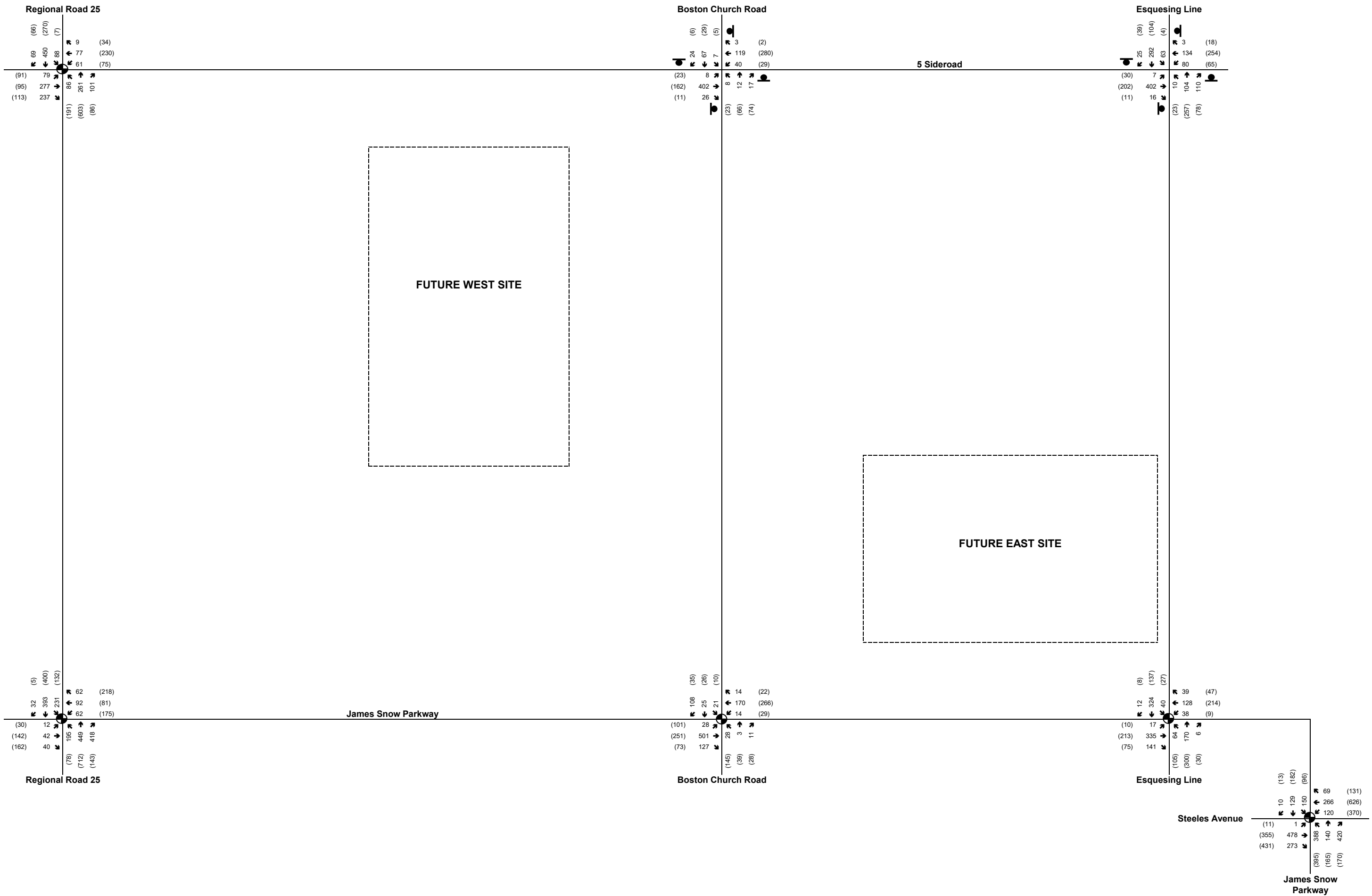
Historical turning movement counts for James Snow Parkway at Steeles Avenue East were obtained from the Region, and were counted on April 25, 2018 during the a.m. and p.m. peak periods.

Counts were collected for the a.m. peak period from 7:00 to 9:00 a.m., and the p.m. peak hour from 3:00 to 6:00 p.m.. A growth rate of 2% was applied to all movements at the intersection to estimate

2019 baseline traffic volumes in order to bring the volumes in-line with 2019 traffic levels recorded at all other study area intersections.

Due to the time that has passed between the collection of the existing traffic counts and the submission of this report, it was determined that counts at all study area intersections would be grown to the 2021 horizon year to estimate baseline 2021 volumes. All turning movement volumes at all study area intersections were grown from 2019 to 2021 using an annual growth rate of 2%.

Figure 3-2 and **Figure 3-3** provide the 2019 and 2021 baseline traffic volumes, respectively, at the study intersections for the weekday a.m. and p.m. peak hours. Existing and historical traffic data is provided in **Appendix D**.

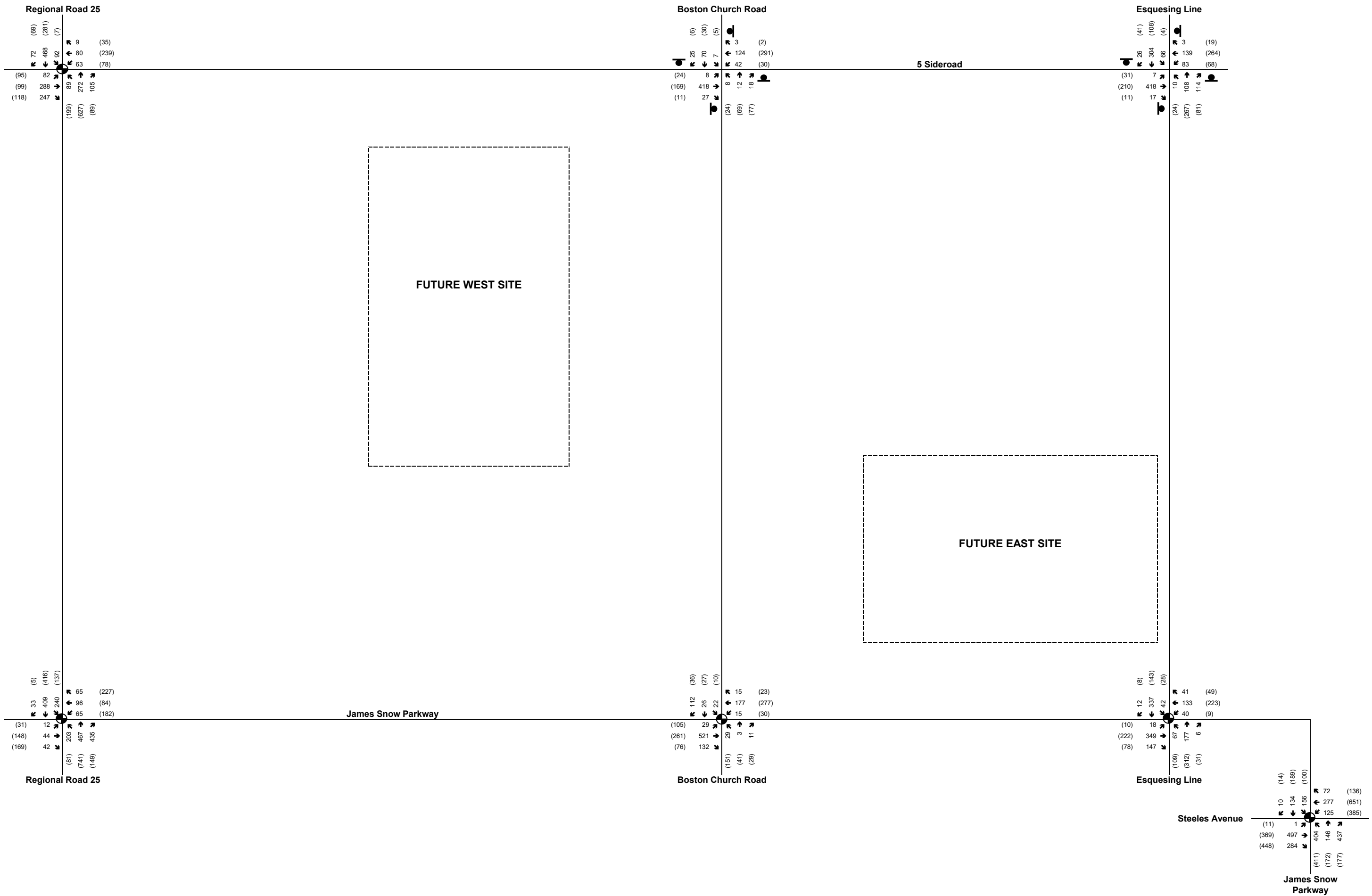


LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ◉ Signalized Intersection
- ◐ Stop Control

2019 Baseline Traffic Volumes
Figure 3-2

Figure 3-3 2021 Baseline Traffic Volumes



LEGEND
 XX AM Peak Hour Volumes
 (XX) PM Peak Hour Volumes
 Signalized Intersection
 Stop Control

2021 Existing Traffic Volumes
Figure 3-3

4 FUTURE BACKGROUND CONDITIONS

4.1 Study Horizon Years

A planning horizon of 2024 was selected to correspond with the anticipated build-out of the proposed industrial development. The study also includes five (2029) and ten-year (2034) planning horizons beyond full build-out of the proposed development.

4.2 Roadway Improvements

As per Halton Region's Budget and Business Plan Capital Report 2022, Regional Road 25 is scheduled to be widened within the study area. The Region plans to widen Regional Road 25 from four lanes to six lanes between Steeles Avenue to the south, and 5 Side Road to the north with construction scheduled for 2026. The Region also plans to widen Regional Road 25 north of 5 Side Road to 10 Side Road from a 2-lane cross-section to a 4-lane cross-section with construction scheduled for 2027.

As part of the Environmental Assessment (October 2020) that was undertaken to plan the widening of Regional Road 25, its intersection with 5 Side Road was proposed to be converted from signalized control to a roundabout. The roundabout configuration provided in the EA's design drawings was accounted for in the 2029 and 2034 horizon years and was analyzed using roundabout analysis software.

Also identified within the Region's 2022 Capital Budget, Steeles Avenue is to be widened from 4 lanes to 6 lanes from Regional Road 25 in the west through the study area to Trafalgar Road in the east, with construction scheduled for 2027.

Given the planned improvements to Regional Road 25 and Steeles Avenue and the anticipated construction start dates, it has been assumed for analysis purposes that the Regional Road 25 and Steeles Avenue widening project will be completed by 2029, and therefore the road widening is taken into consideration in 2029 planning horizon. Accordingly, the 2024 analysis will assess operations on Regional Road 25 and Steeles Avenue based on the existing lane configurations, and the 2029 will assess operations with an additional travel lane in both directions on Regional Road 25 and Steeles Avenue.

The 2022 Capital Budget also identifies the future widening of James Snow Parkway within the study area. James Snow Parkway is to be widened from 4 lanes to 6 lanes from the Highway 401 interchange to Tremaine Road (west of Regional Road 25), with construction planned to start in 2030. It was assumed for analysis purposes that the widening of James Snow Parkway would be completed by the 2034 planning horizon, and operations were assessed with an additional travel

lane in both directions 2034 horizon year.

No other improvements to Town or Regional roads were identified within the study area for the planning horizons chosen for this study. Excerpts from Halton's 2022 Capital Budget that identify each widening project are provided in **Appendix E**.

4.3 Background Growth

Annual traffic growth was applied to all existing roads within the study area by growing all intersection movements at each study intersection. Based on consultation with Town of Milton Staff, an annual growth rate of 2% was applied to Town of Milton roads (Boston Church Road, Esquesing Line, and 5 Side Road) within the study area.

Halton Region Staff provided detailed information regarding annual growth rates and anticipated changes to the annual growth rates based on capital construction projects within the study area and the Region's EMME model forecasts. An annual growth rate of 2% was applied to all Halton Region roads (RR 25, James Snow Parkway, and Steeles Avenue) to grow the 2019 traffic data to estimated 2021 baseline traffic levels. The 2% annual growth rate was maintained to grow 2021 traffic to the future 2024 full build-out horizon year.

From 2024 onwards, an annual growth rate of 3% was applied to RR 25 to account for widening of the roadway between the 2024 and 2029 horizon years. Similarly, to account for future widening of Steeles Avenue, an increased annual growth rate of 4% was applied to Steeles Avenue from 2029 onwards. The Region also plans to widen James Snow Parkway within the study area; however, the widening is not expected to be completed until after the 2028 study horizon. Accordingly, an increased annual growth rate of 6% was applied to James Snow Parkway traffic from the 2029 horizon year onward to forecast background traffic growth post-widening.

The post widening growth rates were applied to all turning movements at the intersection of Regional Roads and to only through movements at the intersection of Regional Roads with Town owned approaches. A 2% growth rate was maintained for turning movements on the Regional Road intersections with Town-owned approaches. A summary of the annual growth rates applied to each road to estimate the background growth for each horizon year within the study area is provided in **Table 4-1**.

Table 4-1 Annual Growth Rate as per Study Horizon Year

Road	Annual Growth Rate				
	2018 - 2019	2019 - 2021	2021 - 2024	2024 - 2029	2029 - 2034
Steeles Avenue ¹	2%	2%	2%	2%	4%
RR 25	N/A	2%	2%	3%	3%
James Snow Parkway ¹	2%	2%	2%	2%	6%
5 Side Road	N/A	2%	2%	2%	2%
Boston Church Road	N/A	2%	2%	2%	2%
Esquesing Line	N/A	2%	2%	2%	2%

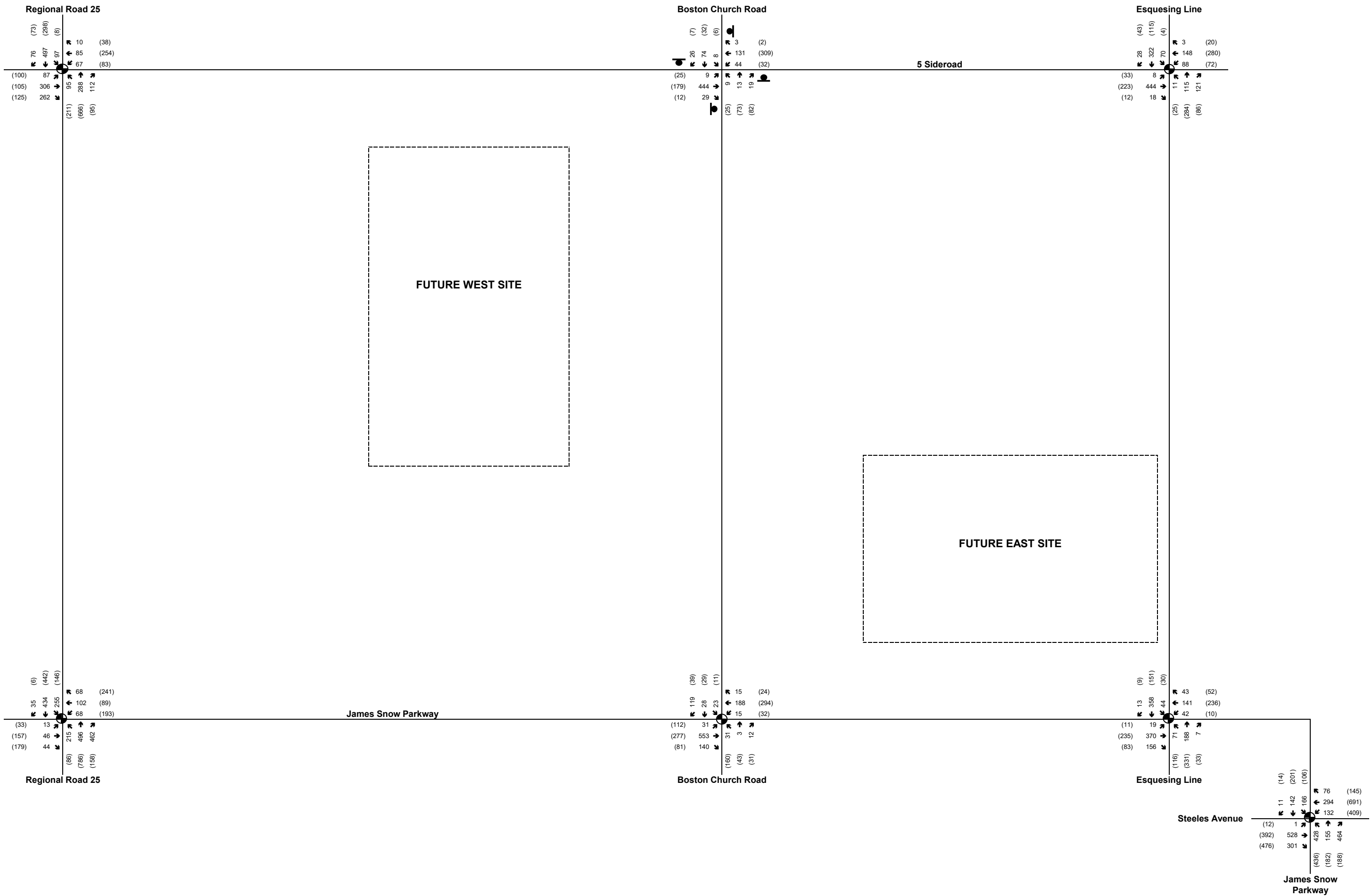
1. As noted in Section 3.5, all movements at the intersection of Steeles Avenue and James Snow Parkway were grown by 2% to bring the historical 2018 Turning Movement Counts provided by the Region in-line with the 2019 counts conducted at all other study area intersections.

4.4 Background Developments

During pre-consultation with the Town of Milton and Region of Halton, specific background developments to consider for analysis were not identified within the vicinity of the study area. As such, growth rates provided by the Region account for the background development traffic generated within the vicinity of the subject site.

4.5 Background Traffic Volumes

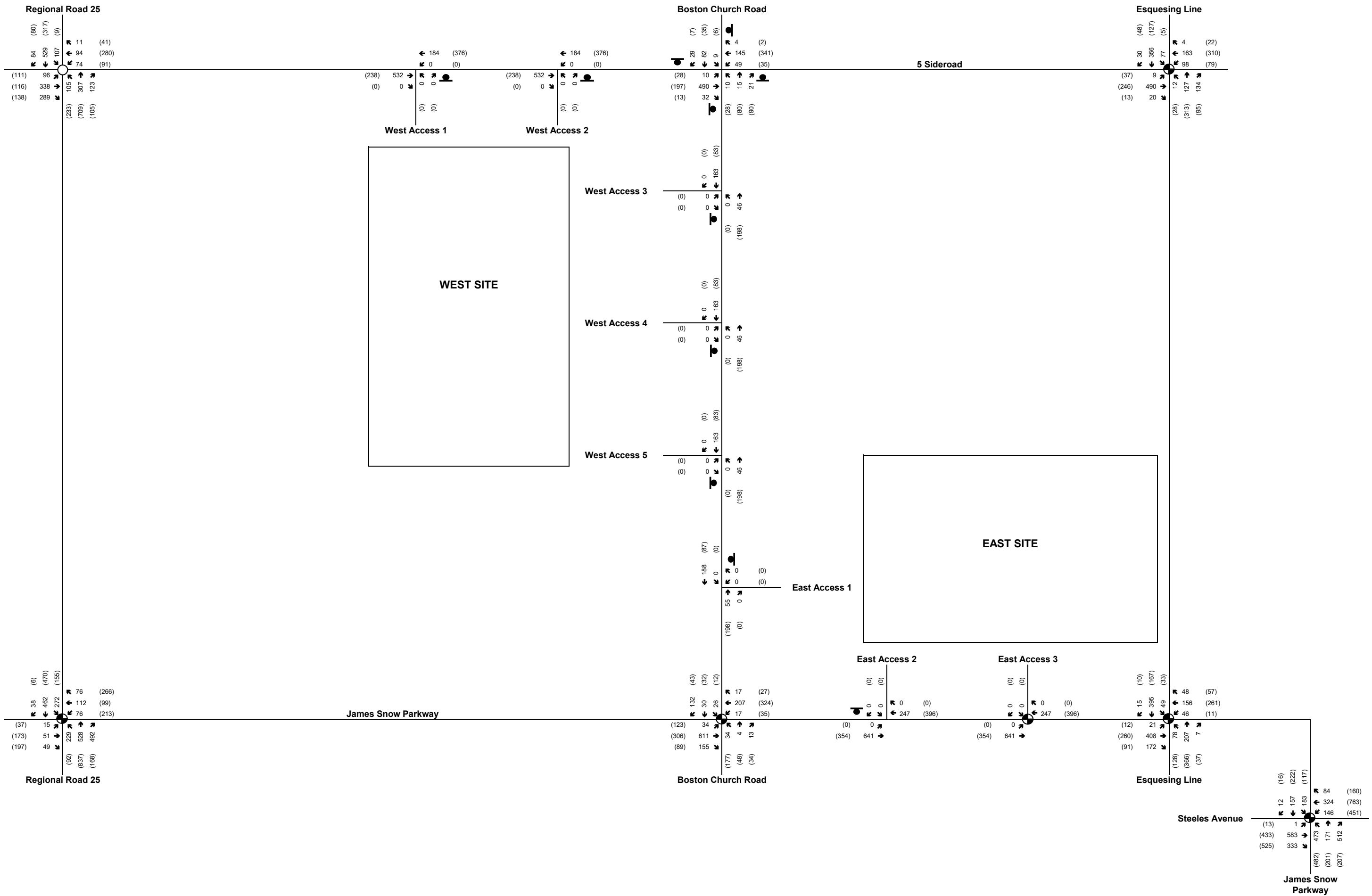
The background traffic volumes were estimated by combining estimated 2021 baseline traffic volumes with the total annual traffic growth (2024, 2029, and 2034 planning horizons) associated with each of the planning horizon years. The background weekday a.m. and p.m. peak hour volumes for the 2024, 2029, and 2034 planning horizon years are provided in **Figure 4-1**, **Figure 4-2**, and **Figure 4-3**, respectively. Supplemental traffic volume figures for each horizon year are provided in **Appendix F** that present the number of trips that are attributable to annual background growth.



LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ◉ Signalized Intersection
- ◐ Stop Control

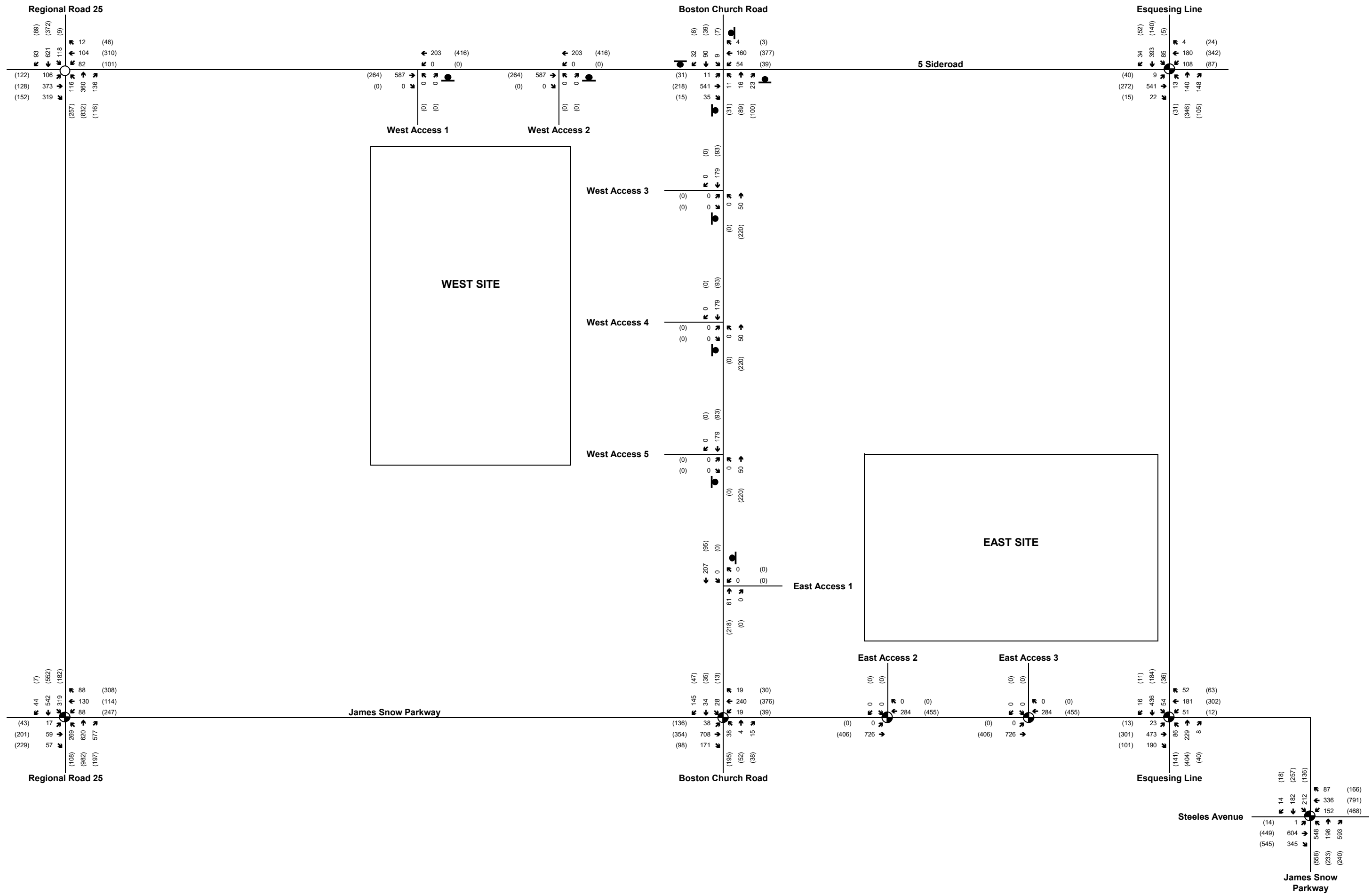
2024 Future Background Traffic Volumes
Figure 4-1



LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ◉ Signalized Intersection
- Roundabout
- ⊠ Stop Control

2029 Future Background Traffic Volumes
Figure 4-2



LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- Signalized Intersection
- Roundabout
- ⊥ Stop Control

2034 Future Background Traffic Volumes
Figure 4-3

5 SITE TRIP GENERATION

5.1 Site Trip Generation

The proposed concept plan, dated December 14, 2023, consists of seven warehouse buildings with a combined total of 4,915,588 ft² G.F.A. Three buildings with a combined G.F.A. of 1,401,511 ft² are located west of Boston Church Road, and four buildings with a combined G.F.A. of 3,514,077 ft² are located to the east.

For analysis purposes, the names of the seven proposed buildings were taken from the Concept Plan's labeling. Buildings 'G', 'H', and 'J' are located on the parcel of land west of Boston Church Road. Buildings 'A', 'B', 'D', and 'F' are located on the parcel of land east of Boston Church Road.

Of note, compared to the G.F.A. values used in the 2nd submission of the TIS, the latest concept plan reduces the G.F.A. of Building G from 349,845 ft² (32,302 m²) to 326,605 ft² (30,342 m²), a difference of 23,240 ft² (1,960 m²). The magnitude of the reduction in Building G's G.F.A. is small enough that it will not have a significant impact on the results and conclusions of the analysis. Accordingly, the following subject site trip generation estimates remain the same as the previous submission. Therefore, the site generated trips estimated in this TIS are conservative.

Site traffic generated by the proposed development for the weekday a.m. and p.m. peak hours was estimated by applying the trip rates for Land Use Code (LUC) 150 "Warehousing" in Trip Generation, 10th Edition, published by the Institute of Transportation Engineers (ITE). At the time of this TIS update, ITE 11th Edition was available. A comparison of trip generation rates from the 11th and 10th Editions suggests that trip rates from the 11th Edition are lower than those in the 10th Edition. Therefore, in this TIS update, ITE 10th Edition trip rates were maintained and the resultant future traffic operations in the TIS are considered conservative.

Both the total site trip generation (i.e., all vehicles) and the truck-only trip generation were computed to determine the number of automobile trips for the site. The number of automobile trips was found by subtracting the number of truck trips from the total number of site trips.

As noted previously, trip generation estimates were adjusted to reflect the proportion of automobiles versus heavy vehicles inherent in an industrial warehouse/distribution centre development. The mix of automobiles and heavy vehicles was based on information provided in ITE's 10th edition Trip Generation.

While consideration was given to including a proportion of non-automobile site trips, particularly transit trips, the proposed land use of the subject site is likely to have only a minor component of non-automobile trips. Thus, the site trip estimates conservatively excluded an allowance for non-automobile trips during all peak study hours.

Table 5-1 summarizes the estimated total trip generation of the west parcel at full build-out of the subject site. Similarly, **Table 5-2** summarizes the estimated total trip generation of the east parcel upon full build-out of the development. The trip generation tables also specify the volume of site trips assigned to heavy vehicles (trucks) and automobiles.

Table 5-1 Site Trip Generation - West Parcel Buildings

Building Name and G.F.A. (ft ²)	Parameters	Peak Hour Trip Generation					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
Building 'J' (537,453 ft ²)	Combined Trip Rate	0.130	0.039	0.169	0.051	0.139	0.190
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	70	21	91	28	74	102
	Truck Trip Rate	0.011	0.009	0.020	0.015	0.015	0.030
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	6	5	11	8	8	16
	Automobile Gross Trips	64	16	80	20	66	86
Building 'H' (537,453 ft ²)	Combined Trip Rate	0.130	0.039	0.169	0.051	0.139	0.190
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	70	21	91	28	74	102
	Truck Trip Rate	0.011	0.009	0.020	0.015	0.015	0.030
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	6	5	11	8	8	16
	Automobile Gross Trips	64	16	80	20	66	86
Building 'G' (349,845 ft ²)	Combined Trip Rate	0.130	0.039	0.169	0.051	0.138	0.189
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	45	14	59	18	48	66
	Truck Trip Rate	0.010	0.010	0.020	0.015	0.014	0.029
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	4	3	7	5	5	10
	Automobile Gross Trips	41	11	52	13	43	56
<i>Total New Automobile West Site Trips</i>		<i>169</i>	<i>43</i>	<i>212</i>	<i>53</i>	<i>175</i>	<i>228</i>
<i>Total New Heavy Vehicle West Site Trips</i>		<i>16</i>	<i>13</i>	<i>29</i>	<i>21</i>	<i>21</i>	<i>42</i>
Total New West Site Trips		185	56	241	74	196	270

Table 5-2 Site Trip Generation-East Parcel Buildings

Building Name and G.F.A. (ft ²)	Parameters	Peak Hour Trip Generation					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
Building 'A' (513,345 ft ²)	Combined Trip Rate	0.130	0.039	0.169	0.052	0.139	0.191
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	67	20	87	26	72	98
	Truck Trip Rate	0.010	0.009	0.019	0.015	0.014	0.029
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	5	5	10	8	7	15
	Automobile Gross Trips	62	15	77	18	65	83
Building 'B' (1,135,833 ft ²)	Combined Trip Rate	0.131	0.039	0.170	0.051	0.139	0.190
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	149	44	193	58	158	216
	Truck Trip Rate	0.011	0.009	0.020	0.016	0.014	0.030
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	12	11	23	18	16	34
	Automobile Gross Trips	137	33	170	40	142	182
Building 'D' (1,183,149 ft ²)	Combined Trip Rate	0.131	0.039	0.170	0.051	0.139	0.190
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	155	46	201	61	164	225
	Truck Trip Rate	0.011	0.009	0.020	0.015	0.015	0.030
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	12	12	24	18	17	35
	Automobile Gross Trips	143	34	177	43	147	190
Building 'F' (681,750 ft ²)	Combined Trip Rate	0.131	0.039	0.170	0.051	0.140	0.191
	Combined Trip Ratio	77%	23%	-	27%	73%	-
	Combined Gross Trips	89	27	116	35	95	130
	Truck Trip Rate	0.011	0.010	0.021	0.015	0.014	0.029
	Truck Trip Ratio	52%	48%	-	52%	48%	-
	Truck Gross Trips	7	7	14	10	10	20
	Automobile Gross Trips	82	20	102	25	85	110
<i>Total New Automobile East Site Trips</i>		<i>424</i>	<i>102</i>	<i>526</i>	<i>126</i>	<i>439</i>	<i>565</i>
<i>Total New Heavy Vehicle East Site Trips</i>		<i>36</i>	<i>35</i>	<i>71</i>	<i>54</i>	<i>50</i>	<i>104</i>
Total New East Site Trips		460	137	597	180	489	669

The three warehouse buildings on the west parcel of the proposed development are expected to generate a total of 241 new two-way vehicle trips during the weekday a.m. peak hour consisting of 185 inbound and 56 outbound trips. During the weekday p.m. peak hour, the west parcel is expected to generate a total of 270 new two-way vehicle trips consisting of 74 inbound and 196 outbound trips.

The four warehouse buildings located on the east parcel of the proposed development are expected to generate a total of 597 new two-way vehicle trips during the weekday a.m. peak hour consisting of 460 inbound and 137 outbound trips. During the weekday p.m. peak hour, the east parcel is expected to generate a total of 669 new two-way vehicle trips consisting of 180 inbound and 489 outbound trips.

Table 5-3 summarizes the total trips generated by the east and west parcels of land and the overall total trip generation of the proposed industrial warehouse site.

Table 5-3 Site Trip Generation - East and West Parcels Combined

Parcel Name and G.F.A. (ft ²)	Parameters	Peak Hour Trip Generation					
		Weekday AM			Weekday PM		
		In	Out	Total	In	Out	Total
West Parcel (1,424,751 ft ²)	Automobile Trips	169	43	212	53	175	228
	Truck Trips	16	13	29	21	21	42
	Total Trips	185	56	241	74	196	270
East Parcel (3,514,077 ft ²)	Automobile Trips	424	102	526	126	439	565
	Truck Trips	36	35	71	54	50	104
	Total Trips	460	137	597	180	489	669
<i>Total New Automobile Site Trips</i>		593	145	738	179	614	793
<i>Total New Heavy Vehicle Site Trips</i>		52	48	100	75	71	146
Total New Site Trips		645	193	838	254	685	939

The proposed development is expected to generate a combined total of 838 new two-way vehicle trips during the weekday a.m. peak hour consisting of 645 inbound and 193 outbound trips. During the weekday p.m. peak hour, it is expected to generate a total of 939 new two-way vehicle trips consisting of 254 inbound and 685 outbound trips.

5.2 Site Trip Distribution and Assignment

The new trips generated by the subject site were assigned to the surrounding road network on a building-by-building basis for the purposes of distributing site traffic across the multiple site accesses for each parcel of land. Consideration was also made for assigning heavy vehicle and automobile site traffic differently. For example, no truck traffic was assigned to 5 Side Road, as it was assumed all heavy vehicles would access the site via accesses on James Snow Parkway and Boston Church Road.

Distribution of site traffic was derived from a review of 2016 Transportation Tomorrow Survey (TTS) summary data and existing travel patterns. Automobile site traffic was assigned to the road network based on these distributions and are provided in **Table 5-4**.

The distribution of site traffic derived from 2016 TTS data was also used to inform the distribution of heavy vehicle site traffic, however, a review of information from the Escarpment Business Community 2009 Study (EBC Study) prepared by Sernas Transtech as it relates to the site was also used. The 2019 Site Traffic distribution figure in the EBC Study (provided in **Appendix G**) summarized the differing distribution of automobiles and heavy vehicles in the vicinity of the Escarpment Business Community. The distributions applied to the heavy vehicle site traffic are provided in

Table 5-5, with further information available in **Appendix G**.

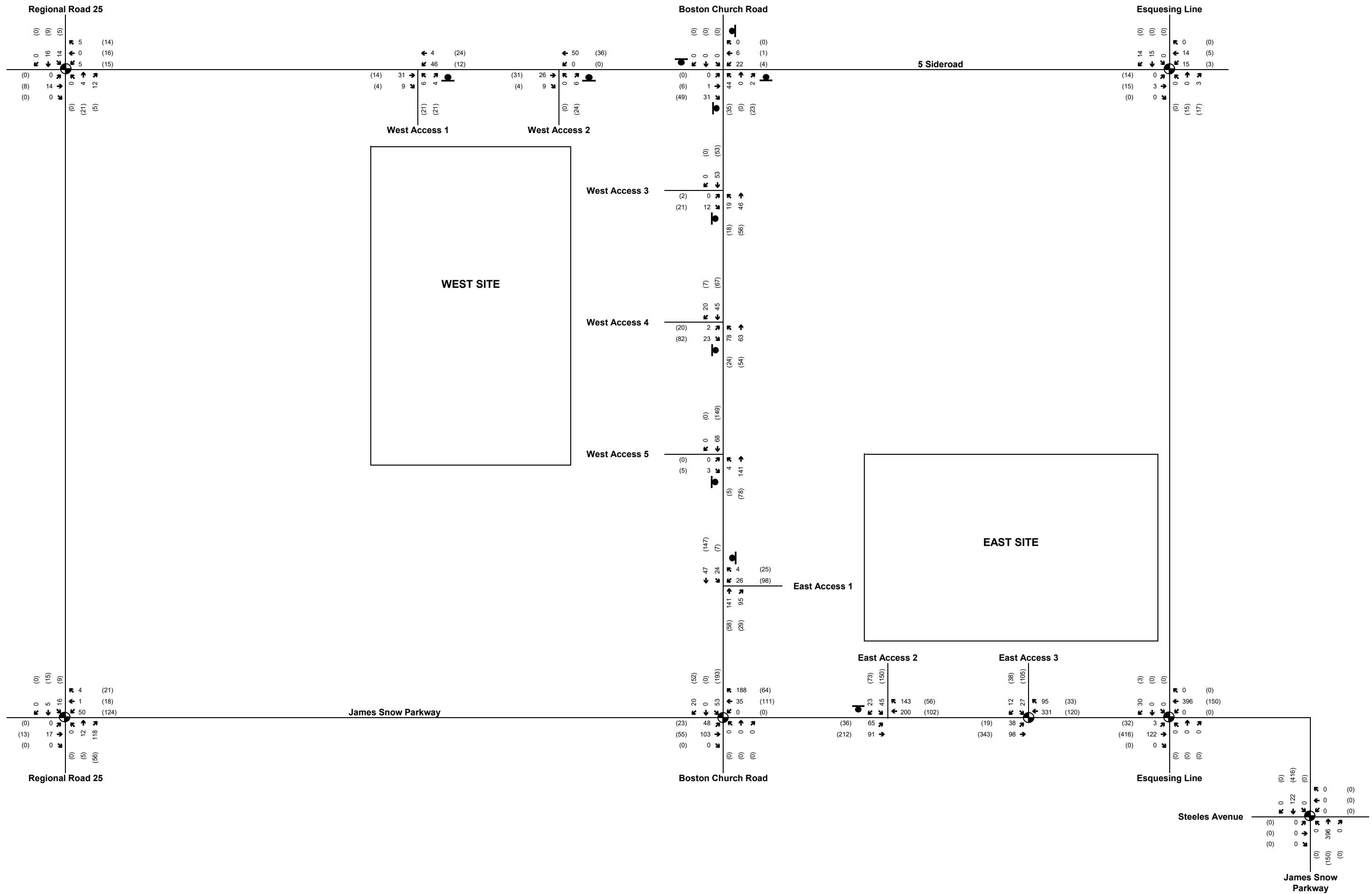
The estimated total site trips generated by the proposed development, as assigned to the nearby road network for the weekday a.m. and p.m. peak hours, are provided in **Figure 5-1**. More detailed trip assignment, divided into auto and truck site traffic, is provided in **Figure 5-2** and **Figure 5-3**, respectively. 2016 TTS data is provided in **Appendix G**.

Table 5-4 Site Trip Distribution-Automobiles

Trip Orientation	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
North	10%	5%	5%	10%
R.R. 25	5%	5%	5%	5%
Esquesing Line	5%	0%	0%	5%
South	45%	25%	65%	50%
Tremaine Road via 5 Sideroad	5%	0%	10%	5%
R.R. 25	10%	5%	15%	10%
James Snow Parkway	30%	20%	40%	35%
East	35%	35%	25%	30%
Highway 401 via RR 25	5%	5%	5%	5%
Highway 401 via JSP	25%	25%	15%	20%
5 Sideroad	5%	5%	5%	5%
West	10%	35%	5%	10%
Highway 401 via RR 25	5%	20%	5%	5%
Highway 401 via JSP	5%	15%	0%	5%
Total	100%	100%	100%	100%

Table 5-5 Site Trip Distribution-Heavy Vehicles

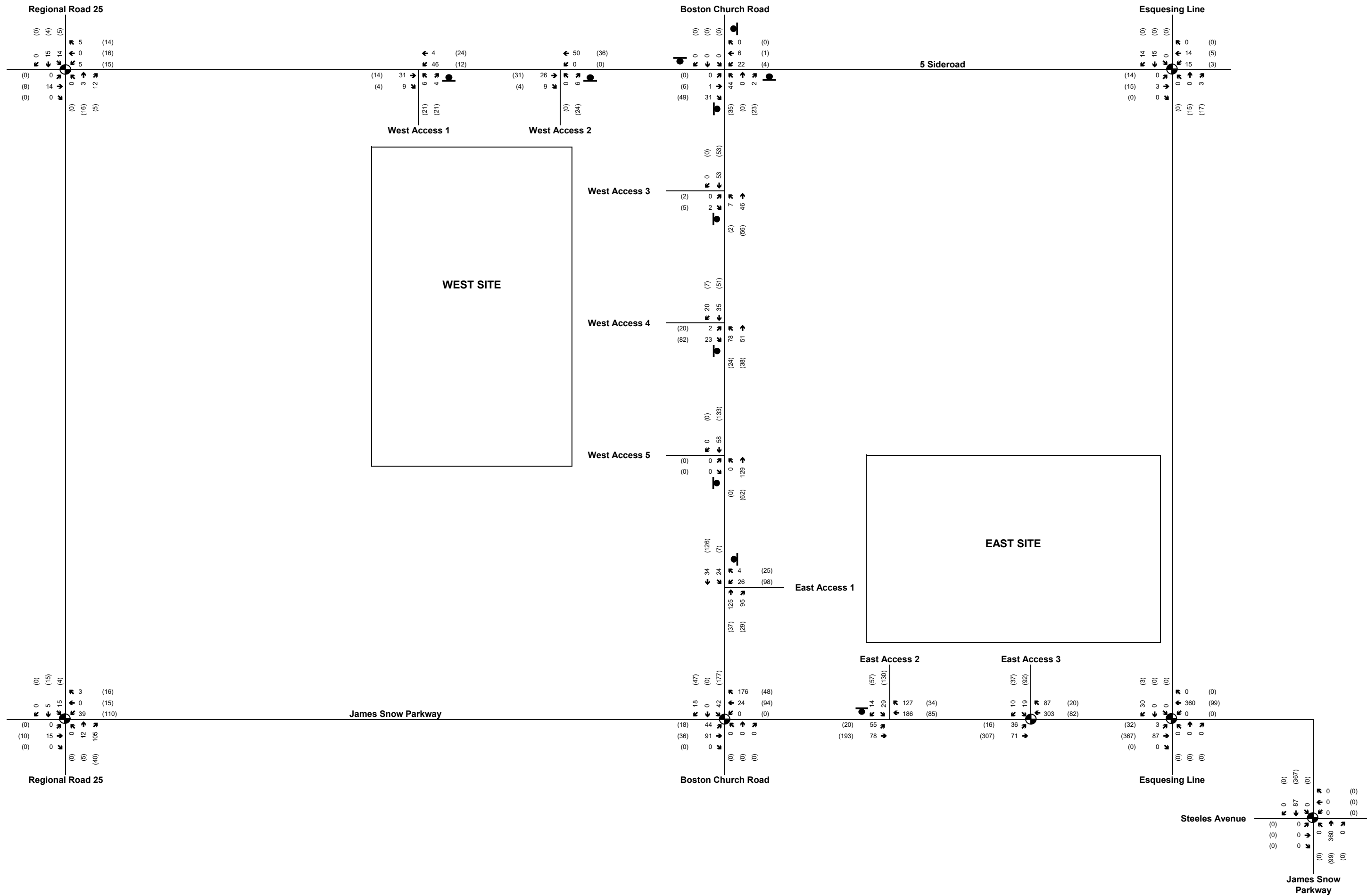
Trip Orientation	AM Peak Hour		PM Peak Hour	
	Inbound	Outbound	Inbound	Outbound
North	7%	7%	7%	7%
R.R. 25	7%	7%	7%	7%
South	30%	30%	30%	30%
Tremaine Road via 5 Sideroad	5%	5%	5%	5%
R.R. 25	5%	5%	5%	5%
James Snow Parkway	20%	20%	20%	20%
East	38%	38%	38%	38%
Highway 401 via RR 25	5%	5%	5%	5%
Highway 401 via JSP	33%	33%	33%	33%
West	25%	25%	25%	25%
Highway 401 via RR 25	15%	15%	15%	15%
Highway 401 via JSP	10%	10%	10%	10%
Total	100%	100%	100%	100%



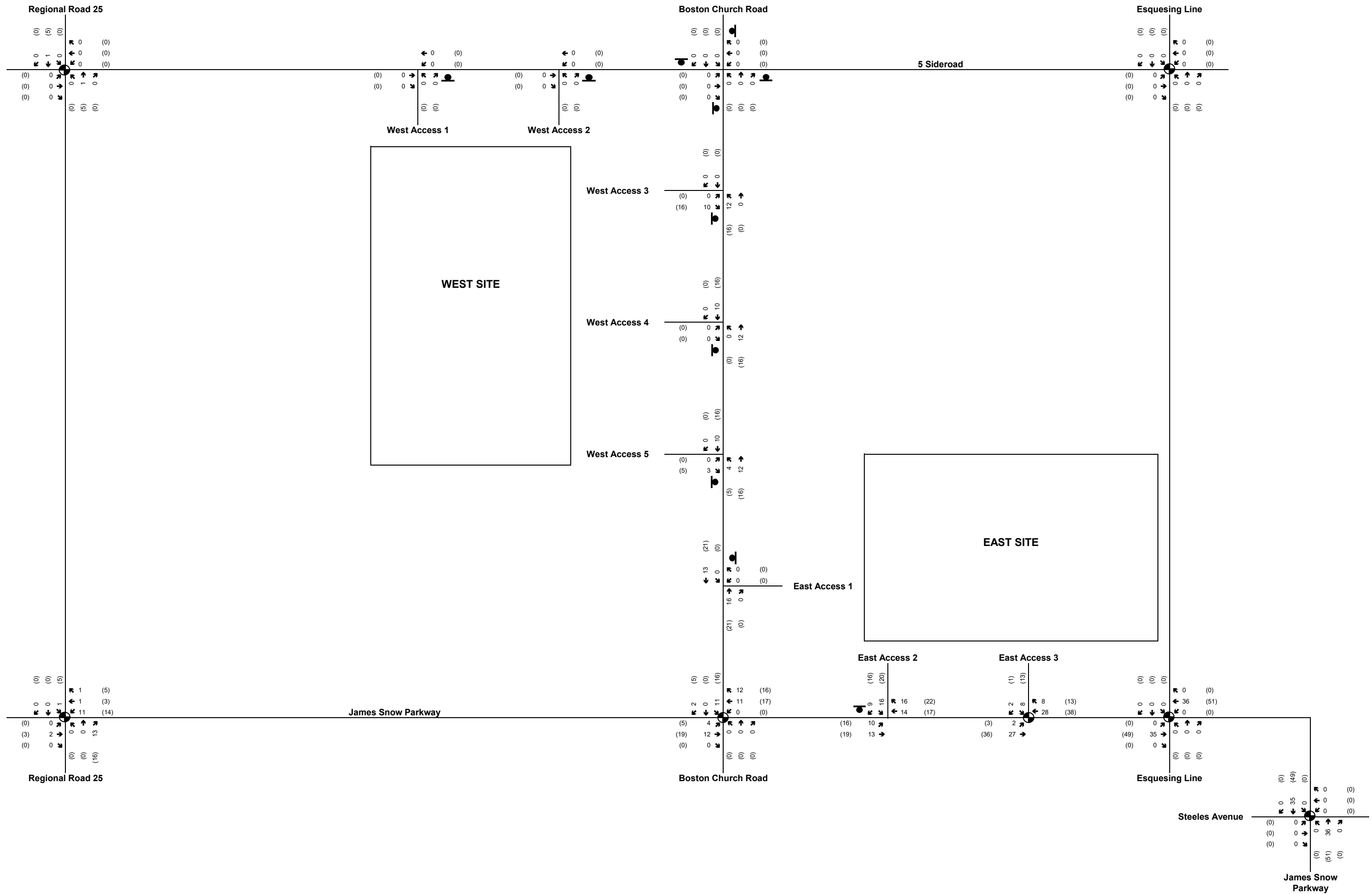
LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ◉ Signalized Intersection
- ◉ Stop Control

Site Traffic Volumes
Figure 5-1



**Automobile Site Traffic Volumes
Figure 5-2**



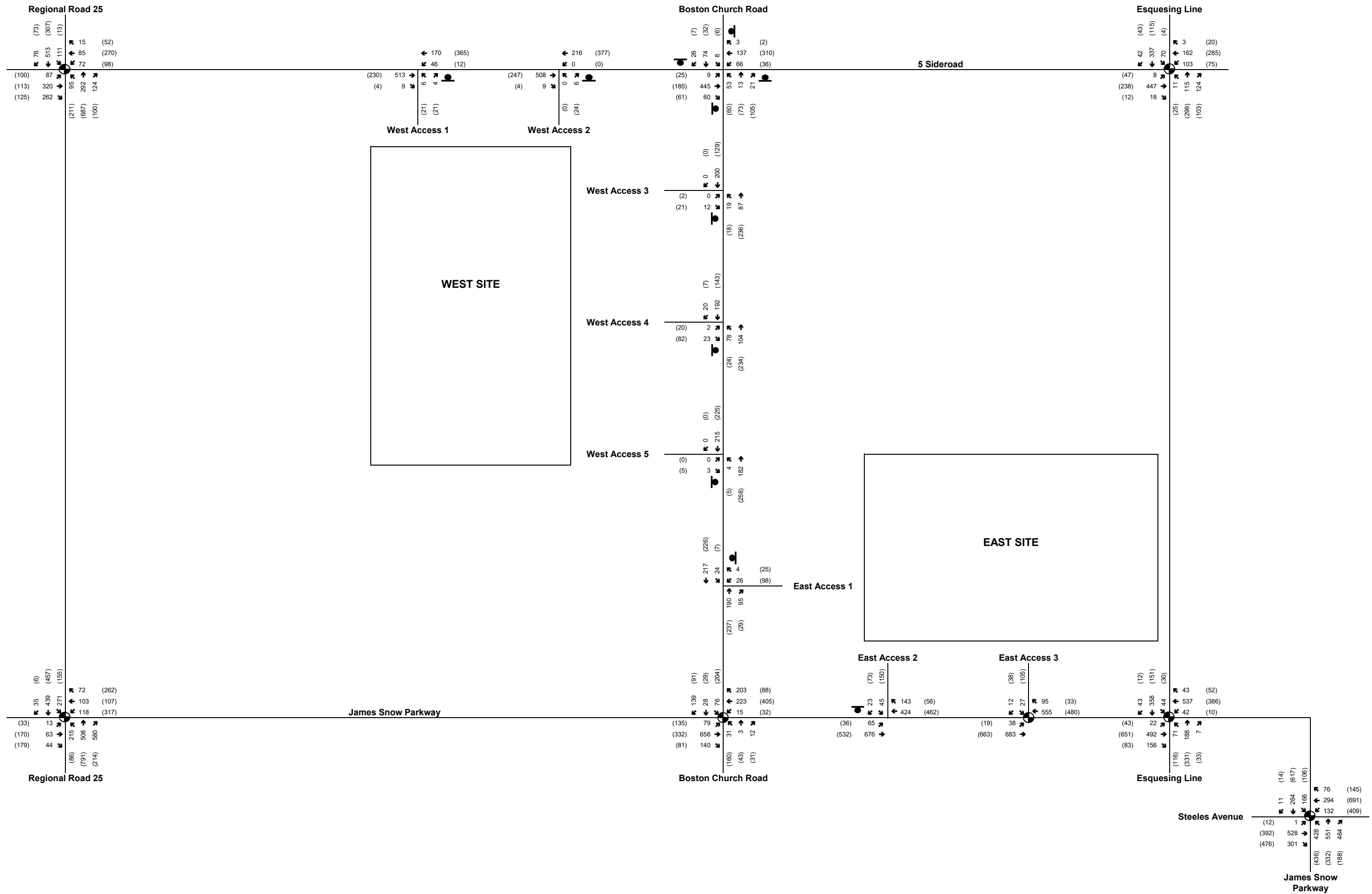
LEGEND
 XX AM Peak Hour Volumes
 (XX) PM Peak Hour Volumes
 Signalized Intersection
 Stop Control

**Heavy Vehicle Site Traffic Volumes
 Figure 5-3**

6 FUTURE TOTAL TRAFFIC

The future total traffic volumes during the weekday a.m. and p.m. peak hours for the 2024, 2029, and 2034 planning horizons were derived by combining the projected future background traffic for each horizon year with the estimated total subject site traffic.

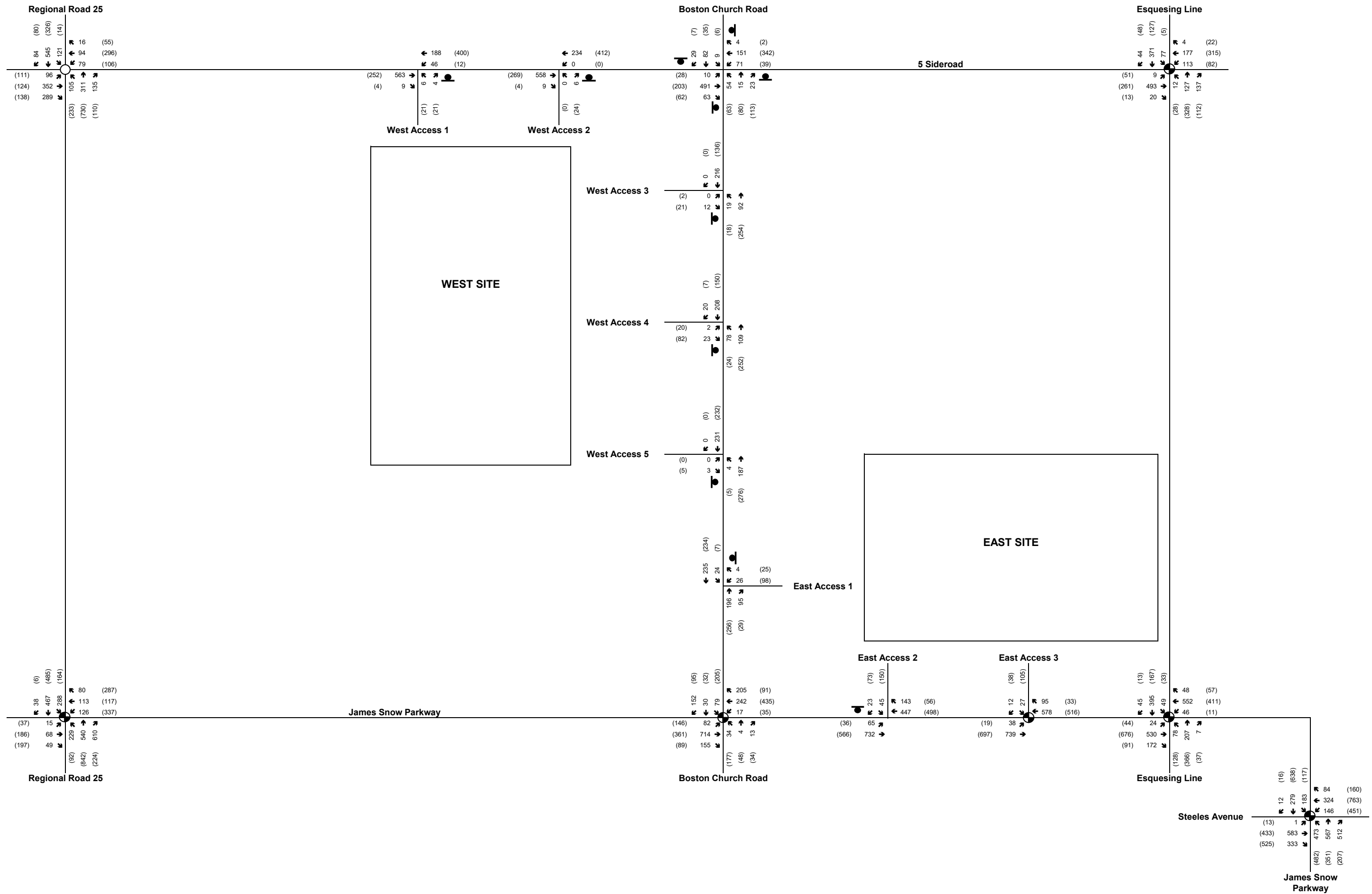
Figure 6-1, Figure 6-2, and Figure 6-3 summarize the future total traffic volumes for the 2024, 2029, and 2034 planning horizons, respectively, during the weekday a.m. and p.m. peak hours.



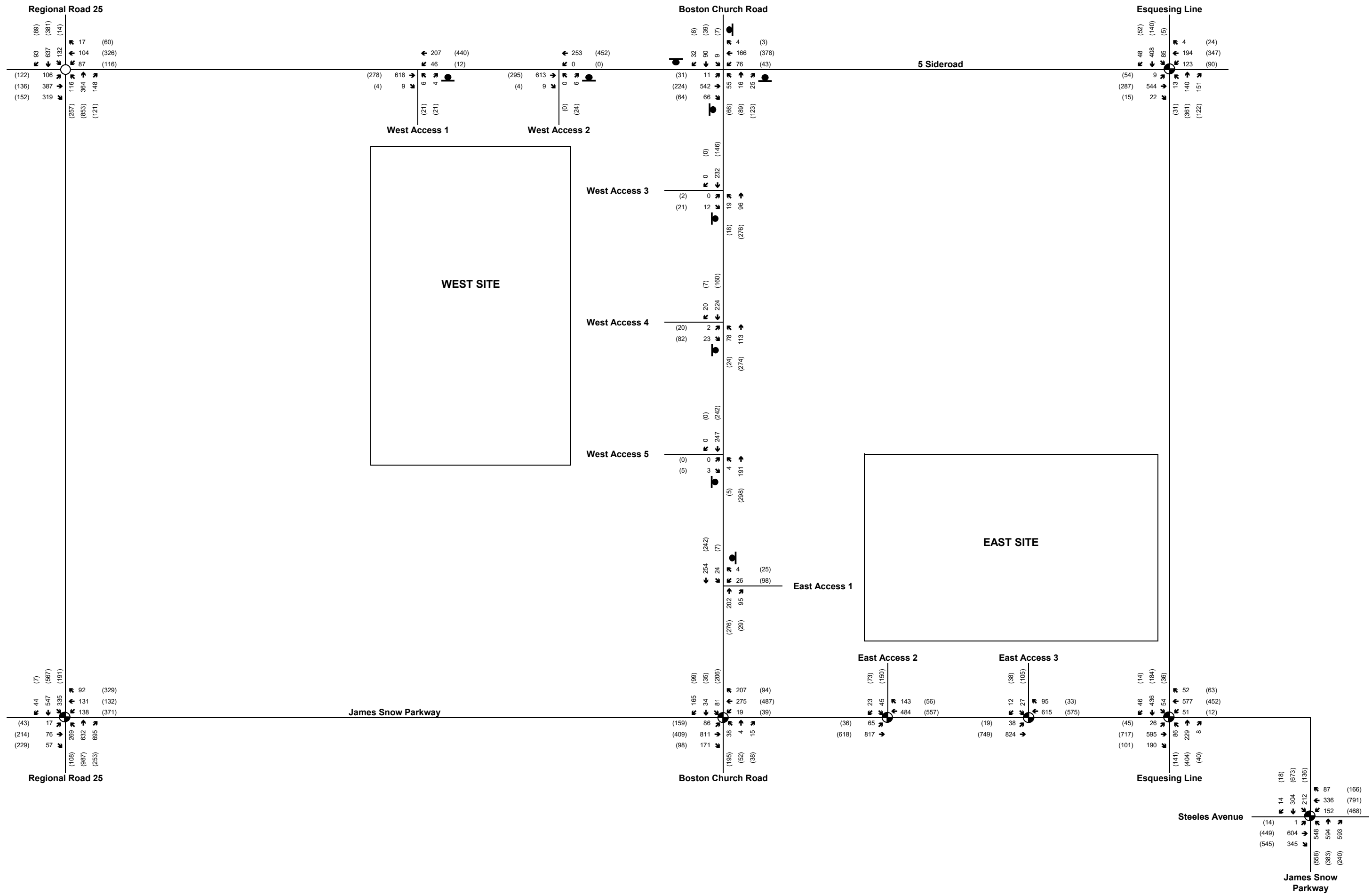
LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ◉ Signalized Intersection
- ⊥ Stop Control

2024 Future Total Traffic Volumes
Figure 6-1



**2029 Future Total Traffic Volumes
Figure 6-2**



LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- Signalized Intersection
- Roundabout
- ⊥ Stop Control

2034 Future Total Traffic Volumes
Figure 6-3

7 INTERSECTION CONTROL WARRANT SUMMARY

7.1 MTO Left Turn Lane Requirement

The MTO left turn lane warrants were used to determine if left turn lanes were warranted at the intersections of proposed site accesses and public roads.

The 2029/2034 future total turning, advancing, and opposing volumes at the proposed site accesses are provided in **Appendix H**. With the exception of 5 Side Road, a posted speed limit of 70 km/h with a design speed of 90 km/h was assumed for all roads. The posted speed limit on 5 Side Road is 60 km/h and a design speed of 80 km/h was assumed.

Under 2034 future total traffic conditions, MTO left turn lane warrants were conducted for unsignalized intersections along a two-lane highway for site accesses on Boston Church Road and 5 Side Road. For both site accesses on James Snow Parkway, MTO left turn lane warrants were conducted under the pre-widening condition i.e., 2029 traffic conditions for unsignalized intersections and along a four-lane undivided highway. Left-turn lane warrants were also conducted for existing unsignalized intersections along 5 Side Road. Left-turn lanes are warranted or recommended at the following locations:

- ▶ East Access 2 on James Snow Parkway (136 m storage, 90 m taper)
- ▶ East Access 3 on James Snow Parkway (136 m storage, 90 m taper)
- ▶ West Access 1 on 5 Side Road (15 m storage and 50 m taper)
- ▶ Westbound left-turn lane at Esquesing Line and 5 Sideroad (40 m storage and 50 m taper)
- ▶ Southbound left-turn at Esquesing Line and 5 Sideroad (60 m storage and 50 m taper)

Table 7-1 summarizes the turning, advancing, and opposing volumes at the proposed public road intersections on James Snow Parkway and 5 Side Road.

Table 7-1 MTO Left Turn Warrant Summary

Intersection	V_L (Left Turn Traffic Volume)	V_A (Advancing Traffic Volume)	% of Left Turns in VA	V_O (Opposing Traffic Volume)	Left Turn Lane Warranted?
Future Total 2029 AM Peak Hour					
James Snow Parkway & East Site Access 2	65	797	10%	590	Yes 15 m Storage
James Snow Parkway & East Site Access 3	38	777	5%	673	Yes 15 m Storage
Future Total 2029 PM Peak Hour					
James Snow Parkway & East Site Access 2	36	602	10%	554	Yes 15 m Storage
James Snow Parkway & East Site Access 3	19	716	5%	549	Not warranted
Future Total 2034 AM Peak Hour					
West Access 1 at 5 Side Road	46	253	20%	627	Yes 15 m Storage
Esquesing Line at 5 Side Road (Westbound left-turn)	123	321	40%	575	Yes 25 m Storage
Esquesing Line at 5 Side Road (Southbound left-turn)	85	541	20%	304	Yes 25 m Storage
Future Total 2034 PM Peak Hour					
West Access 1 at 5 Side Road	12	452	5%	282	Not warranted
Esquesing Line at 5 Side Road (Westbound left-turn)	90	461	20%	356	Yes 25 m Storage
Esquesing Line at 5 Side Road (Southbound left-turn)	5	197	5%	514	Not warranted

As summarized in **Table 7-1**, a left turn warrant is satisfied at East Site Access 2 and East Site Access 3 at James Snow Parkway by the 2029 horizon year and at West Access 1 on 5 Sideroad by the 2034 horizon year, all with a minimum storage length of 15 metres. Additionally, a westbound left-turn lane and a southbound left-turn lane with a minimum storage length of 25 m is warranted at the intersection of Esquesing Line and 5 Side Road by the 2034 horizon year.

According to Halton Region’s Access Management Guideline:

Access management provides a systematic means of balancing the access and mobility requirements of roads. Access management is the process that manages access to land development while simultaneously preserving the flow of traffic on the surrounding public road system in terms of safety, capacity and speed.

Thus, to adhere to the goals of the Region’s access guidelines, TYLin recommends the implementation of both left turn lanes. These auxiliary lanes are essential from both a safety and capacity perspective. Additionally, as heavy vehicles require more time and space to complete a turn or decelerate/accelerate compared to passenger vehicles, it is safer to have a dedicated turning lane for heavy vehicles.

Furthermore, the proposed public road intersections on James Snow Parkway at East Site Access 2 and 3 satisfy the minimum access spacing requirement of 300 metres for a signalized or unsignalized full moves intersection, as per Halton Region’s Access Management Guideline (James Snow Parkway is classified as a C4 Urban Corridor according to Halton Region’s Right-of-Way Classification Code).

The left and right turn storage lengths were estimated as per equation 9.14.1 of the TAC standard as shown below: -

$$S = \frac{NL}{30}$$

Where:

S= Storage length in metres

N = Design volume of left/right turning vehicle (veh/hr)

L = Length (m) occupied by each vehicle – passenger car length = 5.6 metres as per Fig 2.4.1 in TAC and trucks length (Long Combination Vehicles - LCV) = 41 metres

Deceleration lane length was obtained using equation 2.5.1 of the TAC standards as shown below:

$$d_b = 0.039 \frac{v^2}{a}$$

Where:

d_b = Braking distance in metres

V = Design speed in km/hr

a = Deceleration rate (3.4 m/s²)

As per TAC Standards, taper lengths, parallel lane length design domain were determined using Table 9.17.1 and Table 9.14.2.

Table 7-2 summarizes the total storage requirements for the eastbound left-turn lanes for the two site access intersections on James Snow Parkway. As shown in **Table 7-1**, the p.m. peak hour volumes did not warrant a turning lane for East Site Access 3, thus only the a.m. peak hour volumes were used to determine the total storage length. To accommodate at least one queued Long Combination Vehicle (LCV) design vehicle a minimum left turn storage length of 41 metres is proposed.

Table 7-2 TAC based Left Turn Lane Total Storage Length Summary

Intersection	Peak Hour	
James Snow Parkway North & East Site Access 2	AM Peak Hour	
	Lane width	3.25
	Number of Cars making Left Turn	55
	Number of Trucks making Left Turn	10
	Storage length (m) based on Cars	10
	Storage length (m) based on Trucks	41
	Storage length (m) (maximum of storage length obtained using cars and trucks)	41
	Taper Ratio (Table 9.17.1)	27:1
	Taper Length (m) (Table E9-1)	88
	Deceleration Lane (m) (eq 2.5.1 and Table 9.14.2)	95
	Total Storage Length (m) (Storage + Deceleration Lane Length)	136
	PM Peak Hour	
	Lane width(m)	3.25
	Number of Cars making Left Turn	26
	Number of Trucks making Left Turn	16
	Storage length (m) based on Cars	4
	Storage length (m) based on Trucks	41
	Storage length (m) (maximum of storage length obtained using cars and trucks)	41
	Taper Ratio (Table 9.17.1)	27:1
	Taper Length (m) (Table E9-1)	88
	Deceleration Lane (m) (eq 2.5.1 and Table 9.14.2))	95
	Total Storage Length (m) (Storage + Deceleration Lane Length)	136

James Snow Parkway North & East Site Access 3	AM Peak Hour	
	Lane width(m)	3.25
	Number of Cars making Left Turn	36
	Number of Trucks making Left Turn	2
	Storage length (m) based on Cars	7
	Storage length (m) based on Trucks	3
	Storage length (m) (maximum of storage length obtained using cars and trucks)	41
	Taper Ratio (Table 9.17.1)	27:1
	Taper Length (m) (Table E9-1)	88
	Deceleration Lane (m) (eq 2.5.1)	95
	Total Storage Length (m) (Storage + Deceleration Lane Length)	136
5 Sideroad & West Access 1	AM Peak Hour	
	Lane width(m)	3.2
	Number of Cars making Left Turn	46
	Number of Trucks making Left Turn	0
	Storage length (m) based on Cars	9
	Storage length (m) based on Trucks	0
	Storage length (m) (maximum of storage length obtained using cars and trucks)	15
	Taper Ratio (Table 9.17.1)	15:1
	Taper Length (m) (Table E9-1)	48
	Total Storage Length (m)	15

Therefore, as summarized in **Table 7-2**, the eastbound left turn lanes for both East Access 2 and East Access 3 on James Snow Parkway are recommended to have a total storage distance of 136 metres each. The westbound left-turn lane at West Access 1 on 5 Side Road is recommended to have a total storage distance of 15 metres.

7.2 TAC and Halton Region Right Turn Lane Requirement

Per Halton Region Access Management Guidelines, auxiliary right-turn lanes are recommended for accesses that:

- ▶ Have sufficient volume of decelerating vehicles
- ▶ Have right turn volume at signalized intersections of 10% of the through traffic volume
- ▶ Have constrained sight distance approaching the access

The proposed site accesses that satisfy this criterion are James Snow Parkway and East Access 2, which has a right turning volume of 141 vehicles during the a.m. peak hour, and James Snow Parkway and East Access 3, which has a right turning volume of 85 vehicles during the a.m. peak

hour.

In the previous submission, a northbound right turn lane was recommended at Boston Church Road and East Access 1. Although the northbound right movement at Boston Church Road and East Access 1 has a right-turning volume of 96 vehicles during the a.m. peak hour (which satisfies the right-turn criterion), a dedicated right-turn lane is not recommended in this updated TIS submission, as it is not required from capacity analysis and safety standpoint. The intersection of Boston Church and East Access 1 operates below capacity with no concerns related to delays (see **section 8.2.6**) or queues (see **section 9.3**) under ultimate 2034 future total traffic conditions.

Additionally, a review of a preliminary pavement marking and signage plan showing curb to curb markings on Boston Church Road indicated that the addition of a northbound right turn lane along Boston Church Road would create confusion for drivers. It is for these reasons stated above that TYLin does not recommend the dedicated northbound right-turn lane at the intersection of Boston Church Road and East Access 1.

As all accesses on 5 Side Road and Boston Church Road are proposed as unsignalized accesses, the recommended volume warrant was not applicable. Given the number of vehicles and the percentage of heavy vehicles expected to turn right at the east site accesses on James Snow Parkway (both of which are proposed to be signalized by the 2034 horizon year), TYLin recommends providing a westbound right-turn lane at East Access 2 with a storage length of 136 metres and a taper length of 60 metres as well as a westbound right-turn lane at East Access 3 with a storage length of 136 metres and a taper length of 60 metres, as per TAC standards. Halton Region right-turn lane warrant summaries are provided in **Appendix H**.

Conceptual design plans have been prepared for James Snow Parkway (CD-00) and Boston Church Road (CD-01) as per TAC, MTO, and Halton Region guidelines identified in this section of the report. The conceptual designs are provided in **Appendix H**.

7.3 Traffic Signal Warrant

The existing unsignalized intersection of 5 Side Road at Esquesing Line was evaluated to confirm justification for traffic signal installation. The Ontario Traffic Manual (OTM) Book 12 Justification 7 Signal Warrant Analysis was applied to the unsignalized intersections. Signal warrants are provided in **Appendix H**.

The 5 Side Road and Esquesing Line intersection did not satisfy the OTM signal warrant under 2021 Baseline traffic conditions or ultimate 2034 Future Total conditions.

Traffic signal warrant analysis was also completed for the three East Site Accesses under ultimate 2034 Future Total traffic conditions. Signals were found to not be warranted at any of the East Site Accesses.

Despite not warranting traffic signals according to the OTM warrant, signals are recommended for implementation at the following locations due to existing or predicted traffic capacity and safety concerns:

- ▶ Esquesing Line and 5 Side Road (2024 onward – triggered by existing over-capacity conditions)
- ▶ James Snow Parkway and East Access 2 (2024 onward)
- ▶ James Snow Parkway and East Access 3 (2024 onward)

Signalization is expected to improve the operation of the intersections from not only an operational perspective (by creating protected turning opportunities against the James Snow Parkway traffic flow), but more importantly through the road safety lens, by providing those protected gaps in east/westbound James Snow Parkway traffic for site-generated vehicles (especially LCV trucks) to enter and exit the site safely, minimizing right-angle collision risk.

Additionally, as discussed in **Section 2.7.2.2** according to the Region of Halton Access Management Guideline James Snow Parkway is classified as a C (4) Urban Corridor and requires a minimum 300 metres full movement access spacing. The proposed intersection spacing on James Snow Parkway between the site accesses and the existing upstream and downstream intersections will satisfy the minimum 300 metres required distance, satisfying Regional design criteria for the installation of traffic signals.

8 INTERSECTION CAPACITY ANALYSIS

The capacity analysis identifies how well the study area intersections and access driveways are operating and how they are expected to operate in the future. The analysis contained in this report utilized the Highway Capacity Manual (HCM) 2000 techniques within the Synchro Version 10 software package. The reported intersection volume-to-capacity ratios (v/c) are a measure of the saturation volume for each turning movement, while the levels-of-service (LOS) are a measure of the average delay for each turning movement. Queuing characteristics are reported as the predicted 95th percentile queue for each turning movement.

The analysis includes identification of all intersections and for all movements; v/c ratios, delay, LOS indicators and 95th percentile queue lengths.

'Critical' signalized intersections and movements, as per Town of Milton and Halton Region guidelines, are defined as:

- ▶ Volume/capacity (v/c) ratios for overall intersection operations, through movements, or shared through/turning movements increased to 0.85 or above;
- ▶ v/c ratios for exclusive movements increased to 0.95 or above; and
- ▶ Queues for individual movements are projected to exceed available turning lane storage.

The guidelines identify the following 'critical' operation levels for unsignalized intersections:

- ▶ Level of Service (LOS) based on average delay per vehicle, on individual movements exceeds LOS "D" (i.e., is "E" or "F"); or
- ▶ The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

The following tables summarize the Synchro/HCM capacity results for the study intersections during the weekday a.m. and p.m. peak hours under existing (2021), future 2024, 2029, and 2034 traffic conditions. 'Critical movements', as listed above, will be bolded in the capacity tables. For detailed Synchro reports, see **Appendix I**. A peak hour factor of 1.00 was applied to all the Town owned roads/intersection approaches in the study area under future background and future total conditions, as per the Town's comments on the first submission. It is to be noted that the future traffic operations forecast on the Regional road network will be confirmed through future traffic analysis prepared for the Site Plan Application of each individual building within the Halton Business Community Center.

8.1 Existing Intersections

8.1.1 Regional Road 25 and 5 Side Road

The capacity analysis results for the existing signalized intersection of Regional Road 25 and 5 Side Road are summarized in **Table 8-1** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

Table 8-1 Regional Road 25 and 5 Side Road Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	0.78	47	D	0.60	21	C
	EBL	0.22	23	C	0.49	34	C
	EBTR	1.12	109	F	0.69	39	D
	WBL	0.50	23	C	0.31	21	C
	WBTR	0.13	16	B	0.50	24	C
	NBL	0.43	18	B	0.52	14	B
	NBT	0.22	17	B	0.44	15	B
	NBR	0.08	16	B	0.08	12	B
	SBL	0.30	24	C	0.03	19	B
	SBTR	0.54	26	C	0.34	22	C
Existing 2021 (Sensitivity Test)	<i>Overall</i>	0.75	35	C	Not assessed under p.m. peak hour conditions		
	EBL	0.16	17	B			
	EBTR	0.97	62	E			
	WBL	0.41	22	C			
	WBTR	0.15	21	C			
	NBL	0.47	21	C			
	NBT	0.24	19	B			
	NBR	0.08	18	B			
	SBL	0.31	26	C			
	SBTR	0.57	29	C			
Future Background 2024	<i>Overall</i>	0.76	34	C	0.57	22	C
	EBL	0.18	22	C	0.47	36	D
	EBTR	0.91	49	D	0.68	42	D

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	WBL	0.36	20	C	0.34	25	C
	WBTR	0.12	15	B	0.54	29	C
	NBL	0.54	26	C	0.47	13	B
	NBT	0.26	23	C	0.43	13	B
	NBR	0.09	21	C	0.08	10	B
	SBL	0.36	32	C	0.04	22	C
	SBTR	0.66	36	D	0.38	25	C
Future Total 2024	<i>Overall</i>	0.78	35	D	0.58	22	C
	EBL	0.18	21	C	0.48	36	D
	EBTR	0.92	51	D	0.69	42	D
	WBL	0.40	21	C	0.41	26	C
	WBTR	0.12	15	B	0.59	30	C
	NBL	0.55	27	C	0.48	13	B
	NBT	0.27	23	C	0.45	14	B
	NBR	0.10	21	C	0.09	11	B
	SBL	0.42	34	C	0.07	23	C
	SBTR	0.68	37	D	0.40	26	C

The signalized intersection is operating well overall, with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours does not exceed 0.78 and 0.60, respectively, for any study horizon year. The intersection operates with an overall LOS of 'D' or better during the a.m. peak hour and LOS of 'C' during the p.m. peak hour for all planning horizons.

Individual movements at the intersection are operating with reserve capacity under all study conditions and peak hours, operating with v/c ratios less than 0.70 and LOS 'D' or better, with the exception of the eastbound through/right movement during the weekday a.m. peak hour.

Under existing conditions, the eastbound through/right movement operates above capacity with a v/c ratio of 1.12 and LOS 'F' during the a.m. peak hour. This is because the latest signal timing plans differ from the plan/phases in use when the counts were taken in the year 2019. The advanced eastbound left turn movement which was operating as protected phase in the 2019 signal timing plans no longer operates as a protected phase. A sensitivity test was conducted by applying the

2019 signal timing plans to the baseline 2021 conditions. The capacity results show that eastbound through/right movement operates within capacity at v/c of 0.97 and LOS 'E' during weekday a.m. peak hour.

To improve the operation of this intersection, the cycle length was increased from 90s to 120s and signal timing splits were optimized for both peak hours under 2024 future background and future total conditions. Under 2024 future background and future total conditions, although still critical, there is an improvement in operation of the shared eastbound through/right movement, with a v/c ratio of 0.92 or less and LOS 'D', compared to the movement originally being overcapacity during a.m. peak hour under 2021 baseline conditions.

As per Design Plate 17 of the Region's October 2022 Environment Study Report (ESR) for Regional Road 25 Transportation Corridor Improvements, the intersection of the Regional Road 25 and 5 Side Road is proposed to be reconfigured as a roundabout by 2029. Therefore, the intersection was modelled as a roundabout for both the 2029 and 2034 planning horizons.

Roundabout capacity analysis was completed for the 2029 and 2034 horizon years using ARCADY roundabout analysis software. Resulting peak hour level of service (LOS), delay results, capacity, and 95th percentile queueing are summarized in , **Table 8-3**, **Table 8-4** and **Table 8-7** for the future background and future total 2029 and 2034 years, respectively. The full ARCADY reports for each scenario are provided in **Appendix I**.

A capacity adjustment was applied (-10% adjustment to the y-intercept of the capacity equation) to approximate expected operations. The 90% adjustment was completed to remain consistent with other studies in the area (such as the Boyne RNA), which used a 90% y-intercept to account for driver's unfamiliarity with roundabouts. With the increase in roundabouts in the Town of Milton, it is likely that this penalty to capacity will lessen, and therefore the results of an unadjusted 100% y-intercept scenario was also analyzed.

Similar to baseline 2024 future background and future total conditions assessed under signalized control, the eastbound movement is predicted to continue to have capacity constraints and relatively high delays for a roundabout-controlled intersection during the weekday a.m. peak hour.

It is important to note that the further deterioration of operations between the 2029 and 2034 horizon years is due to the amount of background growth that was predicted by the Town and Region and applied to all movements at the intersection, including the existing high volume turning movements. As the volume of circulating traffic within the roundabout increases, the amount of gaps for traffic from the minor legs (east and west) to enter the roundabout decreases, thus increasing predicted delays and queue lengths.

Additionally, traffic operations continue to deteriorate between the 2029 and 2034 future total horizon years compared to 2029 and 2034 future background conditions. This suggests that although the amount of site traffic added to this intersection under future total conditions is nominal (less than 100 vehicles), yet traffic operations under future total horizon years worsen compared to future background horizon years. This indicates that the roundabout is sensitive to changes in traffic pattern and changes in traffic volumes and the site traffic is not responsible for the deterioration of operations at this roundabout under future total horizon years.

Table 8-2 2029 Future Background Roundabout Capacity Analysis Summary

Y-intercept Adjustment	Peak Hour	Leg of Roundabout	95% Queues (veh)	Delays (s)	v/c	LOS (Leg)	LOS (Intersection)
90%	AM	WB	1.3	6	0.23	A	C
		SB	1.5	4	0.45	A	
		EB	59.9	62	0.98	F	
		NB	1.5	5	0.45	A	
	PM	WB	17.6	26	0.79	D	B
		SB	1.7	4	0.31	A	
		EB	1.6	7	0.44	A	
		NB	9.4	9	0.75	A	
100%	AM	WB	1.1	5	0.20	A	A
		SB	1.5	3	0.40	A	
		EB	25.2	22	0.84	C	
		NB	1.7	4	0.40	A	
	PM	WB	5.2	14	0.64	B	A
		SB	1.4	3	0.27	A	
		EB	2.0	6	0.39	A	
		NB	3.7	6	0.67	A	

Table 8-3 2034 Future Background Roundabout Capacity Analysis Summary

Y-intercept Adjustment	Peak Hour	Leg of Roundabout	95% Queues (veh)	Delays (s)	v/c	LOS (Leg)	LOS (Intersection)
90%	AM	WB	1.2	6	0.26	A	F
		SB	1.5	5	0.53	A	
		EB	200.0	324	1.18	F	
		NB	1.5	6	0.51	A	
	PM	WB	49.2	90	1.04	F	D
		SB	2.2	4	0.36	A	
		EB	1.4	8	0.50	A	
		NB	33.0	16	0.87	C	
100%	AM	WB	1.3	5	0.23	A	C
		SB	1.4	4	0.47	A	
		EB	66.4	66	1.00	F	
		NB	1.5	5	0.46	A	
	PM	WB	20.6	27	0.82	D	B
		SB	1.8	3	0.32	A	
		EB	1.5	6	0.44	A	
		NB	12.0	9	0.78	A	

Table 8-4 2029 Future Total Roundabout Capacity Analysis Summary

Y-intercept Adjustment	Peak Hour	Leg of Roundabout	95% Queues (veh)	Delays (s)	v/c	LOS (Leg)	LOS (Intersection)
90%	AM	WB	1.4	6	0.24	A	D
		SB	1.5	4	0.47	A	
		EB	71.1	94	1.03	F	
		NB	1.4	5	0.47	A	
	PM	WB	26.9	40	0.90	E	B
		SB	1.9	4	0.32	A	
		EB	1.5	7	0.46	A	
		NB	12.9	10	0.77	A	
100%	AM	WB	1.2	5	0.21	A	B
		SB	1.5	3	0.42	A	
		EB	30.2	27	0.88	D	
		NB	1.5	4	0.41	A	
	PM	WB	11.8	18	0.72	C	A
		SB	1.2	3	0.28	A	
		EB	1.9	6	0.40	A	
		NB	4.2	7	0.69	A	

Table 8-5 2034 Future Total Roundabout Capacity Analysis Summary

Y-intercept Adjustment	Peak Hour	Leg of Roundabout	95% Queues (veh)	Delays (s)	v/c	LOS (Leg)	LOS (Intersection)
90%	AM	WB	1.4	6	0.27	A	F
		SB	1.8	5	0.55	A	
		EB	172.4	446	1.23	F	
		NB	1.4	6	0.53	A	
	PM	WB	70.8	210	1.17	F	F
		SB	2.2	4	0.37	A	
		EB	1.5	9	0.52	A	
		NB	39.1	19	0.90	C	
100%	AM	WB	1.4	5	0.24	A	D
		SB	1.5	4	0.49	A	
		EB	77.5	99	1.04	F	
		NB	1.5	5	0.48	A	
	PM	WB	29.9	42	0.92	E	B
		SB	2.0	3	0.33	A	
		EB	1.5	7	0.46	A	
		NB	15.8	10	0.80	A	

It is recommended that the Town and Region monitor the intersection and should the predicted volumes and associated delays and queues be actualized, investigate the feasibility of constructing a dedicated eastbound right-turn/by-pass lane. Such a dedicated eastbound right-turn lane would ease capacity constraints for the eastbound movements and improve the roundabout’s overall operations.

8.1.2 Regional Road 25 and James Snow Parkway

The capacity analysis results for the existing signalized intersection of Regional Road 25 and James Snow Parkway are summarized in **Table 8-6** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions. The cycle length was reduced from 155s to 120s, and signal timing splits were optimized for all future background and future total conditions under a.m. and

p.m. peak hour conditions.

Table 8-6 Regional Road 25 and James Snow Parkway

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	<i>0.46</i>	<i>20</i>	<i>B</i>	<i>0.67</i>	<i>24</i>	<i>C</i>
	EBL	0.07	24	C	0.13	27	C
	EBT	0.10	25	C	0.31	32	C
	EBR	0.04	25	C	0.14	31	C
	WBL	0.24	18	B	0.54	23	C
	WBT	0.13	21	C	0.14	25	C
	WBR	0.06	21	C	0.18	26	C
	NBL	0.46	13	B	0.26	14	B
	NBT	0.55	22	C	0.76	27	C
	NBR	0.31	20	B	0.12	18	B
	SBL	0.58	15	B	0.52	15	B
	SBTR	0.55	22	C	0.42	20	B
Future Background 2024	<i>Overall</i>	<i>0.51</i>	<i>18</i>	<i>B</i>	<i>0.69</i>	<i>24</i>	<i>C</i>
	EBL	0.09	25	C	0.15	28	C
	EBT	0.13	27	C	0.34	33	C
	EBR	0.04	26	C	0.14	32	C
	WBL	0.31	20	C	0.53	22	C
	WBT	0.17	23	C	0.14	24	C
	WBR	0.06	23	C	0.19	25	C
	NBL	0.45	11	B	0.31	15	B
	NBT	0.55	20	B	0.76	27	C
	NBR	0.33	18	B	0.13	18	B
	SBL	0.57	12	B	0.68	23	C
	SBTR	0.51	19	B	0.44	20	B
Future Background 2029	<i>Overall</i>	<i>0.54</i>	<i>19</i>	<i>B</i>	<i>0.68</i>	<i>23</i>	<i>C</i>
	EBL	0.09	24	C	0.16	25	C
	EBT	0.11	25	C	0.34	29	C
	EBR	0.05	24	C	0.16	28	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	WBL	0.29	19	B	0.55	19	B
	WBT	0.15	21	C	0.14	21	C
	WBR	0.07	21	C	0.23	22	C
	NBL	0.51	14	B	0.35	16	B
	NBT	0.46	21	C	0.66	24	C
	NBR	0.35	21	C	0.22	20	B
	SBL	0.63	15	B	0.70	24	C
	SBT	0.38	20	B	0.37	20	C
	SBR	0.04	18	B	0.01	18	B
Future Background 2034	<i>Overall</i>	<i>0.65</i>	<i>21</i>	<i>C</i>	<i>0.78</i>	<i>26</i>	<i>C</i>
	EBL	0.11	25	C	0.19	27	C
	EBT	0.09	26	C	0.30	32	C
	EBR	0.05	26	C	0.18	31	C
	WBL	0.36	21	C	0.66	24	C
	WBT	0.13	23	C	0.12	23	C
	WBR	0.08	23	C	0.25	24	C
	NBL	0.60	16	B	0.39	15	B
	NBT	0.53	23	C	0.75	27	C
	NBR	0.47	23	C	0.29	21	C
	SBL	0.73	18	B	0.83	38	D
	SBT	0.42	20	C	0.45	23	C
	SBR	0.04	18	B	0.01	20	B
Future Total 2024	<i>Overall</i>	<i>0.63</i>	<i>19</i>	<i>B</i>	<i>0.83</i>	<i>27</i>	<i>C</i>
	EBL	0.09	26	C	0.16	30	C
	EBT	0.18	28	C	0.39	35	D
	EBR	0.04	27	C	0.14	34	C
	WBL	0.55	24	C	0.80	33	C
	WBT	0.17	24	C	0.15	24	C
	WBR	0.06	23	C	0.21	25	C
	NBL	0.45	11	B	0.33	16	B
	NBT	0.56	21	C	0.78	29	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	NBR	0.42	19	B	0.18	19	B
	SBL	0.59	12	B	0.76	31	C
	SBTR	0.50	19	B	0.46	21	C
Future Total 2029	<i>Overall</i>	<i>0.65</i>	<i>20</i>	<i>B</i>	<i>0.85</i>	<i>25</i>	<i>C</i>
	EBL	0.09	24	C	0.17	26	C
	EBT	0.15	26	C	0.38	31	C
	EBR	0.05	25	C	0.16	30	C
	WBL	0.50	21	C	0.80	29	C
	WBT	0.16	22	C	0.15	20	C
	WBR	0.07	22	C	0.28	22	C
	NBL	0.51	14	B	0.37	17	B
	NBT	0.46	21	C	0.68	26	C
	NBR	0.44	22	C	0.33	22	C
	SBL	0.65	15	B	0.79	34	C
	SBT	0.36	19	B	0.39	22	C
	SBR	0.04	17	B	0.01	19	B
	Future Total 2034	<i>Overall</i>	<i>0.75</i>	<i>22</i>	<i>C</i>	0.95	<i>31</i>
EBL		0.14	29	C	0.20	29	C
EBT		0.16	30	C	0.33	33	C
EBR		0.05	30	C	0.18	33	C
WBL		0.54	24	C	0.95	54	D
WBT		0.13	24	C	0.13	23	C
WBR		0.08	24	C	0.26	25	C
NBL		0.61	16	B	0.40	16	B
NBT		0.52	23	C	0.76	28	C
NBR		0.58	25	C	0.41	23	C
SBL		0.76	18	B	0.90	52	D
SBT		0.40	20	B	0.47	24	C
SBR		0.04	17	B	0.01	21	C

The intersection is operating well with acceptable operational characteristics under all study

conditions and peak hours except for during the p.m. peak hour under 2029 and 2034 future total conditions with an overall v/c ratio of 0.85 and 0.95, respectively. For all other horizons, the overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours is not expected to exceed 0.83. The intersection is expected to operate with an overall LOS 'C' or better during the weekday a.m. and p.m. peak hours for all planning horizons.

Individual movements at the intersection are operating with reserve capacity for all study horizon years and peak hours, operating with v/c ratios of 0.83 or less and LOS 'D' or better except for the westbound left and southbound left movements. These movements are predicted to operate with v/c ratios of 0.95 and 0.90 during the p.m. peak hour, respectively, under 2034 future total conditions.

8.1.3 Boston Church Road and James Snow Parkway

The capacity analysis results for the existing signalized intersection of Boston Church Road and James Snow Parkway are summarized in **Table 8-7** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions. The existing cycle length of 118s was maintained under 2024 and 2029 horizon years. Post widening of James Snow Parkway i.e., after 2029 horizon year, cycle length was increased from 118s to 120s under 2034 horizon year. Signal timing splits were optimized for all future background and future total conditions under a.m. and p.m. peak hour conditions.

Table 8-7 Boston Church and James Snow Parkway

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	<i>0.40</i>	<i>18</i>	<i>B</i>	<i>0.39</i>	<i>19</i>	<i>B</i>
	EBL	0.07	12	B	0.27	13	B
	EBTR	0.59	18	B	0.36	19	B
	WBL	0.08	14	B	0.13	17	B
	WBTR	0.18	15	B	0.37	21	C
	NBL	0.16	23	C	0.36	17	B
	NBT	0.00	24	C	0.05	19	B
	NBR	0.01	24	C	0.03	19	B
	SBL	0.07	17	B	0.08	29	C
	SBT	0.04	21	C	0.08	31	C
SBR	0.08	22	C	0.03	30	C	
Future Background	<i>Overall</i>	<i>0.42</i>	<i>16</i>	<i>B</i>	<i>0.40</i>	<i>20</i>	<i>B</i>

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
2024	EBL	0.07	10	A	0.27	13	B
	EBTR	0.56	15	B	0.38	19	B
	WBL	0.08	11	B	0.13	17	B
	WBTR	0.17	13	B	0.40	22	C
	NBL	0.20	26	C	0.36	18	B
	NBT	0.01	26	C	0.05	20	B
	NBR	0.01	26	C	0.03	20	B
	SBL	0.08	19	B	0.07	30	C
	SBT	0.05	24	C	0.08	31	C
	SBR	0.08	24	C	0.03	31	C
Future Background 2029	<i>Overall</i>	<i>0.45</i>	<i>19</i>	<i>B</i>	<i>0.46</i>	<i>22</i>	<i>C</i>
	EBL	0.08	11	B	0.32	14	B
	EBTR	0.65	19	B	0.45	22	C
	WBL	0.10	13	B	0.15	19	B
	WBTR	0.20	15	B	0.46	25	C
	NBL	0.18	25	C	0.42	18	B
	NBT	0.01	26	C	0.06	19	B
	NBR	0.01	26	C	0.04	19	B
	SBL	0.08	19	B	0.06	28	C
	SBT	0.04	24	C	0.07	29	C
Future Background 2034	<i>Overall</i>	<i>0.38</i>	<i>17</i>	<i>B</i>	<i>0.42</i>	<i>21</i>	<i>C</i>
	EBL	0.10	11	B	0.34	14	B
	EBTR	0.52	17	B	0.33	20	B
	WBL	0.11	13	B	0.20	20	C
	WBTR	0.17	15	B	0.39	25	C
	NBL	0.17	22	C	0.41	19	B
	NBT	0.01	23	C	0.05	20	B
	NBR	0.02	23	C	0.04	20	B
	SBL	0.09	21	C	0.06	29	C
	SBT	0.05	23	C	0.07	30	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	SBR	0.10	23	C	0.03	30	C
Future Total 2024	<i>Overall</i>	<i>0.51</i>	<i>20</i>	<i>B</i>	<i>0.53</i>	<i>22</i>	<i>C</i>
	EBL	0.23	11	B	0.38	13	B
	EBTR	0.69	20	B	0.42	19	B
	WBL	0.10	16	B	0.13	17	B
	WBTR	0.34	19	B	0.56	24	C
	NBL	0.21	28	C	0.41	24	C
	NBT	0.01	29	C	0.10	31	C
	NBR	0.01	29	C	0.03	31	C
	SBL	0.20	18	B	0.50	23	C
	SBT	0.04	22	C	0.05	29	C
	SBR	0.09	23	C	0.06	29	C
Future Total 2029	<i>Overall</i>	<i>0.54</i>	<i>20</i>	<i>C</i>	<i>0.57</i>	<i>23</i>	<i>C</i>
	EBL	0.23	11	B	0.43	14	B
	EBTR	0.71	21	C	0.45	20	B
	WBL	0.11	14	B	0.15	17	B
	WBTR	0.34	18	B	0.60	25	C
	NBL	0.26	32	C	0.49	25	C
	NBT	0.01	33	C	0.14	32	C
	NBR	0.01	33	C	0.04	32	C
	SBL	0.22	21	C	0.56	25	C
	SBT	0.04	25	C	0.07	31	C
	SBR	0.10	26	C	0.07	31	C
Future Total 2034	<i>Overall</i>	<i>0.46</i>	<i>19</i>	<i>B</i>	<i>0.50</i>	<i>23</i>	<i>C</i>
	EBL	0.26	11	B	0.41	13	B
	EBTR	0.60	19	B	0.33	18	B
	WBL	0.13	15	B	0.20	20	B
	WBTR	0.28	18	B	0.50	25	C
	NBL	0.19	25	C	0.48	26	C
	NBT	0.01	27	C	0.13	33	C
	NBR	0.02	28	C	0.04	32	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	SBL	0.22	19	B	0.51	25	C
	SBT	0.05	24	C	0.07	31	C
	SBR	0.11	24	C	0.07	32	C

The intersection is expected to operate well with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. peak hour does not exceed 0.54, and the v/c ratio during the p.m. peak hour does not exceed 0.57 for any study horizon year. The intersection operates with an overall LOS of 'C' or better during both peak hours for all horizon years.

Individual movements at the intersection are expected to continue operating with significant reserve capacity under all study conditions and peak hours, operating with v/c ratios of 0.71 or less with LOS 'C' or better.

8.1.4 Esquesing Line and James Snow Parkway

The capacity analysis results for the existing signalized intersection of Esquesing Line and James Snow Parkway are summarized in **Table 8-8** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions. The existing cycle length of 95s was maintained under 2024 and 2029 horizon years. Post widening of James Snow Parkway i.e., after 2029 horizon year, cycle length was increased from 95s to 120s under 2034 horizon year. Signal timing splits were optimized for all future background and future total conditions under a.m. and p.m. peak hour conditions.

Table 8-8 Esquesing Line and James Snow Parkway Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	<i>0.55</i>	<i>18</i>	<i>B</i>	<i>0.44</i>	<i>15</i>	<i>B</i>
	EBL	0.05	15	B	0.04	14	B
	EBTR	0.57	21	C	0.35	16	B
	WBL	0.15	13	B	0.03	14	B
	WBTR	0.17	16	B	0.34	16	B
	NBL	0.27	16	B	0.29	13	B
	NBT	0.31	15	B	0.52	14	B
	NBR	0.01	13	B	0.02	11	B

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	SBL	0.12	14	B	0.10	11	B
	SBT	0.60	19	B	0.24	12	B
	SBR	0.01	13	B	0.01	10	B
Future Background 2024	<i>Overall</i>	<i>0.55</i>	<i>18</i>	<i>B</i>	<i>0.44</i>	<i>15</i>	<i>B</i>
	EBL	0.06	14	B	0.05	14	B
	EBTR	0.59	21	C	0.37	17	B
	WBL	0.16	13	B	0.03	14	B
	WBTR	0.18	16	B	0.36	16	B
	NBL	0.24	16	B	0.27	12	B
	NBT	0.30	16	B	0.50	14	B
	NBR	0.01	13	B	0.02	11	B
	SBL	0.11	14	B	0.09	11	B
	SBT	0.58	19	B	0.23	12	B
	SBR	0.01	14	B	0.01	11	B
Future Background 2029	<i>Overall</i>	<i>0.60</i>	<i>19</i>	<i>B</i>	<i>0.48</i>	<i>15</i>	<i>B</i>
	EBL	0.06	15	B	0.05	14	B
	EBTR	0.65	22	C	0.42	17	B
	WBL	0.19	14	B	0.04	14	B
	WBTR	0.20	16	B	0.40	17	B
	NBL	0.29	17	B	0.30	13	B
	NBT	0.32	16	B	0.55	15	B
	NBR	0.01	14	B	0.02	11	B
	SBL	0.12	15	B	0.11	11	B
	SBT	0.62	21	C	0.26	12	B
	SBR	0.01	14	B	0.01	11	B
Future Background 2034	<i>Overall</i>	<i>0.57</i>	<i>19</i>	<i>B</i>	<i>0.47</i>	<i>15</i>	<i>B</i>
	EBL	0.07	16	B	0.06	15	B
	EBTR	0.52	21	C	0.33	17	B
	WBL	0.22	14	B	0.04	15	B
	WBTR	0.16	17	B	0.32	17	B
	NBL	0.34	17	B	0.33	13	B

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	NBT	0.34	16	B	0.58	15	B
	NBR	0.01	13	B	0.03	10	B
	SBL	0.13	14	B	0.12	11	B
	SBT	0.66	21	C	0.27	12	B
	SBR	0.01	13	B	0.01	10	B
Future Total 2024	<i>Overall</i>	<i>0.61</i>	<i>20</i>	<i>C</i>	<i>0.63</i>	<i>19</i>	<i>B</i>
	EBL	0.10	14	B	0.14	11	B
	EBTR	0.69	22	C	0.70	20	B
	WBL	0.18	13	B	0.05	14	B
	WBTR	0.62	20	B	0.47	18	B
	NBL	0.26	17	B	0.31	18	B
	NBT	0.31	17	B	0.57	21	C
	NBR	0.01	15	B	0.02	15	B
	SBL	0.11	16	B	0.12	16	B
	SBT	0.60	21	C	0.27	17	B
	SBR	0.03	15	B	0.01	15	B
Future Total 2029	<i>Overall</i>	<i>0.66</i>	<i>22</i>	<i>C</i>	<i>0.66</i>	<i>20</i>	<i>B</i>
	EBL	0.11	14	B	0.15	11	B
	EBTR	0.74	24	C	0.70	20	C
	WBL	0.22	14	B	0.05	14	B
	WBTR	0.63	21	C	0.48	19	B
	NBL	0.32	19	B	0.35	19	B
	NBT	0.33	18	B	0.63	23	C
	NBR	0.01	15	B	0.02	16	B
	SBL	0.13	16	B	0.14	17	B
	SBT	0.65	23	C	0.30	18	B
	SBR	0.03	15	B	0.01	16	B
Future Total 2034	<i>Overall</i>	<i>0.60</i>	<i>21</i>	<i>C</i>	<i>0.59</i>	<i>19</i>	<i>B</i>
	EBL	0.12	16	B	0.17	12	B
	EBTR	0.58	22	C	0.56	19	B
	WBL	0.22	14	B	0.06	16	B

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	WBTR	0.45	19	B	0.41	20	B
	NBL	0.38	21	C	0.35	17	B
	NBT	0.35	19	B	0.63	21	C
	NBR	0.01	16	B	0.03	14	B
	SBL	0.14	17	B	0.15	16	B
	SBT	0.69	25	C	0.29	16	B
	SBR	0.03	16	B	0.01	14	B

The intersection is expected to operate well with acceptable operational characteristics under all study conditions and peak hours. The overall v/c ratio of the intersection during the weekday a.m. and p.m. peak hours does not exceed 0.66 for any study horizon year. The intersection operates with an overall LOS 'C' or better during the a.m. peak hour and LOS 'B' during the p.m. peak hour, for all planning horizons.

Individual movements at the intersection are expected to continue operating with reserve capacity for all study horizon years and peak hours, operating with v/c ratios of 0.74 or less and LOS 'C' or better.

8.1.5 James Snow Parkway and Steeles Avenue

The capacity analysis results for the existing signalized intersection of James Snow Parkway and Steeles Avenue are summarized in **Table 8-9** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions. The existing cycle length of 140s was maintained for all future horizon years. Signal timings splits were optimized under all future background and future total horizon conditions.

Table 8-9 James Snow Parkway and Steeles Avenue Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021	<i>Overall</i>	<i>0.61</i>	<i>33</i>	<i>C</i>	<i>0.62</i>	<i>33</i>	<i>C</i>
	EBL	0.00	26	C	0.06	27	C
	EBT	0.59	33	C	0.48	32	C
	EBR	0.21	29	C	0.32	31	C
	WBL	0.52	44	D	0.80	49	D

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	WBT	0.25	21	C	0.51	22	C
	WBR	0.07	20	B	0.12	18	B
	NBL	0.71	43	D	0.71	42	D
	NBT	0.19	30	C	0.22	31	C
	NBR	0.53	35	D	0.15	31	C
	SBL	0.51	28	C	0.42	31	C
	SBTR	0.25	36	D	0.42	39	D
Future Background 2024	<i>Overall</i>	<i>0.66</i>	<i>35</i>	<i>D</i>	<i>0.65</i>	<i>34</i>	<i>C</i>
	EBL	0.00	27	C	0.06	28	C
	EBT	0.62	35	D	0.50	33	C
	EBR	0.22	30	C	0.45	33	C
	WBL	0.55	48	D	0.77	47	D
	WBT	0.26	23	C	0.52	22	C
	WBR	0.08	21	C	0.13	18	B
	NBL	0.77	47	D	0.80	48	D
	NBT	0.19	31	C	0.23	31	C
	NBR	0.62	39	D	0.16	31	C
	SBL	0.52	29	C	0.49	34	C
	SBTR	0.24	36	D	0.45	41	D
Future Background 2029	<i>Overall</i>	<i>0.70</i>	<i>38</i>	<i>D</i>	<i>0.72</i>	<i>37</i>	<i>D</i>
	EBL	0.00	30	C	0.07	27	C
	EBT	0.52	35	D	0.36	31	C
	EBR	0.24	33	C	0.61	36	D
	WBL	0.59	49	D	0.88	57	E
	WBT	0.21	24	C	0.39	20	B
	WBR	0.09	23	C	0.14	18	B
	NBL	0.87	56	E	0.91	62	E
	NBT	0.20	30	C	0.25	33	C
	NBR	0.75	44	D	0.17	32	C
	SBL	0.54	28	C	0.55	37	D
	SBTR	0.24	35	C	0.49	43	D

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Background 2034	<i>Overall</i>	<i>0.81</i>	<i>43</i>	<i>D</i>	<i>0.80</i>	<i>44</i>	<i>D</i>
	EBL	0.00	34	C	0.07	26	C
	EBT	0.58	41	D	0.36	30	C
	EBR	0.25	37	D	0.67	38	D
	WBL	0.81	75	E	1.01	86	F
	WBT	0.25	30	C	0.42	22	C
	WBR	0.09	29	C	0.14	19	B
	NBL	0.85	55	D	0.99	75	E
	NBT	0.12	23	C	0.22	33	C
	NBR	0.88	50	D	0.20	34	C
	SBL	0.67	36	D	0.58	35	D
	SBT	0.16	34	C	0.39	41	D
Future Total 2024	<i>Overall</i>	<i>0.68</i>	<i>38</i>	<i>D</i>	<i>0.86</i>	<i>51</i>	<i>D</i>
	EBL	0.00	30	C	0.06	33	C
	EBT	0.64	38	D	0.48	40	D
	EBR	0.22	33	C	0.81	55	D
	WBL	0.57	51	D	0.96	86	F
	WBT	0.27	25	C	0.56	30	C
	WBR	0.08	23	C	0.13	24	C
	NBL	0.81	53	D	0.99	94	F
	NBT	0.62	36	D	0.31	32	C
	NBR	0.63	39	D	0.16	31	C
	SBL	0.64	32	C	0.43	33	C
	SBTR	0.38	37	D	0.79	50	D
Future Total 2029	<i>Overall</i>	<i>0.72</i>	<i>40</i>	<i>D</i>	0.94	<i>64</i>	E
	EBL	0.00	32	C	0.06	32	C
	EBT	0.54	38	D	0.34	38	D
	EBR	0.24	35	D	0.89	65	E
	WBL	0.60	52	D	1.11	134	F
	WBT	0.22	26	C	0.41	28	C
	WBR	0.09	25	C	0.14	25	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	NBL	0.91	65	E	1.15	150	F
	NBT	0.60	35	C	0.33	34	C
	NBR	0.76	44	D	0.17	33	C
	SBL	0.68	31	C	0.48	35	D
	SBTR	0.37	35	C	0.81	53	D
Future Total 2034	<i>Overall</i>	<i>0.81</i>	<i>43</i>	<i>D</i>	0.93	<i>68</i>	E
	EBL	0.00	36	D	0.07	29	C
	EBT	0.60	43	D	0.33	34	C
	EBR	0.25	39	D	0.87	57	E
	WBL	0.84	81	F	1.23	177	F
	WBT	0.26	32	C	0.42	26	C
	WBR	0.09	30	C	0.14	23	C
	NBL	0.87	58	E	1.19	158	F
	NBT	0.34	25	C	0.29	36	D
	NBR	0.87	48	D	0.20	36	D
	SBL	0.85	52	D	0.56	36	D
	SBT	0.24	34	C	0.68	48	D
	SBR	0.01	32	C	0.01	39	D

The intersection is expected to generally operate with acceptable operational characteristics and reserve capacity for all study horizon years, with the exception of select individual movements during the p.m. peak hour.

The intersection operates with an overall v/c ratio of 0.81 or less and LOS 'D' or better during the weekday a.m. peak hour for all study horizon years. All individual movements are expected to operate with reserve capacity during the a.m. peak hour, with the exception of the northbound left movement that is predicted to experience a v/c ratio of 0.87 and LOS 'E' under 2029 future background conditions and a v/c ratio of 0.91 and LOS 'E' under 2029 future total conditions

During the p.m. peak hour, the intersection is expected to operate with an overall v/c ratio of 0.94 or less and LOS 'E' or better.

Individual movements at the intersection are predicted to operate with reserve capacity and acceptable delay during the p.m. peak hour for all study horizon years, with the exception of the

westbound left and northbound left movements under 2024, 2029 and 2034 future total conditions and 2029 and 2034 future background conditions.

Under 2029 future background conditions, the northbound dual left movement is expected to approach capacity, with v/c ratios of 0.91 and experiencing LOS 'E'. Under 2034 future background conditions, the operations of the westbound and northbound dual left turn movements deteriorate further due to background growth, with the westbound left turn movement predicted to operate above theoretical capacity and the northbound left turn movement predicted to approach capacity. The westbound left movement is predicted to operate with a v/c ratio of 1.01 while the northbound left is predicted to operate with a v/c ratio of 0.99.

Under 2024 future total conditions, with addition of site traffic both the westbound and northbound dual left movements are expected to approach capacity, with v/c ratios of 0.96 and 0.99, respectively, both experiencing LOS 'F'. Under 2029 future total conditions, the operations of the dual left turn movements deteriorate further due to background growth, with both predicted to operate above theoretical capacity. The westbound left movement is predicted to operate with a v/c ratio of 1.11 while the northbound left is predicted to operate with a v/c ratio of 1.15. Both movements will continue to experience LOS 'F' due to high delays over 100 seconds. Under 2034 future total conditions, both westbound left and northbound left turn movements continue to operate above theoretical capacity with a v/c ratio of 1.23 and 1.19, respectively and experience LOS 'F' due to high delays over 100 seconds.

While the high delays predicted for these movements are not abnormal for dual left-turns that operate only under a protected turn phase, mitigation measures were explored to improve the operations of the intersection during the p.m. peak hour.

To improve traffic operations under future conditions, the pedestrian crossing on the west leg (eastbound approach) of the intersection could be removed in the future, should the need arise. Based on available TMC data, a total of 2 pedestrians were recorded as crossing the intersection via the west leg (north-south crossing) during the a.m., mid-day, and p.m. peak periods that were recorded. By removing the pedestrian crossing on the west leg of the intersection, the pedestrian crossing time associated with the southbound through phase will be removed from the signal timing plan, allowing the southbound through phase to be shortened and time reallocated to other phases, such as the northbound and westbound left-turn movements without increasing the existing cycle length of 140 seconds. This is expected to decrease delay and improved traffic operations at this intersection under future conditions.

It should be noted that one of the main drivers of deterioration in operations at the intersection, particularly for the dual left movements, is the background growth rates applied to Steeles Avenue and James Snow Parkway. Subject site traffic is not expected to contribute to the existing high volumes of westbound and northbound left-turning traffic. It is recommended that the Region

monitor the intersection to determine if the predicted levels of growth are realized, leading to deteriorating levels of service and available capacity. At that time, the Region could choose to implement the proposed removal of the pedestrian crossing on the west leg of the intersection, restricting north-south pedestrian crossings to the east leg of the intersection.

8.1.6 Boston Church Road / Third Line and 5 Side Road

The capacity analysis results for the existing unsignalized intersection of Boston Church Road / Third Line and 5 Side Road are summarized in **Table 8-10** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

Table 8-10 Boston Church Road / Third Line and 5 Side Road Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Existing 2021 [unsignalized]	EBLTR	0.70	19	C	0.36	11	B
	WBLTR	0.29	11	B	0.54	14	B
	NBLTR	0.07	9	A	0.30	11	B
	SBLTR	0.19	10	B	0.08	10	A
Future Background 2024 [unsignalized]	EBLTR	0.64	16	C	0.32	11	B
	WBLTR	0.26	10	B	0.49	13	B
	NBLTR	0.07	9	A	0.27	10	B
	SBLTR	0.17	10	A	0.07	9	A
Future Background 2029 [unsignalized]	EBLTR	0.73	20	C	0.36	12	B
	WBLTR	0.30	11	B	0.56	15	B
	NBLTR	0.08	10	A	0.31	11	B
	SBLTR	0.20	10	B	0.08	10	A
Future Background 2034 [unsignalized]	EBLTR	0.82	27	D	0.42	13	B
	WBLTR	0.34	11	B	0.64	18	C
	NBLTR	0.09	10	A	0.36	12	B
	SBLTR	0.22	11	B	0.10	10	B
Future Total 2024 [unsignalized]	EBLTR	0.72	20	C	0.42	12	B
	WBLTR	0.32	11	B	0.53	15	B
	NBLTR	0.15	10	B	0.38	12	B
	SBLTR	0.18	10	B	0.08	10	A

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2029 [unsignalized]	EBLTR	0.81	26	D	0.46	14	B
	WBLTR	0.36	12	B	0.60	17	C
	NBLTR	0.16	11	B	0.42	13	B
	SBLTR	0.21	11	B	0.09	10	B
Future Total 2034 [unsignalized]	EBLTR	0.91	39	E	0.53	16	C
	WBLTR	0.40	13	B	0.70	21	C
	NBLTR	0.18	11	B	0.48	15	B
	SBLTR	0.24	12	B	0.11	11	B

Under existing and all future horizon years, the all-way stop controlled (AWSC) unsignalized intersection is generally operating well with acceptable operational characteristics during both peak hours. Under 2034 Future Total conditions, the eastbound shared left/through/right movement is predicted to experience LOS 'E' and a v/c ratio of 0.91 during the weekday a.m. peak hour.

8.1.7 Esquesing Line / Fourth Line and 5 Side Road

The capacity analysis results for the existing unsignalized intersection of Esquesing Line / Fourth Line and 5 Side Road are summarized in **Table 8-11** for both the weekday a.m. and p.m. peak hours under existing and future traffic conditions.

Please note that although an OTM signal warrant is not triggered at this intersection (as discussed in **Section 7.3**), it has been analyzed as a signalized intersection from the 2024 horizon onwards due to v/c ratios greater than 1.0 and high delays under existing conditions. A cycle length of 90 seconds was used for analysis purposes, satisfying Milton's minimum cycle length of 75 seconds. The unsignalized capacity results for the 2024 Future Background horizon have been included for comparison purposes.

Additionally, as per the comments received from the Town's peer reviewer on the 2nd submission of the TIS, an OTM-based left-turn warrant was conducted for the ultimate 2034 horizon (as noted in **section 7.1**). A westbound left-turn and a southbound left-turn lane was included in the future background and future total scenarios from the 2024 horizon year onwards for safety and operational considerations. A placeholder storage length of 40 and 60 metres were applied to the westbound and southbound left-turn lanes, respectively. A taper length of 50 metres was used for both left-turn lanes.

Turning movement count data obtained in 2019 at this intersection was utilized to calibrate the

existing condition model for the weekday a.m. peak hour to be representative of existing conditions prior to growing the traffic to the 2021 baseline horizon year. The Peak Hour Factor (PHF) for the eastbound approach was incrementally increased from 0.92 to 0.95 until the v/c ratio for the eastbound and southbound approaches were within theoretical capacity limits (i.e. approaching, but not exceeding a v/c ratio of 1.0), as shown in **Table 8-11**. A PHF of 0.95 was maintained for the eastbound approach the 2021 baseline a.m. peak hour synchro model.

Table 8-11 Esquering Line and 5 Side Road / Fourth Line Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Calibrated 2019 [unsignalized]	EBLTR	0.99	69	F	Not assessed under p.m. peak hour conditions		
	WBLTR	0.61	25	C			
	NBLTR	0.60	23	C			
	SBLTR	0.97	65	F			
Existing 2021 [unsignalized]	EBLTR	1.03	80	F	0.54	19	C
	WBLTR	0.63	26	D	0.73	26	D
	NBLTR	0.62	24	C	0.75	28	D
	SBLTR	1.01	73	F	0.35	15	B
Future Background 2024 [unsignalized]	EBLTR	1.01	73	F	0.53	18	C
	WBLTR	0.57	22	C	0.71	25	C
	NBLTR	0.56	21	C	0.74	26	D
	SBLTR	0.91	51	F	0.34	14	B
Future Background 2024 [signalized]	<i>Overall</i>	<i>0.62</i>	<i>23</i>	<i>C</i>	<i>0.55</i>	<i>23</i>	<i>C</i>
	EBLTR	0.63	23	C	0.39	19	B
	WBL	0.23	12	B	0.14	11	B
	WBTR	0.16	11	B	0.33	13	B
	NBLTR	0.49	32	C	0.79	38	D
	SBL	0.26	21	C	0.02	21	C
	SBTR	0.58	25	C	0.24	20	C
Future Background 2029 [signalized]	<i>Overall</i>	<i>0.69</i>	<i>25</i>	<i>C</i>	<i>0.61</i>	<i>25</i>	<i>C</i>
	EBLTR	0.69	26	C	0.46	22	C
	WBL	0.28	13	B	0.17	13	B
	WBTR	0.18	11	B	0.39	15	B

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	NBLTR	0.55	34	C	0.80	40	D
	SBL	0.30	21	C	0.03	19	B
	SBTR	0.64	29	C	0.27	20	B
Future Background 2034 [signalized]	<i>Overall</i>	<i>0.76</i>	<i>28</i>	<i>C</i>	<i>0.70</i>	<i>24</i>	<i>C</i>
	EBLTR	0.76	29	C	0.68	35	C
	WBL	0.33	13	B	0.25	18	B
	WBTR	0.20	11	B	0.51	20	B
	NBLTR	0.62	36	D	0.72	26	C
	SBL	0.35	22	C	0.02	15	B
	SBTR	0.71	32	C	0.25	14	B
Future Total 2024 [signalized]	<i>Overall</i>	<i>0.65</i>	<i>23</i>	<i>C</i>	<i>0.61</i>	<i>23</i>	<i>C</i>
	EBLTR	0.63	24	C	0.47	22	C
	WBL	0.27	12	B	0.16	13	B
	WBTR	0.18	11	B	0.35	14	B
	NBLTR	0.50	32	C	0.78	34	C
	SBL	0.26	21	C	0.02	19	B
	SBTR	0.63	26	C	0.24	19	B
Future Total 2029 [signalized]	<i>Overall</i>	<i>0.72</i>	<i>26</i>	<i>C</i>	<i>0.67</i>	<i>27</i>	<i>C</i>
	EBLTR	0.70	26	C	0.52	23	C
	WBL	0.32	13	B	0.18	13	B
	WBTR	0.20	11	B	0.39	15	B
	NBLTR	0.56	34	C	0.86	45	D
	SBL	0.30	21	C	0.03	19	B
	SBTR	0.69	31	C	0.27	20	B
Future Total 2034 [signalized]	<i>Overall</i>	<i>0.80</i>	<i>29</i>	<i>C</i>	<i>0.76</i>	<i>27</i>	<i>C</i>
	EBLTR	0.79	31	C	0.84	48	D
	WBL	0.37	14	B	0.31	20	C
	WBTR	0.22	11	B	0.56	22	C
	NBLTR	0.63	36	D	0.71	24	C

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	SBL	0.35	22	C	0.02	13	B
	SBTR	0.76	34	C	0.23	13	B

After calibration, during the weekday a.m. peak hour under 2019 conditions, the eastbound and southbound shared left/through/right movements are operating with v/c ratios of 0.99 and 0.97, respectively, with LOS 'F'. Under 2021 baseline conditions, the eastbound and southbound shared left/through/right movements are operating above theoretical capacity with v/c ratios of 1.03 and 1.01, respectively, and both movements experience LOS 'F'. The increase in the v/c ratio from 2019 to 2021 can be attributed to background traffic growth over two years. All other individual movements operate with reserve capacity and LOS 'D' or better during both peak hours under baseline conditions.

As seen in **Table 8-11**, the movements that operate at, or above, theoretical capacity under existing conditions will continue to operate poorly under 2024 Future Background conditions (despite increasing the intersection's PHF to 1.0) should unsignalized control remain unchanged at the intersection. As discussed earlier in this section, the intersection was analyzed as a signalized intersection with auxiliary westbound left-turn and southbound left-turn lanes from the 2024 Future Background horizon forward to address existing over-capacity movements.

Under signalized operation, from the 2024 Future Background horizon onward, the intersection is expected to operate at an overall LOS 'C' or better for all future horizon years. The overall v/c ratio for the intersection is expected to not exceed 0.80 for all future horizon years. All individual movements are expected to operate well under all future background and future total conditions after signalization of the intersection.

It is to be noted that improvements suggested at this intersection in terms of increased cycle length and auxiliary left-turn lanes are triggered due to congestion under existing and future background conditions and not due to site traffic.

It is recommended that signal timings at this intersection be monitored at regular intervals after installation of westbound left-turn lane and a southbound left-turn.

8.2 Future Intersections

8.2.1 West Site Access 1 and 5 Side Road

The capacity analysis results for the proposed unsignalized intersection of West Site Access 1 and 5 Side Road are summarized in **Table 8-12** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

Table 8-12 West Site Access 1 and 5 Side Road Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024	EBTR	0.31	0	-	0.14	0	
	WBL	0.04	9	A	0.01	8	
	WBT	0.10	0		0.21	0	A
	NBLR	0.02	14	B	0.07	12	B
Future Total 2029	EBTR	0.34	0		0.15	0	
	WBL	0.05	9	A	0.01	8	A
	WBT	0.11	0		0.24	8	
	NBLR	0.03	15	B	0.08	12	B
Future Total 2034	EBTR	0.37	0		0.17	0	
	WBL	0.05	9	A	0.01	0	A
	WBT	0.12	0		0.26	0	
	NBLR	0.03	16	C	0.08	12	B

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays during both peak hours under all future total study horizon years. Individual movements are predicted to operate with v/c ratios of 0.37 and 0.26 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'C' or better.

8.2.2 West Site Access 2 and 5 Side Road

The capacity analysis results for proposed the right-in and right-out unsignalized intersection of West Site Access 2 and 5 Side Road are summarized in **Table 8-13** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

Table 8-13 West Site Access 2 and 5 Side Road Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024	EBTR	0.30	0	-	0.15	0	-
	WBT	0.00	0	A	0.00	0	A
	NBR	0.01	12	B	0.03	10	A
Future Total 2029	EBTR	0.33	0	-	0.16	0	-
	WBT	0.00	1	A	0.00	0	A
	NBR	0.01	12	B	0.03	10	A
Future Total 2034	EBTR	0.37	0	-	0.18	0	-
	WBT	0.00	0	A	0.00	0	A
	NBR	0.01	12	B	0.03	10	A

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays during both peak hours under all future total study horizon years. Individual movements are predicted to operate with v/c ratios of 0.37 and 0.18 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'B' or better.

8.2.3 Boston Church Road and West Site Access 3

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and West Site Access 3 are summarized in **Table 8-14** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

Table 8-14 Boston Church Road and West Site Access 3 Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024	EBLR	0.02	11	B	0.03	10	B
	NBTL	0.02	2	A	0.02	1	A
	SBTR	0.12	0	-	0.08	0	-
Future Total 2029	EBLR	0.02	11	B	0.03	10	B
	NBTL	0.02	2	A	0.02	1	A
	SBTR	0.13	0	-	0.08	0	-
Future Total 2034	EBLR	0.02	11	B	0.03	10	B

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	NBTL	0.02	2	A	0.02	1	A
	SBTR	0.14	0	-	0.09	0	-

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays during both peak hours under all future total study horizon years. Individual movements are predicted to operate with v/c ratios of 0.14 and 0.09 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'B' or better.

8.2.4 Boston Church Road and West Site Access 4

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and West Site Access 4 are summarized in **Table 8-15** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

Table 8-15 Boston Church Road and West Site Access 4 Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024	EBLR	0.03	10	A	0.13	10	B
	NBTL	0.06	4	A	0.02	1	A
	SBTR	0.12	0	-	0.09	0	-
Future Total 2029	EBLR	0.03	10	A	0.13	10	B
	NBTL	0.16	4	A	0.02	1	A
	SBTR	0.13	0	-	0.09	0	-
Future Total 2034	EBLR	0.03	10	A	0.13	10	B
	NBTL	0.16	4	A	0.02	1	A
	SBTR	0.14	0	-	0.10	0	-

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays during both peak hours under all future total study horizon years. Individual movements are predicted to operate with v/c ratios of 0.16 or less during the weekday a.m. and p.m. peak hours. All movements during both peak hours are expected to operate with LOS 'B' or better.

8.2.5 Boston Church Road and West Site Access 5

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and West Site Access 5 are summarized in **Table 8-16** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

Table 8-16 Boston Church Road and West Site Access 5 Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024	EBLR	0.00	11	B	0.01	11	B
	NBTL	0.00	0	A	0.01	0	A
	SBTR	0.13	0	-	0.13	0	-
Future Total 2029	EBLR	0.01	11	B	0.01	11	B
	NBTL	0.01	0	A	0.01	0	A
	SBTR	0.14	0	-	0.14	0	-
Future Total 2034	EBLR	0.00	11	B	0.01	11	B
	NBTL	0.00	0	A	0.01	0	A
	SBTR	0.15	0	-	0.14	0	-

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted to operate with v/c ratios of 0.15 or less during the weekday a.m. and p.m. peak hours. All movements during both peak hours are expected to operate with LOS 'B' or better.

8.2.6 Boston Church Road and East Site Access 1

The capacity analysis results for the proposed unsignalized intersection of Boston Church Road and East Site Access 1 are summarized in **Table 8-17** for both the weekday a.m. and p.m. peak hours under future total traffic conditions.

Table 8-17 Boston Church Road and East Site Access 1 Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024	WBL	0.05	12	B	0.18	13	B
	WBR	0.00	10	A	0.00	-	-

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
	NBTR	0.17	0	-	0.16	0	-
	SBTL	0.02	1	A	0.01	0	A
Future Total 2029	WBL	0.05	13	B	0.19	14	B
	WBR	0.00	10	A	0.03	10	A
	NBTR	0.17	0	-	0.17	0	-
	SBTL	0.02	1	A	0.01	0	A
Future Total 2034	WBL	0.05	13	B	0.20	13	B
	WBR	0.01	10	A	0.00	-	-
	NBTR	0.17	0	-	0.18	0	-
	SBTL	0.02	1	A	0.01	0	A

The intersection is expected to operate well with individual movements operating with reserve capacity and minimal delays under all future total study horizon years and peak hours. Individual movements are predicted to operate with v/c ratios of 0.17 and 0.20 or less during the weekday a.m. and p.m. peak hours, respectively. All movements during both peak hours are expected to operate with LOS 'B' or better.

8.2.7 James Snow Parkway and East Site Access 2

The capacity analysis results for the proposed intersection of James Snow Parkway and East Site Access 2 are summarized in **Table 8-18** for both the weekday a.m. and p.m. peak hours under future total traffic conditions. This intersection is proposed to be signalized under 2024 horizon year to maximize safety in order to accommodate LCVs turning movements at this intersection. Additionally, as noted in **section 8.2.8** since East Access 3 is proposed to be signalized under 2024 horizon year therefore it is recommended to be signalize East Access 2 as planning for both interconnections to be signalized from 2024 horizon year onwards will be more time and cost efficient in the overall process.

A cycle length of 95 seconds similar to the cycle length at the intersection of James Snow Parkway and Esquesing Line was used for analysis purposes under 2024 and 2029 horizon years. Post widening of James Snow Parkway i.e., after 2029 horizon year, cycle length was increased from 95s to 120s under 2034 horizon year.

Table 8-18 James Snow Parkway and East Site Access 2 Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024 [signalized]	<i>Overall</i>	0.33	5	A	0.36	10	A
	EBL	0.11	3	A	0.10	5	A
	EBT	0.31	3	A	0.29	6	A
	WBT	0.20	3	A	0.26	6	A
	WBR	0.11	3	A	0.05	5	A
	SBL	0.52	41	D	0.59	31	C
	SBR	0.02	35	C	0.06	25	C
Future Total 2029 [signalized]	<i>Overall</i>	0.46	8	A	0.43	7	A
	EBL	0.20	7	A	0.15	6	A
	EBT	0.58	8	A	0.48	7	A
	WBT	0.37	7	A	0.43	7	A
	WBR	0.11	6	A	0.05	5	A
	SBL	0.18	13	B	0.35	9	A
	SBR	0.02	12	B	0.06	8	A
Future Total 2034 [signalized]	<i>Overall</i>	0.27	5	A	0.30	10	A
	EBL	0.12	3	A	0.10	5	A
	EBT	0.25	3	A	0.22	5	A
	WBT	0.15	3	A	0.20	5	A
	WBR	0.11	3	A	0.05	5	A
	SBL	0.47	47	D	0.63	38	D
	SBR	0.02	43	D	0.06	30	C

The intersection is expected to operate well with acceptable operational characteristics under all study conditions and peak hours with overall v/c of 0.46 or less during weekday a.m. peak hour and p.m. peak hours. All individual movements are predicted to operate with v/c ratios of 0.63 or less and LOS of 'D' or better during both peak hours under all future horizon years.

8.2.8 James Snow Parkway and East Site Access 3

The capacity analysis results for the proposed signalized intersection of James Snow Parkway and East Site Access 3 are summarized in **Table 8-19** for both the weekday a.m. and p.m. peak hours under future total traffic conditions. Please note that although an OTM signal warrant is not

triggered at this intersection (as discussed in **Section 7.3**), it has been analyzed as a signalized intersection from the 2024 horizon onwards.

By providing a signalized access to the subject site, East Site Access 3 will act as the main heavy vehicle entrance to the east lands and the signalized traffic control will aid in protecting the safety of all road users. For example, a truck making a southbound left-turn out of the site access will wait for the southbound phase to be served by the signal controller instead of waiting at an unsignalized access for a gap in eastbound and westbound traffic on James Snow Parkway. Provision of a signal will help to avoid any potential misjudgment of gap size by the truck drivers exiting the site. The signal will also help to minimize potential delays to site related traffic entering and exiting the site.

A cycle length of 95 seconds similar to the cycle length at the intersection of James Snow Parkway and Esquesing Line was used for analysis purposes under 2024 and 2029 horizon years. Post widening of James Snow Parkway i.e., after 2029 horizon year, cycle length was increased from 95s to 120s under 2034 horizon year.

Table 8-19 James Snow Parkway and East Site Access 3 Capacity Analysis

Scenario	Movement of Interest	Weekday AM Peak Hour			Weekday PM Peak Hour		
		V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Future Total 2024 [signalized]	<i>Overall</i>	0.32	4	A	0.38	8	A
	EBL	0.07	2	A	0.04	3	A
	EBT	0.31	3	A	0.35	5	A
	WBT	0.27	3	A	0.26	4	A
	WBR	0.07	2	A	0.03	3	A
	SBL	0.36	41	D	0.59	36	D
	SBR	0.01	37	D	0.03	30	C
Future Total 2029 [signalized]	<i>Overall</i>	0.34	4	A	0.40	8	A
	EBL	0.07	2	A	0.04	4	A
	EBT	0.34	3	A	0.37	5	A
	WBT	0.28	3	A	0.28	4	A
	WBR	0.07	2	A	0.03	3	A
	SBL	0.36	41	D	0.59	36	D
	SBR	0.01	37	D	0.03	30	C
Future Total 2034 [signalized]	<i>Overall</i>	0.26	3	A	0.31	8	A
	EBL	0.07	2	A	0.04	4	A
	EBT	0.25	2	A	0.26	4	A
	WBT	0.20	2	A	0.21	4	A
	WBR	0.07	2	A	0.03	4	A
	SBL	0.43	53	D	0.56	42	D
	SBR	0.01	48	D	0.03	36	D

The intersection is expected to operate at an overall LOS 'A' for all future horizon years. The overall v/c ratio for the intersection is expected to not exceed 0.34 and 0.40 during the a.m. and p.m. peak hours, respectively, for all future horizon years.

All individual movements are expected to operate at LOS 'D' or better with v/c ratios of 0.59 or less during both peak hours.

9 QUEUING ANALYSIS

Queuing results were reported from SimTraffic Version 11 microsimulation software using the following methodology: 30 minutes seeding time, one-hour recording, and 10 simulation runs. The 95th percentile queue lengths that are bolded in **Table 9-1**, **Table 9-3** and **Table 9-3** are predicted to extend beyond available storage of a dedicated turn lane or extend beyond an upstream intersection and/or major access point. Detailed queuing analysis reports are provided in **Appendix J**.

9.1 2021 Baseline

Table 9-1 provides a summary of the 95th percentile queues derived from microsimulation of 2021 baseline.

Table 9-1 95th Percentile Queues: 2021 Baseline

Intersection	Movement of Interest	Available Storage (m)	95 th Percentile Queue Length (m)	
			2021 Baseline	
			AM	PM
Regional Road 25 & 5 Side Road	EBL	80	247	40
	WBL	70	32	33
	NBL	75	46	57
	NBR	70	24	19
	SBL	35	33	7
Regional Road 25 & James Snow Parkway	EBL	80	13	17
	EBR	115	22	32
	WBL	85	36	57
	WBR	35	25	46
	NBL	30	43	34
Boston Church Road & James Snow Parkway	SBL	75	55	38
	EBL	70	11	25
	WBL	70	10	17
	NBL	60	19	36
	NBR	25	-	-
	SBL	60	9	6
Esquesing Line & James Snow Parkway	SBR	25	-	-
	EBL	85	12	7
	WBL	70	20	8
	NBL	40	24	33
	NBR	25	-	7
	SBL	25	16	14

Intersection	Movement of Interest	Available Storage (m)	95 th Percentile Queue Length (m)	
			2021 Baseline	
			AM	PM
	SBR	25	-	-
James Snow Parkway and Steeles Avenue	EBL	122	2	8
	EBR	72	37	82
	WBL	170	43	68
	WBR	130	18	23
	NBL	105	82	80
	NBR	260	77	34
	SBL	160	64	49
Boston Church Road / 3 Line & 5 Side Road	EBLTR	-	42	32
	WBLTR	-	26	32
	NBLTR	-	14	24
	SBLTR	-	17	16
Esquesing Line / Fourth Line & 5 Side Road	EBLTR	-	71	41
	WBLTR	-	34	40
	NBLTR	-	42	59
	SBLTR	-	68	25

Under 2021 baseline, the predicted 95th percentile queue lengths at all study intersections are generally able to be accommodated within the existing storage lane lengths during the weekday a.m. and p.m. peak hours. However, select movements at the intersections of Regional Road 25 and 5 Side Road, Regional Road 25 and James Snow Parkway, and James Snow Parkway and Steeles Avenue, are predicted to have 95th percentile queues that extend beyond existing storage lengths.

At the intersection of Regional Road 25 and 5 Side Road, the 95th percentile queue of the eastbound left movement exceeds the existing queue storage during the weekday a.m. peak hour by 167 metres under 2021 baseline traffic conditions. The eastbound left movement is impacted by the significant eastbound queue that occurs from the adjacent shared through/right movement. There is a relatively high volume of eastbound right movements, and in addition to the lack of an exclusive eastbound right turn lane, a “no right-turns on red” restriction is currently in place for eastbound traffic. As a result, the eastbound left movement is getting blocked due to the queue from the shared eastbound through/right lane, leading to long queues, especially during the weekday a.m. peak hour period.

At the intersection of Regional Road 25 and James Snow Parkway, the 95th percentile queue of the northbound left movement exceeds the storage length by 13 and 4 metres during the weekday a.m. and p.m. peak hours, respectively, under 2021 baseline conditions. The westbound

right movement's 95th percentile queue marginally exceeds the available queue storage by 11 metres during the weekday p.m. peak hour.

At the intersection of James Snow Parkway and Steeles Avenue, the 95th percentile queue length of the eastbound right movement marginally exceeds the available storage during p.m. peak hour by 10 m under baseline conditions.

9.2 2024, 2029, and 2034 Future Background

Table 9-2 provides a summary of the 95th percentile queues derived from microsimulation of 2024, 2029, and 2034 future background traffic conditions.

Table 9-2 95th percentile Queues: 2024, 2029 & 2034 Future Background

Intersection	Movement of Interest [Future Movement]	Available Storage (m)	95 th Percentile Queue Length (m)					
			2024		2029		2034	
			AM	PM	AM	PM	AM	PM
Regional Road 25 & 5 Side Road	EBL	80	94	44	145	12	382	9
	WBL	70	34	33	6	30	7	118
	NBL	75	52	59	10	21	9	69
	NBR	70	27	18				
	SBL	35	44	7	9	8	8	10
Regional Road 25 & James Snow Parkway	EBL	80	15	19	18	20	20	24
	EBR	115	23	35	22	30	23	36
	WBL	85	38	60	41	62	50	76
	WBR	35	24	48	23	40	29	57
	NBL	30	46	37	46	35	53	49
	NBR	- [30]	47	24	[52]	[23]	[67]	[26]
	SBL	75	59	50	59	53	82	78
	SBTR[SBR]	- [75]	51	49	[12]	[5]	[12]	[6]
Boston Church Road & James Snow Parkway	EBL	70	13	26	12	27	11	29
	WBL	70	8	17	12	21	12	20
	NBL	60	22	39	23	43	25	46
	NBR	25	-	4	-	-	-	-
	SBL	60	11	6	12	8	13	7
	SBR	25	3	-	-	-	-	-
Esquesing Line & James Snow Parkway	EBL	85	11	9	12	11	11	9
	WBL	70	20	8	21	8	23	8
	NBL	40	26	35	28	37	37	38
	NBR	25	-	18	-	11	-	8
	SBL	25	18	17	22	17	26	18
	SBR	25	16	9	15	-	15	-
	EBL	122	2	9	1	10	2	7

Intersection	Movement of Interest [Future Movement]	Available Storage (m)	95 th Percentile Queue Length (m)					
			2024		2029		2034	
			AM	PM	AM	PM	AM	PM
James Snow Parkway and Steeles Avenue	EBR	72	44	78	47	102	38	100
	WBL	170	45	70	48	106	54	218
	WBR	130	19	22	20	26	21	24
	NBL	105	88	93	104	116	104	208
	NBR	260	88	39	74	34	105	44
	SBL	160	73	57	79	57	86	64
	SBTR[SBR]	- [70]	28	38	32	39	[8]	[6]
Boston Church Road / 3 Line & 5 Side Road	EBLTR	-	54	35	49	31	73	32
	WBLTR	-	30	45	31	48	32	55
	NBLTR	-	15	23	16	26	16	27
	SBLTR	-	20	16	22	17	21	17
Esquesing Line / Fourth Line & 5 Side Road	EBLTR	-	94	59	100	67	117	77
	WBL	40	26	20	27	25	30	29
	WBTR	-	32	49	35	58	35	66
	NBLTR	-	69	112	88	129	117	103
	SBL	60	27	7	35	6	42	6
	SBTR	-	84	41	89	45	108	42

Under future background condition, the predicted 95th percentile queue lengths at the study area intersections are generally able to be accommodated within, or only marginally exceed, the existing storage lengths during the weekday a.m. and p.m. peak hours. Select movements are predicted to exceed available storage and are discussed intersection by intersection in the following sections: -

9.2.1 Regional Road 25 and 5 Side Road

At the intersection of Regional Road 25 and 5 Side Road, the eastbound left and southbound left movements are predicted to experience 95th percentile queue lengths that will exceed the available storage. During the a.m. peak hour, the eastbound left and southbound left movements are expected to exceed the available storage by 14 metres and 9 metres, respectively, under 2024 future background signalized conditions. As noted in **Section 8.1.1** of this report, the eastbound shared through/right movement is expected to experience capacity constraints due to the high volume of right turns, which may be a contributing factor to the queue exceedances of the eastbound left-turn movement.

As noted in **Section 8.1.1**, this intersection is planned to be reconfigured as a roundabout by the 2029 study horizon year. The predicted queue lengths for 2029 and 2034 future background conditions are reported in Table 8-2 and **Table 8-3**, respectively, and are expressed in the number of vehicles that ARCADY predicts will be in the 95th percentile queue of each roundabout approach.

To provide a more direct comparison of results, the 95th percentile queues presented in **Table 9-3** were derived by multiplying the ARCADY queues reported in vehicles by 5.75 metres, ARCADY's assumed length of a vehicle. The 95th percentile queues in **Table 9-3** represent the 100% intercept roundabout analysis scenario results, expressed in metres.

Regarding the roundabout analysis results, it is important to note that the 95th percentile queue results are estimated for an entire leg/approach of the roundabout and is not divided into individual lanes or movements. Overall, the predicted queues at the roundabout are expected to be at manageable levels under 2029 future background conditions except for the eastbound approach during the a.m. peak hour. The eastbound movements are expected to experience a queue approximately 145 metres long under 2029 future background conditions, however, this is not unexpected given that the existing high eastbound volumes have increased with background growth.

Under 2034 future background conditions, background growth on both Regional Road 25 and 5 Side Road contribute to the further degradation of the eastbound and westbound movements in terms of predicted 95th percentile queue lengths. During the a.m. peak hour, it is estimated that the predicted eastbound queue length of 145 metres under 2029 future background conditions will increase to 382 metres under 2034 future background conditions. During the p.m. peak hour, it is estimated that the 95th percentile queue of the westbound approach will increase from 30 metres to 118 metres as a result of 5 years of background traffic growth between 2029 and 2034. The northbound approach is also expected to see a significant increase in its predicted queue length during the p.m. peak hour, increasing from 21 metres to 69 metres between 2029 and 2034 future background conditions.

9.2.2 Regional Road 25 and James Snow Parkway

At the intersection of Regional Road 25 and James Snow Parkway, the 95th percentile queue of the westbound right movement is expected to exceed available storage during the weekday p.m. peak hour by 13, 5, and 22 metres under 2024, 2029, and 2034 background conditions, respectively. The northbound right queue is expected to exceed the available storage during the weekday a.m. peak hour by 22 and 37 metres under 2029, and 2034 future total conditions, respectively. The 95th percentile queues for the northbound left movement are expected to exceed available storage by up to 23 metres during both weekday peak hours under all future background conditions.

9.2.3 Boston Church Road and James Snow Parkway

At the intersection of Boston Church Road and James Snow Parkway, there are no queues of particular concern at the intersection, as the predicted 95th percentile queue for all legs of the intersection remain within the provided storage lengths during the a.m. and p.m. peak hour for all future background horizon years.

9.2.4 Esquesing Line and James Snow Parkway

At the intersection of Esquesing Line and James Snow Parkway, the 95th percentile queue for southbound left turn movement marginally exceeds the available storage length by a metre under 2034 a.m. peak future background conditions.

9.2.5 James Snow Parkway and Steeles Avenue

At the intersection of James Snow Parkway and Steeles Avenue, the eastbound right movement is expected to exceed available storage during the p.m. peak hour by 6, 30 and 28 metres under 2024, 2029, and 2034 future background conditions, respectively. The northbound left turn movement is expected to exceed available storage during the p.m. peak hour by 11 and 103 metres under 2029, and 2034 future background conditions, respectively.

9.2.6 Boston Church Road and 5 Side Road

While the intersection of Boston Church Road / 3 Line at 5 Side Road does not have dedicated turn lanes on any legs, the 95th percentile queue lengths for the shared left/through/right movements have been provided in **Table 9-2**. There are no queues of particular concern at the intersection, as the predicted 95th percentile queue for all legs of the intersection remain under 100 metres during the a.m. and p.m. peak hour for all future total horizon years.

9.2.7 Esquesing Line and 5 Sideroad

As noted in **section 8.1.7**, a westbound left turn and southbound left turn lane is proposed at the intersection of Esquesing Line / Fourth Line and 5 Side Road from 2024 horizon year onwards. As a result, there are no queues of particular concern at the intersection, as the predicted 95th percentile queue remain within the provided storage lengths during the a.m. and p.m. peak hour for all future background horizon years.

9.3 2024, 2029, and 2034 Future Total

Table 9-3 provides a summary of the 95th percentile queues derived from microsimulation of 2024, 2029, and 2034 future total traffic conditions.

Table 9-3 95th Percentile Queues: 2024, 2029, & 2034 Future Total

Intersection	Movement of Interest [Future Movement]	Available Storage (m)	95 th Percentile Queue Length (m)					
			2024		2029		2034	
			AM	PM	AM	PM	AM	PM
Regional Road 25 & 5 Side Road	EBL	80	103	50	174	11	446	9
	WBL	70	34	40	7	68	8	172
	NBL	75	53	62	9	24	9	91
	NBR	70	30	21				
	SBL	35	47	11	9	7	9	12
Regional Road 25 & James Snow Parkway	EBL	80	17	20	16	21	21	24
	EBR	115	24	35	21	31	25	45
	WBL	85	53	92	62	104	73	216
	WBR	35	27	54	26	49	28	73
	NBL	30	45	43	46	45	65	64
	NBR	- [30]	68	37	[75]	[28]	[98]	[33]
	SBL	75	67	57	73	63	112	134
	SBTR[SBR]	- [75]	54	54	[11]	[4]	[12]	[7]
Boston Church Road & James Snow Parkway	EBL	70	20	30	22	36	22	41
	WBL	70	10	19	11	20	13	21
	NBL	60	22	44	23	45	27	54
	NBR	25	-	-	-	-	-	-
	SBL	60	28	61	25	55	28	56
	SBR	25	-	-	-	4	-	-
Esquesing Line & James Snow Parkway	EBL	85	12	21	14	25	12	22
	WBL	70	23	9	22	9	25	8
	NBL	40	28	36	30	39	36	51
	NBR	25	-	7	-	10	-	19
	SBL	25	21	17	19	19	37	21
	SBR	25	25	-	30	-	38	-
James Snow Parkway and Steeles Avenue	EBL	122	2	8	2	9	1	9
	EBR	72	45	119	55	177	52	196
	WBL	170	47	114	51	280	80	290
	WBR	130	22	26	26	33	23	27
	NBL	105	91	144	106	212	143	214
	NBR	260	88	38	78	86	130	64
	SBL	160	76	53	101	52	173	82
	SBTR[SBR]	- [70]	41	84	47	200	[8]	[8]

Intersection	Movement of Interest [Future Movement]	Available Storage (m)	95 th Percentile Queue Length (m)					
			2024		2029		2034	
			AM	PM	AM	PM	AM	PM
Boston Church Road / 3 Line & 5 Side Road	EBLTR	-	58	34	66	36	82	36
	WBLTR	-	33	47	36	55	35	58
	NBLTR	-	18	28	19	28	19	32
	SBLTR	-	19	15	21	16	21	17
Esquesing Line / Fourth Line & 5 Side Road	EBLTR	-	90	61	96	76	111	83
	WBL	40	26	20	29	21	30	26
	WBTR	-	34	51	37	61	39	66
	NBLTR	-	67	128	103	154	143	124
	SBL	60	32	5	36	7	53	6
West Site Access 1 & 5 Side Road	SBTR	-	88	44	102	44	129	41
	EBTR	-	-	-	-	-	-	-
	WBL	15	11	4	12	4	15	5
	WBT	-	-	-	-	-	-	-
	NBLR	-	9	14	10	14	9	14
West Site Access 2 & 5 Side Road	EBTR	-	-	-	-	-	-	-
	WBT	-	-	-	-	-	-	-
	NBR	-	7	12	6	13	7	12
Boston Church Road & West Site Access 3	EBLR	-	18	23	17	21	18	21
	NBLT	-	8	8	8	10	8	11
	SBTR	-	-	-	-	-	-	1
Boston Church Road & West Site Access 4	EBLR	-	12	16	13	16	13	15
	NBLT	-	11	6	12	6	12	5
	SBTR	-	-	-	-	-	1	-
Boston Church Road & West Site Access 5	EBLR	-	9	13	11	13	11	12
	NBLT	-	4	4	6	6	6	6
	SBTR	-	-	-	-	-	-	-
Boston Church Road & East Site Access 1	WBL	30	13	17	13	17	13	18
	WBR	-	6	11	6	12	5	13
	NBTR	-	-	-	-	-	-	-
	SBLT	-	8	4	8	3	8	3
James Snow Parkway & East Site Access 2	EBL	136	19	18	23	20	22	24
	WBR	136	14	15	21	17	16	16
	SBL	-	28	46	22	36	29	54
	SBR	-	16	20	15	19	16	20
James Snow Parkway & East Site Access 3	EBL	136	13	10	14	11	14	12
	WBR	136	12	10	11	12	12	11
	SBL	-	18	36	17	35	20	43
	SBR	-	8	12	10	14	11	13

At existing intersections within the study area, the predicted 95th percentile queue lengths are

generally able to be accommodated within, or only marginally exceed, the existing storage lengths during the weekday a.m. and p.m. peak hours under future total conditions. Select movements are predicted to exceed available storage and are discussed intersection by intersection in the balance of this report section.

9.3.1 Regional Road 25 and 5 Side Road

At the intersection of Regional Road 25 and 5 Side Road, the southbound left movements is predicted to experience 95th percentile queue length that will exceed the available storage. During the a.m. peak hour, southbound left movement is expected to exceed the available storage by 12 metres under 2024 future total signalized conditions.

The predicted queue lengths for 2029 and 2034 future total conditions are reported in **Table 8-4** and **Table 8-5**, respectively, and are expressed in the number of vehicles that ARCADY predicts will be in the 95th percentile queue of each roundabout approach. To provide a more direct comparison of results, the 95th percentile queues presented in **Table 9-3** were derived by multiplying the ARCADY queues reported in vehicles by 5.75 metres, ARCADY's assumed length of a vehicle. The 95th percentile queues in **Table 9-3** represent the 100% intercept roundabout analysis scenario results, expressed in metres.

Similar to the predicted queues observed under 2029 future background conditions, overall, the predicted queues at the roundabout are expected to be at manageable levels under 2029 future total conditions except for the eastbound approach during the a.m. peak hour. The eastbound movements are expected to experience a queue approximately 174 metres long under 2029 future total conditions, which is 29 metres higher than the queue length observed under 2029 future background conditions.

Compared to 2034 future background conditions, at Regional Road 25 and 5 Side Road further degradation of the eastbound and westbound movements in terms of predicted 95th percentile queue lengths were observed under 2034 future total conditions. During the a.m. peak hour, it is estimated that the predicted eastbound queue length of 382 metres under 2034 future background conditions will increase to 446 metres under 2034 future total conditions. During the p.m. peak hour, it is estimated that the 95th percentile queue of the westbound approach will increase from 118 metres under 2034 future background conditions to 172 metres under 2034 future total conditions. The northbound approach is also expected to see an increase in its predicted queue length during the p.m. peak hour, increasing from 69 metres to 91 metres between 2034 future background and 2034 future total conditions.

It is recommended that the Region and Town review the operations and queueing of this intersection in the future prior to the widening of Regional Road 25 and construction of the proposed roundabout to determine if the construction of a dedicated eastbound right-turn lane

will alleviate any existing or future capacity and queueing constraints due to predicted background growth. Alternatively, further review of the roundabout design and projected volumes/traffic patterns could be assessed by the Region prior to the roundabout's construction so as to avoid any costly redesign post-construction.

9.3.2 Regional Road 25 and James Snow Parkway

At the intersection of Regional Road 25 and James Snow Parkway, the 95th percentile queue of the westbound left movement is expected to exceed available storage during the weekday p.m. peak hour by 7, 19, and 131 metres under 2024, 2029, and 2034 future total conditions, respectively. The westbound right queue is also predicted to exceed its available storage during the weekday p.m. peak hour by 19, 14, and 38 metres under 2024, 2029, and 2034 future total conditions, respectively. The northbound right queue is expected to exceed the available storage during the weekday a.m. peak hour by 45 and 68 metres and by three metres during the weekday p.m. peak hour under 2029, and 2034 future total conditions, respectively. The 95th percentile queues for the northbound left movement are expected to exceed available storage by up to 35 metres during both weekday peak hours under all future total conditions. As noted in **section 9.2.2**, the predicted 95th queue length exceeds available storage for select movements under future background conditions as well. Thus, queueing concerns at this intersection are not triggered by site traffic as they exist under future background conditions as well.

It is recommended that the queue lengths at the intersection be reviewed prior to the widening of Regional Road 25 in 2026 and James Snow Parkway in 2030 to determine if extending turn lane storage can be accommodated as a part of the widening of the roads/intersection.

9.3.3 Boston Church Road and James Snow Parkway

At the intersection of Boston Church Road and James Snow Parkway, the 95th percentile queue of the southbound left movement is expected to marginally exceed available storage by a metres during the weekday p.m. peak hour under 2024 future total conditions. It is expected that the predicted 95th percentile queue can be accommodated within the available combined storage and taper lengths.

9.3.4 Esquesing Line and James Snow Parkway

At the intersection of Esquesing Line and James Snow Parkway, the 95th percentile queue of the northbound left movement is expected to marginally exceed available storage by 11 metres during the weekday p.m. peak hour under 2034 future total conditions. It is expected that the predicted 95th percentile queue can be accommodated within the available combined storage and taper lengths.

9.3.5 James Snow Parkway and Steeles Avenue

At the intersection of James Snow Parkway and Steeles Avenue, the eastbound right movement is expected to exceed available storage during the p.m. peak hour by 47, 105 and 124 metres under 2024, 2029, and 2034 future total conditions, respectively. The northbound left turn movement is expected to exceed available storage during the p.m. peak hour by 39, 107 and 109 metres under 2024, 2029, and 2034 future total conditions, respectively. During a.m. peak hour, northbound left turn movement is expected to exceed available storage by a metre and by 38 metres under 2029 and 2034 future total condition, respectively. As noted in **section 9.2.5**, the predicted 95th queue length exceeds available storage for select movements under future background conditions as well. Thus, queueing concerns at this intersection are not triggered by site traffic as they exist under future background conditions as well.

It is recommended that the queue lengths at the intersection be reviewed prior to the widening of Steeles Avenue in 2027 and James Snow Parkway in 2030 to determine if extending turn lane storage can be accommodated as a part of the widening of the roads/intersection.

9.3.6 Boston Church Road and 5 Side Road

While the intersection of Boston Church Road / 3 Line at 5 Side Road does not have dedicated turn lanes on any legs, the 95th percentile queue lengths for the shared left/through/right movements have been provided in **Table 9-3**. There are no queues of particular concern at the intersection, as the predicted 95th percentile queue for all legs of the intersection remain under 100 metres during the a.m. and p.m. peak hour for all future total horizon years.

9.3.7 Esquesing Line/Fourth Line and 5 Side Road

As noted in **section 8.1.7**, a westbound left turn and southbound left turn lane is proposed at the intersection of Esquesing Line / Fourth Line and 5 Side Road from 2024 horizon year onwards. As a result, there are no queues of particular concern at the intersection, as the predicted 95th percentile queue remain within the provided storage lengths during the a.m. and p.m. peak hour for all future total horizon years.

9.3.8 Proposed Site Accesses

All of the proposed unsignalized site accesses are generally expected to operate with minimal 95th percentile queues for the shared through/right and left/through movements located along 5 Side Road and Boston Church Road.

The two proposed signalized site accesses on James Snow Parkway are also expected to operate with 95th percentile queues that can be accommodated within the provided queue storage lengths. East Site Access 2 and East Access 3 (signalized from the horizon year 2024 onwards) operates well

from a queueing perspective, with minimal changes to the predicted 95th percentile queues.

East Site Access 2 and 3 have been analyzed with dedicated westbound right-turn lanes to aid in removing potential conflicts between heavy vehicles turning into the site and general westbound through traffic on James Snow Parkway.

10 TRANSPORTATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) refers to various measures that are undertaken to encourage non-auto modes of travel and to reduce single-occupant vehicle (SOV) traffic. These have direct impacts to both parking and trip-related aspects of the site. TDM measures can be categorized into five categories and are listed as follows:

1. Introduction of Alternative Travel Modes
2. Core Commuter Information and Assistance
3. Financial Incentives
4. Supporting Infrastructure
5. TDM Program Support

10.1 Introduction of Alternate Travel Modes

The introduction of new modes of travel to current single-occupant vehicle drivers can be accomplished by utilizing various marketing and communication strategies. For industrial land uses, this can be accomplished through raising awareness of the availability for alternate travel modes for the employees. It is recommended that TDM marketing material be provided to all future employees, and that any updates to the transit / active transportation infrastructure be posted.

Marketing material should be prepared and provided by Town, Region, and Milton Transit staff to ensure that the information provided is up to date. It is also important that the documents be visually appealing to be more approachable. This will help to target and encourage non-driver modes of transportation from the earliest point in the process.

10.2 Core Commuter Information and Assistance

In addition to marketing and communicating the availability of alternative travel modes, it is important to ensure that those seeking to change their travel behaviours have the tools and information to facilitate this change. Information on the active transportation network should be readily available for anyone looking to travel to or from the site. Improving the ease of access to information on alternative travel modes increases the willingness for behavioural change amongst commuters. It is recommended that carpool ride-matching tools such as www.ridesharing.com and Smart Commute carpool networking be hosted for commuters to meet and find other commuters looking to carpool together.

The information should be prepared by the Town, Region, and Milton Transit and distributed via mail.

10.3 Financial Incentives

It is understood that one of the primary factors in behavioural change is monetary compensation. The purpose of providing financial incentives is to promote this change in behaviour and incentivize commuters to try out new alternate travel modes. This financial support can come in the form of subsidized transit passes or other future subsidies (such as rideshares). It is recommended to provide a pre-loaded PRESTO card to future employees. This incentive can be provided at future TDM outreach events for the site. The exact amount and provision of financial incentives are subject to the Owner's discretion.

10.4 Supporting Infrastructure and Services

Physical infrastructure is necessary to support transit and active transportation modes. The infrastructure should be developed and improved for both the site as well as the Town and Region. For the proposed development, some examples of supportive infrastructure include:

- ▶ Sheltered transit stops/stations;
- ▶ Pedestrian sidewalks;
- ▶ Benches and other streetscape furniture;
- ▶ Cycling facilities (shared or dedicated bicycle paths);
- ▶ Multi-Use Paths;
- ▶ Bicycle parking (on-site); and
- ▶ Car-pool parking (on-site).

It is noted in **Section 3.4** that future transit route(s) and/or expanded service will be proposed within the vicinity of the subject site upon full development and occupation of the remaining Milton 401 Industrial/Business Park lands that are adjacent to the subject site to the west and the south. In **Section 3.3**, it is noted that bike lanes, in-boulevard multi-use trails, and paved shoulders are proposed to be implemented on study area roadways in close proximity to the subject site.

10.5 TDM Program Support

The TDM programs can be further supported through involvement with a Transportation Management Association (TMA). TMAs can provide support to TDM programs through the provision of promotional material, coordination of programs and events, and recommendations

on the appropriate measures to be implemented.

Facilitating the implementation and management of these TDM programs can be accomplished through the effective employment or assignment of a TDM coordinator. The role of the TDM coordinator is to implement, manage, and monitor the TDM measures in place for the development. It is recommended that a TDM coordinator be assigned by the Town or Region to ensure the success of the TDM plan for the area.

In addition to implementation of these programs, it is important to monitor both the success and the opportunities for improvement for the TDM measures. It is recommended that a baseline survey be conducted at the full build-out of the development to identify employee travel behaviours. A follow-up monitoring survey should then be conducted every two years to measure the effectiveness of the TDM programs and provide recommendations for improvements. The provision of the monitoring survey, follow-up surveys, and future TDM programs would be at the discretion of the TDM coordinator.

10.6 TDM Measure Checklist

Based on the preceding TDM classifications, a checklist has been developed, provided as **Table 10-1**, which summarizes the proposed TDM measures and gives a brief description.

Table 10-1 TDM Measure Checklist

TDM Measures (Recommended)	Description
Transit incentives	A pre-loaded PRESTO card will be made available to employees, to be distributed at TDM outreach events (value to be determined). The exact amount and provision of the subsidized transit pass is subject to the discretion of the Owner.
Information packages (Milton Transit, GO schedules, cycling maps)	Provide brochures with information on transit routes & stops, active transportation infrastructure, and TDM programs within the respective development. Information should be provided by Town, Region, and Milton Transit staff and distributed at a TDM outreach event or by mail.
Communication strategy and physical location to deliver PRESTO cards and information packages	A specific outreach event should be held to reach out to new employees of the development. The TDM outreach event would function as a platform for Town, Region, and Milton Transit Staff to answer questions and provide information on the available and upcoming transit / AT infrastructure. The event would also provide a good location to distribute any TDM material such as subsidized transit passes and TDM Information Brochures. Marketing material should be made visually attractive and function as both promotion and information of TDM programs and events.
Outreach programs	
Pedestrian connections	A paved shoulder exists which can be used by pedestrians and cyclists to access transit connections to/from the site.
Cycling connections	
Internal pedestrian/cycling circulation	Pedestrians and cyclists can access the site.

Active transportation network/fine-grid	A paved shoulder exists which can be used by pedestrians and cyclists to access transit connections to/from the site.
Bicycle parking/shelter	Bicycle parking will be considered on-site.
Carpool parking	Carpool parking will be considered on site.
Membership with Smart Commute	Promote online carpool ride matching platforms such as www.ridesharing.com or host carpool networking events to provide safe and efficient methods for carpool drivers and passengers to connect. Smart Commute information will be provided in the information package. Membership with Smart Commute or other TMA's is subject to the Owner / Tenant's discretion and should be considered based on employee demand.
Monitoring program/report	Conduct TDM monitoring surveys to track changes in travel patterns and the success of the implemented TDM programs. It is recommended to conduct a baseline survey with occupants when the site is fully occupied and conduct follow-up surveys once every two years. The provision of the monitoring survey is subject to the discretion of the Owner on an as needed basis.

11 RECOMMENDATIONS

The existing unsignalized intersections of 5 Side Road at Esquesing Line was evaluated to confirm justification for traffic signal installation based on existing and future traffic volumes. The Ontario Traffic Manual (OTM) Book 12 Justification 7 Signal Warrant Analysis was applied to the unsignalized intersections. Although traffic signals are not warranted at this existing intersection according to the OTM warrant, it is recommended that signals be implemented to alleviate existing and future background traffic capacity constraints (v/c ratio(s) greater than 1.0) under all-way stop control. A 90 second signal cycle length was used for analysis purposes, which satisfies the Town of Milton's minimum cycle length of 75 seconds.

Based on the comments received from the Town's peer reviewer on the 2nd submission of the TIS, and OTM-based left-turn warrants conducted for the ultimate 2034 horizon year, TYLin recommends implementation of a westbound left-turn lane and a southbound left-turn lane at the intersection of 5 Side Road at Esquesing Line from the 2024 horizon year onwards for safety and operational considerations.

Although a single access on 5 Sideroad was recommended as per the comments received from the Town's peer reviewer on the 2nd submission of the TIS, TYLin recommends two accesses on 5 Side Road with West Access 2 operating as a right-in/right-out access (access closest to the intersection of Boston Church Road and 5 Sideroad) while West Access 1 on 5 Side Road operating as a full-moves access with an auxiliary westbound left turn lane.

Based on microsimulation queueing analysis, there is potential for select movements to experience 95th percentile queues extending beyond existing storage at the intersection of Regional Road 25 and 5 Side Road, Regional Road 25 and James Snow Parkway, and Steeles Avenue and James Snow Parkway. It is recommended that these movements be monitored and evaluated by the Region and Town to determine if the extension of existing turn lane storage can be included in the construction efforts required to widen Regional Road 25, Steeles Avenue, and James Snow Parkway.

Both Boston Church Road and Esquesing Line are identified as Collector roadways in the Town's LOPA Schedule C.2.A. The Draft Plan of Subdivision for lands east and west of Boston Church Road identify protection for a 26.0 metre ROW for both Boston Church Road and Esquesing Line.

Site trip distribution resulted in a nominal amount of passenger car, and no heavy truck site-related traffic assigned to Esquesing Line, therefore, it is our opinion the need to widen and/or upgrade Esquesing Line is not required at this time to accommodate build-out of the subject lands.

Based on the forecasted 2034 total traffic volumes, TYLin is of the opinion that from a traffic perspective any road improvements to Boston Church Road that are specifically triggered by the subject development do not require an additional lane of traffic along the full length of Boston

Church Road. However, the developer proposes to reconstruct the existing rural section of Boston Church Road between James Snow Parkway and 5 Side Road to its ultimate 26.0 metre ROW width based on Town Standard E-5, on lands they currently control and exclusive of lands owned by others. Reconstruction will include the full 16.8 metre roadbed width (measured from back of curb to back of curb) per Town standard to ensure the pavement structure will accommodate heavy truck traffic.

The 26.0 metre ROW width will be implemented where feasible, exclusive of lands owned by others. The developer proposes to accommodate the 3.0m metre widening required on either side of Boston Church Road within the subject lands. The outstanding 3.0 metre widening of the ultimate 26.0 metre ROW, located on lands owned by others, will be completed through future development.

The current 20.0 metre ROW and additional 3.0 metre widening within the subject lands will adhere to Town standard E-5 including boulevard treatments such as sidewalks, landscaping and utilities. On-street bike lanes can be provided as required by the Town.

Warrants for dedicated left-turn and right-turn lanes were conducted at each of the eight proposed site accesses. Adhering to the goals of the Region's access guidelines, TYLin recommends the implementation of left-turn lanes on James Snow Parkway at the proposed public road intersections. These auxiliary lanes are essential from both a safety and capacity perspective. Additionally, as heavy vehicles require more time and space to complete a turn or decelerate/accelerate compared to passenger vehicles, it is safer to have a dedicated turning lane for heavy vehicles. Additionally, TYLin also recommends a left-turn lane at the intersection of West Access 1 on 5 Sideroad and left turn lanes at the Esquesing Line and 5 Sideroad intersection for safety and operational considerations.

The following turn lanes are recommended:

- ▶ East Site Access 2 & James Snow Parkway – eastbound left-turn lane & westbound right-turn lane
- ▶ East Site Access 3 & James Snow Parkway – eastbound left-turn lane & westbound right-turn lane
- ▶ West Access 1 & 5 Side Road – westbound left-turn lane
- ▶ Esquesing Line & 5 Side Road – westbound left-turn lane & southbound left-turn lane

Although the previous version of the TIS (2nd submission) recommended a northbound right-turn lane at the intersection of Boston Church Road and East Access 1, TYLin recommends that the proposed right-turn lane be removed/reverted to a shared through/right-turn lane. The new recommendation of implementing a shared through/right-turn lane instead of a dedicated right-turn is to allow for consistent and predictable pavement markings/lane alignment along Boston

Church Road. Through preparing different iterations of the pavement marking and signage plan, TYLin found that the inclusion of a northbound right-turn lane at East Access 1 within the planned asphalt width would lead to potentially confusing drivers with abnormal pavement markings and lane alignment.

TYLin also confirmed that the intersection of Boston Church and East Access 1 is expected to operate below capacity, with no concerns related to delays or queues under ultimate 2034 future total traffic conditions, should the northbound through/right-turn lane be implemented in place of the previously proposed dedicated right-turn lane.

Despite not warranting traffic signals according to the OTM warrant, signals are recommended for implementation at the following locations due to traffic capacity and safety concerns:

- ▶ Esquesing Line and 5 Side Road (2024 onward – triggered by existing over-capacity conditions)
- ▶ James Snow Parkway and East Site Access 2 (2024 onward)
- ▶ James Snow Parkway and East Site Access 3 (2024 onward)

Signalization is expected to improve the operation of the intersections from not only an operational perspective (by creating protected turning opportunities against the James Snow Parkway traffic flow), but more importantly through the road safety lens, by providing those protected gaps in east/westbound James Snow Parkway traffic for site-generated vehicles (especially LCV trucks) to enter and exit the site safely, minimizing right-angle collision risk.

Overall, the off-site improvements (non-access related) to the existing intersections within the study area can be attributed to significant background growth and demand on the network and are not directly attributable to the traffic generated by the subject site.

The aforementioned recommendations are summarized in **Table 11-1**.

Table 11-1 Recommendations Summary

Year	Scenario	Recommendation	Responsibility
2024/2029/2034	Future Background and Future Total	Signalization of Esquesing Line and 5 Side Road intersection	Town of Milton
2024/2029/2034	Future Background and Future Total	Recommended to provide exclusive westbound left-turn lane and a southbound left-turn lane at the intersection of 5 Side Road at Esquesing Line	Town of Milton
2029/2034	Future Background and Future Total	Monitor intersection of Regional Road 25 and 5 Side Road, Regional Road 25 and James Snow Parkway, and Steeles Avenue and James Snow Parkway to determine extension of existing storage lane while widening these roads.	Halton Region
2024/2029/2034	Future Total	Recommended to widen Boston Church Road to the ultimate 26 metre ROW, as per the Town's LOPA, exclusive of sections of road owned by others.	Town of Milton and Developer
2024/2029/2034	Future Total	Recommended to provide exclusive eastbound left and westbound right-turn lanes at East Site Access 2 and East Site Access 3 on James Snow Parkway.	Town of Milton and Region of Halton
2024/2029/2034	Future Total	Signalization of James Snow Parkway and East Site Access 3	Region of Halton
2024/2029/2034	Future Total	Signalization of James Snow Parkway and East Site Access 2	Region of Halton
2024/2029/2034	Future Total	Recommended to provide exclusive westbound left turn lane at West Access 1 and run-off lane to accommodate platform widening	Town of Milton and Developer
2024/2029/2034	Future Total	Recommended to provide a directional island at West Access 2 on 5 Sideroad to allow right-in/right-out movements only.	Town of Milton and Developer

Appendix A Pre-Consultation Correspondence

Kyla Rodgers

From: Michael.Turco@milton.ca
Sent: Wednesday, May 8, 2019 3:56 PM
To: Michael Dowdall
Cc: 'Monaghan, Patrick'
Subject: FW: JSP Industrial Development - Study Terms of Reference, Town of Milton

Good afternoon Michael,

Please see below Town TOR comments in [green](#):

Please confirm Regional requirements with Halton Region directly.

Should you have any questions, please feel free to contact me.

Thank you,



Michael Turco, C.E.T., MITE
Transportation Planning Technologist
150 Mary Street, Milton ON,
905-878-7252 x2363
www.milton.ca

Confidentiality notice: This message and any attachments are intended only for the recipient named above. This message may contain confidential or personal information that may be subject to the Municipal Freedom of Information Act and must not be distributed or disclosed to unauthorized persons. If you received this message in error, please notify the sender immediately. Thank you for your assistance.

From: Michael Dowdall <mdowdall@tmig.ca>
Sent: Thursday, April 11, 2019 2:11 PM
To: Michael Turco <Michael.Turco@milton.ca>; Monaghan, Patrick <Patrick.Monaghan@halton.ca>
Subject: JSP Industrial Development - Study Terms of Reference, Town of Milton

Hi Michael and Patrick,

The Municipal Infrastructure Group Ltd. (TMIG) has been retained to prepare a Transportation Impact Study for a proposed industrial warehouse development consisting of approximately 80 Hectares of land that covers two separate parcels of land north of James Snow Parkway, west of Esquesing Line, south of 5th Sideroad and east of the CN railway line (see attached image). The primary use of the development will be 7 industrial high-cube warehouses (see attached concept plan).

The Phase 1 lands are the lands bound by the CN Railway to the west, Campbellville Road West to the north, Boston Church Road to the east and James Snow Parkway to the south. The Phase 1 lands are 21.7 ha in total.

The Phase 2 lands are bound by Boston Church Road to the west, an unnamed tributary to 16 Mile Creek to the north, Esquesing Line to the east and James Snow Parkway / Hydro Corridor to the south. The Phase 2 lands are 55.0 ha in total.

It is anticipated that both phases will be built concurrently within an estimated 2023 build-out year.

The greenfield property is situated along the north side of James Snow Parkway between the CN Railway and Esquesing Line. Our client intends to develop two parcels of land (Phases 1 and 2) located within the Milton North Business Park with approximately 4,950,000 ft² industrial (high-cube warehouse) gross floor area (GFA). Furthermore, our client is also seeking approval for a new public roadway connecting to James Snow Parkway via two new public road connections crossing the abutting hydro corridor, with private site accesses to serve the proposed development parcels. **Please be advised that the Town does not support the roads indicated as “Public Roads” on the Concept Plan being Public Roads. These roads are required to be private roads.**

- Phase 1 of the development consists of three buildings with an approximate total of 1,520,000 ft² of industrial GFA. Access to the proposed Phase 1 development includes:
 - Two full moves driveways with direct connection to 5 Sideroad; and
 - Two full moves driveways with direct connections to Boston Church Road.
- Phase 2 of the development consists of four buildings with an approximate total of 3,430,000 ft² of industrial GFA. Access to the proposed Phase 2 development includes:
 - One full moves driveway with direct connection to Boston Church Road;
 - Full moves driveways with direct connections to the Proposed ~~Public~~Private Roadway; and
 - Two full moves intersections with direct connections to James Snow Parkway via the Proposed ~~Public~~Private Roadway

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

Terms of Reference

- We will conduct a study area road inventory review to confirm lane assignments, traffic controls, speed limits, and surrounding land uses and general study area characteristics of the study area.

The study area will consist of:

- Boston Church Road at James Snow Parkway (Regional Road 4)
- Boston Church Road at 5 Sideroad
- Esquesing Line at James Snow Parkway (Regional Road 4)
- Esquesing Line at 5 Sideroad
- Regional Road 25 at James Snow Parkway (Regional Road 4)
- Regional Road 25 at 5 Sideroad
- 5 Sideroad at Phase 1 Site Access (Future Condition)
- Boston Church Road at Phase 1 and 2 Site Accesses (Future Condition)
- James Snow Parkway at Proposed ~~Public~~Private Road Intersections (Future Condition)

Based on the development of these lands as industrial warehouses, we propose counts be completed on a weekday morning between the hours of 7:00 am and 10:00 am and a weekday afternoon between the hours of 4:00 pm and 7:00 pm. This will capture the vehicular activity on the surrounding street system during the typical peak.

- Once existing traffic volumes have been collected, we will prepare a baseline model of traffic operations of the study area intersection using Synchro v.10 for the critical time periods (weekday am and weekday pm) as discussed above.
- The proposed horizon years are as follows (please confirm):
 - Full Build-out (assume 2023) to be confirmed by client
 - 5 Year Post Buildout Horizon (2028)

- 10 Year Post Buildout Horizon (2033)
- Town/Regional staff to provide the background traffic growth rates, and future background development, within the study area to be adopted as part of this study. **Roadways under the Town's jurisdiction should be assumed to have a 2% growth rate compounded per annum.**
- Please provide any potential/committed future road / intersection / other transportation infrastructure improvements within the study area that could affect local traffic distribution or assignments. Their effects on traffic patterns will be accounted for in the appropriate planning horizon as specified by Town/Regional staff.
 - Regarding Boston Church Road, 5 Sideroad and Esquesing Line; are there any plans to widen these streets within the 2033 planning horizon
 - **No plans at this time. Through the TIS, please confirm if and when any widenings will be required.**
 - Further, please confirm the existing and future ROW of these streets
 - **Boston Church Road requires a 26m ROW**
 - **5 Side Road requires a 35m ROW**
 - **Esquesing Line requires a 26m ROW**
- If available, please provide the process required to locate a new public road across a hydro corridor, and the clearance required from a hydro tower to the edge of the proposed ROW. **The Town does not support new public roads at this location. Please confirm any requirements for locating new private roads with the landowner (Hydro One)**
- Trip generation estimates will be prepared for the weekday am and pm peak hours for the proposed development. ITE 10th Edition trip generation data will be reviewed and the appropriate rates used in the analysis.
- Intersection capacity analyses for the resultant post-build out future traffic condition (the combination of future background traffic plus estimated site trip generation) during selected peak hours will then be conducted at all study intersections using Synchro v.10. Input parameters to the Synchro software will be consistent with the recommended practices and guidelines.
- Transit mode split and non-auto trip rates methodologies will be clearly documented in the report. **As modal splits are already implicit in the trip generation rates within the ITE Trip Generation Manual, no further modal split is to be applied.**
- The directional distribution of traffic approaching and departing the site will be determined based upon a review of existing traffic patterns and Toronto Tomorrow Survey 2011 (TTS) data. The site traffic will be assigned to the study area roadway network in accordance with our interpretation of these various patterns. **Please utilize 2016 TTS data for the trip distribution.**
- **Conduct left-turn and right-turn lane warrants at off the site accesses. Determine the required storage lane lengths.**
- **As part of a complete application, it must be ensured that truck traffic can enter and exit the site in a forward motion and access to the waste storage and loading areas are functional. On separate plans, illustrate truck turning movements with one continuous path with AutoTURN and insert the design vehicles on the plan. The site must be able to accommodate the largest design vehicles which will be accessing the property.**
- **Detailed Recommendations regarding on-site/off-site roadway improvements, site access, and site circulation (vehicular & pedestrian) are to be made.**

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

Michael Dowdall, C.E.T., MITE
Project Manager, Transportation Services

TMIG | The Municipal Infrastructure Group Ltd.

8800 Dufferin Street, Suite 200 | Vaughan, Ontario L4K 0C5

p: 905.738.5700 x361 | c: 437.993.2662 | f: 905.738.0065 | mdowdall@tmig.ca | tmig.ca



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Kyla Rodgers

From: Monaghan, Patrick <Patrick.Monaghan@halton.ca>
Sent: Wednesday, May 8, 2019 3:40 PM
To: Michael Dowdall
Cc: Michael.Turco@milton.ca; Hudson, Brian; McNeish, Amanda
Subject: RE: JSP Industrial Development - Study Terms of Reference, Town of Milton

Hi Michael D,

Please be advised that we are working on providing some comments on this Terms of Reference, however our process requires that these requests be filtered through our Planning Department to our Public Works Department. I have copied the appropriate Planning contacts on this email. They will provide a response back on our behalf after we fully understand the Planning context and considered the technical implications in detail.

Patrick

Patrick Monaghan

Transportation Planning Coordinator

Infrastructure Planning & Policy

Public Works

Halton Region

905-825-6000, ext. 7213 | 1-866-442-5866



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From: Michael Dowdall [mailto:mdowdall@tmig.ca]
Sent: Thursday, April 11, 2019 2:11 PM
To: Michael.Turco@milton.ca; Monaghan, Patrick
Subject: JSP Industrial Development - Study Terms of Reference, Town of Milton

Hi Michael and Patrick,

The Municipal Infrastructure Group Ltd. (TMIG) has been retained to prepare a Transportation Impact Study for a proposed industrial warehouse development consisting of approximately 80 Hectares of land that covers two separate parcels of land north of James Snow Parkway, west of Esquesing Line, south of 5th Sideroad and east of the CN railway line (see attached image). The primary use of the development will be 7 industrial high-cube warehouses (see attached concept plan).

The Phase 1 lands are the lands bound by the CN Railway to the west, Campbellville Road West to the north, Boston Church Road to the east and James Snow Parkway to the south. The Phase 1 lands are 21.7 ha in total.

The Phase 2 lands are bound by Boston Church Road to the west, an unnamed tributary to 16 Mile Creek to the north, Esquesing Line to the east and James Snow Parkway / Hydro Corridor to the south. The Phase 2 lands are 55.0 ha in total.

It is anticipated that both phases will be built concurrently within an estimated 2023 build-out year.

The greenfield property is situated along the north side of James Snow Parkway between the CN Railway and Esquesing Line. Our client intends to develop two parcels of land (Phases 1 and 2) located within the Milton North Business Park with approximately 4,950,000 ft² industrial (high-cube warehouse) gross floor area (GFA). Furthermore, our client is also seeking approval for a new public roadway connecting to James Snow Parkway via two new public road connections crossing the abutting hydro corridor, with private site accesses to serve the proposed development parcels.

- Phase 1 of the development consists of three buildings with an approximate total of 1,520,000 ft² of industrial GFA. Access to the proposed Phase 1 development includes:
 - Two full moves driveways with direct connection to 5 Sideroad; and
 - Two full moves driveways with direct connections to Boston Church Road.
- Phase 2 of the development consists of four buildings with an approximate total of 3,430,000 ft² of industrial GFA. Access to the proposed Phase 2 development includes:
 - One full moves driveway with direct connection to Boston Church Road;
 - Full moves driveways with direct connections to the Proposed Public Roadway; and
 - Two full moves intersections with direct connections to James Snow Parkway via the Proposed Public Roadway

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

Terms of Reference

- We will conduct a study area road inventory review to confirm lane assignments, traffic controls, speed limits, and surrounding land uses and general study area characteristics of the study area.

The study area will consist of:

- Boston Church Road at James Snow Parkway (Regional Road 4)
- Boston Church Road at 5 Sideroad
- Esquesing Line at James Snow Parkway (Regional Road 4)
- Esquesing Line at 5 Sideroad
- Regional Road 25 at James Snow Parkway (Regional Road 4)
- Regional Road 25 at 5 Sideroad
- 5 Sideroad at Phase 1 Site Access (Future Condition)
- Boston Church Road at Phase 1 and 2 Site Accesses (Future Condition)
- James Snow Parkway at Proposed Public Road Intersections (Future Condition)

Based on the development of these lands as industrial warehouses, we propose counts be completed on a weekday morning between the hours of 7:00 am and 10:00 am and a weekday afternoon between the hours of 4:00 pm and 7:00 pm. This will capture the vehicular activity on the surrounding street system during the typical peak.

- Once existing traffic volumes have been collected, we will prepare a baseline model of traffic operations of the study area intersection using Synchro v.10 for the critical time periods (weekday am and weekday pm) as discussed above.

- The proposed horizon years are as follows (please confirm):
 - Full Build-out (assume 2023) to be confirmed by client
 - 5 Year Post Buildout Horizon (2028)
 - 10 Year Post Buildout Horizon (2033)
- Town/Regional staff to provide the background traffic growth rates, and future background development, within the study area to be adopted as part of this study.
- Please provide any potential/committed future road / intersection / other transportation infrastructure improvements within the study area that could affect local traffic distribution or assignments. Their effects on traffic patterns will be accounted for in the appropriate planning horizon as specified by Town/Regional staff.
 - Regarding Boston Church Road, 5 Sideroad and Esquesing Line; are there any plans to widen these streets within the 2033 planning horizon
 - Further, please confirm the existing and future ROW of these streets
- If available, please provide the process required to locate a new public road across a hydro corridor, and the clearance required from a hydro tower to the edge of the proposed ROW.
- Trip generation estimates will be prepared for the weekday am and pm peak hours for the proposed development. ITE 10th Edition trip generation data will be reviewed and the appropriate rates used in the analysis.
- Intersection capacity analyses for the resultant post-build out future traffic condition (the combination of future background traffic plus estimated site trip generation) during selected peak hours will then be conducted at all study intersections using Synchro v.10. Input parameters to the Synchro software will be consistent with the recommended practices and guidelines.
- Transit mode split and non-auto trip rates methodologies will be clearly documented in the report.
- The directional distribution of traffic approaching and departing the site will be determined based upon a review of existing traffic patterns and Toronto Tomorrow Survey 2011 (TTS) data. The site traffic will be assigned to the study area roadway network in accordance with our interpretation of these various patterns.

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

Michael Dowdall, C.E.T., MITE
Project Manager, Transportation Services

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8800 Dufferin Street, Suite 200 | Vaughan, Ontario L4K 0C5

p: 905.738.5700 x361 | c: 437.993.2662 | f: 905.738.0065 | mdowdall@tmig.ca | tmig.ca



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From: MacKenzie, Adam <Adam.MacKenzie@halton.ca>
Sent: Monday, November 28, 2022 4:34 PM
To: Sarada Pulugurta
Cc: PapiezLopata, Brittany; Michael Dowdall; Kyla Zijlstra; Loro, Darren
Subject: RE: STP Inquiry

You don't often get email from adam.mackenzie@halton.ca. [Learn why this is important](#)

Hey Sarada,
See my responses below in red.
Thanks,
Adam

From: Sarada Pulugurta <sarada.pulugurta@tylin.com>
Sent: Monday, November 28, 2022 4:11 PM
To: MacKenzie, Adam <Adam.MacKenzie@halton.ca>
Cc: PapiezLopata, Brittany <Brittany.PapiezLopata@halton.ca>; Michael Dowdall <michael.dowdall@tylin.com>; Kyla Zijlstra <kyla.zijlstra@tylin.com>; Loro, Darren <Darren.Loro@halton.ca>
Subject: RE: STP Inquiry

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Hi Adam,

Thank you for responding to my queries and providing the updated signal timing at RR25 and JSP intersection.

I just have some follow up questions as listed below:-

- i) To resolve the Minimum split error on Synchro can we reduce the don't walk time or should we just move forward with the min error in place?
- I would just move forward with the error in place as we have many of our intersections operating in this manner.
- ii) The updated signal timings still show the same issue. The phases do not add up. Phase times $1+2+3+4 = 151s$ and $5+6+7+8 = 155s$. The Synchro model still shows the grey area in phase 2 as shown in the image below. Also, given the Region; s ideal max cycle length of 120s, is it okay to have a cycle length of 155 s at this intersection?
- We will confirm the signal timings at this intersection and get back to you.

NODE SETTINGS		TIMING SETTINGS																
Node #	2	Lanes and Shoving (BRL)	[Icons for EBL, EBT, EBR, WBL, WBT, WBR, NBL, NBT, NBR, SBL, SBT, SBR, PED, HOLD]															
ATMS now Controller ID	0	Traffic Volume (vph)	12	62	40	62	99	62	196	467	418	231	411	32	---	---		
Input from ATMS now	Input	Future Volume (vph)	12	62	40	62	99	62	196	467	418	231	411	32	---	---		
Export to ATMS now	Export	Turn Type	prvpt	---	Perm	prvpt	---	Perm	prvpt	---	Perm	prvpt	---	Perm	prvpt	---		
Zone	Sig	Protected Phases	7	4	---	3	8	---	5	2	---	1	6	---	---			
X East (m)	797.6	Permitted Phases	4	---	4	8	---	8	---	2	---	6	---	---				
Y North (m)	-155.5	Permitted Flashing Yellow	<input type="checkbox"/>	---	---	<input type="checkbox"/>	---	---	<input type="checkbox"/>	---	---	<input type="checkbox"/>	---	---				
Z Elevation (m)	0.0	Detector Phases	7	4	---	3	8	---	5	2	---	1	6	---	---			
Description	---	Switch Phase	0	0	0	0	0	0	0	0	0	0	0	0	---	---		
Control Type	Act/Uncond	Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	---	---			
Cycle Length (s)	155.0	Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	---	---			
Lock Timing	<input type="checkbox"/>	Minimum Inhibit (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	---	---			
Optimize Cycle Length	Optimize	Minimum Split (s)	11.0	42.9	42.9	11.5	43.9	43.9	11.0	42.9	42.9	11.0	26.9	---	---			
Optimize Split	Optimize	Total Split (s)	16.0	49.0	49.0	16.0	49.0	49.0	20.0	70.0	70.0	16.0	70.0	---	---			
Actuated Cycle(s)	68.1	Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	---	---			
Natural Cycle(s)	110.0	AllRed Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	---	---			
Max v/c Ratio	0.58	Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	---	---			
Intersection Delay (s)	16.6	Lagging Phase?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	---	---			
Intersection LOS	B	Allow Lead/Lag Optimise?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	---	---			
ICU	0.60	Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	---	---			
ICU LOS	B	Speed Inlt (km/h)	---	60	---	---	60	---	---	70	---	---	70	---	---			
Offset (s)	---	Actuated Elct. Green (s)	17.5	10.1	10.1	21.6	17.7	17.7	35.0	21.5	21.5	33.5	20.7	---	---			
Referenced to	---	Actuated p/C Ratio	0.26	0.15	0.15	0.32	0.26	0.26	0.51	0.32	0.32	0.49	0.30	---	---			
Reference Phase	---	Volume to Capacity Ratio	0.05	0.16	0.16	0.22	0.12	0.17	0.40	0.53	0.56	0.51	0.52	---	---			
Coordination Mode	---	Control Delay (s)	17.2	29.3	4.4	19.0	21.7	6.8	11.2	22.8	5.8	13.4	23.7	---	---			
Main Intersection	---	Phase Factor (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	---	---			

- iii) At Regional Road 25 and 5 Side Road intersection can you please confirm if the recall mode should be set to pedestrian for phase 2 and phase 6 in Synchro?
- We will confirm whether the recall mode for pedestrians is active at this intersection when confirming the existing signal timings

Date: 29-Apr-22

Intersection: Regional Road 25 @ 5 Sideroad

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped
Phases in use		x	x	x	x	x		x		
Direction		NB	WBLT	EB	NBLT	SB		WB		
Min Green		20	7	10	7	20		10		
Veh Ext.		5.0	3.0	5.0	3.0	5.0		5.0		
Yellow		4.2	3	3.7	3	4.2				
Red		2	1	2.3	1	2		2.3		
Walk		7		7	7	7		7		
Don't Walk		25		25	25	25		25		
Max 1		42	11	37	11	31		48		
Max 2		46	16	28	14	32		44		
Max 3		35	11	24	11	35		24		
Veh Recall		x				x				
Ped Recall		x				x				

Notes: Max 1 (6:00-15:00)

Max 2 (15:00-21:30)

Max 3 (21:30-6:00)

NODE SETTINGS		PHASING SETTINGS						
		2-NBTL	3-WBL	4-EBTL	5-NBL	6-SBTL	8-WBTL	
Node #	1	Minimum Initial (s)	20.0	7.0	10.0	7.0	20.0	10.0
ATMS now Controller ID	0	Minimum Split (s)	38.2	11.0	38.0	11.0	38.2	38.0
Import from ATMS now	Import	Maximum Split (s)	42.0	11.0	37.0	11.0	31.0	48.0
Export to ATMS now	Export	Yellow Time (s)	4.2	3.0	3.7	3.0	4.2	3.7
Zone	Sig	All-Red Time (s)	2.0	1.0	2.3	1.0	2.0	2.3
X East (m)	883.7	Lagging Phase?	—	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	—
Y North (m)	-573.3	Allow Lead/Lag Optimize?	—	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	—
Z Elevation (m)	0.0	Optimize Phs Weights - Delays	1.0	1.0	1.0	1.0	1.0	1.0
Description		Vehicle Extension (s)	5.0	3.0	5.0	3.0	5.0	5.0
Control Type	Actd-Uncrd	Minimum Gap (s)	3.0	3.0	3.0	3.0	3.0	3.0
Cycle Length (s)	90.0	Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lock Timings	<input type="checkbox"/>	Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0
Optimize Cycle Length	Optimize	Recall Mode	Ped	None	None	None	Ped	None
Optimize Splits	Optimize	Pedestrian Phase	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Actuated Cycle 90th (s)	97.2	Walk Time (s)	7.0	—	7.0	—	7.0	7.0
Actuated Cycle 70th (s)	97.2	Flash Dont Walk (s)	25.0	—	25.0	—	25.0	25.0
Actuated Cycle 50th (s)	97.2	Pedestrian Calls (#/hr)	0	—	0	—	0	0
Actuated Cycle 30th (s)	97.2	Dual Entry?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Actuated Cycle 10th (s)	75.2	Fixed Force Off?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Natural Cycle(s)	100.0	90th %ile Green Time (s)	43 hd	7 mx	31 mx	7 mx	32 pd	42 hd
Max v/c Ratio	1.08	70th %ile Green Time (s)	43 hd	7 mx	31 mx	7 mx	32 pd	42 hd
Intersection Delay (s)	43.3	50th %ile Green Time (s)	43 hd	7 mx	31 mx	7 mx	32 pd	42 hd
Intersection LOS	D	30th %ile Green Time (s)	43 hd	7 mx	31 mx	7 mx	32 pd	42 hd
ICU	0.88	10th %ile Green Time (s)	32 pd	0 sk	31 mx	0 sk	32 pd	31 hd
ICU LOS	E							
Offset (s)	—							
Referenced to	—							
Reference Phase	—							
Coordination Mode	—							
Master Intersection	—							

Thanks,

Sarada Pulugurta

TRANSPORTATION PLANNER/TRAFFIC ANALYST

TYLin

From: MacKenzie, Adam <Adam.MacKenzie@halton.ca>

Sent: Monday, November 28, 2022 3:03 PM

To: Sarada Pulugurta <sarada.pulugurta@tylin.com>

Cc: PapiezLopata, Brittany <Brittany.PapiezLopata@halton.ca>

Subject: RE: STP Inquiry

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Hey Sarada,

Please see my responses below your questions in red.

Thanks,

Adam

Adam MacKenzie

Traffic Operations Technologist

Waste Management & Road Operations

Public Works

Halton Region

905-825-6000, ext. 3518 | 1-866-442-5866



From: Sarada Pulugurta <sarada.pulugurta@tylin.com>

Sent: Monday, November 28, 2022 2:25 PM

To: PapiezLopata, Brittany <Brittany.PapiezLopata@halton.ca>

Cc: Michael Dowdall <michael.dowdall@tylin.com>; Kyla Zijlstra <kyla.zijlstra@tylin.com>; Loro, Darren <Darren.Loro@halton.ca>

Subject: RE: STP Inquiry

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Hi Brittany,

I have few questions regarding the signal timing plans that you provided as described below:-

- i) At Regional Road 25 and 5 Side Road - The Max 1 timings which is equal to 37s for phase 4- eastbound movement exceeds the sum of walk+ flash don't walk+ yellow + red timings (which is equal to 38s) as highlighted in red in the image below. This creates an error in Synchro stating, " Split less than Minimum Split". The same issue was observed in the case of Max 2 timings for Phase 4 and Max 1, Max 2 timings for phase 6. Could you please confirm if the timings in the spreadsheet are correct.
 - The reason why you are getting this error is because we are violating the pedestrian crossing timings as our TMC counts have shown low pedestrian crossing activity in order to provide more time to the main street (Regional Rd 25).

Date:	29-Apr-22							
Intersection:	Regional Road 25 @ 5 Sideroad							
8 Phase Basic Timing Sheet								
	1	2	3	4	5	6	7	8
Phases in use		x	x	x	x	x		x
Direction		NB	WBLT	EB	NBLT	SB		WB
Min Green		20	7	10	7	20		10
Veh Ext.		5.0	3.0	5.0	3.0	5.0		5.0
Yellow		4.2	3	3.7	3	4.2		
Red		2	1	2.3	1	2		2.3
Walk		7		7		7		7
Don't Walk		25		25		25		25
Max 1		42	11	37	11	31		48
Max 2		46	16	28	14	32		44
Max 3		35	11	24	11	35		24
Veh Recall		x				x		
Ped Recall		x				x		
Notes:	Max 1 (6:00-15:00)							

ii) At RR 25 at JSP Intersection –

- a) The minimum split error discussed in point i) above was also noted for phase 4 (Eastbound movement) at this junction as shown in the left side image below.
 - The reason why you are getting this error is because we are violating the pedestrian crossing timings as our TMC counts have shown low pedestrian crossing activity in order to provide more time to the main street (Regional Rd 25).

- b) As pointed out in my earlier mail (attached for your reference), the phase 2 (NBT) = 60s and phase 6 (SBT) = 70s are not equal. This results in mismatched cycle lengths as phase times 1+2+3+4 = 120s are not equal to phase 5+6+7+8 = 141s as shown using the grey area in the right-side image from the synchro model below. Can you please confirm if the signal timings are correct?
 - There were errors discovered in our existing timing sheet data. Please see updated timing sheet

- c) Can you please confirm if the phase 3 (westbound left turn movement) and phase 7 (eastbound left turn movement) should be omitted from Synchro model as they appear to be not in use since there is no cross mark against these two phases in the row “Phases in use” as per the signal timing card shown in the left side image below:-
 - All phases are in use at this intersection again it was an error in the timing sheet not showing phased 3 and 7 as being active. Please see updated timing sheet.

Date: 21-Nov-19
 Intersection: Regional Road 25 @ JSP

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Pe
Phases in use	x	x	x	x	x	x	x	x		
Direction	SBLT	NB	WBLT	EB	NBLT	SB	EBLT	WB		
Min Green	7	20	7	10	7	20	7	10		
Veh Ext.	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0		
Yellow	3	4.2	3	3.7	3	4.2	3	3.7		
Red	1	2.7	1	2.9	1	2.7	1	2.9		
Walk		7		7		7		7		
Don't Walk		29		30		22		30		
Max 1	11	60	16	33	11	70	11	49		
Max 2										
Max 3										
Veh Recall		x				x				
Ped Recall										

Notes:

The screenshot shows the software interface for configuring traffic signal timing. It is divided into two main sections: Node Settings and Timing Settings.

- Node Settings:** Includes fields for Node ID (2), ATMS now Controller ID (0), Input from ATMS now (Import), Export to ATMS now (Export), Zone (5g), X East (m) (797.6), Y North (m) (-1955.5), Z Elevation (m) (0.0), Control Type (Acd/Lead), Cycle Length (s) (141.0), Lock Timing (checkbox), Optimize Cycle Length (Optimize), Optimize Spkts (Optimize), Actuated Cycle(s) (64.0), Natural Cycle(s) (110.0), Max v/c Ratio (0.54), Intersection Delay (s) (14.7), Intersection LOS (B), ICU (0.62), ICU LOS (B), Offset (s) (---), Reference to (---), Reference Phase (---), and Coordination Mode (---).
- Timing Settings:** A grid for 8 phases (EBL, EBT, EBR, WBL, WBT, WBR, NEL, NBT, NBR, SBL, SBT, SBR). It includes:
 - Lanes and Sharing (B/L): 1, 1, 1, 1, 1, 1, 1, 1
 - Traffic Volume (vph): 12, 62, 40, 62, 99, 62, 195, 467, 418, 231, 411, 32
 - Future Volume (vph): 12, 62, 40, 62, 99, 62, 195, 467, 418, 231, 411, 32
 - Turn Type: prvpt, Perm, prvpt, Perm, prvpt, Perm, prvpt, Perm
 - Protected Phases: 7, 4, 3, 8, 5, 2, 1, 6
 - Permitted Phases: 4, 4, 8, 8, 2, 2, 6, 6
 - Permitted Flashing Yellow: checkbox
 - Detector Phases: 7, 4, 4, 3, 8, 8, 5, 2, 2, 1, 6, 6
 - Switch Phase: 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0
 - Leading Detector (s): 8.0, 8.0, 8.0, 8.0, 8.0, 8.0, 8.0, 8.0, 8.0, 8.0, 8.0, 8.0
 - Trailing Detector (s): -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -1.0, -0.2, -1.0, -1.0, -1.0
 - Minimum Inlet (s): 7.0, 10.0, 10.0, 7.0, 10.0, 10.0, 7.0, 20.0, 20.0, 7.0, 20.0
 - Minimum Spk (s): 11.0, 43.6, 43.6, 11.5, 43.6, 43.6, 11.0, 42.9, 42.9, 11.0, 35.9
 - Total Spk (s): 11.0, 33.0, 33.0, 16.0, 49.0, 49.0, 11.0, 60.0, 60.0, 11.0, 70.0
 - Yellow Time (s): 3.0, 3.7, 3.7, 3.0, 3.7, 3.7, 3.0, 4.2, 4.2, 3.0, 4.2
 - AllRed Time (s): 1.0, 2.9, 2.9, 1.0, 2.9, 2.9, 1.0, 2.7, 2.7, 1.0, 2.7
 - Lost Time Adjust (s): 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
 - Logging Phase? (checkbox)
 - Allow Lead/Lag Optimize? (checkbox)
 - Recall Mode: None, None, None, None, None, None, None, Min, Min, None, Min
 - Speed Limit (km/h): 60, 60, 60, 60, 60, 60, 60, 70, 70, 60, 70
 - Actuated E/Ext Green (s): 16.9, 10.9, 10.9, 20.8, 19.2, 19.2, 24.6, 24.0, 24.0, 24.6, 24.0
 - Actuated v/c Ratio: 0.26, 0.17, 0.17, 0.32, 0.26, 0.26, 0.54, 0.37, 0.37, 0.54, 0.37
 - Volume to Capacity Ratio: 0.04, 0.14, 0.14, 0.22, 0.11, 0.16, 0.40, 0.45, 0.54, 0.50, 0.43
 - Control Delay (s): 16.8, 28.8, 1.0, 18.3, 21.3, 4.4, 12.1, 19.4, 4.8, 14.5, 19.0
 - Queue/Excess Del. (s): A.A, A.A, A.A, A.A, A.A, A.A, A.A, A.A, A.A, A.A, A.A

Thanks,

Sarada Pulugurta

TRANSPORTATION PLANNER/TRAFFIC ANALYST



From: Sarada Pulugurta

Sent: Wednesday, November 23, 2022 2:56 PM

To: PapiezLopata, Brittany <Brittany.PapiezLopata@halton.ca>

Cc: Michael Dowdall <michael.dowdall@tylin.com>; Kyla Zijlstra <kyla.zijlstra@tylin.com>; Loro, Darren <Darren.Loro@halton.ca>
Subject: RE: STP

Hi Brittany,

Thank you for providing the signal timing plans.

Regards,
Sarada Pulugurta
TRANSPORTATION PLANNER/TRAFFIC ANALYST



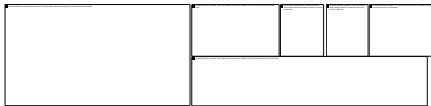
From: PapiezLopata, Brittany <Brittany.PapiezLopata@halton.ca>
Sent: Wednesday, November 23, 2022 2:51 PM
To: Sarada Pulugurta <sarada.pulugurta@tylin.com>
Subject: STP

You don't often get email from brittany.papiezlopata@halton.ca. [Learn why this is important](#)

Hello,
Please find attached STP requested, let me know if anything else is required.

Thanks,
Brittany

Brittany PapiezLopata
Road Operations Technician
Waste Management & Road Operations
Public Works
Halton Region
905-825-6000, ext. 7862 | 1-866-442-5866



This message, including any attachments, is intended only for the person(s) named above and may contain confidential and/or privileged information. Any use, distribution, copying or disclosure by anyone other than the intended recipient is strictly prohibited. If you are not the intended recipient, please notify us immediately by telephone or e-mail and permanently delete the original transmission from us, including any attachments, without making a copy.

Region of Halton
Pre-consultation on Terms of
Reference

Study	Requirements
	<p>supported in the RNHS where deemed “essential” (as defined in s.233 of the ROP) after all alternatives are explored and it is determined there are no negative impacts to the RNHS through an appropriate environmental study. The EIS must demonstrate that any proposed infrastructure (e.g. SWM components and Low Impact Development (LID)) within the RNHS is “essential” and does not result in negative impacts on the RNHS. It doesn’t appear that the proponents are proposing naturalized SWM facilities within the Greenbelt Plan Natural Heritage System. Should SWM infrastructure be proposed in the Greenbelt Natural Heritage System, the EIS must address the applicable policies under s.4.2 of the Greenbelt Plan and the ROP policies related to essential infrastructure.</p> <p><i>Monitoring Plan:</i></p> <p>A monitoring plan is intended to assess the implementation and efficacy of mitigation measures. Generally, the monitoring plan will include three phases for the project: pre-construction, during construction and post-construction. It should include an environmental inspection plan to be conducted through all phases of development outlining what is to be monitored, the frequency of monitoring, a reporting schedule and protocols that will ensure protection of natural features and functions, ceasing works temporarily until suitable mitigation measures are identified and implemented, rectifying the causes of environmental damage, and restoring areas that have been impacted by construction activities. Furthermore, the EIS should identify how the monitoring plan will be implemented (e.g. through site plan control, conditions of planning approval or regulations by the appropriate authority, etc.), in accordance with s.118 (4) of the ROP and detail any securities requirements or other measures needed to guarantee mitigation measures are successfully implemented. Please see s.3.10 of the EIA Guideline, 2020, for further guidance on the monitoring plan. Also, please refer to CH comments for any specific monitoring requirements related to their policies and Regulation.</p> <p>To assist with the review of the next submission, please include a comment-response matrix that describes how agency comments have been addressed. A comment-response matrix template is included in Appendix D-4 of the EIA Guideline, 2020, which Savanta may wish to use.</p>
<p>Infrastructure Assessment</p>	<p>The infrastructure studies and servicing plans prepared to support the development of the lands are required to support the ROPA application and the feasibility of the proposed expansion.</p> <p>To assist the applicant and consultant team with preparing the infrastructure assessment, Regional Transportation staff have reviewed the proposed terms of reference for the Transportation Impact Study (TIS) and offer the following comments. Additional comments may be provided on any updated Concept Plans that propose significant revisions to the current Concept Plan.</p> <p><u>Right-of-way – James Snow Parkway</u></p> <p>The Region requires a 15m x 15m daylighting land dedication (if a municipal road) or easement dedication (if a private access road) conforming to the ultimate right-of-way width at any proposed intersection with James Snow Parkway. Additionally, a 15m x 15m daylighting triangle is required at James Snow Parkway and Boston Church Road, and at James Snow Parkway and Esquesing Line. The ultimate right-of-way width of James Snow Parkway will be required to satisfy the greatest dedication of the following listed below. Currently, a Municipal Class Environmental Assessment or Detail Design project has not been initiated. Thus, the Transportation Master Plan (TMP) right-of-way requirement currently applies.</p> <p>Official Plan/Transportation Master Plan Right-of-Way Requirements: Any lands within 23.5m of the centreline of the original right-of-way of James Snow Parkway (Regional Road 4) that are part of the subject property shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.</p> <p>Municipal Class Environmental Assessment Study/Environmental Study Report (Transportation Planning) Right-of-Way Requirements – James Snow Parkway: Any additional lands that are part of the subject property and have been identified as required for the future widening of James Snow Parkway (Regional Road 4) per a Municipal Class Environmental Assessment Study / Environmental Study Report shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.</p> <p>Detail Design Project (Engineering & Construction) Right-of-Way Requirements – James Snow Parkway:</p>

Study	Requirements
	<p>Any additional lands that are part of the subject property and have been identified as required for the future widening of James Snow Parkway (Regional Road 4) per a Detail Design Project shall be dedicated to the Regional Municipality of Halton for the purpose of road right-of-way widening and future road improvements.</p> <p>All lands or easements to be dedicated to the Regional Municipality of Halton shall be dedicated with clear title (free and clear of encumbrances) and a Certificate of title shall be provided in a form satisfactory to the Director of Legal Services or his/her designate.</p> <p><u>Access to James Snow Parkway</u></p> <p>Any proposed site accesses to a Regional Road must conform to Halton Region’s Access Management Guideline and be supported by a Transportation Impact Study (TIS) completed to the Region’s satisfaction. The Access Management Guideline document is available online at: https://www.halton.ca/Repository/Access-Management-Guideline</p> <p>Halton’s Access By-Law 32-17, a By-Law to Prohibit, Restrict and Regulate access to the Regional Road System, is also available online at: https://www.halton.ca/Repository/By-law-32-17-Regional-Roads</p> <p>The TIS must justify any proposed site accesses to James Snow Parkway by demonstrating that access to James Snow Parkway is absolutely necessary (e.g. traffic operations, safety, circulation, etc.)</p> <p><u>Intersection Configuration – Site Accesses</u></p> <p>An important component of the TIS will be to evaluate and recommend an interim configuration and design (e.g. traffic control, auxiliary turn lanes) at any proposed site accesses to James Snow Parkway (that are justified via the TIS) prior to the widening of James Snow Parkway to six lanes.</p> <p><u>MTO Review</u></p> <p>Given the size of the proposed development, we recommend consultation with the Ministry of Transportation of Ontario (MTO) to determine if they require analysis of the Highway 401 ramp terminals at Regional Road 25 and at James Snow Parkway, and if so, receive confirmation from the MTO on the proposed Terms of Reference.</p> <p><u>Study Area</u></p> <p>Please include the intersection of James Snow Parkway (Regional Road 4) and Steeles Avenue (Regional Road 8) in the study area.</p> <p><u>Existing Traffic Data</u></p> <p>Traffic counts newer than March 2020 should not be used given the impacts to travel patterns resulting from the COVID-19 pandemic. Historical traffic data should be used and adjusted to reflect 2021 “existing” conditions, with the methodology and assumptions for adjustments clearly documented in the TIS. Historical traffic data can be requested at trafficdatarequests@halton.ca.</p> <p><u>Horizon Years</u></p> <p>The proposed horizon years are acceptable pending confirmation of the anticipated year of full build-out. However, the interim horizon year reflecting Phase 1 build-out should be analyzed separately as to quantify impacts associated with Phase 1 compared to impacts associated with the entire development.</p> <p><u>Background Roadway Improvements</u></p> <p>The Region’s TMP identified the need to widen James Snow Parkway to six lanes from Highway 401 to Tremaine Road. This improvement is currently scheduled to start construction in 2030 per the Region’s Capital Project Forecast Listing 2021. This improvement should be accounted for under the 2033 horizon year.</p>

Study	Requirements
	<p>The Region's TMP identified the need to widen Regional Road 25 to six lanes from Steeles Avenue to 5 Side Road. This improvement is currently scheduled to start construction in 2026 per the Region's Capital Project Forecast Listing 2021. Information regarding the Municipal Class Environmental Assessment is available online at: https://www.halton.ca/For-Residents/Roads-Construction/Municipal-Class-Environmental-Assessment-Studies/Regional-Road-25-Corridor-Study-%E2%80%93-Steeles-Avenue-t. This improvement should be accounted for under the 2028 and 2033 horizon years.</p> <p>The Region's TMP identified the need to widen Steeles Avenue to six lanes from Regional Road 25 to Trafalgar Road. This improvement is currently scheduled to start construction in 2024 per the Region's Capital Project Forecast Listing 2021. This improvement should be accounted for under the 2028 and 2033 horizon years.</p> <p><u>Background Traffic Volume Forecasting</u></p> <p>The traffic volume forecasts for the intersection of James Snow Parkway and Regional Road 25 should be based on the "Transportation Impact Study 8465 Mount Pleasant Way Milton Escarpment West Business Park Phase III" update prepared by Crozier Consulting Engineers in March 2020. The growth rates and forecasting methodology outlined in the Crozier study for forecasting 2024 future total volumes from the historical 2019 traffic counts can be applied to forecast 2023 future background traffic volumes in this study. The growth rate of 2% compounded annually that was applied in the Crozier study to the through movements on Regional Road 25 at James Snow Parkway can also be applied to the through movements on Regional Road 25 at the existing Highway 401 ramp terminals to forecast 2023 future background traffic volumes. Per the Region's EMME model forecasts, a growth rate of 3% compounded annually should be applied to Regional Road 25 from 2023 to forecast 2028 and 2033 future background traffic volumes post-widening.</p> <p>For consistency with previous studies around James Snow Parkway, a growth rate of 2% compounded annually should be applied to James Snow Parkway to forecast up to 2028 future background traffic volumes. Per the Region's EMME model forecasts, a growth rate of 6% compounded annually should be applied to James Snow Parkway from 2028 to forecast 2033 future background traffic volumes post-widening.</p> <p>A growth rate of 2% compounded annually can be applied to Steeles Avenue to forecast 2023 future background volumes. Per the Region's EMME model forecasts, a growth rate of 4% compounded annually should be applied to Steeles Avenue from 2023 to forecast 2028 and 2033 future background traffic volumes post-widening.</p> <p><u>Trip Generation</u></p> <p>In addition to using Institute of Transportation Engineers (ITE) data, trip generation should also be forecasted using first principles data from the tenant if available. The more conservative trip generation forecasts between the ITE forecasts and the first principles forecasts should be applied. Trip generation assumptions and results should be confirmed with Transportation Planning before the TIS is completed.</p> <p>Please separate trip generation forecasts between passenger cars and heavy trucks using ITE data for heavy truck proportions.</p> <p><u>Trip Distribution</u></p> <p>Trip distribution should consider 2016 Transportation Tomorrow Survey (TTS) data, existing travel patterns and expected catchment areas for the proposed development.</p> <p>Please apply separate trip distributions for passenger cars and heavy trucks, justifying and documenting all assumptions for trip distribution.</p> <p><u>Other Analysis Components</u></p> <p>Per the Region's Transportation Impact Study Guidelines, the TIS should include analysis of other transportation components including (but not limited to):</p>

Study	Requirements
	<ul style="list-style-type: none"> • sight distance; • corner clearance requirements between James Snow Parkway and the proposed access to Boston Church Road (and any potential access to Esquesing Line); • clear throat length requirements at the proposed accesses to James Snow Parkway to avoid queuing and spillback onto the Regional road; • vehicle-pedestrian conflicts; • access conflicts; • passenger car and heavy truck circulation; • heavy truck maneuverability entering and exiting the site; and • Transportation Demand Management (TDM) opportunities to reduce single-occupant vehicle (SOV) trips and promote alternate modes of transportation to and from the proposed development.
Agricultural Assessment	An assessment of the impacts to the Region's Agricultural System, prime agricultural areas, and Minimum Distance Separation, is required to support the ROPA application and the feasibility of the proposed expansion.
Environmental Site Assessment	An environmental review including site screening checklist, Phase 1 Environmental Site Assessment, Phase 2 Environmental Site Assessment/Record of Site Condition and Risk Assessment (if required) in accordance with Section 187(10)h) of the Regional Official Plan.
Draft ROPA	A Draft ROPA prepared in the Region's standard format (including The Preamble, The Amendment, and The Appendices) which identifies specific changes proposed to be made to the policies and mapping of the Regional Official Plan.

Additional Guidance

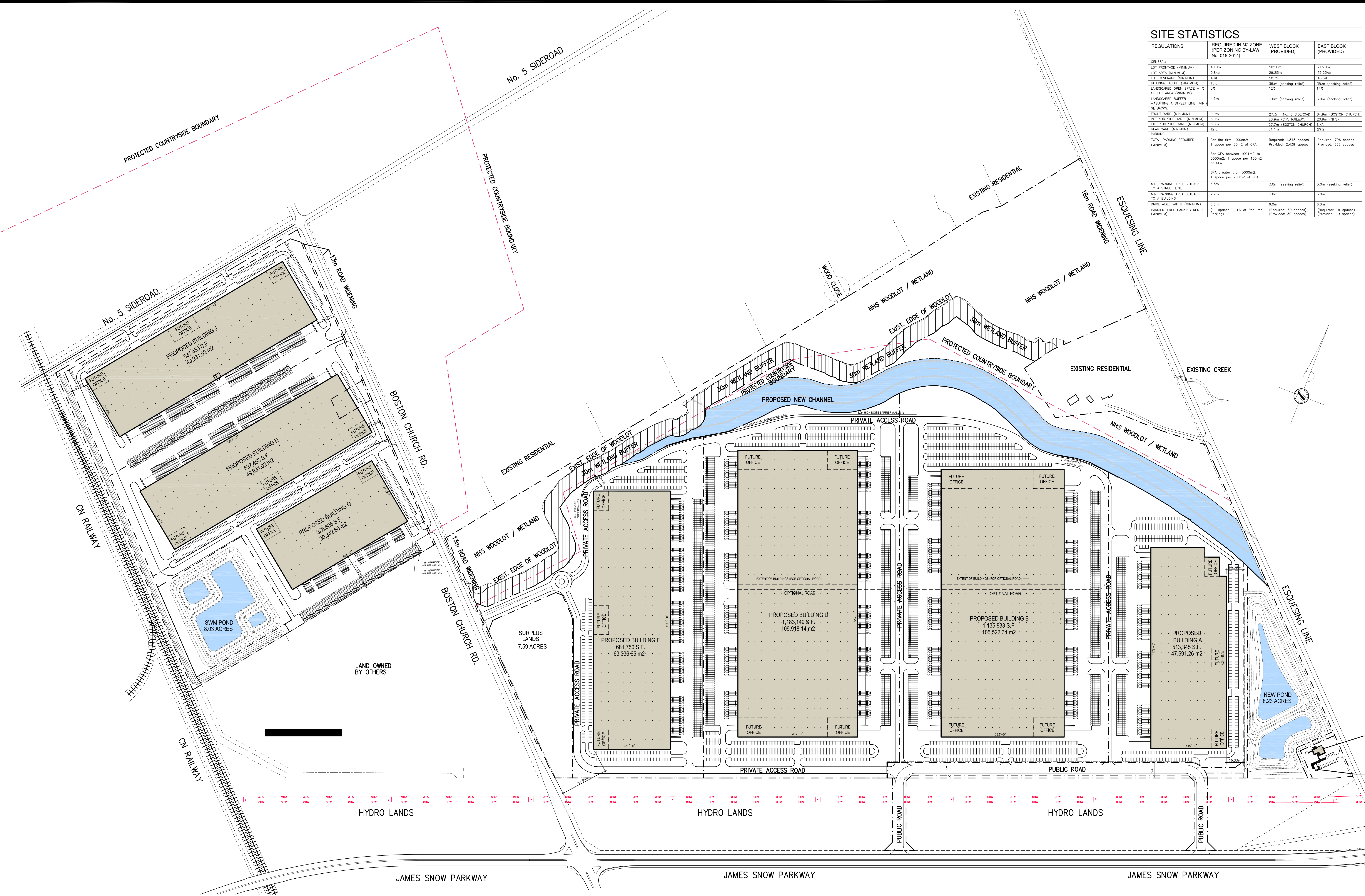
Section 187(10) of the Regional Official Plan provides the following direction in relation to ROPA applications:

- The proponent shall ensure that all additional requirements set out in Local Official Plan policies be addressed, in addition to the Regional requirements.
- All reports shall be conducted by a qualified professional consultant in accordance with Regional guidelines or protocols or in consultation with Regional staff, the appropriate approval authority and other agencies; and the consultant shall be retained by and at the expense of the proponent.
- The Region may request electronic versions of all reports.
- The Region may require a peer review of any report by an appropriate agency or professional consultant retained by the Region at the proponent's expense.
- The scale and scope of any required report is dependent on the scale and scope of the proposal, its relationship to adjacent land uses, and the type of planning approval required, and shall be determined by the Region as part of the pre-consultation process.
- The Chief Planning Official shall be responsible for deeming a ROPA application complete or incomplete.
- In the absence of a pre-consultation meeting between the Region and the proponent or the submission of adequate supporting information with an application, the Chief Planning Official may deem the application incomplete and may refuse the application.

Application Fees

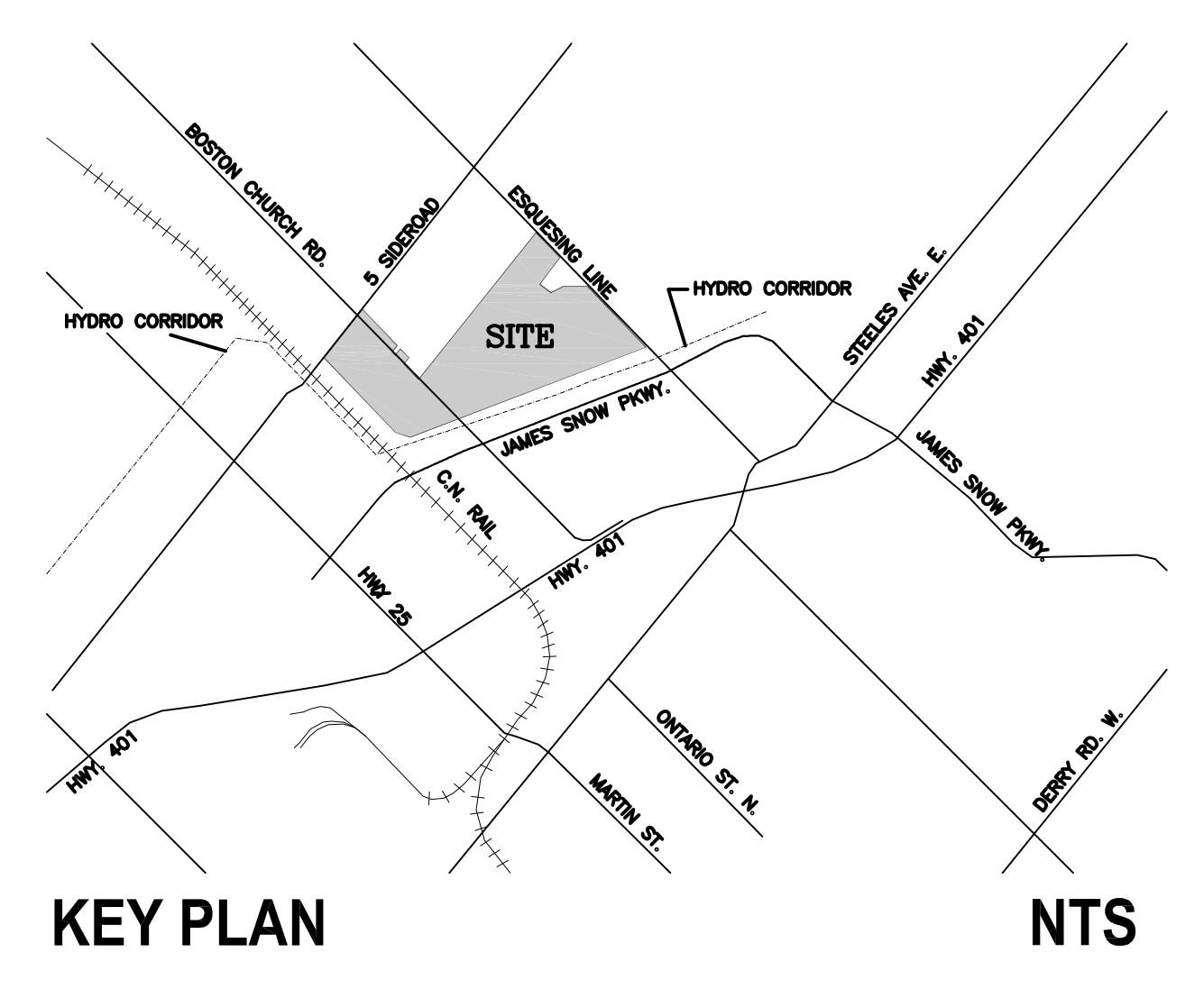
Regional Fees for planning applications are set out in accordance with the Region's Fee By-law 92-19. The Regional Official Plan Amendment Fee is \$10,115.51.

Appendix B **Concept Plan, Draft Plans and Site Circulation Review**



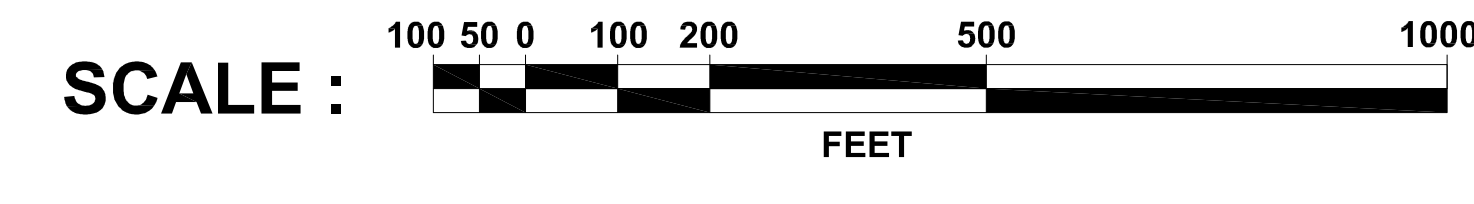
SITE STATISTICS

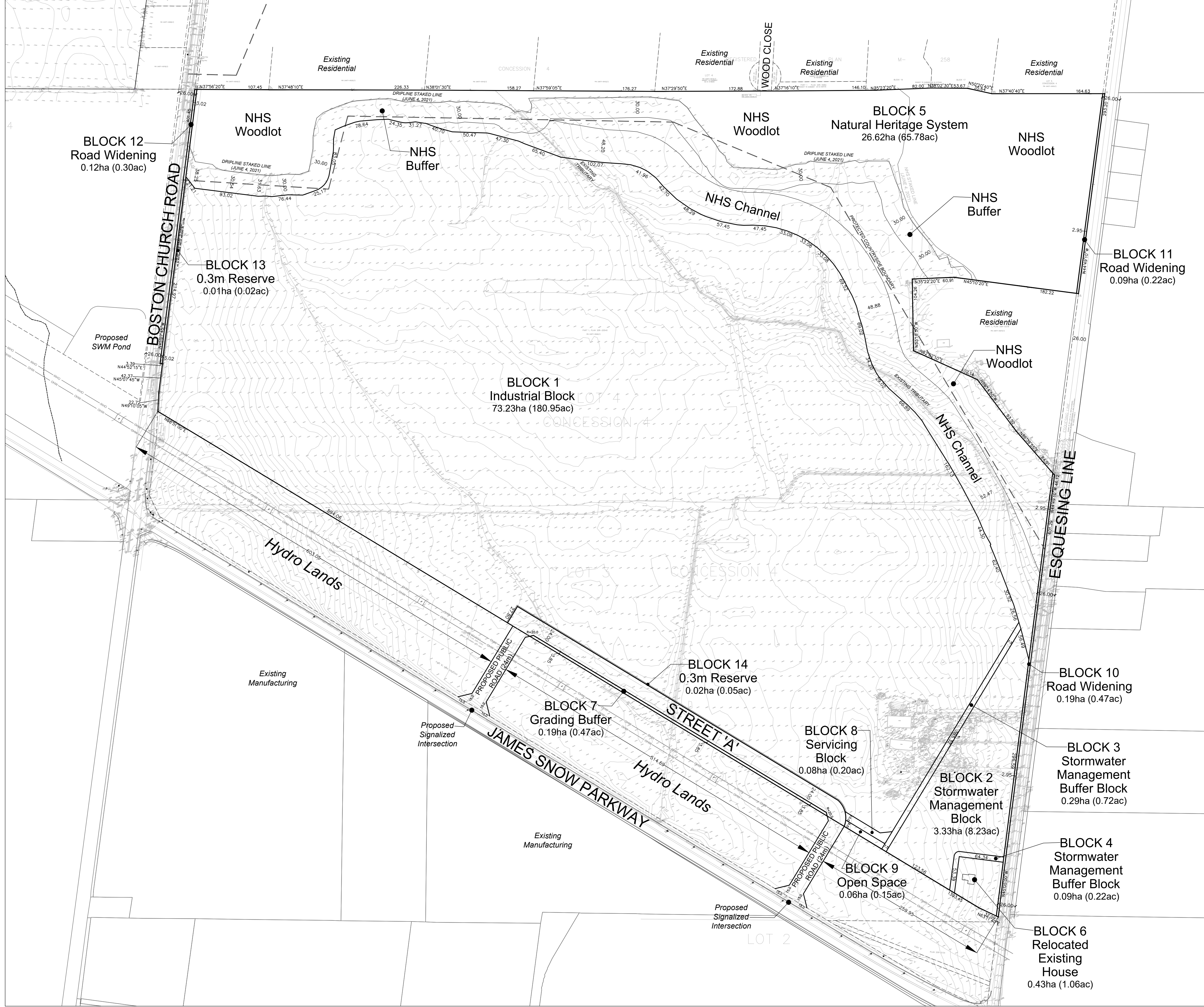
REGULATIONS	REQUIRED IN M2 ZONE (PER ZONING BY-LAW No. 016-2014)	WEST BLOCK (PROVIDED)	EAST BLOCK (PROVIDED)
GENERAL:			
LOT FRONTAGE (MINIMUM)	40.0m	502.0m	215.0m
LOT AREA (MINIMUM)	0.8ha	29.2ha	73.2ha
LOT COVERAGE (MINIMUM)	40%	30.7%	46.5%
BUILDING HEIGHT (MAXIMUM)	15.0m	30m (seeking relief)	30m (seeking relief)
LANDSCAPED OPEN SPACE - % OF LOT AREA (MINIMUM)	5%	12%	14%
LANDSCAPED BUFFER - ADJACENT TO STREET LINE (MIN.)	4.5m	3.0m (seeking relief)	3.0m (seeking relief)
FRONT YARD (MINIMUM)	9.0m	27.3m (No. 5 SIDEROAD)	84.8m (DIXON CHURCH)
REAR YARD (MINIMUM)	3.0m	28.9m (C.P. BUILDING)	23.0m (NHS)
EXTERIOR SIDE YARD (MINIMUM)	3.0m	27.7m (DIXON CHURCH)	N/A
REAR YARD (MINIMUM)	12.0m	61.1m	29.2m
FRONTS:			
TOTAL PARKING REQUIRED (MINIMUM)	For the first 1000m ² : 1 space per 50m ² of GFA For GFA between 1001m ² to 5000m ² : 1 space per 100m ² of GFA GFA greater than 5000m ² : 1 space per 200m ² of GFA	Required: 1,843 spaces Provided: 2,439 spaces	Required: 796 spaces Provided: 868 spaces
MIN. PARKING AREA SETBACK TO A STREET LINE	4.5m	3.0m (seeking relief)	3.0m (seeking relief)
MIN. PARKING AREA SETBACK TO A BUILDING	2.0m	3.0m	3.0m
DRIVE AISLE WIDTH (MINIMUM)	6.0m	6.0m	6.0m
BARREER-FREE PARKING REQ. (MINIMUM)	(11 spaces = 1% of Required Parking)	(Required: 30 spaces) (Provided: 30 spaces)	(Required: 19 spaces) (Provided: 19 spaces)



SITE STATISTICS

WEST BLOCK (WEST OF BOSTON CHURCH RD.)		EAST BLOCK (EAST OF BOSTON CHURCH RD.)	
LAND TO BE DEVELOPED	63.52 ACRES	LAND TO BE DEVELOPED (A,B,D,F)	173.36 ACRES
CHANNEL (NORTH-SOUTH)	2.27 ACRES	SURPLUS LANDS	7.59 ACRES
BLOCK 3 ROW (BOSTON CHURCH)	0.42 ACRES	NATURAL HERITAGE SYSTEM	65.78 ACRES
BLOCK 4 ROW (No. 5 SIDEROAD)	0.96 ACRES	HERITAGE BLOCK	1.06 ACRES
BLOCK 5 (0.3m RESERVE (No. 5 SIDEROAD))	0.02 ACRES	SWM POND	8.23 ACRES
BLOCK 6 (0.3m RESERVE (BOSTON CHURCH))	0.05 ACRES	PUBLIC ROAD (STREET A)	3.39 ACRES
SWM POND	8.03 ACRES	SWM BUFFER BLOCK (BLOCK 3)	0.72 ACRES
CHANNEL (EAST-WEST)	0.73 ACRES	SWM BUFFER BLOCK (BLOCK 4)	0.22 ACRES
TOTAL LAND	76.00 ACRES	GRADING BUFFER (BLOCK 7)	0.47 ACRES
		SERVICING BLOCK 8	0.20 ACRES
		OPEN SPACE (BLOCK 9)	0.15 ACRES
		ESQUESING LINE RW (BLOCK 10)	0.47 ACRES
		ESQUESING LINE RW (BLOCK 11)	0.22 ACRES
		BOSTON CHURCH RW (BLOCK 12)	0.30 ACRES
		B.C. (0.3m) RESERVE (BLOCK 13)	0.02 ACRES
		STREET A (0.3m) RSV. (BLOCK 14)	0.05 ACRES
		TOTAL LAND	262.23 ACRES
		BUILDING A	
		SITE AREA	16.40 ACRES
		BUILDING AREA	326,605 S.F.
		CAR PARKING	211
		SHIPPING DOORS	40
		DRIVE-IN DOORS	2
		TRAILER PARKING	66
		BUILDING 'B'	
		SITE AREA	23.23 ACRES
		BUILDING AREA	537,453 S.F.
		CAR PARKING	290
		SHIPPING DOORS	77
		DRIVE-IN DOORS	2
		TRAILER PARKING	45
		BUILDING 'C'	
		SITE AREA	23.89 ACRES
		BUILDING AREA	537,453 S.F.
		CAR PARKING	367
		SHIPPING DOORS	75
		DRIVE-IN DOORS	2
		TRAILER PARKING	45
		BUILDING 'D'	
		SITE AREA	56.02 ACRES
		BUILDING AREA	1,183,149 S.F.
		CAR PARKING	692
		SHIPPING DOORS	159
		DRIVE-IN DOORS	4
		TRAILER PARKING	241
		BUILDING 'E'	
		SITE AREA	34.72 ACRES
		BUILDING AREA	681,750 S.F.
		CAR PARKING	472
		SHIPPING DOORS	90
		DRIVE-IN DOORS	2
		TRAILER PARKING	115
		TOTAL BUILDING AREA (WEST BLOCK):	1,401,511 S.F.
		TOTAL BUILDING AREA (EAST BLOCK):	3,514,077 S.F.
		TOTAL BUILDING AREA	4,915,588 S.F.





**DRAFT PLAN OF SUBDIVISION
ORLANDO CORPORATION**

File # 24T-21007/M

PART OF LOT 3 AND 4, CONCESSION 4,
TOWNSHIP OF ESQUESING
REGIONAL MUNICIPALITY OF HALTON

OWNERS CERTIFICATE
I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF MILTON FOR APPROVAL.

SIGNED _____ DATE _____
BLAIR WOLK, PRESIDENT
ORLANDO CORPORATION

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

SIGNED *Alister Sankey* DATE: OCTOBER 1, 2021
ALISTER SANKEY, O.L.S., O.L.P.
David B. Searles Surveying Ltd.
ONTARIO LAND SURVEYORS
4255 SHERWOODTOWNE BLVD, SUITE 206 MISSISSAUGA, ONTARIO L4Z 1Y5
(905) 273-6840 FAX: (905) 896-4410
E MAIL: Alister.Sankey@dbsearles.ca

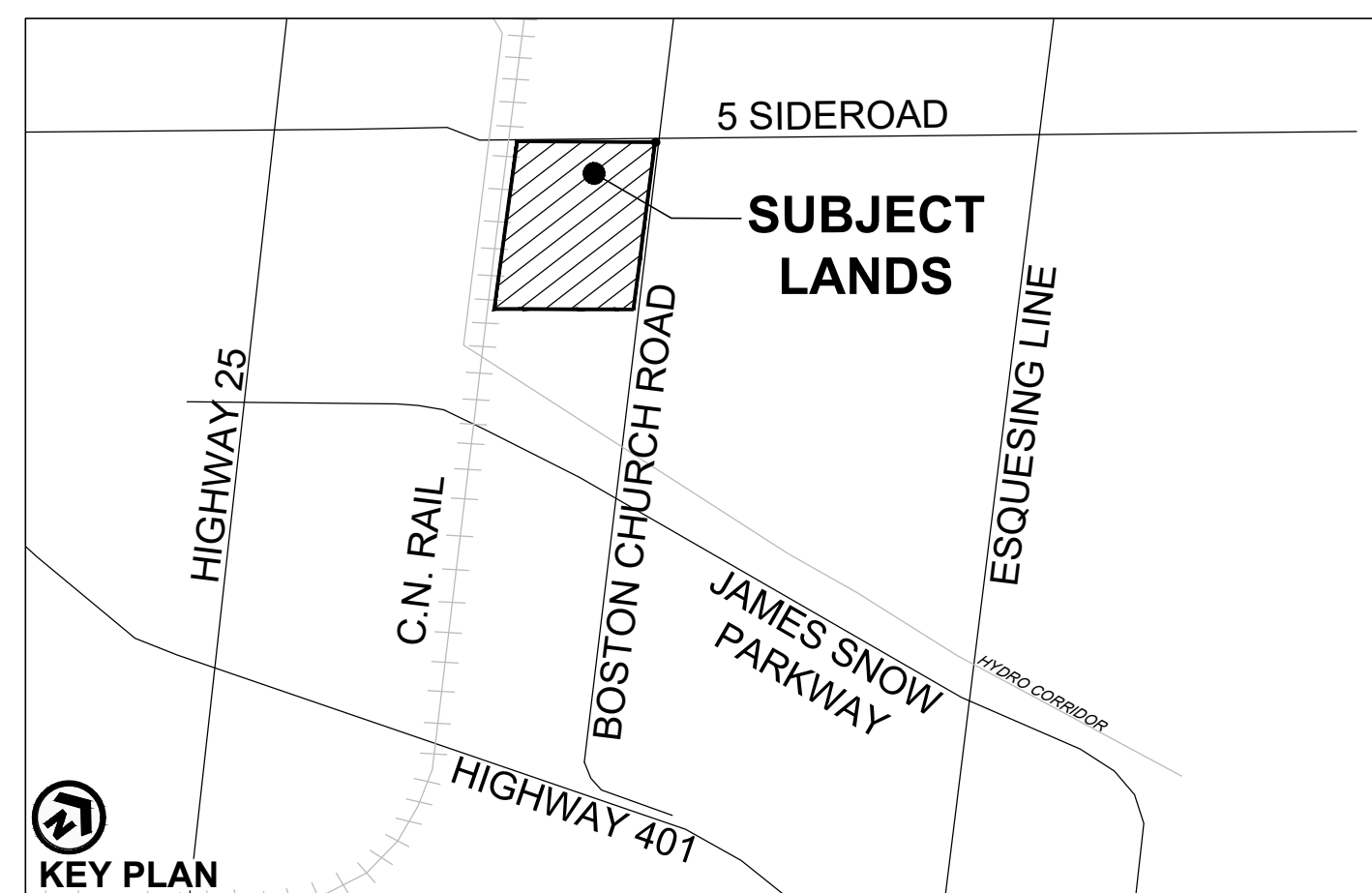
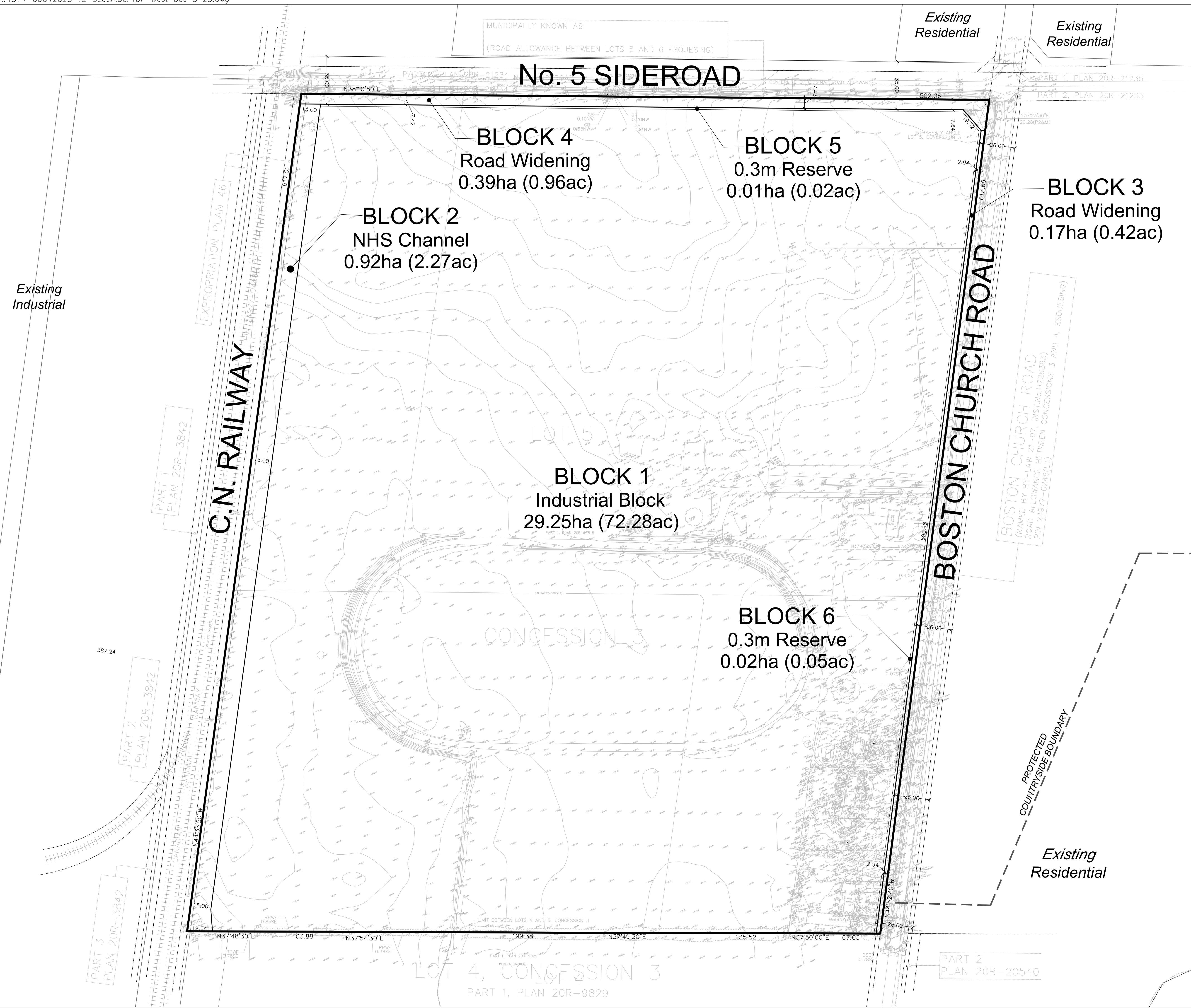
ADDITIONAL INFORMATION
(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, & J ARE SHOWN ON THE DRAFT AND KEY PLANS.

- H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
- I) SANDY LOAM AND CLAY LOAM
- K) SANITARY AND STORM SEWERS TO BE PROVIDED

LAND USE SCHEDULE

LAND USE	BLOCKS	AREA (ha)	AREA (ac)
Industrial Block	1	73.23	180.95
Stormwater Management Block	2	3.33	8.23
Stormwater Management Buffer	3-4	0.38	0.94
Natural Heritage System	5	26.62	65.78
Relocated Existing House	6	0.43	1.06
Grading Buffer	7	0.19	0.47
Servicing Block	8	0.08	0.20
Open Space	9	0.06	0.15
Road Widening	10-12	0.40	0.99
0.3m Reserve	13,14	0.03	0.07
24.0m R.O.W. (591m Length)		1.37	3.39
TOTAL	14	106.12	262.23

NOTES
-Base mapping obtained from DB Searles
-Daylight Triangle at Street 'A' & James Snow Parkway: 15m x 15m



**DRAFT PLAN OF SUBDIVISION
ORLANDO CORPORATION**

File # 24T-21008/M

PART OF LOT 5, CONCESSION 3,
TOWNSHIP OF ESQUESING
REGIONAL MUNICIPALITY OF HALTON

OWNERS CERTIFICATE

I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE TOWN OF MILTON FOR APPROVAL.

SIGNED _____ DATE _____
BLAIR WOLK, PRESIDENT
ORLANDO CORPORATION

SURVEYORS CERTIFICATE

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

SIGNED  DATE: OCTOBER 1, 2021
ALISTER SANKEY, O.L.S., O.L.P.
David B. Searles Surveying Ltd.
ONTARIO LAND SURVEYORS
4255 SHERWOODTOWNE BLVD., SUITE 206 MISSISSAUGA, ONTARIO L4Z 1Y3
(905) 273-6840 FAX: (905) 896-4410
E MAIL: Alister.Sankey@dbsearles.co

ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, & J ARE SHOWN ON THE DRAFT AND KEY PLANS.

- H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
- I) SANDY LOAM AND CLAY LOAM
- K) SANITARY AND STORM SEWERS TO BE PROVIDED

LAND USE SCHEDULE

LAND USE	BLOCKS	AREA (ha)	AREA (ac)
Industrial Block	1	29.25	72.28
NHS Channel	2	0.92	2.27
Road Widening	3,4	0.56	1.38
0.3m Reserve	5,6	0.03	0.07
TOTAL	6	30.76	76.00

NOTES

- Base mapping obtained from DB Searles
- Existing Structures to be removed
- Daylight Triangle at No. 5 Sideroad & Boston Church Road: 15m x 15m

February 3, 2023

SENT VIA EMAIL only
malitol@orlandocorp.com

Attention: Lino Malito, Vice President, Development Planning, Orlando Corporation

Dear Mr. Malito:

Re: Orlando – North Porta Development, Proposed Land sale over Part of Lots 3 and 4, Concession 4, Geographic Township of Esquesing, now Town of Milton, being Part of PIN 249770477
HONI file: Milton 634-7900

I am pleased to advise that Hydro One Networks Inc. (HONI) has completed the technical review and provided a conditional approval pertaining to for the proposed roadway crossings of Hydro corridor, located between Boston Church Road and Equesing Line in the Town of Milton.

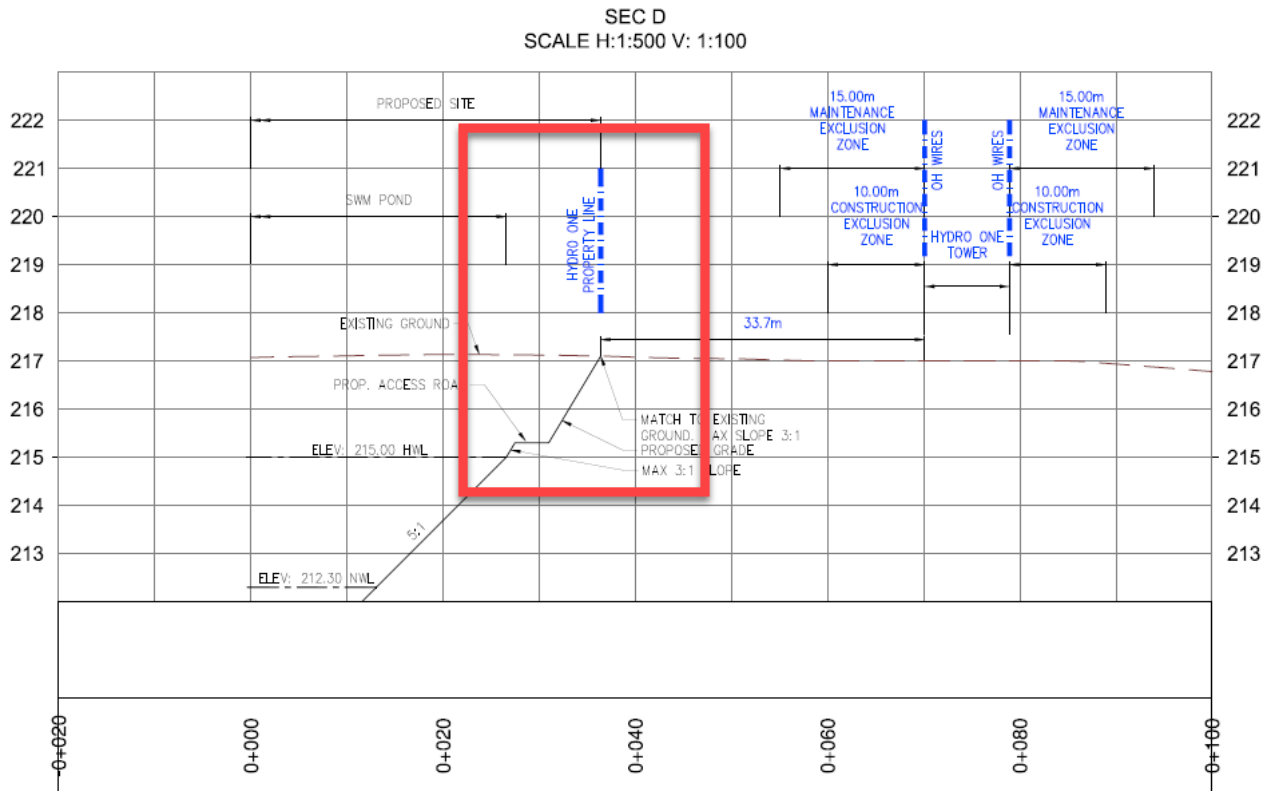
HONI's technical approval is based on review of the following sets of drawings:

- Engineering Drawings for the project titled “Orlando North Porta” for Town of Milton, prepared by Tylin, with Revision# 3, dated Nov 2022:
 - Grading Plan (Drawing No. GR01);
 - Grading Plan (Drawing No. GR02);
 - Grading Section (Drawing No. XS01).
- Landscaping Plan for project titled “Halton Business Community”, prepared by Studio TLA for Orlando Corporation, with revision # 3, dated October 31, 2022.
 - Overall Plan (Sheet No. LP-100);
 - Hydro Lands and Landscape Plan (Sheet No. LP-101);
 - Landscape Details (Sheets No. LD-100, LD101, LD-102).
- Lighting Plan prepared by RTG Systems Inc. for Milton Hydro:
 - Orlando Industrial Streetlighting & photometrics Hydro Land Crossing Milton North, Drawing No. SL-1, Revision R3, dated 2022.11.22.
 - North/East profile – North/East leg Proposed Clearances
 - South/west profile – South/West leg Proposed clearances.

In addition to Hydro One General Conditions for Secondary Land Uses (attached to this letter), the following specific comments form part of HONI's conditional approval:

Specific Conditions/Comments:

- If HONI corridor deteriorates overtime, the proponent will be responsible for remediations. See attached



- All work must comply with the safety and clearance regulations as stated in the Occupational Health and Safety Act (OHSA). The HONI aerial conductors are operating at 500,000 Volts and the required minimum clearance must be maintained at all times.
- The proponent is required to prepare a reference plan with parts designed for the access pathway, soakaway pit (including path to get to it) and the areas of grading change. Circulate a draft plan to HONI for review prior to depositing it in the Land Registry Office.
- The proposed access pathways are to be designed as public road allowance.
- The proponent is required to retain an appraiser with AACI designation to appraise the market value based on the IO's Terms of Reference (see attached). Send us a draft appraisal which will be reviewed by IO's appraiser-reviewer before finalizing it.
- As mentioned earlier, the subject corridor is currently being licenced to a farmer for agricultural purposes. We will make arrangement to reduce the licensed area to facilitate your project. However, prior to licence amendment, the proponent will be responsible for crop damage, if any, and /or lost of farming activities in order to accommodate your project.

- The approval of the proposed works is applicable for one year from the date of this email, after which the proposed uses will be subject to review and revision based on prevailing circumstance.

It should be noted that Tylin indicated no construction laydown area will be required within Hydro corridor. When the deposited reference plan and an appraisal report are ready, and IO Environmental has provided its signoff to HONI, we will provide you the agreement to Town to execute. In the meantime, please review all the terms and conditions as included in this letter, and sign in the spot below to acknowledge your acceptance of the T&C.

Should you have any questions, please contact the writer at joan.zhao@hydroone.com or call 416-573-7987.

Yours truly,

HYDRO ONE NETWORKS INC.



Joan Zhao, SR/WA
Senior Real Estate Coordinator

CC. R. Reynolds HONI
J. Tijanic Town of Milton
D. Morales Tylin

ACKNOWLEDGEMENT

I acknowledge having read this letter and agree to adhere to and be bound by these terms and conditions. Having the authority to bind the corporation, I understand and acknowledge that a breach of any of these conditions automatically negates and nullifies Hydro One's permission for the proposed works on hydro corridor lands.

ORLANDO CORPORATON

Per: _____ Dated: _____

Name:

Title:

Hydro One General Conditions for Secondary Land Uses

1. Scope of Approval

- 1.1. Once issued, the approval is valid for one (1) year from the approval date; should the work not take place within one (1) year after the approval date the approval shall be deemed to be void and the party proposing the installation (including, but not limited to their representatives, agents and/or contractors) (collectively, the “Proponent”) will have to resubmit all drawings for further review at an additional charge.
- 1.2. This approval applies only to the plans, drawings and/or documents (collectively, the “Proposal”) submitted by the Proponent to date. Any revisions to the Proposal must be reviewed and approved by Hydro One prior to construction. No work by the Proponent can begin until an occupation agreement has been duly executed by the required parties.
- 1.3. Any future Proposal on the subject land, including but not limited to, modified use of the present Proposal, must be submitted to Hydro One for review and approval.
- 1.4. Once construction has been completed, the Proponent is to contact Hydro One’s Real Estate Coordinator to arrange for a post-construction site inspection to ensure everything was built in accordance with the final approved Proposal
- 1.5. Hydro One corridor lands are not to be used without express written permission from Hydro One. The use of the Hydro One corridor lands must be contained to the lands outlined in the approved Proposal and identified on site by installing temporary fencing to Hydro One’s satisfaction.
- 1.6. Upon termination of the land occupation agreement, the Proponent must restore lands to their original, pre-use condition. For example, if lands are paved over for parking use, the surface must be restored to grass.
- 1.7. If at any time during a site inspection, the listed conditions are not complied with or the lands are used for inappropriate or non-approved purposes, the Proponent’s land occupation agreement will be subject to cancellation upon written notice.

2. Horizontal Clearances Around Hydro One Structures

- 2.1. A three (3) meter radius around Hydro One structures must be left unpaved for access to tower footings if necessary.
- 2.2. Hydro One requires fifteen (15) meters of clearance on all sides around its transmission structures, as measured from the nearest structure member (base of pole, tower leg footing or structure anchor), in order to carry out maintenance operations. This clearance must be maintained at all times, and storage and/or staging activities are not permitted within this area at any time.

3. Vertical Clearances

- 3.1. Construction equipment and personnel working underneath the Hydro One conductors must satisfy Occupational Health and Safety Act (Ontario) (“OHSA”) clearance requirements. Transmission lines are dynamic in nature, and factors such as changing loads, ambient temperatures and wind can cause the conductors to lower/rise significantly over short periods. It is the Proponent’s responsibility to monitor/manage these changes and adjust work methods accordingly, in order to adhere to the OHSA clearances.
- 3.2. All proposed works on the corridor are subject to adequate overhead transmission line clearances from the high voltage conductors to any proposed works including proposed elevation changes to the existing ground. Review and confirmation that sufficient clearances will be present is part of Hydro One’s review of a Proposal.
- 3.3. All proposed plantings must conform to Hydro One’s approved species list and be reviewed and approved by Hydro One.

4. Corridor Conditions and Access

- 4.1. No grading/excavation work is to be carried out using heavy machinery within ten (10) metres of the tower footings. Hydro One may permit grading/excavation work within ten (10) meters of the tower footings, provided this work is carried out by hand or by using a vacuum truck (VAC) system. Proponent must seek prior written approval for work with ten (10) meters of the tower footings.
- 4.2. Access to Hydro One facilities must not be obstructed at any time during construction, or after the Proposal is in service. The site must be kept free of all debris and equipment, which could prohibit access to Hydro One facilities.
- 4.3. Hydro One requires a minimum of six (6) meter wide route(s) longitudinally along the corridor to access each transmission structure. The access route should not: i) have a slope greater than 10% and ii) a side slope greater than 4%. If the Proponent fails to maintain the required access route(s), it will be liable for any costs incurred by Hydro One in regaining access to perform maintenance or

repairs.

- 4.4. Any changes in grade must be submitted for approval.
- 4.5. If the Proponent performs any construction activity within ten (10) meters of any transmission structures, the Proponent must install either a temporary orange snow fence or jersey barriers, to be determined by Hydro One depending on site specific conditions. The fence or jersey barriers must be erected three (3) meters out from the base of the tower footprint. This fence must be maintained in an upright position for the duration of construction.
- 4.6. All buried infrastructure (including roadways/paths) is to be designed as follows:
 - a) ability to withstand the transportation of heavy loads outlined by CL-625 truck loading according to the latest version of CAN/CSA-S6. Vehicles to be accommodated include large utility vehicles and cranes;
 - b) ability to withstand mobile cranes set up for work with counterweights in place – 267 KN per tandem axle, dual wheel, 1.53m axle spacing, 360mm tires.

5. Storm Water and Drainage Management

- 5.1. The Proposal shall not interfere with the natural drainage patterns or result in standing water anywhere on the affected stretch of the Hydro One corridor.
- 5.2. The Proponent will be held liable for any damage to Hydro One’s facilities, as a result of flooding or standing water caused by the Proposal.
- 5.3. Any proposed catch basins on the Hydro One corridor must be located within a paved or concrete pad surface.

6. Safety & Security

- 6.1. The Proponent is responsible for maintaining security of the site and for the safety of the people working within the Hydro One corridor.

7. Liabilities

- 7.1. The Proponent will assume all liability associated with the Proposal.
- 7.2. Any relocation, modification and/or repair of Hydro One facilities as a result of the Proposal will be carried out by Hydro One at the Proponent’s expense.
- 7.3. The Proponent is responsible for arranging all underground locates prior to digging, auguring or performing any excavation works on the Hydro One corridor.
- 7.4. Hydro One is not responsible for any damages or injuries resulting from the effect of adverse weather conditions. This includes any damages or injuries arising from ice falling off overhead structures or

conductors.

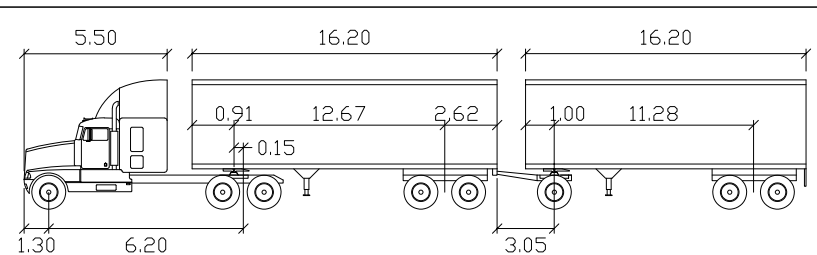
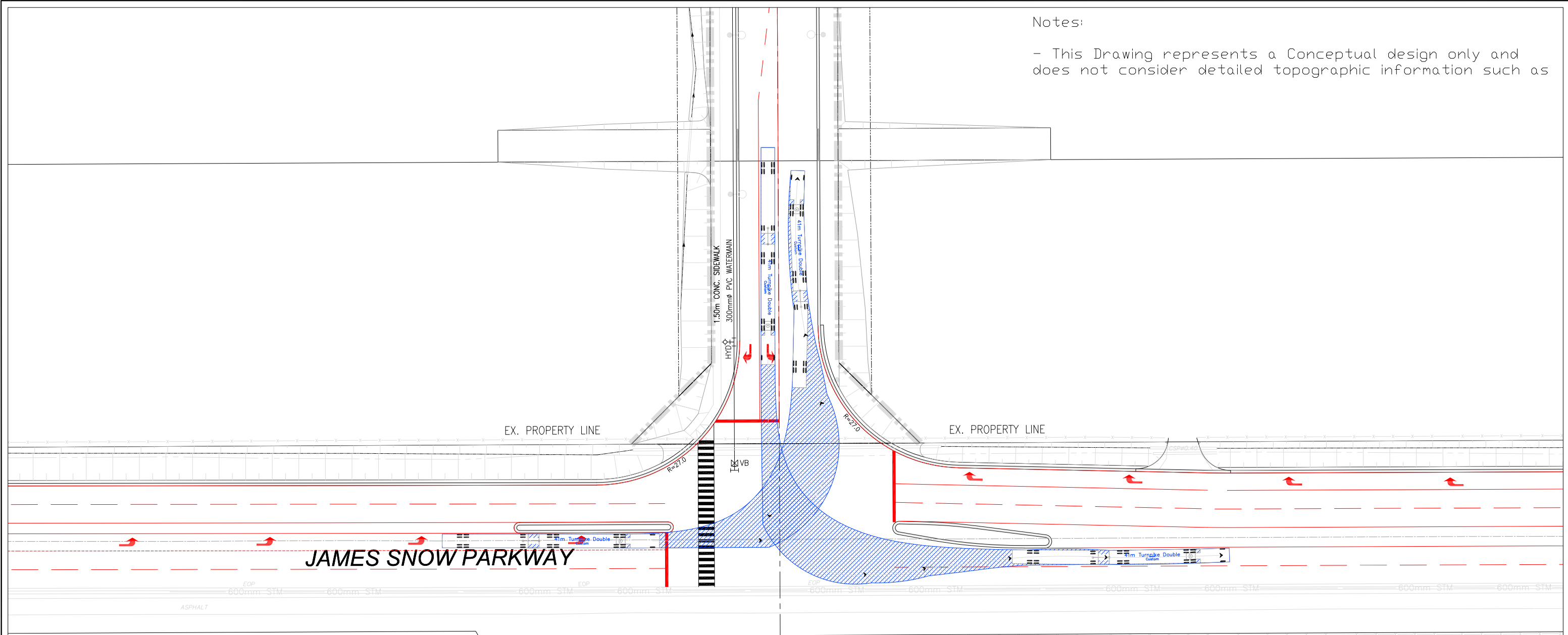
- 7.5. Hydro One may, at its sole discretion and with minimal or no notice, acting reasonably, interrupt the Proponent's occupation of the Hydro One corridor at any time during construction or post construction, to perform maintenance or emergency repairs. Hydro One will not be liable for any damages to the Proposal or any damages or losses of any kind suffered by the Proponent due to this interruption.
- 7.6. The Proponent is responsible for all other utility permits and permissions, which may be required for the Proposal. The Proponent must circulate plans for review to the various utilities for their review and comment.
- 7.7. All means and methods and safety during and prior to the work are the responsibility of the Proponent to manage at all times.

8. Prohibited Activities

- 8.1. Buildings are not permitted within any Hydro One transmission corridors. This absolute prohibition includes, but is not limited to, temporary structures such as tents and/or construction trailers.
- 8.2. Parking within any 500 kV corridor is not permitted for any vehicles.
- 8.3. No fill material is to be placed on the Hydro One corridor without prior written approval from Hydro One.
- 8.4. There shall be no storage of any material on the Hydro One corridor without prior written approval from Hydro One. Any debris found on the Hydro One corridor shall be removed on an ongoing basis once notified in writing by Hydro One, or by a duly appointed Hydro One representative on site, and at the Proponent's expense
- 8.5. There shall be no storage or tipping of garbage dumpsters on the Hydro One corridor.
- 8.6. There shall be no storage or dispensing of gasoline, or any other combustible substance, on the Hydro One corridor.
- 8.7. Burning of brush or other agricultural, or construction debris is strictly prohibited within the limits of any Hydro One corridor.
- 8.8. No stockpiling of snow on Hydro One corridor lands will be permitted. Ploughing of snow into tower bases is not permitted.
- 8.9. Any topsoil removed from site must be properly disposed of at an appropriate landfill and not redistributed within the Hydro One corridor boundary.

Notes:

- This Drawing represents a Conceptual design only and does not consider detailed topographic information such as



41m Turnpike Double

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 21.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

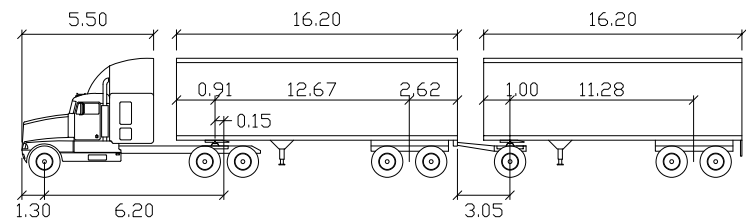
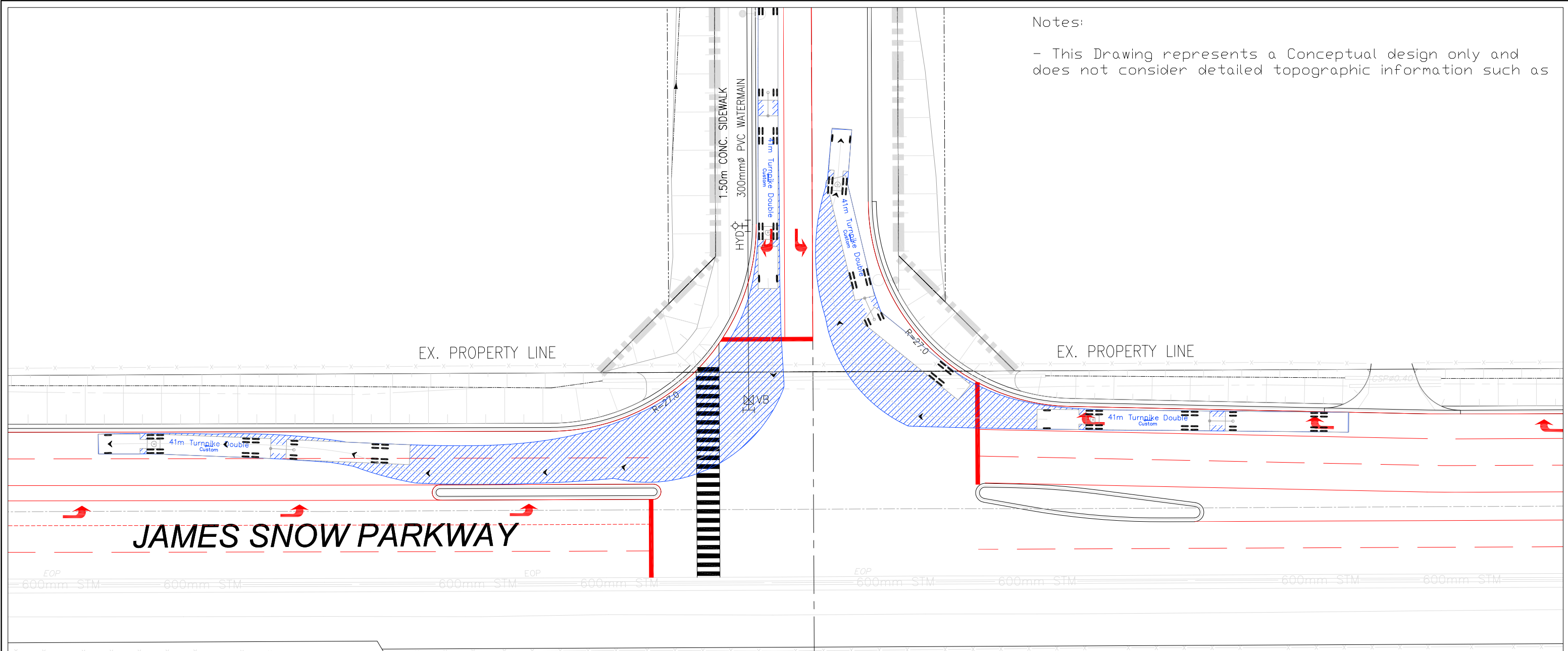


Orlando Milton North Business Park
 Swept Path Analysis - 41m Turnpike Double
 James Snow Parkway - East Site Access 2 - EBL and SBL

SCALE: N.T.S.
 DRAWING No. VMD - 01

Notes:

- This Drawing represents a Conceptual design only and does not consider detailed topographic information such as



41m Turnpike Double

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 21.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

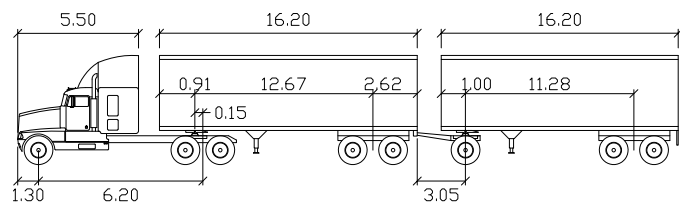
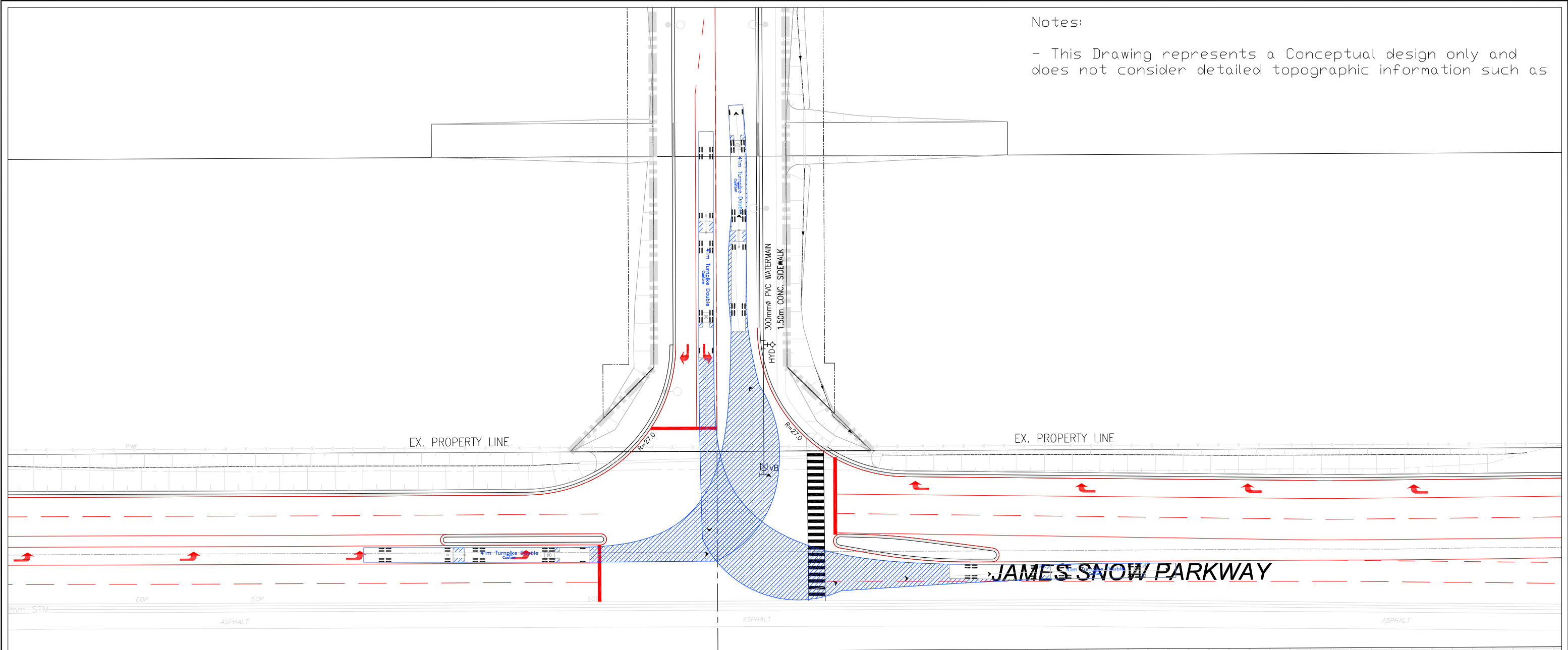


Orlando Milton North Business Park
Swept Path Analysis - 41m Turnpike Double
James Snow Parkway - East Site Access 2 - WBR and SBR

SCALE: N.T.S.
DRAWING No. VMD - 02

Notes:

- This Drawing represents a Conceptual design only and does not consider detailed topographic information such as

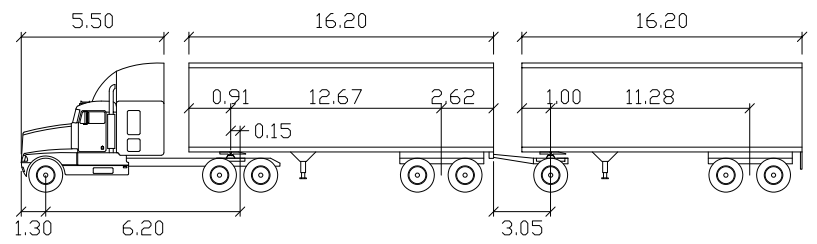
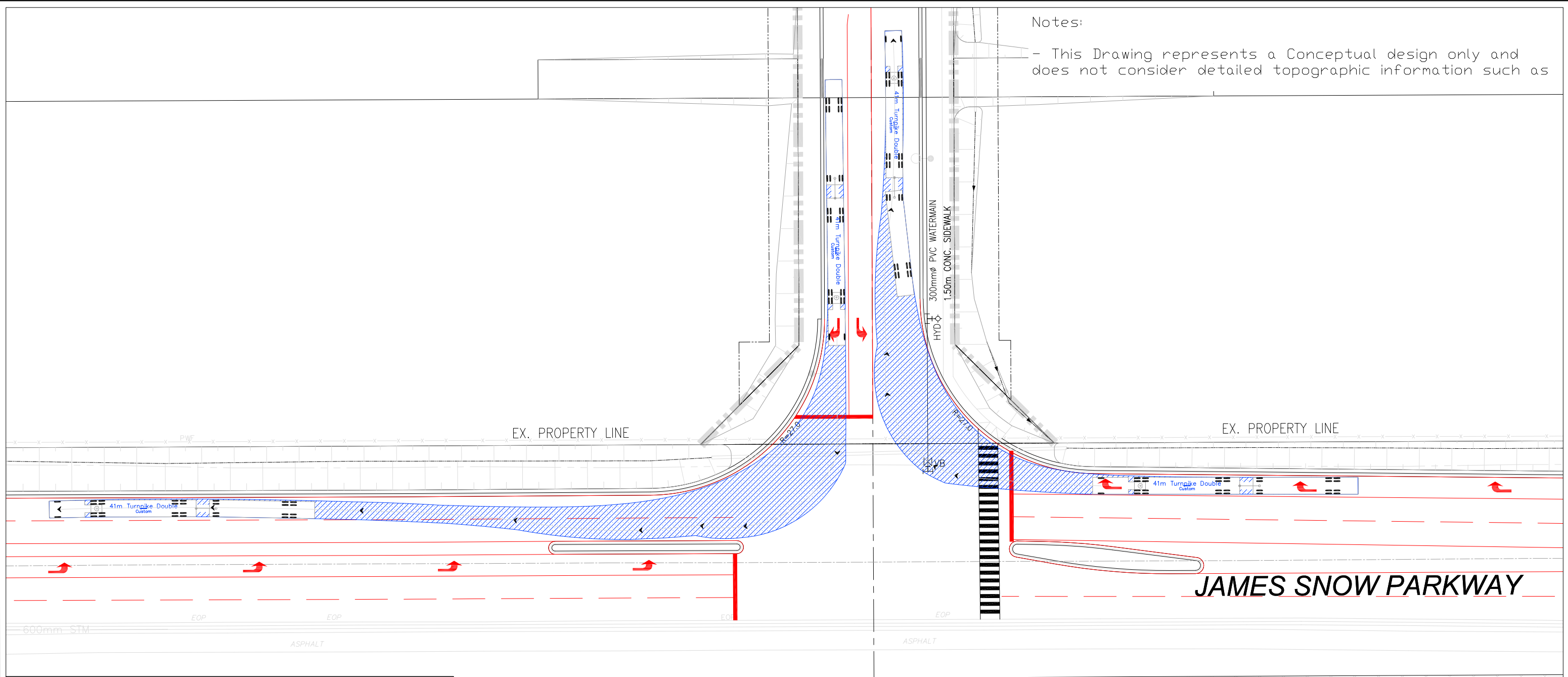


41m Turnpike Double

	Tractor Width	: 2.60	Lock to Lock Time	: 6.0
	Trailer Width	: 2.60	Steering Angle	: 21.0
	Tractor Track	: 2.60	Articulating Angle	: 70.0
	Trailer Track	: 2.60		

Notes:

- This Drawing represents a Conceptual design only and does not consider detailed topographic information such as



41m Turnpike Double

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 21.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

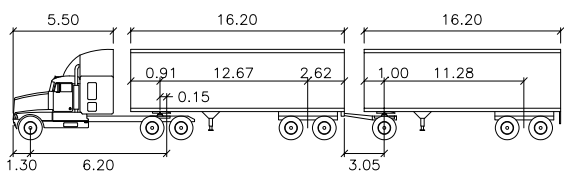
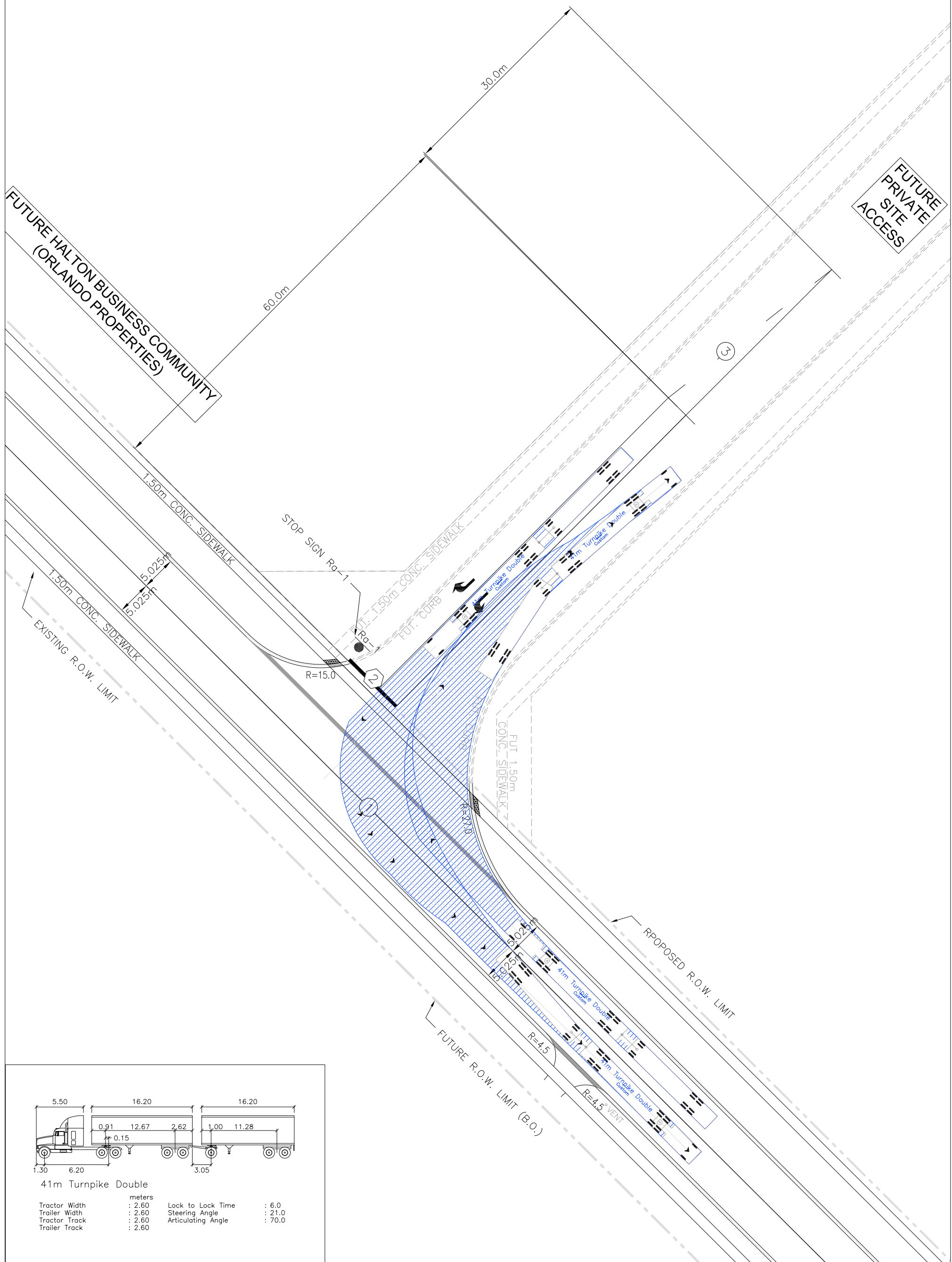


Orlando Milton North Business Park
 Swept Path Analysis - 41m Turnpike Double
 James Snow Parkway - East Site Access 3 - WBR and SBR

SCALE:	N.T.S.
DRAWING No.	VMD - 04

Notes:

- Boston Church Road Widening Design layout as per Town of Milton STD. E-5
- This Drawing represents a Conceptual design only and does not

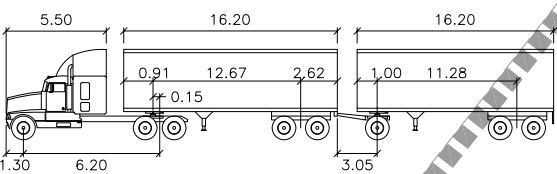
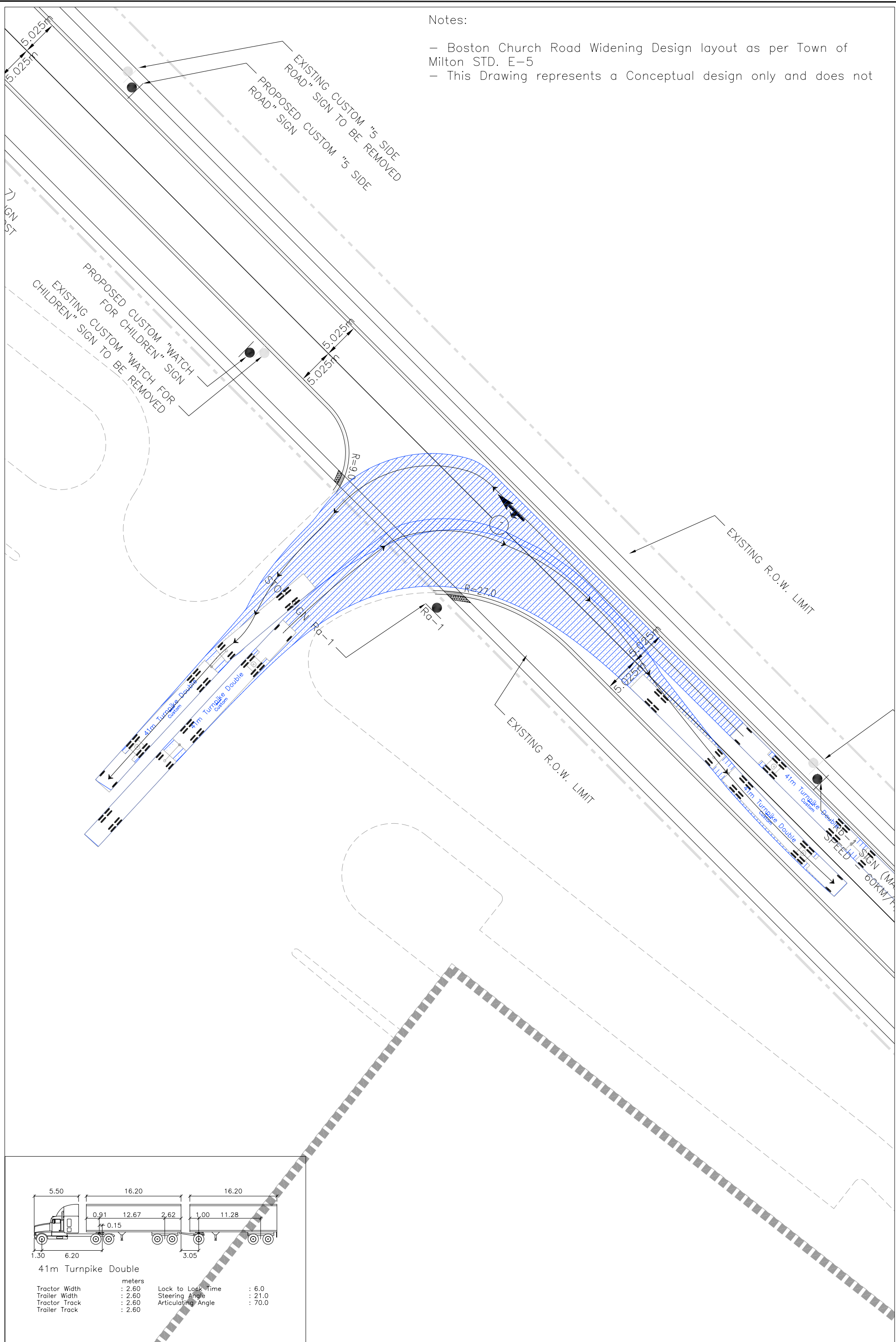


41m Turnpike Double

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 21.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

Notes:

- Boston Church Road Widening Design layout as per Town of Milton STD. E-5
- This Drawing represents a Conceptual design only and does not



41m Turnpike Double

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 21.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		



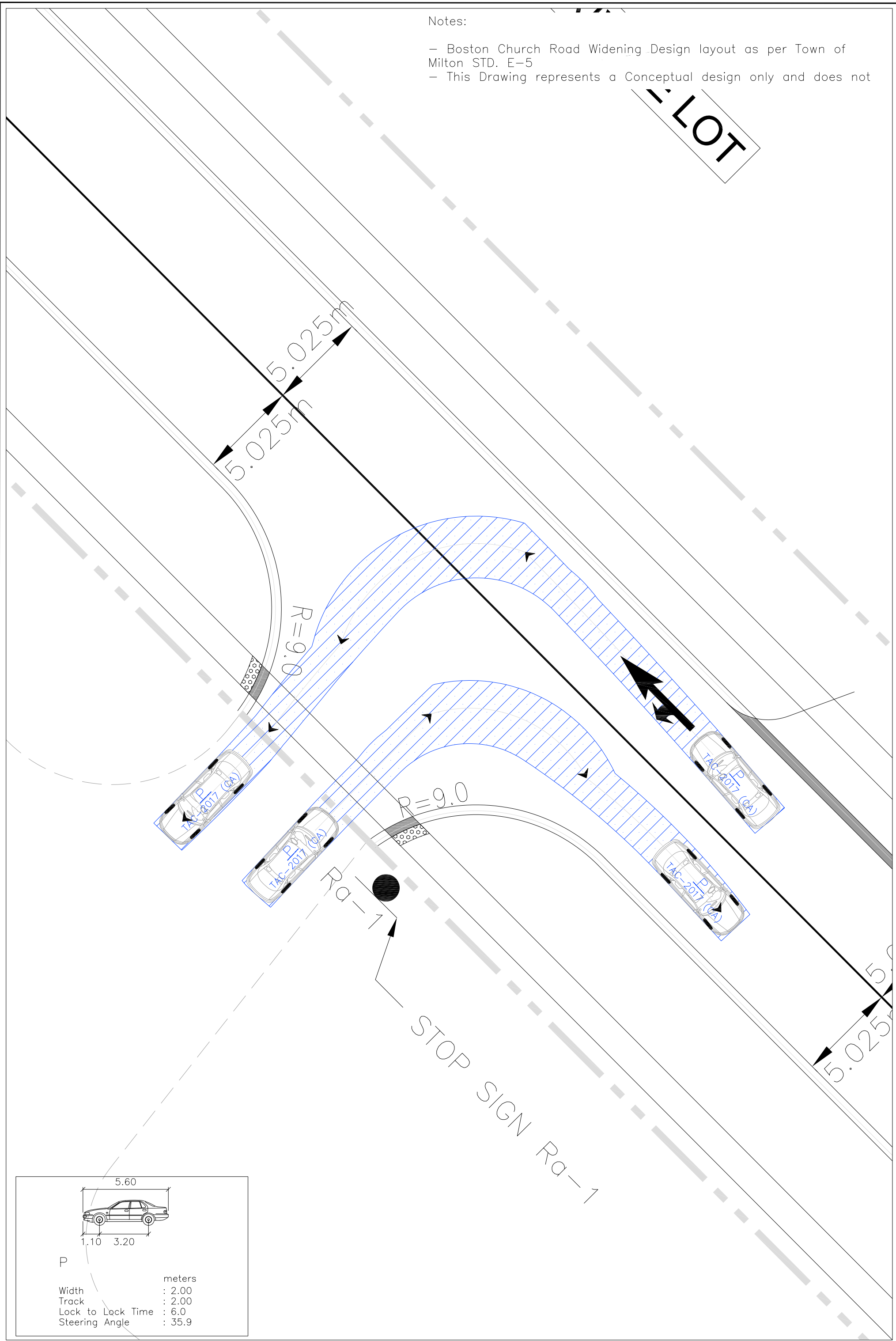
Orlando Milton North Business Park
Swept Path Analysis- 41m Turnpike Double
Boston Church Road - West Site Access 3

SCALE:	N.T.S
DRAWING No.	VMD-06

Notes:

- Boston Church Road Widening Design layout as per Town of Milton STD. E-5
- This Drawing represents a Conceptual design only and does not

LOT

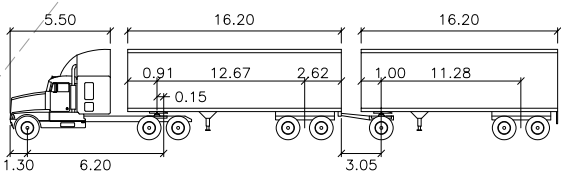
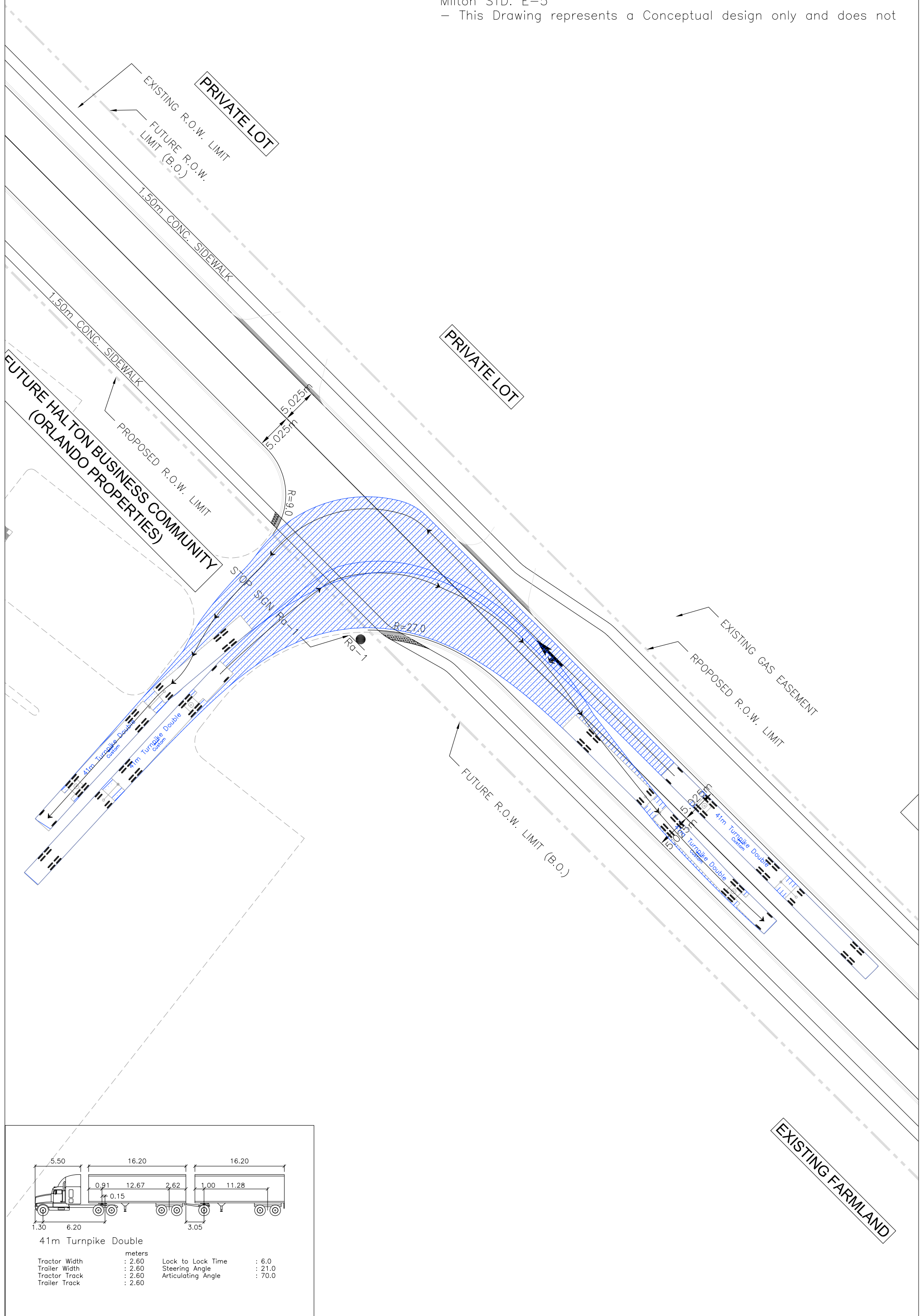


P

Width	: 2.00	meters
Track	: 2.00	
Lock to Lock Time	: 6.0	
Steering Angle	: 35.9	

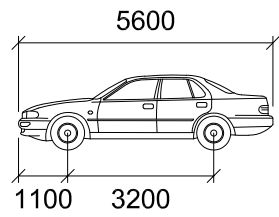
Notes:

- Boston Church Road Widening Design layout as per Town of Milton STD. E-5
- This Drawing represents a Conceptual design only and does not



41m Turnpike Double

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 21.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		



P

	mm
Width	: 2000
Track	: 2000
Lock to Lock Time	: 6.0
Steering Angle	: 35.9

Notes:

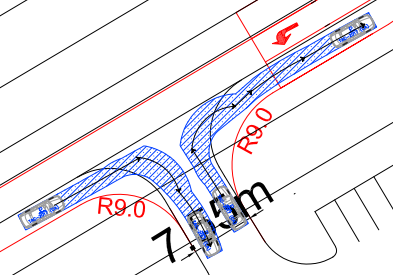
- This Drawing represents a Conceptual design only and does not consider detailed topographic information such as grading.

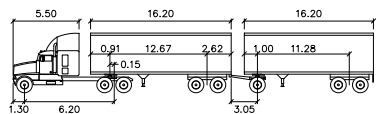
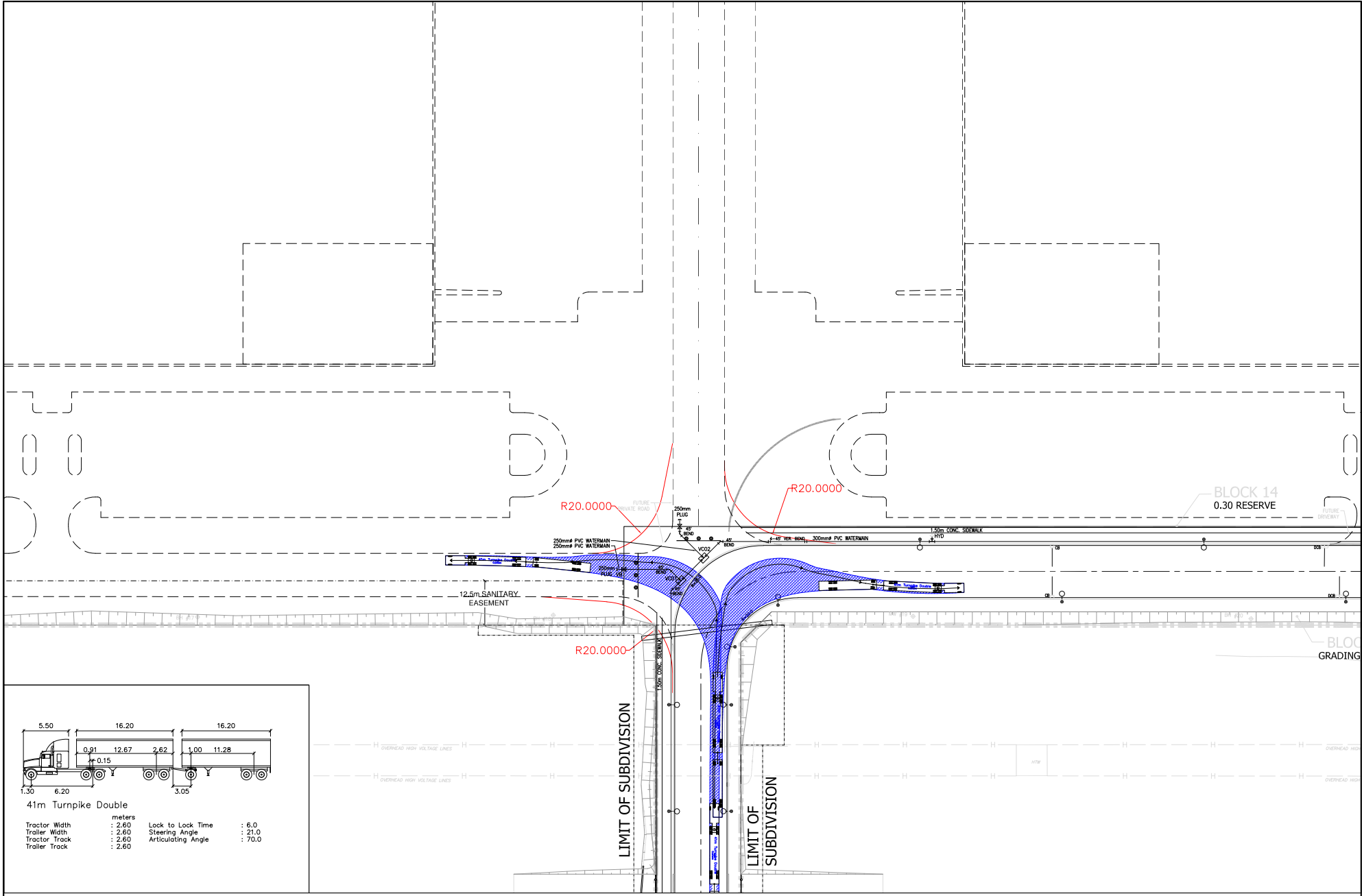
No. 5 SIDEROAD

1347'-0"

FUTURE OFFICE

PROPOSED BUILDING J
537,453 S.F.
931.02 m²





41m Turnpike Double

meters	
Tractor Width	: 2.60
Tractor Track	: 2.60
Trailer Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 21.0
Articulating Angle	: 70.0

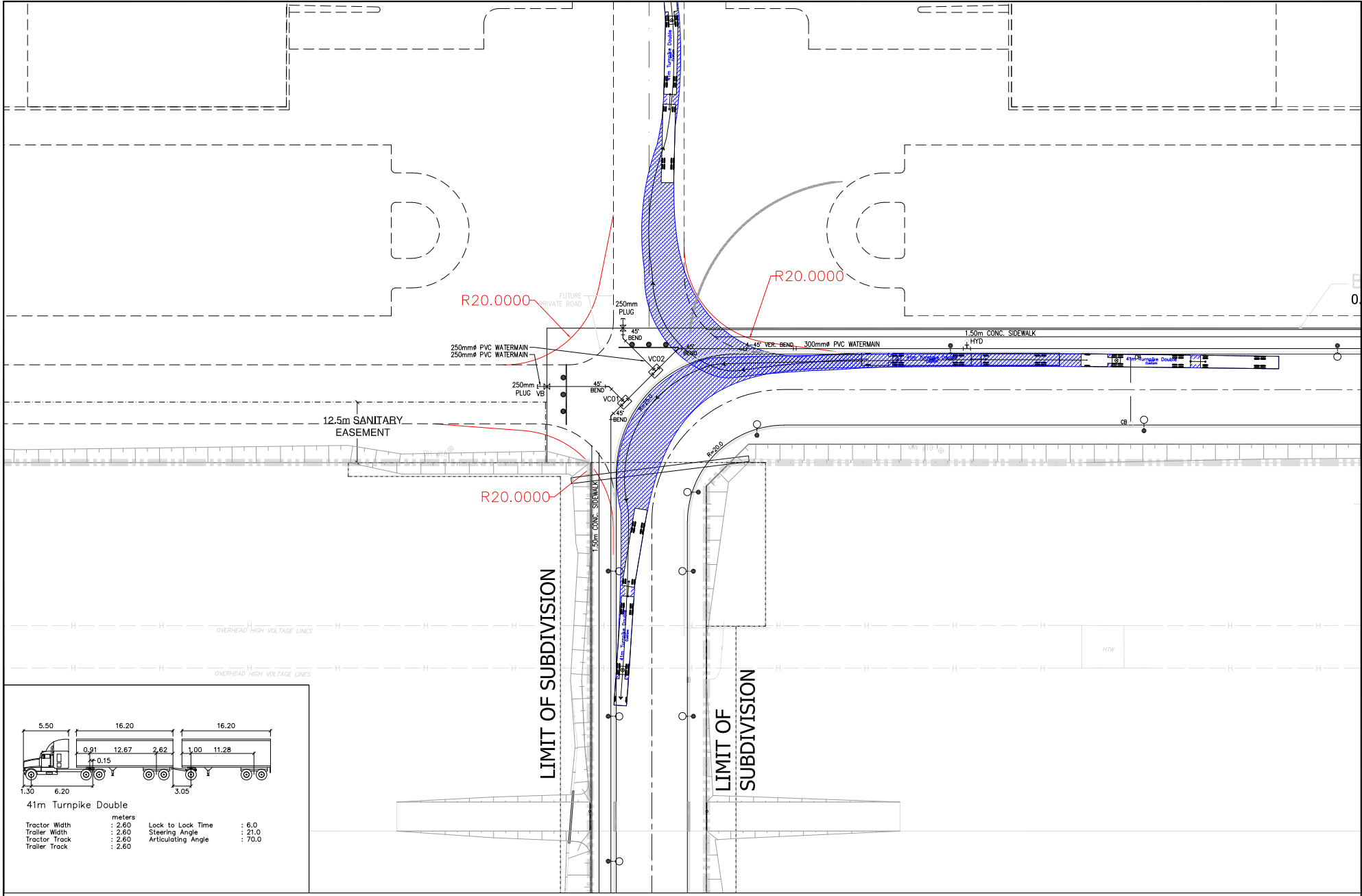
EAST PARCEL - PRIVATE ACCESS (SOUTH OF BUILDING B) - NORTHBOUND APPROACH



8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

41m TURNPIKE DOUBLE - TRUCK CIRCULATION
ORLANDO MILTON NORTH BUSINESS PARK

SCALE: N.T.S.	PROJECT No: 17197
DATE: DECEMBER 2023	FIGURE No: VMD-10



EAST PARCEL - PRIVATE ACCESS (SOUTH OF BUILDING B) - WESTBOUND APPROACH



8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

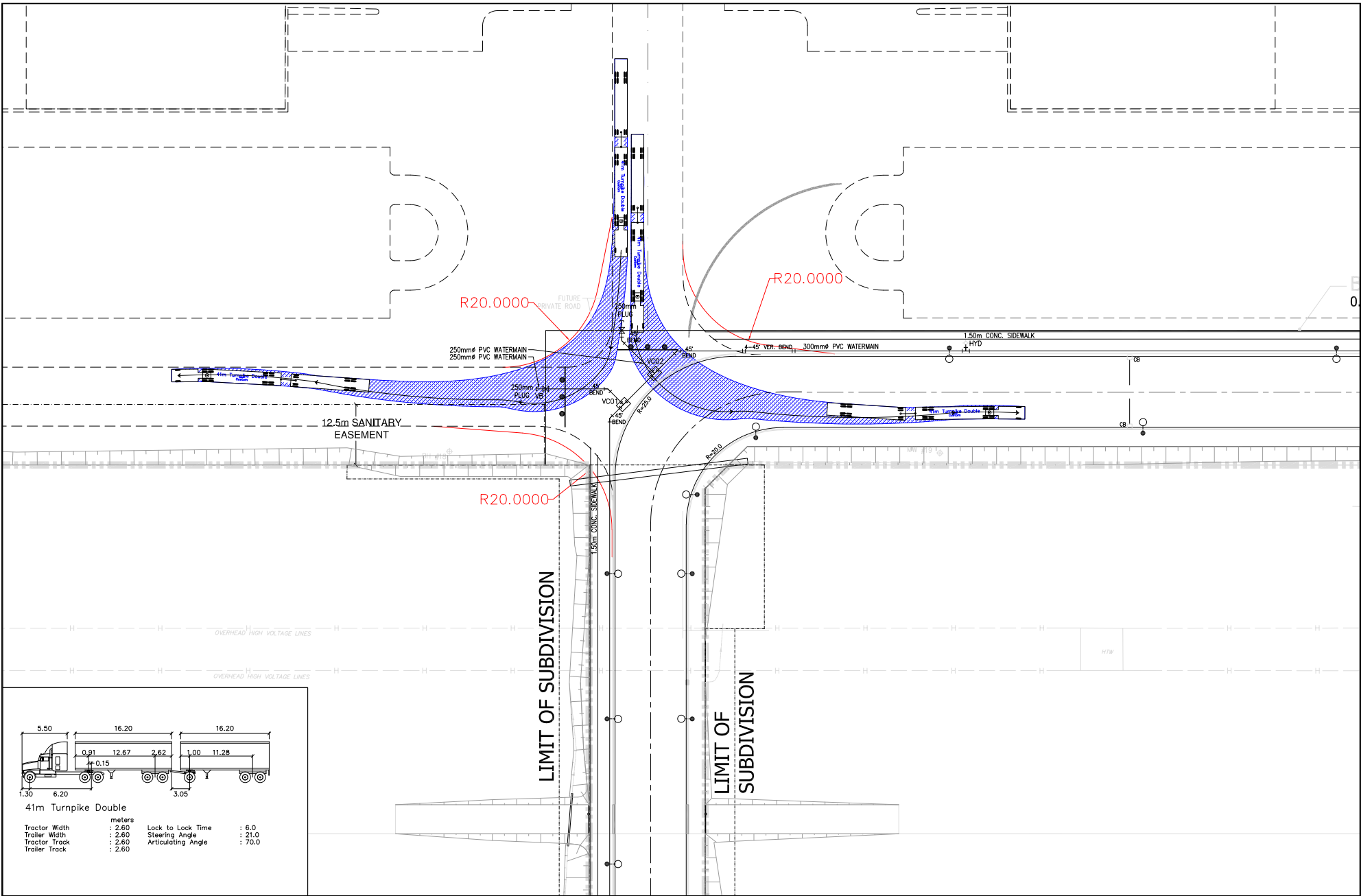
41m TURNPIKE DOUBLE - TRUCK CIRCULATION
ORLANDO MILTON NORTH BUSINESS PARK

SCALE: N.T.S.

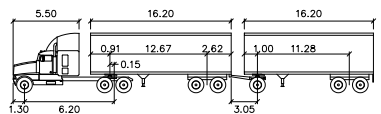
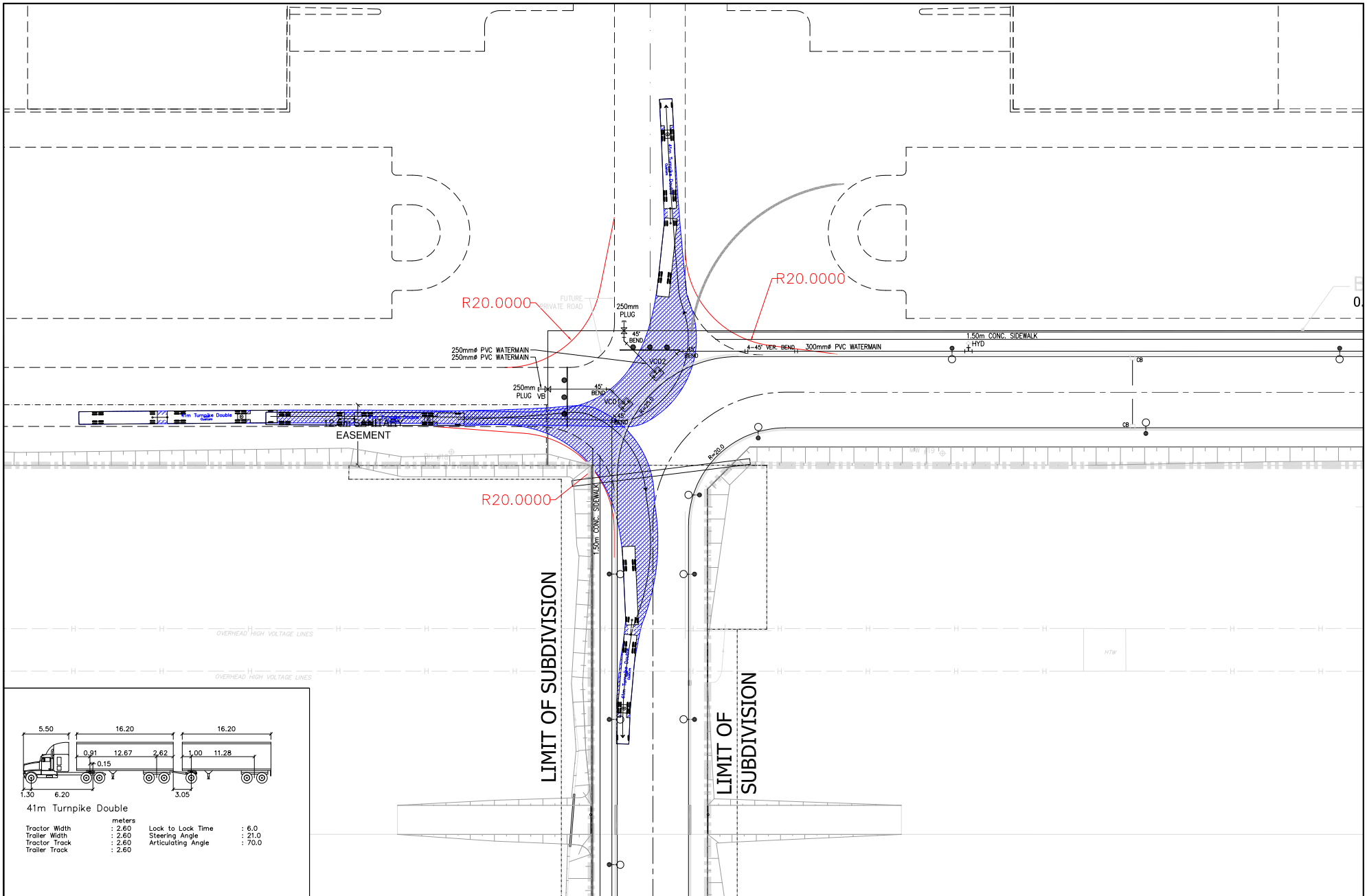
PROJECT No.
17197

DATE: DECEMBER 2023

FIGURE No.
VMD-11



EAST PARCEL - PRIVATE ACCESS (SOUTH OF BUILDING B) - SOUTHBOUND APPROACH



41m Turnpike Double

meters	
Tractor Width	: 2.60
Trailer Width	: 2.60
Tractor Track	: 2.60
Trailer Track	: 2.60
Lock to Lock Time	: 6.0
Steering Angle	: 21.0
Articulating Angle	: 70.0

EAST PARCEL - PRIVATE ACCESS (SOUTH OF BUILDING B) - EASTOUND APPROACH



8800 Dufferin Street,
Suite 200
Vaughan, ON
L4K 0C5
p: 905.738.5700

41m TURNPIKE DOUBLE - TRUCK CIRCULATION
ORLANDO MILTON NORTH BUSINESS PARK

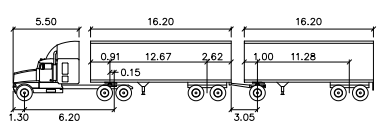
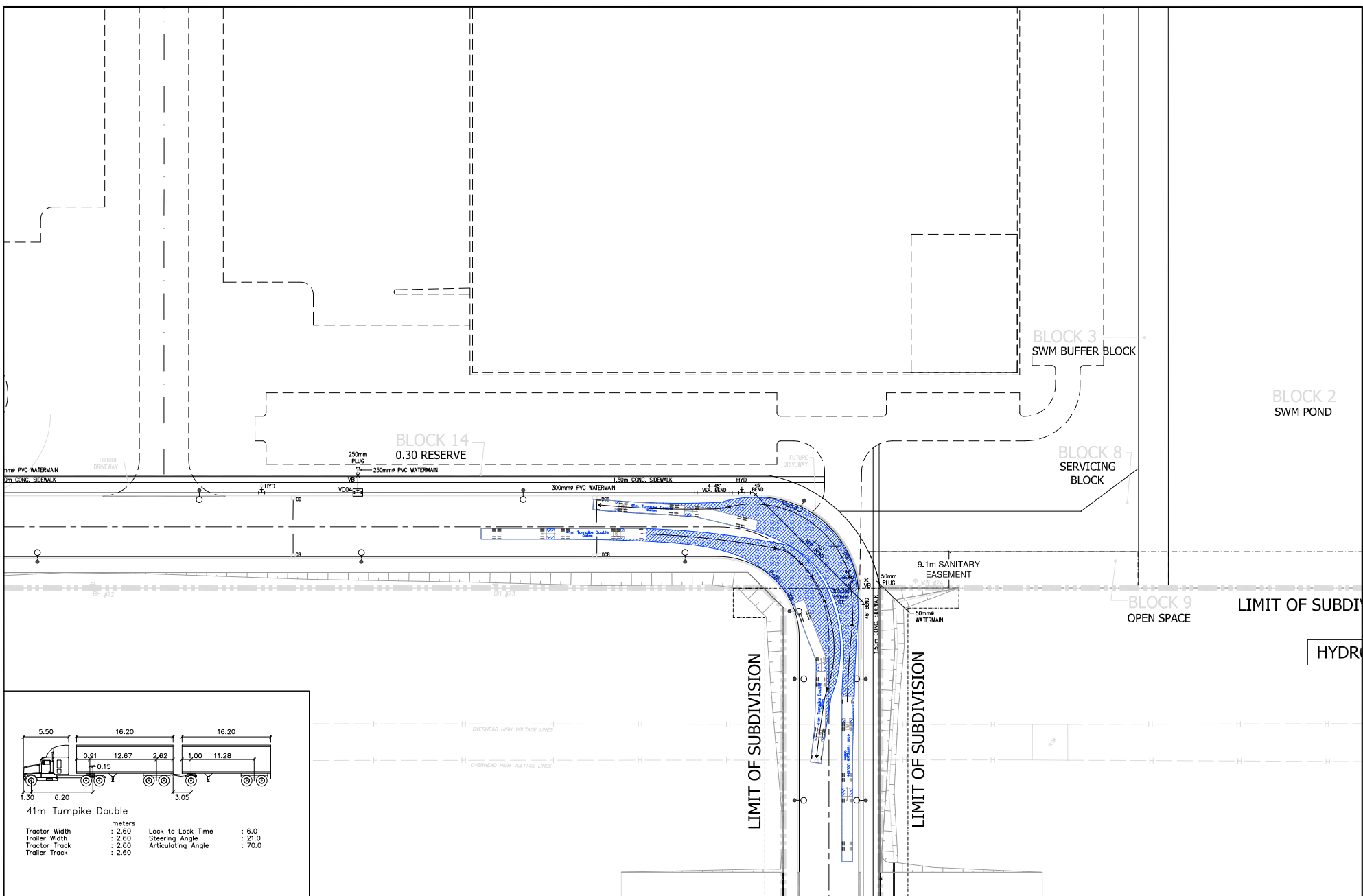
SCALE: N.T.S.

DATE: DECEMBER 2023

PROJECT No.
17197

FIGURE No.
VMD-13

G:\Projects\201717197 - Orlando - North Portal\9 - Transportation\03 TIS Update 20220916 3rd Sub\03 Analysis\03 Site Review & Circulation\Design

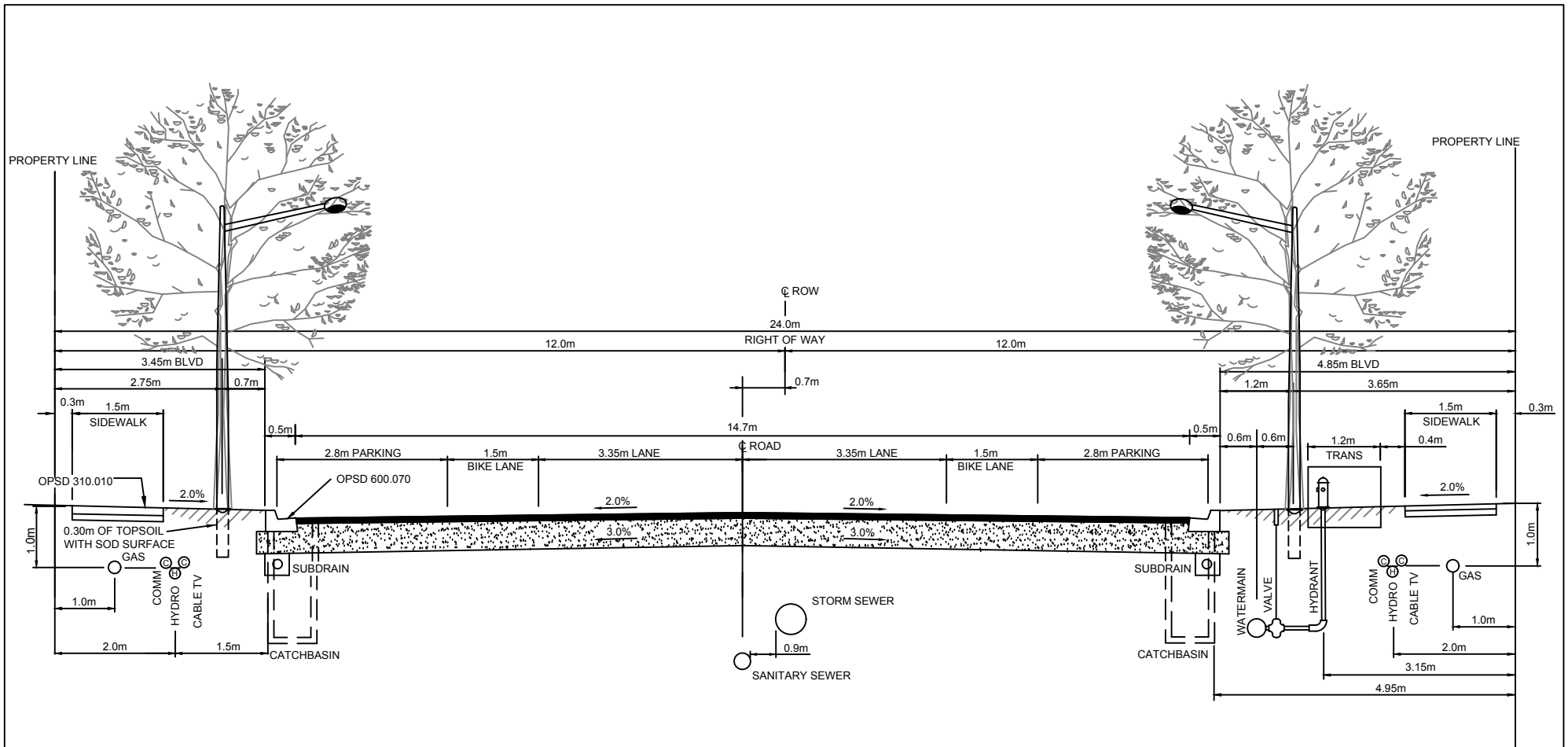


41m Turnpike Double

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Trailer Width	: 2.60	Steering Angle	: 21.0
Tractor Track	: 2.60	Articulating Angle	: 70.0
Trailer Track	: 2.60		

EAST PARCEL - PRIVATE ACCESS BEND (SOUTH OF BUILDING A) - IN AND OUT

Appendix C **Milton Cross Sections**



NOTE:

1. SINGLE AND DOUBLE LOADED REFERS TO BUILDINGS FRONTING THE R.O.W ON ONE OR BOTH SIDES, NOT TO SIDEWALK LOCATIONS.

MINIMUM ROAD STRUCTURE	
SURFACE COARSE	40mm HL3 High Stability
BINDER COARSE	100mm HL8
BASE	150mm 19mm LIMESTONE
SUB BASE	375mm GRANULAR 'B', TYPE II

TOWN OF MILTON

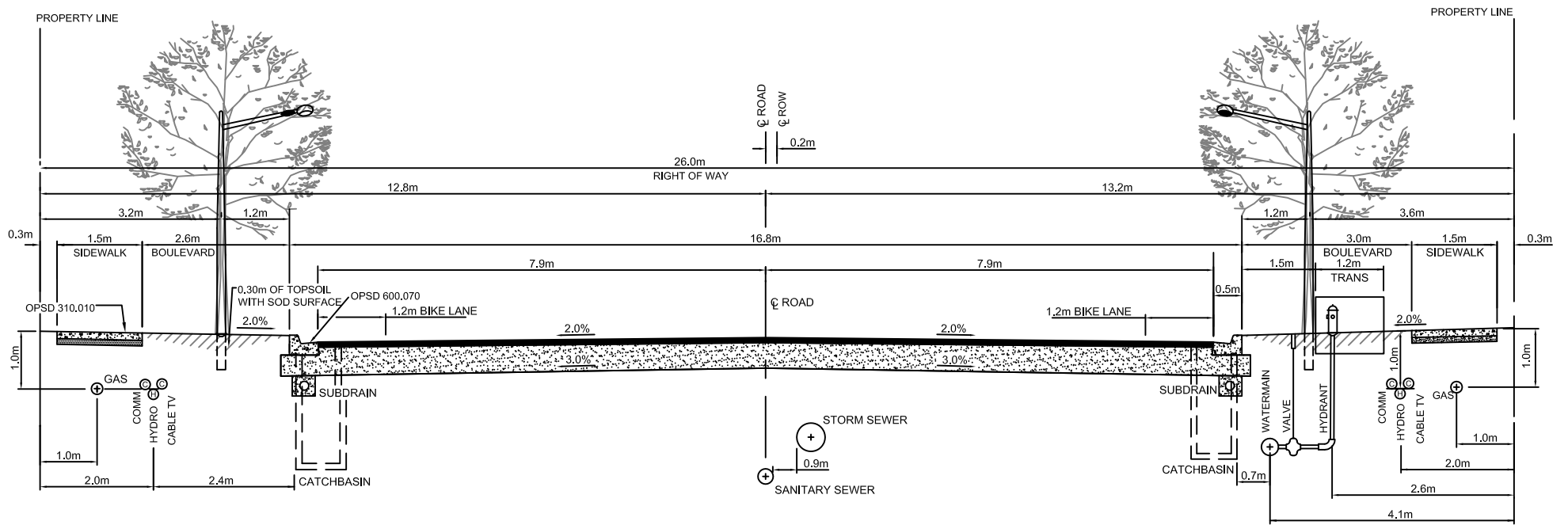
24m ROAD ALLOWANCE - MINOR COLLECTOR - SINGLE OR DOUBLE LOADED

SCALE: N.T.S.

DATE: MARCH 2017

STD. NO. E-4





NOTE:

1. CABLE AND BELL PEDESTALS TO BE ALIGNED WITH LIGHT STANDARDS
2. SIDEWALKS ARE TO BE PLACED ON BOTH SIDES OF THE R.O.W., UNLESS JUSTIFIED BY THE PEDESTRIAN ROUTING PLAN
3. CURB AND GUTTER PER OPSD 600.070
4. SINGLE AND DOUBLE LOADED REFERS TO BUILDINGS FRONTING THE R.O.W ON ONE OR BOTH SIDES, NOT TO SIDEWALK LOCATIONS.

MINIMUM ROAD STRUCTURE	
SURFACE COARSE	40mm HL3 HIGH STABILITY
BINDER COARSE	100mm HL8
BASE	150mm 19mm LIMESTONE
SUB BASE	375mm GRANULAR 'B', TYPE II

TOWN OF MILTON

26m ROAD ALLOWANCE - MAJOR COLLECTOR - SINGLE OR DOUBLE LOADED

SCALE: N.T.S.
 DATE: MARCH 2017
 STD. NO. E - 5



Appendix D Existing Traffic Data

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00
To: 10:00:00

One Hour Peak

From: 7:45:00
To: 8:45:00

Municipality: Milton
Site #: 1912000001
Intersection: James Snow Pkwy & Boston Church
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: James Snow Pkwy runs W/E

North Leg Total: 199
North Entering: 154
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	10	4	4	18
Cars	98	21	17	136
Totals	108	25	21	



Heavys	0
Trucks	8
Cars	37
Totals	45

East Leg Total: 731
East Entering: 198
East Peds: 0
Peds Cross: \times

Heavys	0
Trucks	65
Cars	241
Totals	306

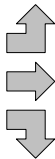


Boston Church Rd

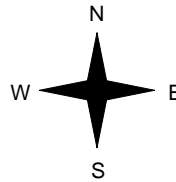
Cars	12	2	0	14
Trucks	133	37	0	170
Heavys	10	4	0	14
Totals	155	43	0	



Heavys	0
Trucks	6
Cars	22
Totals	28
Heavys	0
Trucks	90
Cars	411
Totals	501
Heavys	0
Trucks	23
Cars	104
Totals	127
Heavys	0
Trucks	119
Cars	537
Totals	656



James Snow Pkwy



James Snow Pkwy



Cars	431	102	0	533
Trucks				
Heavys				
Totals	533			

Peds Cross: \times
West Peds: 0
West Entering: 656
West Leg Total: 962

Cars	135	10	3	3	16
Trucks	31	18	0	8	26
Heavys	0	0	0	0	0
Totals	166	28	3	11	



Boston Church Rd



Peds Cross: \times
South Peds: 0
South Entering: 42
South Leg Total: 208

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00
To: 19:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00

Municipality: Milton
Site #: 1912000001
Intersection: James Snow Pkwy & Boston Church
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: James Snow Pkwy runs W/E

North Leg Total: 233
North Entering: 71
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	5	2	2	9
Cars	30	24	8	62
Totals	35	26	10	



Heavys	0
Trucks	19
Cars	143
Totals	162

East Leg Total: 606
East Entering: 317
East Peds: 0
Peds Cross: \times

Heavys	0	Trucks	81	Cars	365	Totals	446
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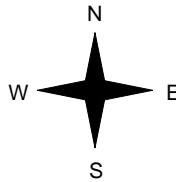


Boston Church Rd

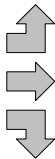
Cars	19	Trucks	3	Heavys	0	Totals	22
Cars	210	Trucks	56	Heavys	0	Totals	266
Cars	16	Trucks	13	Heavys	0	Totals	29
Totals	245	72	0				



James Snow Pkwy



Heavys	0	Trucks	8	Cars	93	Totals	101
Heavys	0	Trucks	51	Cars	200	Totals	251
Heavys	0	Trucks	32	Cars	41	Totals	73
Totals	0	91	334				



Boston Church Rd

James Snow Pkwy



Cars	219	Trucks	70	Heavys	0	Totals	289
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Peds Cross: \times
West Peds: 0
West Entering: 425
West Leg Total: 871

Cars	81	Cars	125	31	11	167
Trucks	47	Trucks	20	8	17	45
Heavys	0	Heavys	0	0	0	0
Totals	128	Totals	145	39	28	



Peds Cross: \times
South Peds: 0
South Entering: 212
South Leg Total: 340

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00
To: 10:00:00

One Hour Peak

From: 7:15:00
To: 8:15:00

Municipality: Milton
Site #: 1912000002
Intersection: 5 Sideroad & Boston Church Rd-3 L
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: 5 Sideroad runs W/E

North Leg Total: 121
North Entering: 98
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	3	6	3	12
Cars	21	61	4	86
Totals	24	67	7	



Heavys	0
Trucks	4
Cars	19
Totals	23

East Leg Total: 588
East Entering: 162
East Peds: 0
Peds Cross: \times

Heavys	0
Trucks	19
Cars	132
Totals	151

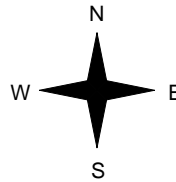


3 Line

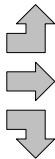
Cars	2	1	0	3
Trucks	104	15	0	119
Heavys	35	5	0	40
Totals	141	21	0	



5 Sideroad



Heavys	0
Trucks	1
Cars	7
Totals	8
Heavys	0
Trucks	53
Cars	349
Totals	402
Heavys	0
Trucks	7
Cars	19
Totals	26
Heavys	0
Trucks	61
Cars	375
Totals	436



5 Sideroad



Cars	368	58	0	426
Trucks				
Heavys				
Totals	426			

Boston Church Rd



Peds Cross: \times
West Peds: 0
West Entering: 436
West Leg Total: 587

Cars	115	7	10	15	32
Trucks	18	1	2	2	5
Heavys	0	0	0	0	0
Totals	133	8	12	17	



Peds Cross: \times
South Peds: 0
South Entering: 37
South Leg Total: 170

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00
To: 19:00:00

One Hour Peak

From: 16:15:00
To: 17:15:00

Municipality: Milton
Site #: 1912000002
Intersection: 5 Sideroad & Boston Church Rd-3 L
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: 5 Sideroad runs W/E

North Leg Total: 131
North Entering: 40
North Peds: 0
Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	1	4	0	5
Cars	5	25	5	35
Totals	6	29	5	



Heavys	0
Trucks	10
Cars	81
Totals	91

East Leg Total: 552
East Entering: 311
East Peds: 0
Peds Cross: \bowtie

Heavys	0
Trucks	57
Cars	252
Totals	309

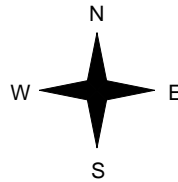


3 Line

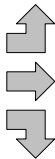
Cars	2	0	0	2
Trucks	230	50	0	280
Heavys	27	2	0	29
Totals	259	52	0	



5 Sideroad



Heavys	0
Trucks	5
Cars	18
Totals	23
Heavys	0
Trucks	25
Cars	137
Totals	162
Heavys	0
Trucks	3
Cars	8
Totals	11
Heavys	0
Trucks	33
Cars	163
Totals	



5 Sideroad



Cars	207	34	0	241
Trucks				
Heavys				
Totals				

Peds Cross: \bowtie
West Peds: 0
West Entering: 196
West Leg Total: 505

Cars	60	17	61	65	143
Trucks	9	6	5	9	20
Heavys	0	0	0	0	0
Totals	69	23	66	74	



Peds Cross: \bowtie
South Peds: 0
South Entering: 163
South Leg Total: 232

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00
To: 10:00:00

One Hour Peak

From: 7:30:00
To: 8:30:00

Municipality: Milton
Site #: 1912000003
Intersection: James Snow Pkwy & Esquesing Lir
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: James Snow Pkwy runs W/E

North Leg Total: 602
North Entering: 376
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	2	46	5	53
Cars	10	278	35	323
Totals	12	324	40	



Heavys	0
Trucks	23
Cars	203
Totals	226

East Leg Total: 586
East Entering: 205
East Peds: 0
Peds Cross: \times

Heavys	0	Trucks	45	Cars	159	Totals	204
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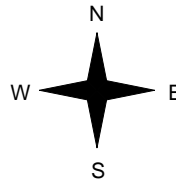


Esquesing Line

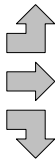
Cars	37	Trucks	2	Heavys	0	Totals	39
Cars	92	Trucks	36	Heavys	0	Totals	128
Cars	34	Trucks	4	Heavys	0	Totals	38
Totals	163	42	0				



James Snow Pkwy



Heavys	0	Trucks	3	Cars	14	Totals	17
Heavys	0	Trucks	72	Cars	263	Totals	335
Heavys	0	Trucks	25	Cars	116	Totals	141
Totals	0	100	393				



James Snow Pkwy



Cars	303	Trucks	78	Heavys	0	Totals	381
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Peds Cross: \times
West Peds: 0
West Entering: 493
West Leg Total: 697

Cars	428	Cars	57	152	5	Totals	214
Trucks	75	Trucks	7	18	1	Totals	26
Heavys	0	Heavys	0	0	0	Totals	0
Totals	503	Totals	64	170	6		



Esquesing Line



Peds Cross: \times
South Peds: 0
South Entering: 240
South Leg Total: 743

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00
To: 19:00:00

One Hour Peak

From: 16:30:00
To: 17:30:00

Municipality: Milton
Site #: 1912000003
Intersection: James Snow Pkwy & Esquesing Lir
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: James Snow Pkwy runs W/E

North Leg Total: 529
North Entering: 172
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	1	22	5	28
Cars	7	115	22	144
Totals	8	137	27	



Heavys	0
Trucks	43
Cars	314
Totals	357

East Leg Total: 540
East Entering: 270
East Peds: 0
Peds Cross: \times

Heavys	0
Trucks	76
Cars	251
Totals	327

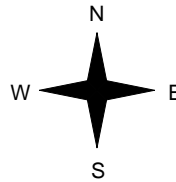


Esquesing Line

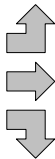
Cars	45	2	0	47
Trucks	157	57	0	214
Heavys	9	0	0	9
Totals	211	59	0	



James Snow Pkwy



Heavys	0
Trucks	3
Cars	7
Totals	10
Heavys	0
Trucks	54
Cars	159
Totals	213
Heavys	0
Trucks	6
Cars	69
Totals	75
Heavys	0
Trucks	63
Cars	235
Totals	298



James Snow Pkwy



Cars	209	61	0	270
Trucks				
Heavys				
Totals				

Esquesing Line



Peds Cross: \times
West Peds: 0
West Entering: 298
West Leg Total: 625

Cars	193	87	262	28	377
Trucks	28	18	38	2	58
Heavys	0	0	0	0	0
Totals	221	105	300	30	



Peds Cross: \times
South Peds: 0
South Entering: 435
South Leg Total: 656

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00
To: 10:00:00

One Hour Peak

From: 7:30:00
To: 8:30:00

Municipality: Milton
Site #: 1912000004
Intersection: 5 Sideroad & Esquesing Line-Fourth
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: 5 Sideroad runs W/E

North Leg Total: 494
North Entering: 380
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	3	44	9	56
Cars	22	248	54	324
Totals	25	292	63	



Heavys	0
Trucks	16
Cars	98
Totals	114

East Leg Total: 792
East Entering: 217
East Peds: 0
Peds Cross: \times

Heavys	0
Trucks	21
Cars	148
Totals	169

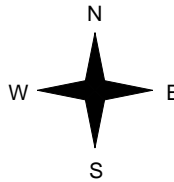


Fourth Line

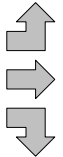
Cars	2	1	0	3
Trucks	117	17	0	134
Heavys	72	8	0	80
Totals	191	26	0	



5 Sideroad



Heavys	0
Trucks	3
Cars	4
Totals	7
Heavys	0
Trucks	48
Cars	354
Totals	402
Heavys	0
Trucks	1
Cars	15
Totals	16



5 Sideroad



Peds Cross: \times
West Peds: 0
West Entering: 425
West Leg Total: 594

Cars	335	9	92	103	204
Trucks	53	1	12	7	20
Heavys	0	0	0	0	0
Totals	388	10	104	110	



Esquesing Line



Peds Cross: \times
South Peds: 0
South Entering: 224
South Leg Total: 612

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 19:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Milton
Site #: 1912000004
Intersection: 5 Sideroad & Esquesing Line-Fourth
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: 5 Sideroad runs W/E

North Leg Total: 452
 North Entering: 147
 North Peds: 0
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	8	19	1	28
Cars	31	85	3	119
Totals	39	104	4	



Heavys	0
Trucks	38
Cars	267
Totals	305

East Leg Total: 621
 East Entering: 337
 East Peds: 0
 Peds Cross: \times

Heavys	0
Trucks	53
Cars	263
Totals	316

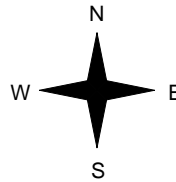


Fourth Line

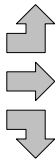
Cars	16	2	0	18
Trucks	218	36	0	254
Heavys	59	6	0	65
Totals	293	44	0	



5 Sideroad



Heavys	0
Trucks	9
Cars	21
Totals	30
Heavys	0
Trucks	23
Cars	179
Totals	202
Heavys	0
Trucks	3
Cars	8
Totals	11
Heavys	0
Trucks	35
Cars	208
Totals	208



5 Sideroad



Peds Cross: \times
 West Peds: 0
 West Entering: 243
 West Leg Total: 559

Cars	152	14	230	71	315
Trucks	28	9	27	7	43
Heavys	0	0	0	0	0
Totals	180	23	257	78	



Esquesing Line



Cars	253	31	0	284
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Peds Cross: \times
 South Peds: 0
 South Entering: 358
 South Leg Total: 538

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00
To: 10:00:00

One Hour Peak

From: 7:45:00
To: 8:45:00

Municipality: Toronto
Site #: 1912000005
Intersection: RR 25 & James Snow Pkwy
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: RR 25 runs N/S

North Leg Total: 1179
North Entering: 656
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	16	100	55	171
Cars	16	293	176	485
Totals	32	393	231	



Heavys	0
Trucks	146
Cars	377
Totals	523

East Leg Total: 907
East Entering: 216
East Peds: 1
Peds Cross: \times

Heavys	0	Trucks	69	Cars	250	Totals	319
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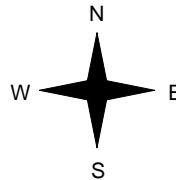


RR 25

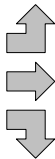
Cars	39	Trucks	23	Heavys	0	Totals	62
Cars	77	Trucks	15	Heavys	0	Totals	92
Cars	34	Trucks	28	Heavys	0	Totals	62
Totals	150	Totals	66	Totals	0	Totals	



James Snow Pkwy



Heavys	0	Trucks	6	Cars	6	Totals	12
Heavys	0	Trucks	15	Cars	27	Totals	42
Heavys	0	Trucks	19	Cars	21	Totals	40
Heavys	0	Trucks	40	Cars	54	Totals	



RR 25

James Snow Pkwy



Cars	570	Trucks	121	Heavys	0	Totals	691
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Peds Cross: \times
West Peds: 0
West Entering: 94
West Leg Total: 413

Cars	348
Trucks	147
Heavys	0
Totals	495



Cars	157	332	367	856
Trucks	38	117	51	206
Heavys	0	0	0	0
Totals	195	449	418	

Peds Cross: \times
South Peds: 0
South Entering: 1062
South Leg Total: 1557

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00
To: 19:00:00

One Hour Peak

From: 16:30:00
To: 17:30:00

Municipality: Toronto
Site #: 1912000005
Intersection: RR 25 & James Snow Pkwy
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: RR 25 runs N/S

North Leg Total: 1497
North Entering: 537
North Peds: 0
Peds Cross: \bowtie

Heavys	0	0	0	0
Trucks	3	82	31	116
Cars	2	318	101	421
Totals	5	400	132	



Heavys 0
Trucks 173
Cars 787
Totals 960

East Leg Total: 891
East Entering: 474
East Peds: 2
Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
0	63	101	164

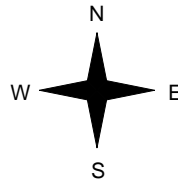


RR 25

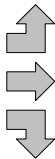
Cars	Trucks	Heavys	Totals
180	38	0	218
57	24	0	81
143	32	0	175
380	94	0	



James Snow Pkwy



Heavys	Trucks	Cars	Totals
0	6	24	30
0	10	132	142
0	28	134	162
0	44	290	



James Snow Pkwy



Peds Cross: \bowtie
West Peds: 0
West Entering: 334
West Leg Total: 498

Cars	595	Cars	42	583	116	741
Trucks	142	Trucks	36	129	27	192
Heavys	0	Heavys	0	0	0	0
Totals	737	Totals	78	712	143	



RR 25



Peds Cross: \bowtie
South Peds: 0
South Entering: 933
South Leg Total: 1670

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00
To: 10:00:00

One Hour Peak

From: 7:15:00
To: 8:15:00

Municipality: Milton
Site #: 1912000006
Intersection: RR 25 & 5 Sideroad
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: RR 25 runs N/S

North Leg Total: 956
North Entering: 607
North Peds: 0
Peds Cross: \times

Heavys	0	0	0	0
Trucks	10	79	12	101
Cars	59	371	76	506
Totals	69	450	88	



Heavys	0
Trucks	77
Cars	272
Totals	349

East Leg Total: 613
East Entering: 147
East Peds: 0
Peds Cross: \times

Heavys	0
Trucks	65
Cars	167
Totals	232



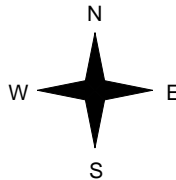
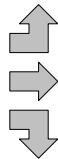
RR 25

Cars	7	2	0	9
Trucks	64	13	0	77
Heavys	39	22	0	61
Totals	110	37	0	



5 Sideroad

Heavys	0
Trucks	11
Cars	68
Totals	79
Heavys	0
Trucks	29
Cars	248
Totals	277
Heavys	0
Trucks	56
Cars	181
Totals	237



Peds Cross: \times
West Peds: 0
West Entering: 593
West Leg Total: 825

Cars	591
Trucks	157
Heavys	0
Totals	748



RR 25

Cars	44	197	79	320
Trucks	42	64	22	128
Heavys	0	0	0	0
Totals	86	261	101	

Cars	403
Trucks	63
Heavys	0
Totals	466

Peds Cross: \times
South Peds: 0
South Entering: 448
South Leg Total: 1196

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 19:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Milton
Site #: 1912000006
Intersection: RR 25 & 5 Sideroad
TFR File #: 1
Count date: 16-Apr-19

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: RR 25 runs N/S

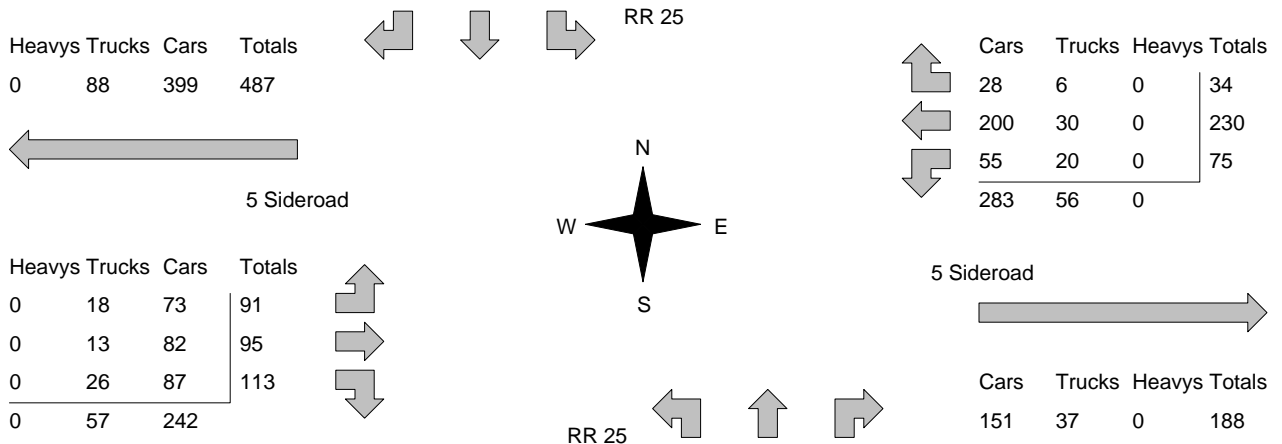
North Leg Total: 1071
 North Entering: 343
 North Peds: 0
 Peds Cross: \times

Heavys	0	0	0	0
Trucks	11	40	1	52
Cars	55	230	6	291
Totals	66	270	7	



Heavys	0
Trucks	124
Cars	604
Totals	728

East Leg Total: 527
 East Entering: 339
 East Peds: 0
 Peds Cross: \times



Peds Cross: \times
 West Peds: 1
 West Entering: 299
 West Leg Total: 786

Cars 372
 Trucks 86
 Heavys 0
Totals 458

Cars 144
 Trucks 47
 Heavys 0
Totals 191

Cars 503
 Trucks 100
 Heavys 0
Totals 603

Cars 63
 Trucks 23
 Heavys 0
Totals 86

Peds Cross: \times
 South Peds: 0
 South Entering: 880
 South Leg Total: 1338

Comments

Ontario Traffic Inc.

Morning Peak Diagram

Specified Period

From: 6:30:00

To: 9:30:00

One Hour Peak

From: 6:30:00

To: 7:30:00

Municipality: Milton
Site #: 1836800001
Intersection: Mount Pleasant Way & 8500 Mount
TFR File #: 1
Count date: 23-Oct-18

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Mount Pleasant Way runs N/S

North Leg Total: 16
 North Entering: 11
 North Peds: 0
 Peds Cross: \times

Heavys	0	4	4
Trucks	1	0	1
Cars	1	5	6
Totals	2	9	



Heavys	0
Trucks	2
Cars	3
Totals	5

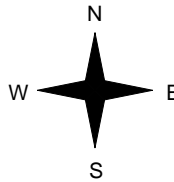
Heavys	Trucks	Cars	Totals
0	1	1	2



Mount Pleasant Way



Mount Pleasant Way



Heavys	Trucks	Cars	Totals
0	1	0	1
0	0	0	0
0	1	0	



8500 Mount Pleasant Way



Peds Cross: \times
 West Peds: 0
 West Entering: 1
 West Leg Total: 3

Cars	5
Trucks	0
Heavys	4
Totals	9



Cars	0	3	3
Trucks	0	1	1
Heavys	0	0	0
Totals	0	4	

Peds Cross: \times
 South Peds: 0
 South Entering: 4
 South Leg Total: 13

Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 19:00:00

One Hour Peak

From: 16:00:00

To: 17:00:00

Municipality: Milton
Site #: 1836800001
Intersection: Mount Pleasant Way & 8500 Mount
TFR File #: 1
Count date: 23-Oct-18

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Mount Pleasant Way runs N/S

North Leg Total: 31

North Entering: 13

North Peds: 0

Peds Cross: ∇

Heavys	1	5	6
Trucks	1	0	1
Cars	0	6	6
Totals	2	11	



Heavys	4
Trucks	2
Cars	12
Totals	18

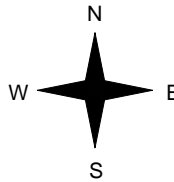
Heavys	Trucks	Cars	Totals
1	1	0	2



Mount Pleasant Way



Mount Pleasant Way



Heavys	Trucks	Cars	Totals
1	2	0	3
0	0	0	0
1	2	0	



8500 Mount Pleasant Way



Peds Cross: ∇

West Peds: 0

West Entering: 3

West Leg Total: 5

Cars	6
Trucks	0
Heavys	5
Totals	11



Cars	0	12	12
Trucks	0	0	0
Heavys	0	3	3
Totals	0	15	

Peds Cross: ∇

South Peds: 0

South Entering: 15

South Leg Total: 26

Comments

Ontario Traffic Inc.

Total Count Diagram

Municipality: Milton
Site #: 1836800001
Intersection: Mount Pleasant Way & 8500 Mount
TFR File #: 1
Count date: 23-Oct-18

Weather conditions:
Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Mount Pleasant Way runs N/S

North Leg Total: 88
 North Entering: 47
 North Peds: 0
 Peds Cross: ∇

Heavys	3	17	20
Trucks	6	0	6
Cars	4	17	21
Totals	13	34	



Heavys	12
Trucks	5
Cars	24
Totals	41

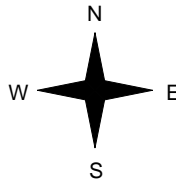
Heavys	3	6	4	Totals	
					13



Mount Pleasant Way



Mount Pleasant Way



Heavys	1	4	1	Totals	
					6
0	0	1			1
					1
					1



8500 Mount Pleasant Way



Peds Cross: ∇
 West Peds: 0
 West Entering: 7
 West Leg Total: 20

Cars	18	23
Trucks	0	1
Heavys	17	11
Totals	35	



Cars	0	23	23
Trucks	0	1	1
Heavys	0	11	11
Totals	0	35	

Peds Cross: ∇
 South Peds: 0
 South Entering: 35
 South Leg Total: 70

Comments

Ontario Traffic Inc. Traffic Count Summary

Intersection: Mount Pleasant Way & 8500 Moun													Count Date: 23-Oct-18		Municipality: Milton	
North Approach Totals						North/South Total Approaches	South Approach Totals									
Includes Cars, Trucks, & Heavys					Total Peds		Includes Cars, Trucks, & Heavys					Total Peds				
Hour Ending	Left	Thru	Right	Grand Total			Hour Ending	Left	Thru	Right	Grand Total					
7:00:00	0	4	1	5	0	6	7:00:00	0	1	0	1	0				
8:00:00	0	7	1	8	0	13	8:00:00	0	5	0	5	0				
9:00:00	0	1	4	5	0	11	9:00:00	0	6	0	6	0				
16:00:00	0	3	1	4	0	4	16:00:00	0	0	0	0	0				
17:00:00	0	11	2	13	0	28	17:00:00	0	15	0	15	0				
18:00:00	0	3	1	4	0	10	18:00:00	0	6	0	6	0				
19:00:00	0	5	3	8	0	10	19:00:00	0	2	0	2	0				
Totals:	0	34	13	47	0	82		0	35	0	35	0				
East Approach Totals						East/West Total Approaches	West Approach Totals									
Includes Cars, Trucks, & Heavys					Total Peds		Includes Cars, Trucks, & Heavys					Total Peds				
Hour Ending	Left	Thru	Right	Grand Total			Hour Ending	Left	Thru	Right	Grand Total					
7:00:00	0	0	0	0	0	1	7:00:00	1	0	0	1	0				
8:00:00	0	0	0	0	0	0	8:00:00	0	0	0	0	0				
9:00:00	0	0	0	0	0	0	9:00:00	0	0	0	0	0				
16:00:00	0	0	0	0	0	1	16:00:00	1	0	0	1	0				
17:00:00	0	0	0	0	0	3	17:00:00	3	0	0	3	0				
18:00:00	0	0	0	0	0	1	18:00:00	1	0	0	1	0				
19:00:00	0	0	0	0	0	1	19:00:00	0	0	1	1	0				
Totals:	0	0	0	0	0	7		6	0	1	7	0				
Calculated Values for Traffic Crossing Major Street																
Hours Ending:	7:00	8:00	9:00	16:00		17:00	18:00	19:00	19:00							
Crossing Values:	1	0	0	1		3	1	0	0							

Steeles Ave E @ James Snow Pkwy

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:30:00

To: 8:30:00

Municipality: Halton Region
Site #: 1003490100
Intersection: Steeles Ave E & James Snow Pkwy
TFR File #: 10
Count date: 25-Apr-2018

Weather conditions:
 Rain
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Steeles Ave E runs W/E

North Leg Total: 489
 North Entering: 283
 North Peds: 1
 Peds Cross: \times

Heavys	2	10	55	67
Trucks	1	3	6	10
Cars	7	113	86	206
Totals	10	126	147	



Heavys	43
Trucks	8
Cars	155
Totals	206

East Leg Total: 1475
 East Entering: 447
 East Peds: 0
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
47	23	581	651

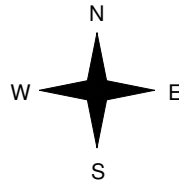


James Snow Pkwy

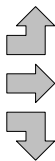
Cars	Trucks	Heavys	Totals
32	4	32	68
218	12	31	261
61	15	42	118
311	31	105	



Steeles Ave E



Heavys	Trucks	Cars	Totals
0	0	1	1
31	12	426	469
19	3	246	268
50	15	673	



James Snow Pkwy



Steeles Ave E



Cars	Trucks	Heavys	Totals
874	31	123	1028

Peds Cross: \times
 West Peds: 1
 West Entering: 738
 West Leg Total: 1389

Cars	420	Cars	356	122	362	840
Trucks	21	Trucks	10	4	13	27
Heavys	71	Heavys	14	11	37	62
Totals	512	Totals	380	137	412	



Peds Cross: \times
 South Peds: 1
 South Entering: 929
 South Leg Total: 1441

Comments

Steeles Ave E @ James Snow Pkwy

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Halton Region
Site #: 1003490100
Intersection: Steeles Ave E & James Snow Pkwy
TFR File #: 10
Count date: 25-Apr-2018

Weather conditions:
 Rain
Person(s) who counted:
 Cam

**** Signalized Intersection ****

Major Road: Steeles Ave E runs W/E

North Leg Total: 586
 North Entering: 285
 North Peds: 0
 Peds Cross: \times

Heavys	0	10	45	55
Trucks	1	3	1	5
Cars	12	165	48	225
Totals	13	178	94	



Heavys	40
Trucks	6
Cars	255
Totals	301

East Leg Total: 1714
 East Entering: 1105
 East Peds: 0
 Peds Cross: \times

Heavys	Trucks	Cars	Totals
56	12	946	1014

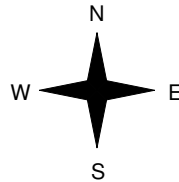


James Snow Pkwy

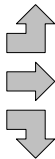
Cars	Trucks	Heavys	Totals
88	4	36	128
566	7	41	614
334	4	25	363
988	15	102	



Steeles Ave E



Heavys	Trucks	Cars	Totals
0	0	11	11
28	7	313	348
21	3	399	423
49	10	723	



James Snow Pkwy

Steeles Ave E



Cars	Trucks	Heavys	Totals
485	17	107	609

Peds Cross: \times
 West Peds: 0
 West Entering: 782
 West Leg Total: 1796

Cars	898	Cars	368	156	124	648
Trucks	10	Trucks	4	2	9	15
Heavys	56	Heavys	15	4	34	53
Totals	964	Totals	387	162	167	



Peds Cross: \times
 South Peds: 1
 South Entering: 716
 South Leg Total: 1680

Comments



Date: 8-Nov-17

Intersection: Steeles Ave & James Snow Pkwy

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use	x	x	x	x	x	x	x	x	x	x	x	x
Direction	WBL	EBT	NBL	SBT	EBL	WBT	SBL	NBT				
Min Green	7	22	7	15	7	22	7	15				
Veh Ext.	3.0	3.0	3.0	5.0	3.0	3.0	3.0	5.0				
Yellow	3	3.7	3	4.2	3	3.7	3	4.2				
Red	2	3.5	2	3.1	1	3.5	1	3.1				
Walk	-	7	-	7	-	7	-	7				
Don't Walk	-	33	-	32	-	33	-	32				
Max 1	21	48	24	47	11	58	20	51				
Max 2												
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	Presently running uncoordinated Rest in Don't Walk Ped reservice on Sync Reference 3:15											



Date: 28-Nov-22

Intersection: Regional Road 25 @ JSP

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use	X	X	X	X	X	X	X	X				
Direction	SBLT	NB	WBLT	EB	NBLT	SB	EBLT	WB				
Min Green	7	20	7	10	7	20	7	10				
Veh Ext.	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0				
Yellow	3	4	3	4	3	4	3	4				
Red	1	2	1	2	1	2	1	2				
Walk		7		7		7		7				
Don't Walk		22		30		22		30				
Max 1	16	70	16	49	20	70	16	49				
Max 2												
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	Local Zero Override Active Set Sync Reference to 3:15											



Date: 29-Apr-22

Intersection: Regional Road 25 @ 5 Sideroad

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use		x	x	x	x	x		x				
Direction		NB	WBLT	EB	NBLT	SB		WB				
Min Green		20	7	10	7	20		10				
Veh Ext.		5.0	3.0	5.0	3.0	5.0		5.0				
Yellow		4.2	3	3.7	3	4.2						
Red		2	1	2.3	1	2		2.3				
Walk		7		7		7		7				
Don't Walk		25		25		25		25				
Max 1		42	11	37	11	31		48				
Max 2		46	16	28	14	32		44				
Max 3		35	11	24	11	35		24				
Veh Recall		x				x						
Ped Recall		x				x						
Notes:	Max 1 (6:00-15:00) Max 2 (15:00-21:30) Max 3 (21:30-6:00)											



Date: 21-May-20

Intersection: JSP @ Esquesing Line

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use		x	x	x		x	x	x	x	x	x	x
Direction		NB	WBLT	EB		SB	EBLT	WB				
Min Green		20	7	15		20	7	15				
Veh Ext.		5.0	3.0	5.0		5.0	3.0	5.0				
Yellow		3.7	3	4.2		3.7	3	4.2				
Red		2.8	1	2.4		2.8	1	2.4				
Walk		7		7		7		7				
Don't Walk		20		17		20		17				
Max 1		45	15	35		45	15	35				
Max 2												
Max 3												
Veh Recall												
Ped Recall												
Notes:	Esquesing Line major road due to current traffic volumes Sync Reference 3:15											



Date: 20-Aug-20

Intersection: [JSP @ Boston Church Rd](#)

8 Phase Basic Timing Sheet

	1	2	3	4	5	6	7	8	2 Ped	4 Ped	6 Ped	8 Ped
Phases in use	x	x	x	x	x	x	x	x	x	x	x	x
Direction	WBL	EB	NBL	SB	EBL	WB	SBL	NB				
Min Green	7	20	7	15	7	20	7	15				
Veh Ext.	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0				
Yellow	3	3.7	3	4.6	3	3.7	3	4.6				
Red	1	2.8	1	3	1	2.8	1	3				
Walk		7		7		7		7				
Don't Walk		20		17		20		17				
Max 1	13	44	20	41	13	44	20	41				
Max 2												
Max 3												
Veh Recall		x				x						
Ped Recall												
Notes:	Sync Reference 3:15											

Appendix E Halton Region Capital Building Report

CAPITAL BUDGET

2022

TRANSPORTATION-CAPITAL

2022-2031 TRANSPORTATION FORECAST PROJECT FORECAST LISTING 2022 (000 DOLLARS)													
PR NO	UNIQ ID #	PROJECT DESCRIPTION	Gross Cost	GROSS EXPENDITURE BY YEAR									
				2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
	6830	Tremaine Road - Widening from 2 to 4 lanes from Dundas Street to Lower Base Line (OAK) (Regional Road 22)	64,664	0	28,262	36,402	0	0	0	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	5,442	0	5,442	0	0	0	0	0	0	0	0
		Property	22,141	0	22,141	0	0	0	0	0	0	0	0
		Utility Relocate	679	0	679	0	0	0	0	0	0	0	0
		Construction	36,402	0	0	36,402	0	0	0	0	0	0	0
	6834	Tremaine Road - Widening from 2 to 4 lanes from Lower Base Line to Britannia Road (ML) (Regional Road 22)	36,864	0	8,425	501	27,938	0	0	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	3,983	0	3,983	0	0	0	0	0	0	0	0
		Property	4,442	0	4,442	0	0	0	0	0	0	0	0
		Utility Relocate	501	0	0	501	0	0	0	0	0	0	0
		Construction	27,938	0	0	0	27,938	0	0	0	0	0	0
	6811	Regional Road 25 - Widening from 2 to 4 lanes from 5 Side Road to 10 Side Road (HHS) (Regional Road 25)	19,690	0	0	1,123	10,005	485	8,077	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	1,123	0	0	1,123	0	0	0	0	0	0	0
		Property	10,005	0	0	0	10,005	0	0	0	0	0	0
		Utility Relocate	485	0	0	0	0	485	0	0	0	0	0
		Construction	8,077	0	0	0	0	0	8,077	0	0	0	0
PR-3379	6814	Regional Road 25 - Widening from 4 to 6 lanes from Highway 407 to Britannia Road (ML) (Regional Road 25)	66,768	0	0	0	13,421	964	52,383	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	7,313	0	0	0	7,313	0	0	0	0	0	0
		Property	6,108	0	0	0	6,108	0	0	0	0	0	0
		Utility Relocate	964	0	0	0	0	964	0	0	0	0	0
		Construction	52,383	0	0	0	0	0	52,383	0	0	0	0

Note: Schedule may not add due to rounding.



CAPITAL BUDGET

2022

TRANSPORTATION-CAPITAL

**2022-2031 TRANSPORTATION FORECAST
PROJECT FORECAST LISTING 2022 (000 DOLLARS)**

PR NO	UNIQ ID #	PROJECT DESCRIPTION	Gross Cost	GROSS EXPENDITURE BY YEAR									
				2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
PR-3392	6815	Regional Road 25 - Widening from 4 to 6 lanes from Britannia Road to Derry Road (MIL) (Regional Road 25)	28,281	0	0	0	4,338	498	23,445	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	3,153	0	0	0	3,153	0	0	0	0	0	0
		Property	1,185	0	0	0	1,185	0	0	0	0	0	0
		Utility Relocate	498	0	0	0	0	498	0	0	0	0	0
		Construction	23,445	0	0	0	0	0	23,445	0	0	0	0
PR-3130	6817	Regional Road 25 - Widening from 4 to 6 lanes from Steeles Avenue to 5 Side Road (MIL) (Regional Road 25)	54,386	1,700	0	1,119	0	51,567	0	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	0	0	0	0	0	0	0	0	0	0	0
		Property	1,119	0	0	1,119	0	0	0	0	0	0	0
		Utility Relocate	1,700	1,700	0	0	0	0	0	0	0	0	0
		Construction	51,567	0	0	0	0	51,567	0	0	0	0	0
PR-3379	6818	Bronte Road - Widening from 4 to 6 lanes from Speers Road to Highway 407 (OAK) (Regional Road 25)	84,804	0	0	0	22,720	1,050	61,034	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	8,507	0	0	0	8,507	0	0	0	0	0	0
		Property	14,213	0	0	0	14,213	0	0	0	0	0	0
		Utility Relocate	1,050	0	0	0	0	1,050	0	0	0	0	0
		Construction	61,034	0	0	0	0	0	61,034	0	0	0	0
	6825	Upper Middle Road - Widening from 4 to 6 lanes from Appleby Line to Burloak Drive (BUR) (Regional Road 38)	20,423	0	0	0	850	0	2,367	0	333	16,873	0
		EA	850	0	0	0	850	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	2,367	0	0	0	0	0	2,367	0	0	0	0
		Property	0	0	0	0	0	0	0	0	0	0	0
		Utility Relocate	333	0	0	0	0	0	0	0	333	0	0
		Construction	16,873	0	0	0	0	0	0	0	0	16,873	0

Note: Schedule may not add due to rounding.



CAPITAL BUDGET

2022

TRANSPORTATION-CAPITAL

**2022-2031 TRANSPORTATION FORECAST
PROJECT FORECAST LISTING 2022 (000 DOLLARS)**

PR NO	UNIQ ID #	PROJECT DESCRIPTION	Gross Cost	GROSS EXPENDITURE BY YEAR									
				2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
PR-3381	6821	Steeles Avenue - Widening from 4 to 6 lanes from Regional Road 25 to Trafalgar Road (MIL) (Regional Road 8)	89,607	6,561	0	0	18,082	0	64,964	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	6,561	6,561	0	0	0	0	0	0	0	0	0
		Property	16,854	0	0	0	16,854	0	0	0	0	0	0
		Utility Relocate	1,228	0	0	0	1,228	0	0	0	0	0	0
		Construction	64,964	0	0	0	0	0	64,964	0	0	0	0
	6822	Steeles Avenue - Widening from 4 to 6 lanes (with RBL) from Trafalgar Road to Winston Churchill Boulevard (HHS) (Regional Road 8)	60,434	0	850	0	5,566	13,287	763	39,968	0	0	0
		EA	850	0	850	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	5,566	0	0	0	5,566	0	0	0	0	0	0
		Property	13,287	0	0	0	0	13,287	0	0	0	0	0
		Utility Relocate	763	0	0	0	0	0	763	0	0	0	0
		Construction	39,968	0	0	0	0	0	0	39,968	0	0	0
PR-2369C	7933	Steeles Ave - Truck inspection station between 5th Line and 6th Line (HHS)	500	500	0	0	0	0	0	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	0	0	0	0	0	0	0	0	0	0	0
		Property	0	0	0	0	0	0	0	0	0	0	0
		Utility Relocate	0	0	0	0	0	0	0	0	0	0	0
		Construction	500	500	0	0	0	0	0	0	0	0	0
	6758	10 Side Road - Widening from 2 to 4 lanes from Trafalgar Road to Winston Churchill Boulevard (HHS) (Regional Road 10)	65,032	0	0	0	850	0	4,944	0	23,361	787	35,090
		EA	850	0	0	0	850	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	4,944	0	0	0	0	0	4,944	0	0	0	0
		Property	23,361	0	0	0	0	0	0	0	23,361	0	0
		Utility Relocate	787	0	0	0	0	0	0	0	0	787	0
		Construction	35,090	0	0	0	0	0	0	0	0	0	35,090

Note: Schedule may not add due to rounding.



CAPITAL BUDGET

2022

TRANSPORTATION-CAPITAL

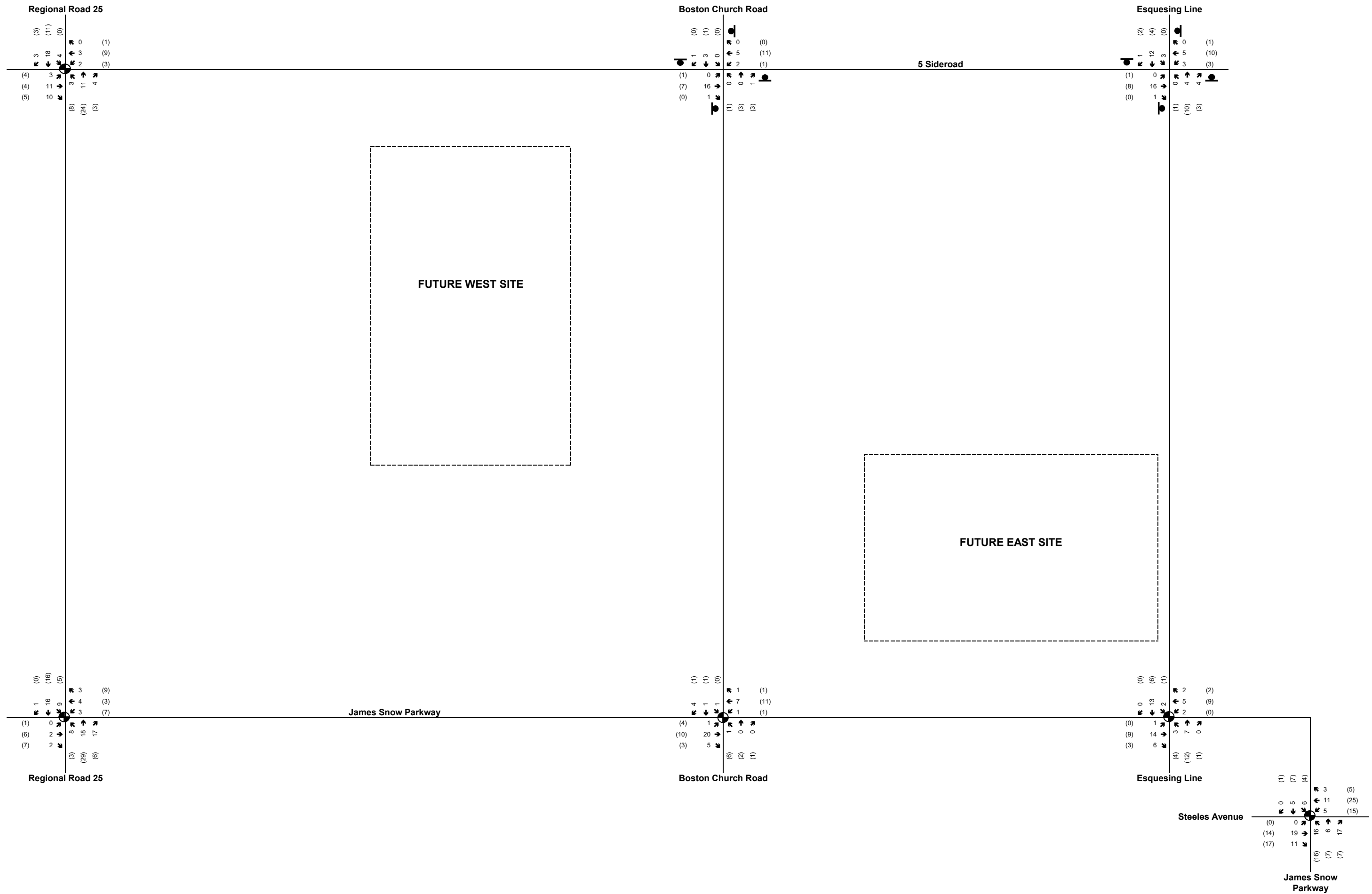
**2022-2031 TRANSPORTATION FORECAST
PROJECT FORECAST LISTING 2022 (000 DOLLARS)**

PR NO	UNIQ ID #	PROJECT DESCRIPTION	Gross Cost	GROSS EXPENDITURE BY YEAR									
				2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
	6807	James Snow Parkway - Widening from 4 to 6 lanes from Highway 401 to Tremaine Road (MIL) (Regional Road 4)	110,538	0	850	0	9,515	31,598	1,179	0	0	67,396	0
		EA	850	0	850	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	9,515	0	0	0	9,515	0	0	0	0	0	0
		Property	31,598	0	0	0	0	31,598	0	0	0	0	0
		Utility Relocate	1,179	0	0	0	0	0	1,179	0	0	0	0
		Construction	67,396	0	0	0	0	0	0	0	0	67,396	0
PR-2671B	3983	Dundas Street - Widening from 4 to 6 lanes from Tremaine Road to Bronte Road (OAK) (Regional Rd 5)	26,811	26,811	0	0	0	0	0	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	0	0	0	0	0	0	0	0	0	0	0
		Property	0	0	0	0	0	0	0	0	0	0	0
		Utility Relocate	0	0	0	0	0	0	0	0	0	0	0
		Construction	26,811	26,811	0	0	0	0	0	0	0	0	0
PR-2550	5180	Dundas Street - Widening from 4 to 6 lanes from North Hampton to Appleby Line (BUR) (Regional Road 5)	21,355	21,355	0	0	0	0	0	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	0	0	0	0	0	0	0	0	0	0	0
		Property	0	0	0	0	0	0	0	0	0	0	0
		Utility Relocate	1,628	1,628	0	0	0	0	0	0	0	0	0
		Construction	19,727	19,727	0	0	0	0	0	0	0	0	0
PR-3207B	7487	Dundas Street - Widening from 4 to 6 lanes from Guelph Line to Halton/Hamilton Boundary, including improvements at Brant Street (BUR) Regional Road 5	28,657	0	0	192	28,465	0	0	0	0	0	0
		EA	0	0	0	0	0	0	0	0	0	0	0
		Study	0	0	0	0	0	0	0	0	0	0	0
		Design	0	0	0	0	0	0	0	0	0	0	0
		Property	0	0	0	0	0	0	0	0	0	0	0
		Utility Relocate	192	0	0	192	0	0	0	0	0	0	0
		Construction	28,465	0	0	0	28,465	0	0	0	0	0	0

Note: Schedule may not add due to rounding.

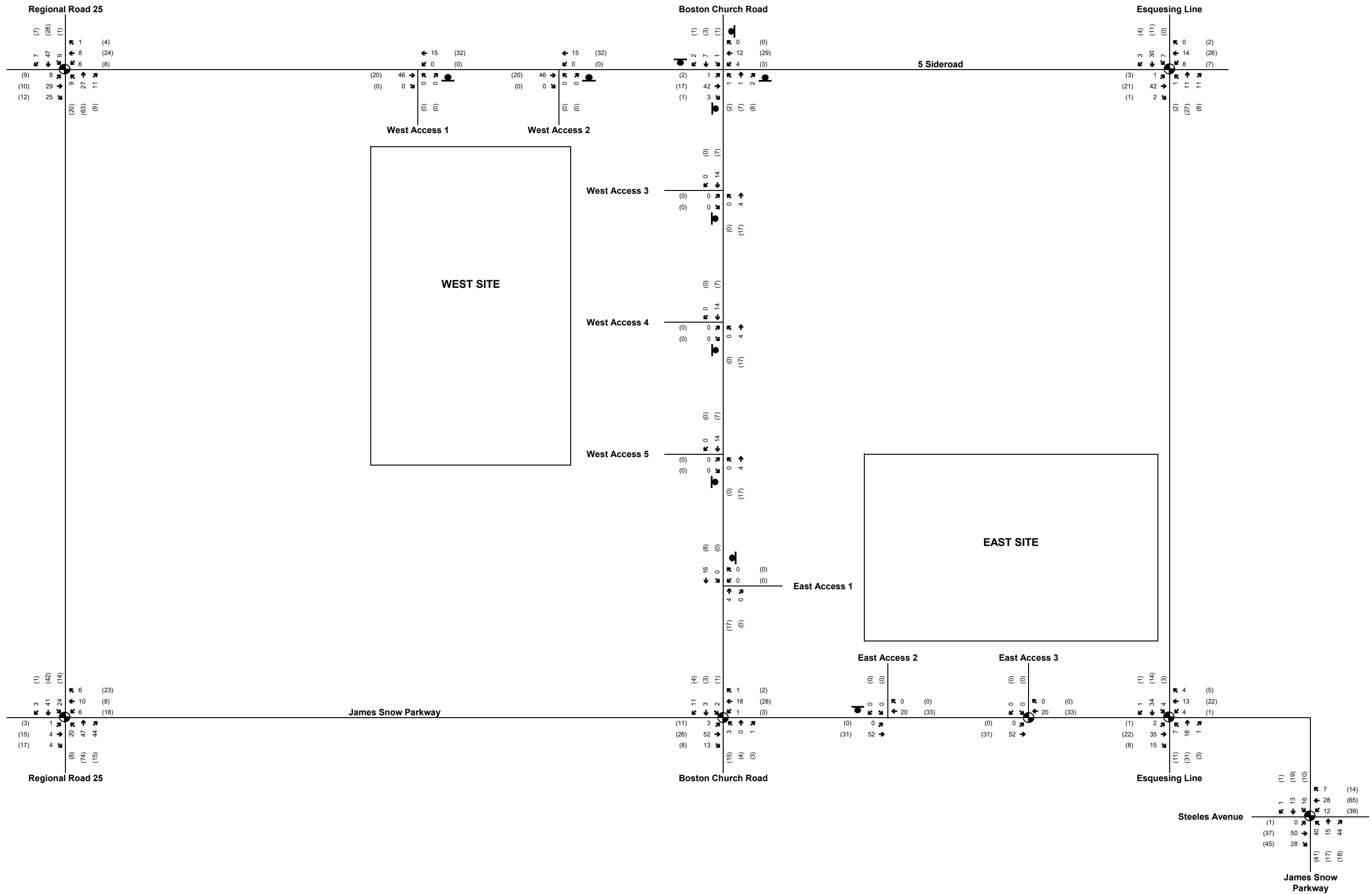


Appendix F **Background Traffic Volume Figures**



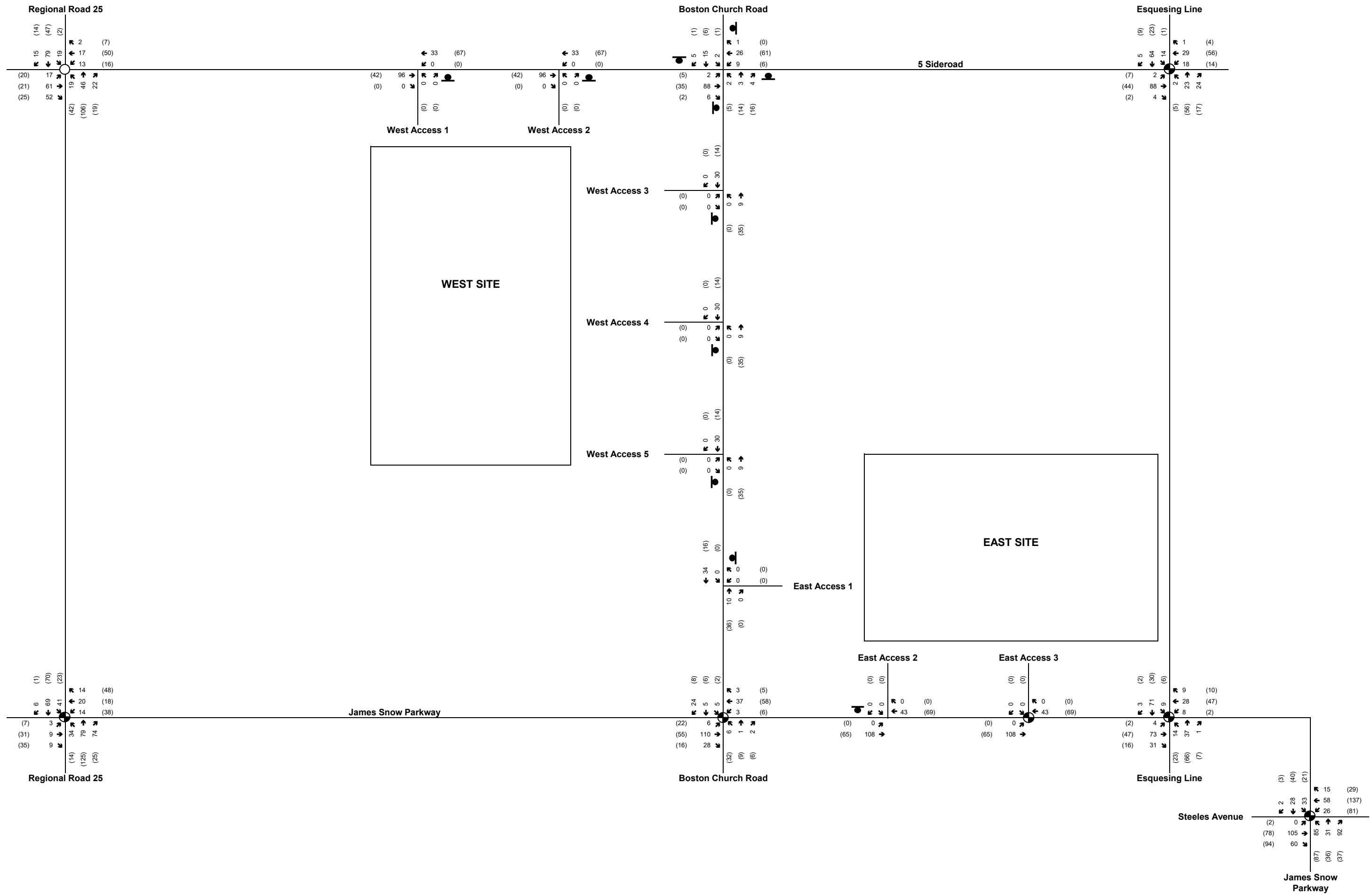
LEGEND
 XX AM Peak Hour Volumes
 (XX) PM Peak Hour Volumes
 Signalized Intersection
 Stop Control

2021 Background Traffic Growth Volumes
Figure G-1

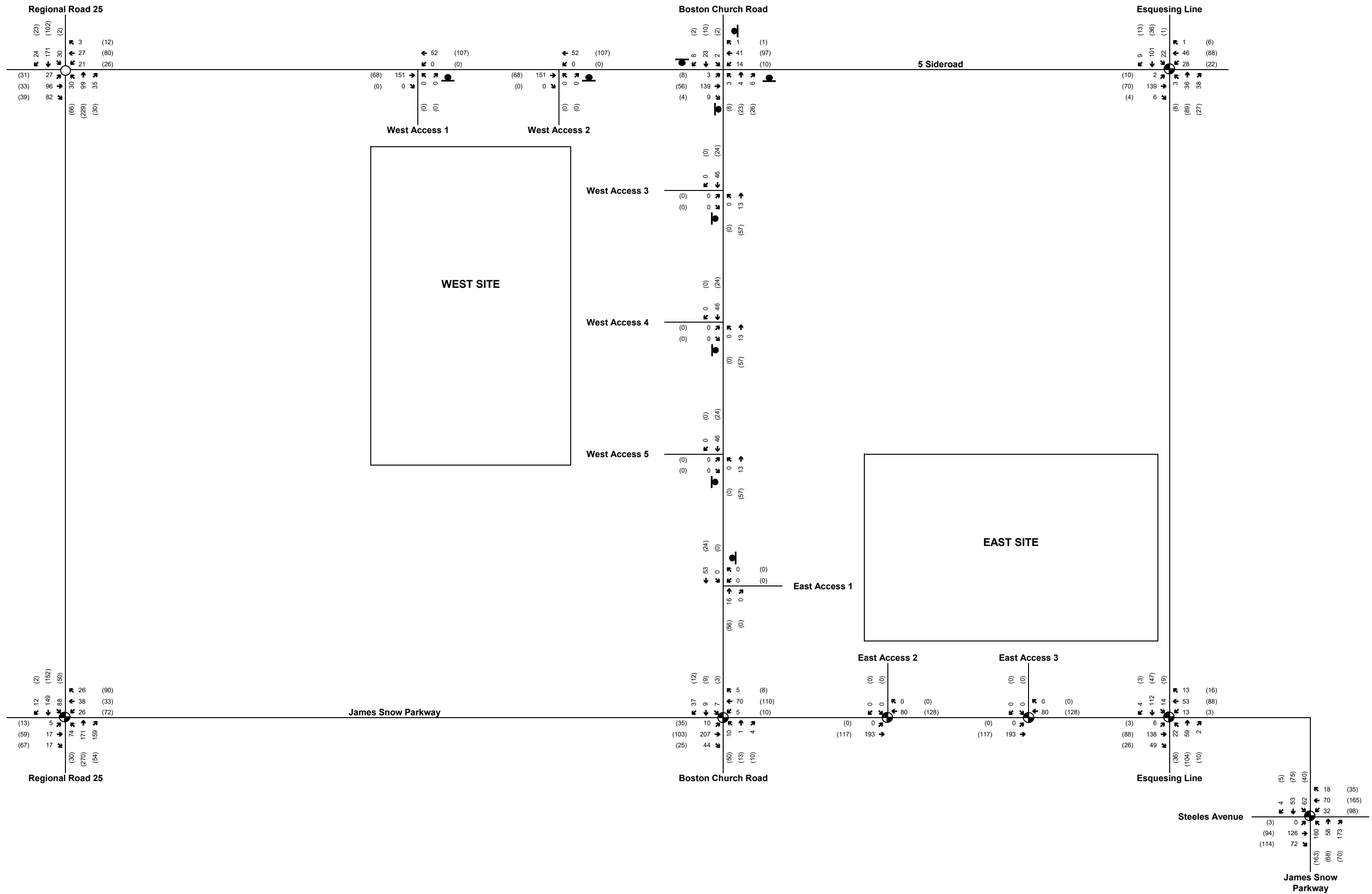


LEGEND
 XX AM Peak Hour Volumes
 (XX) PM Peak Hour Volumes
 Signalized Intersection
 Stop Control

2024 Background Traffic Growth Volumes
Figure G-2



2029 Background Traffic Growth Volumes
Figure G-3

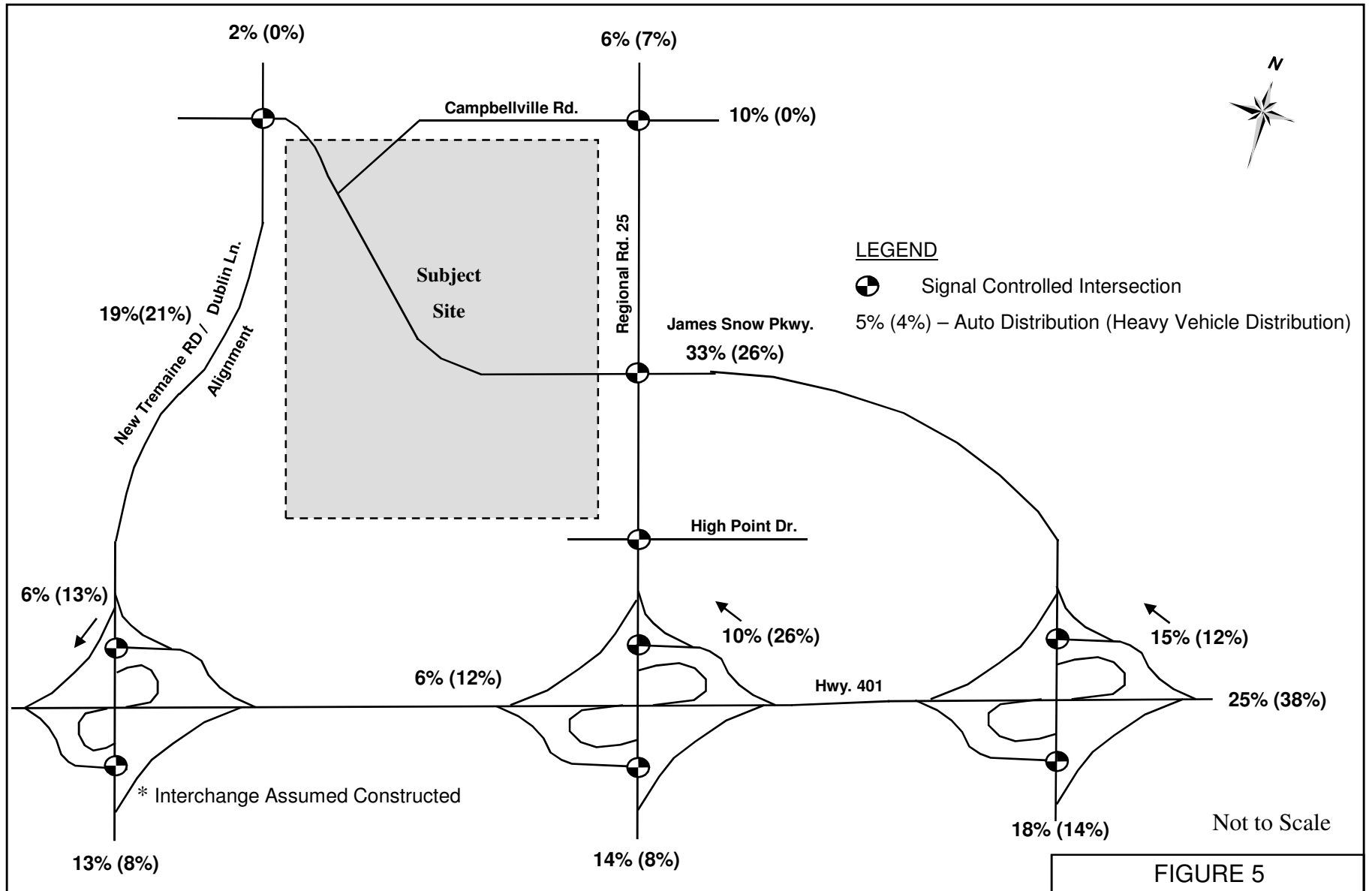


LEGEND

- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes
- ⊙ Signalized Intersection
- Roundabout
- ⊔ Stop Control

2034 Background Traffic Growth Volumes
Figure G-4

Appendix G Escarpment Business Community 2009 Study -
2019 Traffic Distribution



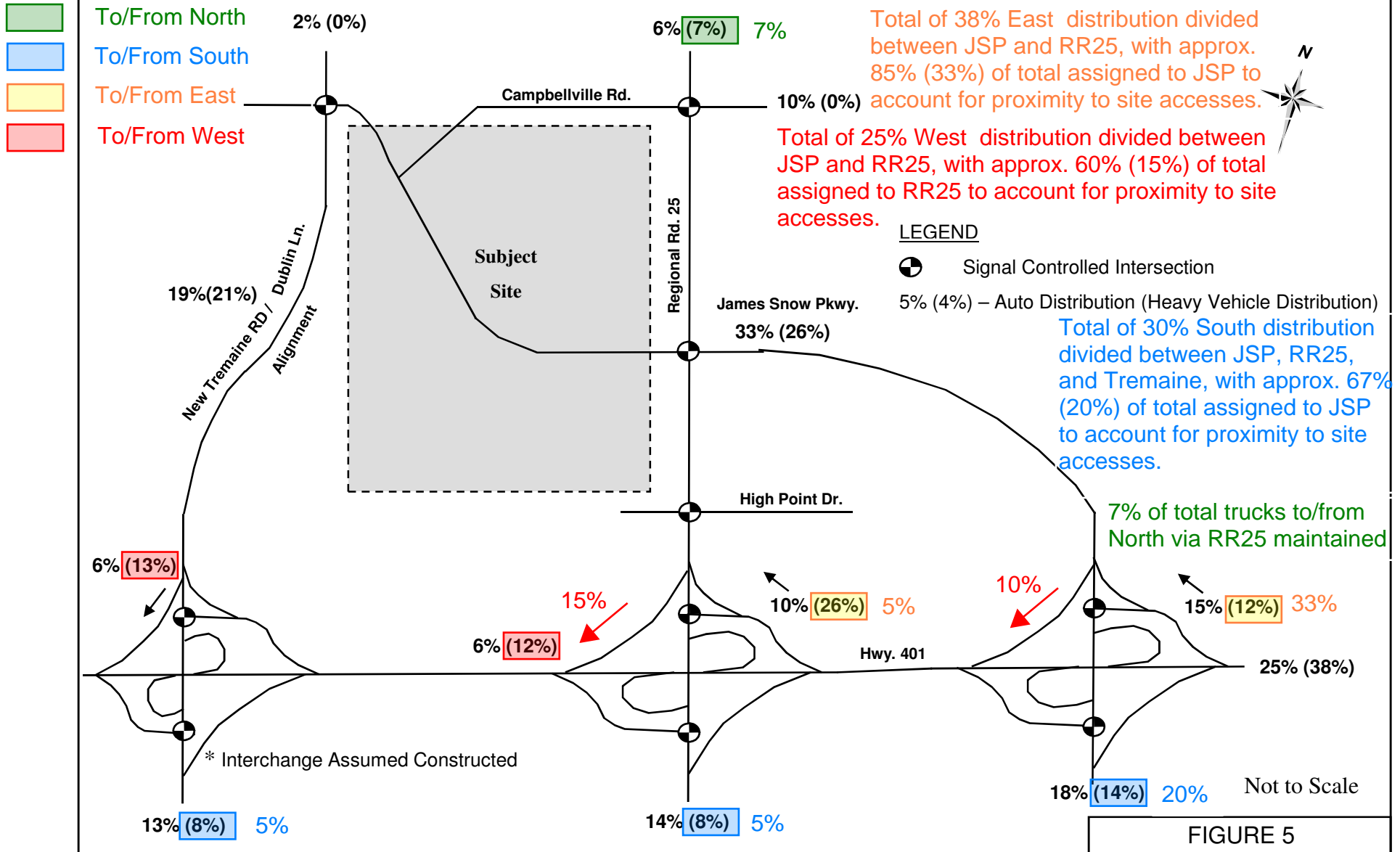
ESCARPMENT BUSINESS COMMUNITY TRAFFIC IMPACT ASSESSMENT-UPDATE

2019 SITE TRAFFIC DISTRIBUTION

(MARCH 2009)

FIGURE 5

SERNAS TRANSTECH
 45 Vogell Rd
 Richmond Hill, Ontario
 L4B 3P6
 T: 905 508-3371
 F: 905 508-2599
 sernastranstech.com



ESCARPMENT BUSINESS COMMUNITY TRAFFIC IMPACT ASSESSMENT-UPDATE

2019 SITE TRAFFIC DISTRIBUTION

(MARCH 2009)

FIGURE 5



EXTERNAL - AM IN

Thu May 02 2019 13:26:08 GMT-0400 (Eastern Daylight Time) - Run Time: 2008ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig

Column: 2006 GTA zone of destination - gta06_dest

Filters:

Start time of trip - start_time In 600-900

and

2006 GTA zone of destination - gta06_dest In 4144 4145 4147 4148

Trip 2016

Table:

	4144	4145	4147	4148	ALL ZONES	% DIRECTION	
PD 1 of Toronto	0	14	0	0	14	0.4% E	
PD 3 of Toronto	0	24	0	0	24	0.6% E	
PD 7 of Toronto	39	0	0	0	39	1.0% E	
PD 8 of Toronto	0	7	30	0	37	1.0% E	
PD 9 of Toronto	17	39	0	0	56	1.5% E	
PD 10 of Toronto	0	21	0	3	24	0.6% E	
PD 12 of Toronto	0	13	0	0	13	0.3% E	
Whitby	0	0	0	35	35	0.9% E	
Oshawa	0	0	0	30	30	0.8% E	
Vaughan	0	18	0	0	18	0.5% E	
Brampton	20	60	87	206	373	9.9% E	
Mississauga	95	159	78	222	554	14.7% E	
Halton Hills	48	93	8	204	353	9.4% N	
Milton	224	152	250	568	1194	31.7% I	Internal
Oakville	23	0	41	18	82	2.2% S	
Burlington	36	9	9	259	313	8.3% S	
Flamborough	0	0	0	11	11	0.3% W	
Dundas	0	0	0	31	31	0.8% W	
Stoney Creek	0	35	0	0	35	0.9% S	
Hamilton	0	38	36	35	109	2.9% W	
Lincoln	0	18	0	0	18	0.5% S	
St. Catharines	0	0	0	35	35	0.9% S	
Waterloo	0	0	23	0	23	0.6% W	
Cambridge	0	0	32	16	48	1.3% W	
City of Guelph	23	0	92	0	115	3.1% W	
Centre Wellington	0	0	16	0	16	0.4% N	
Barrie	0	46	0	0	46	1.2% E	
Shelburne	0	0	0	75	75	2.0% N	
Brantford	0	0	6	0	6	0.2% W	
External	0	0	43	0	43	1.1% ?	
				TOTAL	3770		

INTERNAL (MILTON) AM IN

Thu May 02 2019 15:28:02 GMT-0400 (Eastern Daylight Time) - Run Time: 4915ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination - gta06_dest In 4144 4145 4147 4148

and

2006 GTA zone of origin - gta06_orig In 4100-4145 4147-4148 4192

and

Start time of trip - start_time In 600-900

Trip 2016

Table:

	4144	4145	4147	4148	ALL ZONES	% DIRECTION	INTERNAL	
4103	0	0	15	47	62	5.2% S	N	0
4105	12	14	60	57	143	12.0% S	S	94.3%
4108	0	15	0	14	29	2.4% S	E	0
4110	46	20	0	132	198	16.6% S	W	5.7%
4118	0	0	17	0	17	1.4% S		
4119	0	0	19	67	86	7.2% S		
4120	40	40	0	60	140	11.7% S		
4123	0	0	65	43	108	9.0% S		
4124	63	0	0	89	152	12.7% S		
4125	0	0	42	14	56	4.7% S		
4126	0	0	0	29	29	2.4% S		
4127	43	63	0	0	106	8.9% S		
4130	0	0	0	8	8	0.7% W		
4134	19	0	0	0	19	1.6% W		
4135	0	0	0	9	9	0.8% W		
4144	0	0	32	0	32	2.7% W		
				TOTAL	1194			

	External		External & Internal	ROUNDED
N	11.8%	N	11.8%	10%
S	12.8%	S	42.7%	45%
E	33.5%	E	33.5%	35%
W	9.1%	W	10.9%	10%
	67.2%		98.9%	100.0%

EXTERNAL - AM OUT

Thu May 02 2019 13:42:29 GMT-0400 (Eastern Daylight Time) - Run Time: 1985ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

Start time of trip - start_time In 600-900

and

2006 GTA zone of origin - gta06_orig In 4144

4145 4147 4148

Trip 2016

Table:

	4144	4145	4147	4148	ALL ZONES	% DIRECTION
PD 8 of Toronto	0	0	14	0	14	2.5% E
PD 9 of Toronto	21	0	0	0	21	3.8% E
Vaughan	0	0	0	40	40	7.2% E
Brampton	0	17	5	0	22	4.0% E
Mississauga	38	0	0	58	96	17.3% E
Halton Hills	0	0	8	0	8	1.4% N
Milton	86	8	26	43	163	29.4% I
Hamilton	40	0	0	30	70	12.6% W
Cambridge	0	0	7	0	7	1.3% W
City of Guelph	0	0	95	0	95	17.1% W
External	0	0	18	0	18	3.2% ?
				TOTAL	554	

INTERNAL (MILTON) AM OUT

Thu May 02 2019 15:32:59 GMT-0400 (Eastern Daylight Time) - Run Time: 2532ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 4144 4145 4147 4148
 and
 2006 GTA zone of destination - gta06_dest In 4100-4145 4147-4148 4192
 and
 Start time of trip - start_time In 600-900

Trip 2016

Table:

	4144	4145	4147	4148	ALL ZONES	% DIRECTION	Internal	
4103	0	0	5	0	5	3.1% S	N	0
4110	0	0	0	4	4	2.5% S	S	80.2%
4119	29	0	9	17	55	34.0% S	E	0
4123	0	0	12	21	33	20.4% S	W	19.8%
4124	10	0	0	0	10	6.2% S		
4125	15	8	0	0	23	14.2% S		
4147	32	0	0	0	32	19.8% W		
					TOTAL	162		
	External				External & Internal		ROUNDED	
N	1.4%			N	1.4%		5%	
S				S	23.6%		25%	
E	34.8%			E	34.8%		35%	
W	31.0%			W	36.9%		35%	
					96.8%		100.0%	

EXTERNAL - PM IN

Thu May 02 2019 13:28:51 GMT-0400 (Eastern Daylight Time) - Run Time: 1570ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of origin - pd_orig

Column: 2006 GTA zone of destination - gta06_dest

Filters:

Start time of trip - start_time In 1600-1900

and

2006 GTA zone of destination - gta06_dest In 4144 4145 4147 4148

Trip 2016

Table:

	4144	4145	4147	4148	ALL ZONES	% DIRECTION	
PD 1 of Toronto	0	0	0	16	16	0.9% E	
PD 9 of Toronto	0	0	0	19	19	1.0% E	
PD 16 of Toronto	0	0	21	0	21	1.1% E	
Aurora	29	0	0	0	29	1.5% E	
Vaughan	0	28	0	24	52	2.8% E	
Brampton	0	0	0	108	108	5.8% E	
Mississauga	131	15	0	58	204	10.9% E	
Halton Hills	0	0	0	18	18	1.0% N	
Milton	103	0	36	897	1036	55.4% I	Internal
Oakville	0	0	0	19	19	1.0% S	
Burlington	0	41	0	190	231	12.3% S	
Flamborough	0	0	0	74	74	4.0% W	
Hamilton	0	0	0	14	14	0.7% W	
Cambridge	0	0	0	30	30	1.6% W	
				TOTAL	1871		

INTERNAL (MILTON) PM IN

Thu May 02 2019 15:29:38 GMT-0400 (Eastern Daylight Time) - Run Time: 2126ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig
 Column: 2006 GTA zone of destination - gta06_dest

Filters:

2006 GTA zone of destination - gta06_dest In 4144 4145 4147 4148
 and
 2006 GTA zone of origin - gta06_orig In 4100-4145 4147-4148 4192
 and
 Start time of trip - start_time In 1600-1900

Trip 2016

Table:

	4144	4147	4148 ALL ZONES		% DIRECTION		Internal
4103	0	0	32	32	3.1% S	N	1.3%
4105	0	0	37	37	3.6% S	S	94.5%
4108	0	0	116	116	11.2% S	E	0
4110	34	0	38	72	6.9% S	W	4.2%
4117	0	0	34	34	3.3% S		
4119	0	36	198	234	22.5% S		
4120	0	0	30	30	2.9% S		
4121	0	0	13	13	1.3% N		
4123	0	0	127	127	12.2% S		
4124	32	0	109	141	13.6% S		
4125	15	0	33	48	4.6% S		
4127	23	0	0	23	2.2% S		
4139	0	0	44	44	4.2% W		
4148	0	0	87	87	8.4% S		
			TOTAL	1038			

	External	External & Internal	ROUNDED
N	1.0%	N 1.7%	5%
S	13.4%	S 65.7%	65%
E	24.0%	E 24.0%	25%
W	6.3%	W 8.7%	5%
		100.0%	100.0%

EXTERNAL - PM OUT

Thu May 02 2019 13:40:29 GMT-0400 (Eastern Daylight Time) - Run Time: 2057ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: Planning district of destination - pd_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

Start time of trip - start_time In 1600-1900

and

2006 GTA zone of origin - gta06_orig In 4144

4145 4147 4148

Trip 2016

Table:

	4144	4145	4147	4148	ALL ZONES	% DIRECTION	
PD 1 of Toronto	0	14	0	0	14	0.3% E	
PD 3 of Toronto	0	45	0	0	45	1.0% E	
PD 7 of Toronto	57	0	0	0	57	1.3% E	
PD 8 of Toronto	0	7	0	0	7	0.2% E	
PD 9 of Toronto	17	39	0	0	56	1.3% E	
PD 12 of Toronto	0	13	0	0	13	0.3% E	
PD 16 of Toronto	0	0	0	29	29	0.7% E	
Oshawa	0	0	95	0	95	2.2% E	
Brampton	0	24	94	177	295	6.9% E	
Mississauga	95	240	29	234	598	13.9% E	
Halton Hills	48	12	21	258	339	7.9% N	
Milton	265	120	254	1138	1777	41.3% I	Internal
Oakville	23	0	48	8	79	1.8% S	
Burlington	36	47	25	243	351	8.2% S	
Dundas	0	0	0	31	31	0.7% W	
Stoney Creek	0	35	0	0	35	0.8% S	
Hamilton	0	0	36	68	104	2.4% W	
Waterloo	0	0	23	0	23	0.5% W	
Cambridge	39	0	0	0	39	0.9% W	
City of Guelph	0	74	92	35	201	4.7% W	
Puslinch	15	0	0	0	15	0.3% W	
Centre Wellington	0	0	16	21	37	0.9% N	
Erin	0	56	0	0	56	1.3% N	
Brantford	0	0	6	0	6	0.1% W	
				TOTAL	4302		

INTERNAL (MILTON) PM OUT

Thu May 02 2019 15:31:05 GMT-0400 (Eastern Daylight Time) - Run Time: 2112ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

2006 GTA zone of origin - gta06_orig In 4144 4145 4147 4148

and

2006 GTA zone of destination - gta06_dest In 4100-4145 4147-4148 4192

and

Start time of trip - start_time In 1600-1900

Trip 2016

Table:

	4144	4145	4147	4148	ALL ZONES	% DIRECTION		Internal
4103	0	0	15	63	78	4.4% S	N	2.9%
4105	12	14	60	82	168	9.5% S	S	96.7%
4110	106	20	0	225	351	19.8% S	E	0
4119	0	0	19	158	177	10.0% S	W	0.5%
4120	40	22	0	101	163	9.2% S		
4121	0	0	0	13	13	0.7% N		
4123	0	0	65	63	128	7.2% S		
4124	63	0	32	148	243	13.7% S		
4125	0	0	42	27	69	3.9% S		
4126	0	0	21	57	78	4.4% S		
4127	43	63	0	69	175	9.9% S		
4130	0	0	0	8	8	0.5% W		
4143	0	0	0	38	38	2.1% N		
4148	0	0	0	87	87	4.9% S		
				TOTAL	1776			

	External	External & Internal	ROUNDED
N	10.0%	N 11.2%	10%
S	10.8%	S 50.7%	50%
E	28.1%	E 28.1%	30%
W	9.7%	W 9.9%	10%
		100.0%	100.0%

Appendix H Intersection Control Warrants and Conceptual Designs

Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	22222
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	5 Sideroad	Direction:	East/West
Minor Street:	Boston Church Road	Direction:	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	Number of Lanes:	1
Number of Legs:	Four	Intersection Type:	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: 5 Sideroad						Minor: Boston Church Road						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	11	542	66	76	166	4	55	16	25	9	90	32	0
PM	31	224	64	43	378	3	66	89	123	7	39	8	0
AHV ¹	11	192	33	30	136	2	30	26	37	4	32	10	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then $AHV = (AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then $AHV = AM_{PHV} / 2$ or $AHV = PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	543	Justification 2A: Major Street Both Approaches	404
Justification 1B: Minor Street Both Approaches	139	Justification 2B: Traffic Crossing Major Street	66

Note: The <u>crossing</u> volume is defined as the sum of:	
(1) Left turns from both minor street approaches:	34
(2) The heaviest through volume from the minor street:	32
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:	0
(a) The left turn volume > 120 vph	30 FALSE
(b) The left turn volume plus the opposing volume > 720 vph	222 FALSE
(4) Pedestrians crossing the major street:	0
Total	66

Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	22222
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	5 Sideroad	Direction:	East/West
Minor Street:	Boston Church Road	Direction:	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	600	900
1B: Minor Street Both Approaches	120	170	120	170
2A: Major Street Both Approaches	480	720	600	900
2B: Traffic Crossing Major Street	50	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	576
1B: Minor Street Both Approaches	120	120%	100%	144
2A: Major Street Both Approaches	480	120%	-	576
2B: Traffic Crossing Major Street	50	120%	-	60

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	543	576	94%	No
1B: Minor Street Both Approaches	139	144	97%	
2A: Major Street Both Approaches	404	576	70%	No
2B: Traffic Crossing Major Street	66	60	100%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	22222
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	5 Sideroad	Direction:	East/West
Minor Street:	Esquesing Line	Direction:	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	Number of Lanes:	1
Number of Legs:	Four	Intersection Type:	Existing

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: 5 Sideroad						Minor: Esquesing Line						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	9	544	22	123	194	4	13	140	151	85	408	48	0
PM	54	287	15	90	347	24	31	361	122	5	140	52	0
AHV ¹	16	208	9	53	135	7	11	125	68	23	137	25	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then $AHV = (AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then $AHV = AM_{PHV} / 2$ or $AHV = PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	817	Justification 2A: Major Street Both Approaches	428
Justification 1B: Minor Street Both Approaches	389	Justification 2B: Traffic Crossing Major Street	171

Note: The <u>crossing</u> volume is defined as the sum of:		
(1) Left turns from both minor street approaches:		34
(2) The heaviest through volume from the minor street:		137
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:		0
(a) The left turn volume > 120 vph	53	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	261	FALSE
(4) Pedestrians crossing the major street:		0
	Total	171

Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	22222
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	5 Sideroad	Direction:	East/West
Minor Street:	Esquesing Line	Direction:	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	600	900
1B: Minor Street Both Approaches	120	170	120	170
2A: Major Street Both Approaches	480	720	600	900
2B: Traffic Crossing Major Street	50	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	Existing Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	120%	-	576
1B: Minor Street Both Approaches	120	120%	100%	144
2A: Major Street Both Approaches	480	120%	-	576
2B: Traffic Crossing Major Street	50	120%	-	60

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	817	576	100%	Yes
1B: Minor Street Both Approaches	389	144	100%	
2A: Major Street Both Approaches	428	576	74%	No
2B: Traffic Crossing Major Street	171	60	100%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	17197
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	Boston Church Road	Direction:	North/South
Minor Street:	East Access 1	Direction:	East/West

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	Number of Lanes:	1
Number of Legs:	Three ("T" Intersection)	Intersection Type:	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: Boston Church Road						Minor: East Access 1						Pedestrians Crossing Major
	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	0	202	95	24	254	0	0	0	0	26	0	4	0
PM	0	276	29	7	242	0	0	0	0	98	0	25	0
AHV ¹	0	120	31	8	124	0	0	0	0	31	0	7	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then $AHV = (AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then $AHV = AM_{PHV} / 2$ or $AHV = PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	321	Justification 2A: Major Street Both Approaches	283
Justification 1B: Minor Street Both Approaches	38	Justification 2B: Traffic Crossing Major Street	31

Note: The <u>crossing</u> volume is defined as the sum of:		
(1) Left turns from both minor street approaches:	31	
(2) The heaviest through volume from the minor street:	0	
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:	0	
(a) The left turn volume > 120 vph	8	FALSE
(b) The left turn volume plus the opposing volume > 720 vph	128	FALSE
(4) Pedestrians crossing the major street:	0	
Total	31	

Traffic Signal Warrant - Output Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	17197
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	Boston Church Road	Direction:	North/South
Minor Street:	East Access 1	Direction:	East/West

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	600	900
1B: Minor Street Both Approaches	120	170	120	170
2A: Major Street Both Approaches	480	720	600	900
2B: Traffic Crossing Major Street	50	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	480	150%	-	720
1B: Minor Street Both Approaches	120	150%	150%	270
2A: Major Street Both Approaches	480	150%	-	720
2B: Traffic Crossing Major Street	50	150%	-	75

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	321	720	45%	No
1B: Minor Street Both Approaches	38	270	14%	
2A: Major Street Both Approaches	283	720	39%	No
2B: Traffic Crossing Major Street	31	75	41%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	17197
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	James Snow Parkway	Direction:	East/West
Minor Street:	East Access 2	Direction:	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	Number of Lanes:	2 or more
Number of Legs:	Three ("T" Intersection)	Intersection Type:	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: James Snow Parkway						Minor: East Access 2						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	65	817	0	0	484	143	0	0	0	45	0	23	0
PM	36	618	0	0	557	56	0	0	0	150	0	73	0
AHV ¹	25	359	0	0	260	50	0	0	0	49	0	24	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then $AHV = (AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then $AHV = AM_{PHV} / 2$ or $AHV = PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	767	Justification 2A: Major Street Both Approaches	694
Justification 1B: Minor Street Both Approaches	73	Justification 2B: Traffic Crossing Major Street	49

Note: The <u>crossing</u> volume is defined as the sum of:	
(1) Left turns from both minor street approaches:	49
(2) The heaviest through volume from the minor street:	0
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:	0
(a) The left turn volume > 120 vph 25 FALSE	
(b) The left turn volume plus the opposing volume > 720 vph 285 FALSE	
(4) Pedestrians crossing the major street:	0
Total	49

Traffic Signal Warrant - Output Sheet

Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	17197
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2034	Analyst:	SP

Study Intersection Summary

Major Street:	James Snow Parkway	Direction:	East/West
Minor Street:	East Access 2	Direction:	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	600	900
1B: Minor Street Both Approaches	120	170	120	170
2A: Major Street Both Approaches	480	720	600	900
2B: Traffic Crossing Major Street	50	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	600	150%	-	900
1B: Minor Street Both Approaches	120	150%	150%	270
2A: Major Street Both Approaches	600	150%	-	900
2B: Traffic Crossing Major Street	50	150%	-	75

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	767	900	85%	No
1B: Minor Street Both Approaches	73	270	27%	
2A: Major Street Both Approaches	694	900	77%	No
2B: Traffic Crossing Major Street	49	75	65%	

Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

Traffic Signal Warrant - Input Sheet Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	17197
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2033	Analyst:	SP

Study Intersection Summary

Major Street:	James Snow Parkway	Direction:	East/West
Minor Street:	East Access 3	Direction:	North/South

Intersection Details for Warrant Parameters

Flow Conditions:	Free Flow (Rural)	Number of Lanes:	2 or more
Number of Legs:	Three ("T" Intersection)	Intersection Type:	New

Notes: "Free Flow" is used when the operating speed is greater than or equal to 70km/h, "Restricted Flow" otherwise.
The Number of Lanes greater than 1 only needs to be for one direction along the major road.
An intersection is considered "New" if at least 1-leg is added to an existing intersection.

Input Volumes and Average Hourly Volume Determination

Peak Hour	Major: James Snow Parkway						Minor: East Access 3						Pedestrians Crossing Major
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM	38	824		0	615	95	0	0	0	27	0	12	0
PM	19	749	0	0	575	33	0	0	0	105	0	38	0
AHV ¹	14	393	0	0	298	32	0	0	0	33	0	13	0

1. The AHV is determined by the availability of the peak hour estimates. If both the AM and PM Peak Hour Volume estimate is available then $AHV = (AM_{PHV} + PM_{PHV}) / 4$. In the case that only one estimate is available then $AHV = AM_{PHV} / 2$ or $AHV = PM_{PHV} / 2$.

Determination of Justification Volumes (Based on AHV)

Justification 1A: All Approach Lanes	783	Justification 2A: Major Street Both Approaches	737
Justification 1B: Minor Street Both Approaches	46	Justification 2B: Traffic Crossing Major Street	33

Note: The <u>crossing</u> volume is defined as the sum of:	
(1) Left turns from both minor street approaches:	33
(2) The heaviest through volume from the minor street:	0
(3) 50% of the heavier left turn movement from major street when both of the following criteria are met:	0
(a) The left turn volume > 120 vph 14 FALSE	
(b) The left turn volume plus the opposing volume > 720 vph 312 FALSE	
(4) Pedestrians crossing the major street:	0
Total	33

Traffic Signal Warrant - Output Sheet

Justification 7 - Projected Volumes

Based Ontario Traffic Manual Book 12 - Traffic Signals (March 2012)

Project and Scenario Summary

Project:	Orlando - North Porta Lands			Project No.:	17197
				Date:	28/02/2023
Horizon:	Future Total	Horizon Year:	2033	Analyst:	SP

Study Intersection Summary

Major Street:	James Snow Parkway	Direction:	East/West
Minor Street:	East Access 3	Direction:	North/South

Summary of Base Justification Thresholds

Justification	1 Approach Lane		2 or More Approach Lanes	
	Free Flow	Restricted Flow	Free Flow	Restricted Flow
1A: All Approach Lanes	480	720	600	900
1B: Minor Street Both Approaches	120	170	120	170
2A: Major Street Both Approaches	480	720	600	900
2B: Traffic Crossing Major Street	50	75	50	75

The above values are taken from Table 12 and Table 13 from OTM Book 12 (March 2012).

The grey shaded values are provided for reference only, and are not applicable to the study intersection.

Adjusted Justification Thresholds for Study Intersection Conditions

Justification	Base Threshold	New Intersection	"T" Intersection	Final Threshold
1A: All Approach Lanes	600	150%	-	900
1B: Minor Street Both Approaches	120	150%	150%	270
2A: Major Street Both Approaches	600	150%	-	900
2B: Traffic Crossing Major Street	50	150%	-	75

The above adjustments are taken from OTM Book 12 (March 2012) the "T" Intersection adjustment only applies to Justification 1B, and is a 50% increase on the threshold when the study intersection is a "T" intersection. Otherwise a value of 100% is used.

Warrant Calculation

Justification	Study Intersection Justification Volume	Justification Threshold	Percentage Warrant	Warrant Met?
1A: All Approach Lanes	783	900	87%	No
1B: Minor Street Both Approaches	46	270	17%	
2A: Major Street Both Approaches	737	900	82%	No
2B: Traffic Crossing Major Street	33	75	44%	

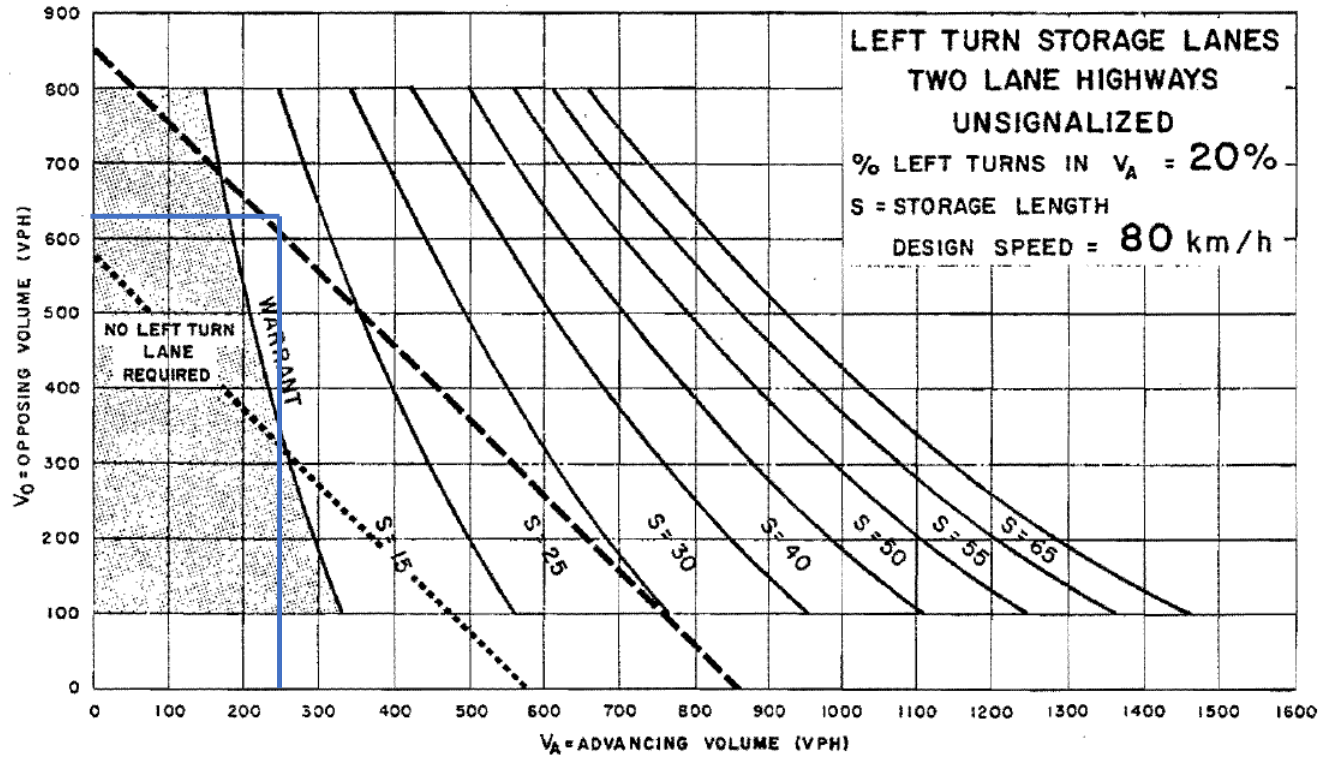
Notes: In the case of Justification 7 based on AHV both Warrant 1 and 2 must be met 100%, which requires both the A and B part of each warrant being equal to 100%.

When calculating the percentage, any value greater than 100% is expressed as 100%.

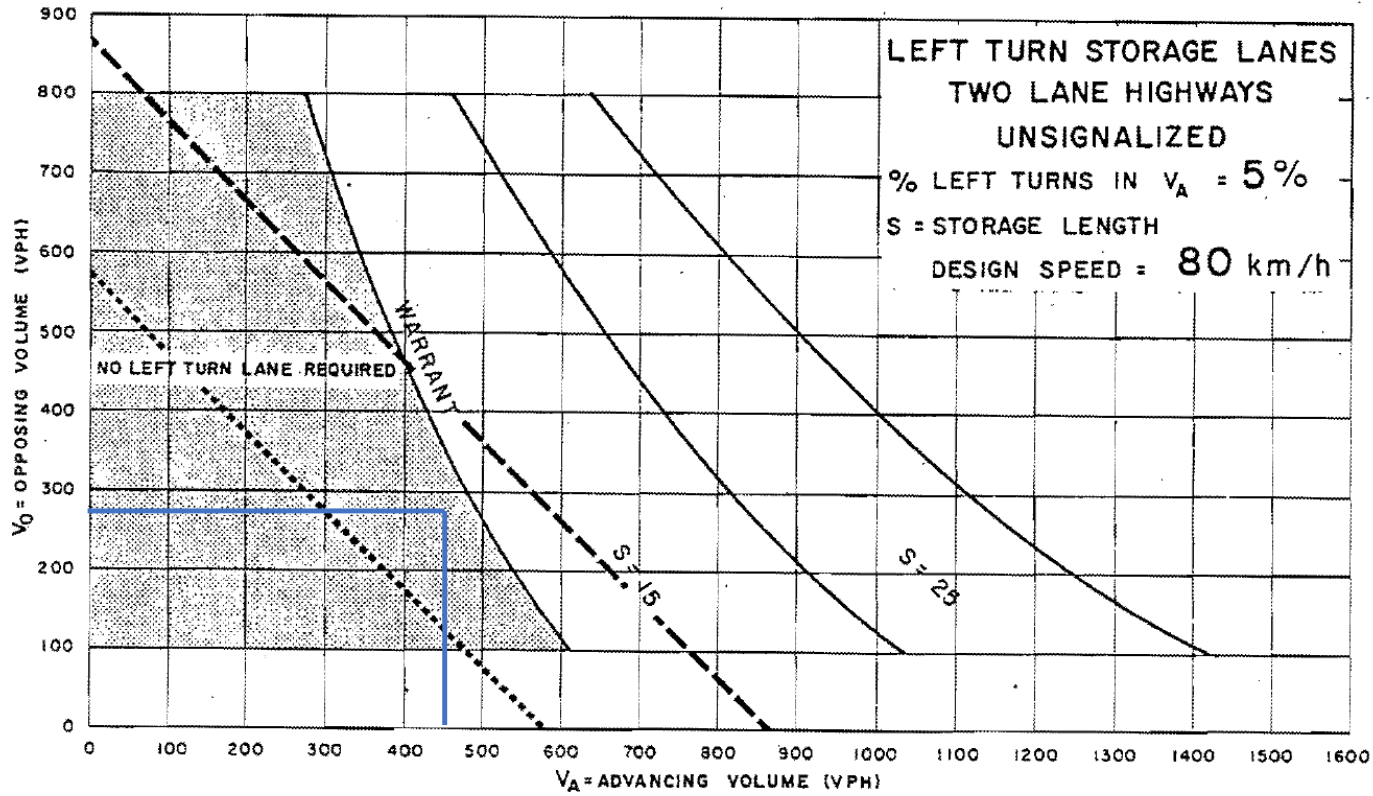
Based on OTM Book 12's Signal Warrant Justification 7 and the estimated AHV for the subject study intersection a signal is:

Not Warranted

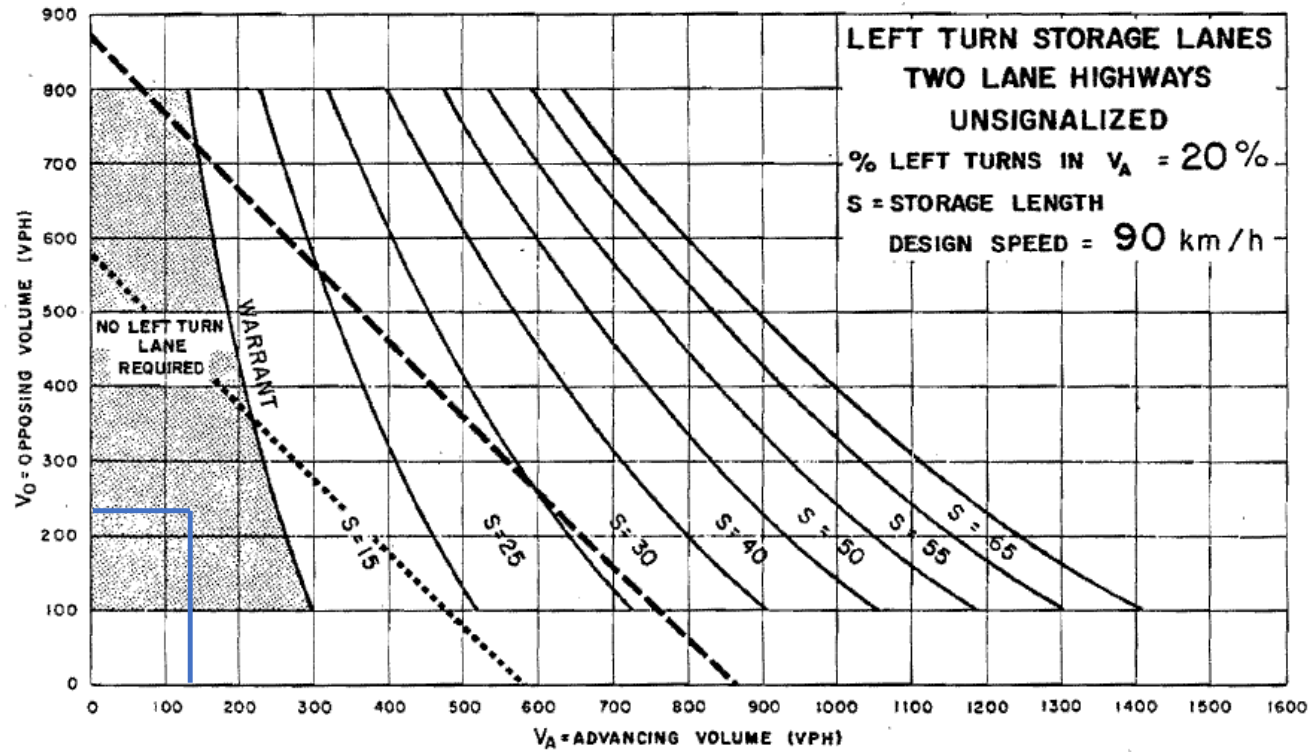
2034 AM Peak- Intersection 201 West Access 1 at 5 SR



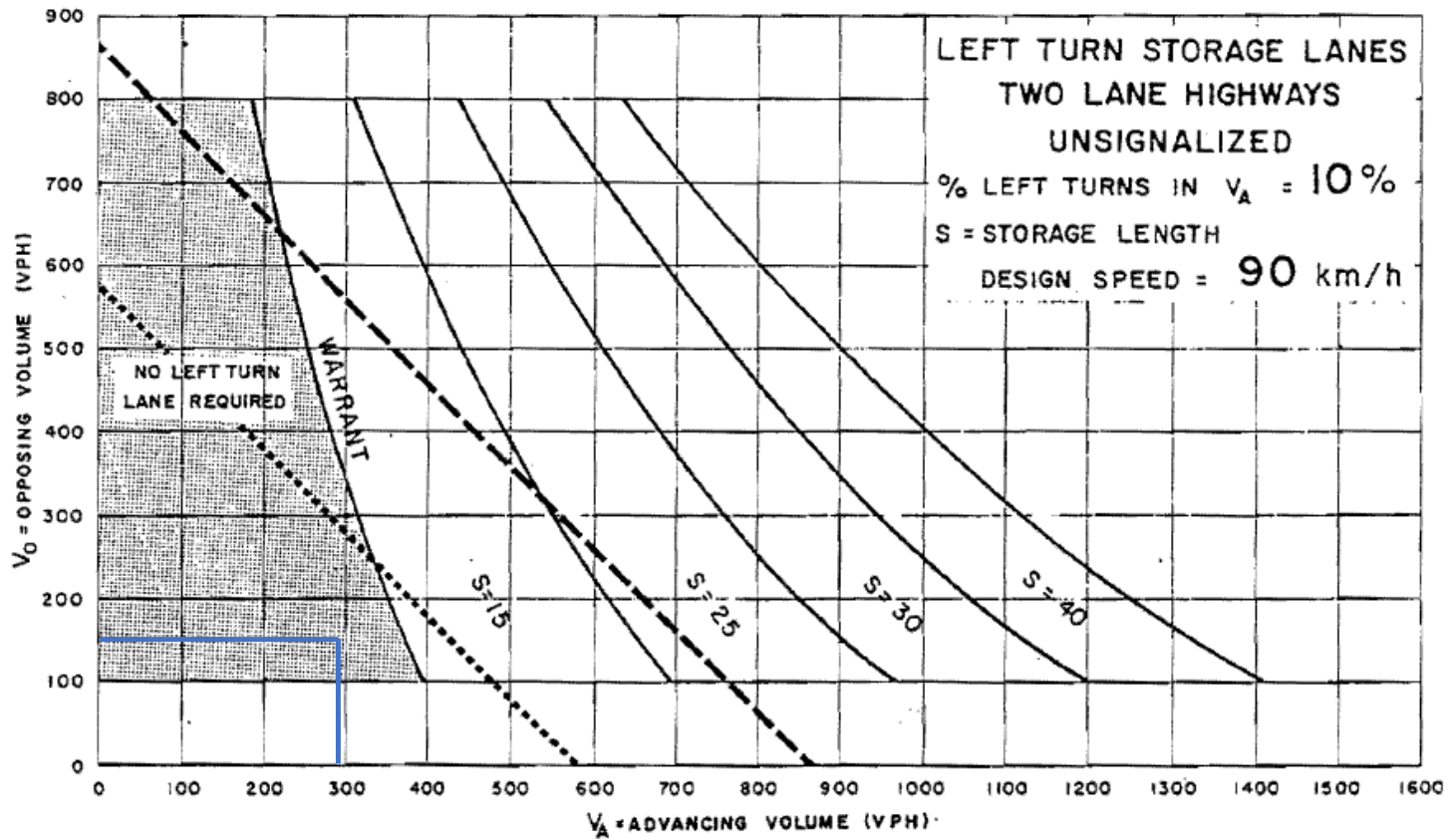
2034 PM Peak- Intersection 201 West Access 1 at 5 SR



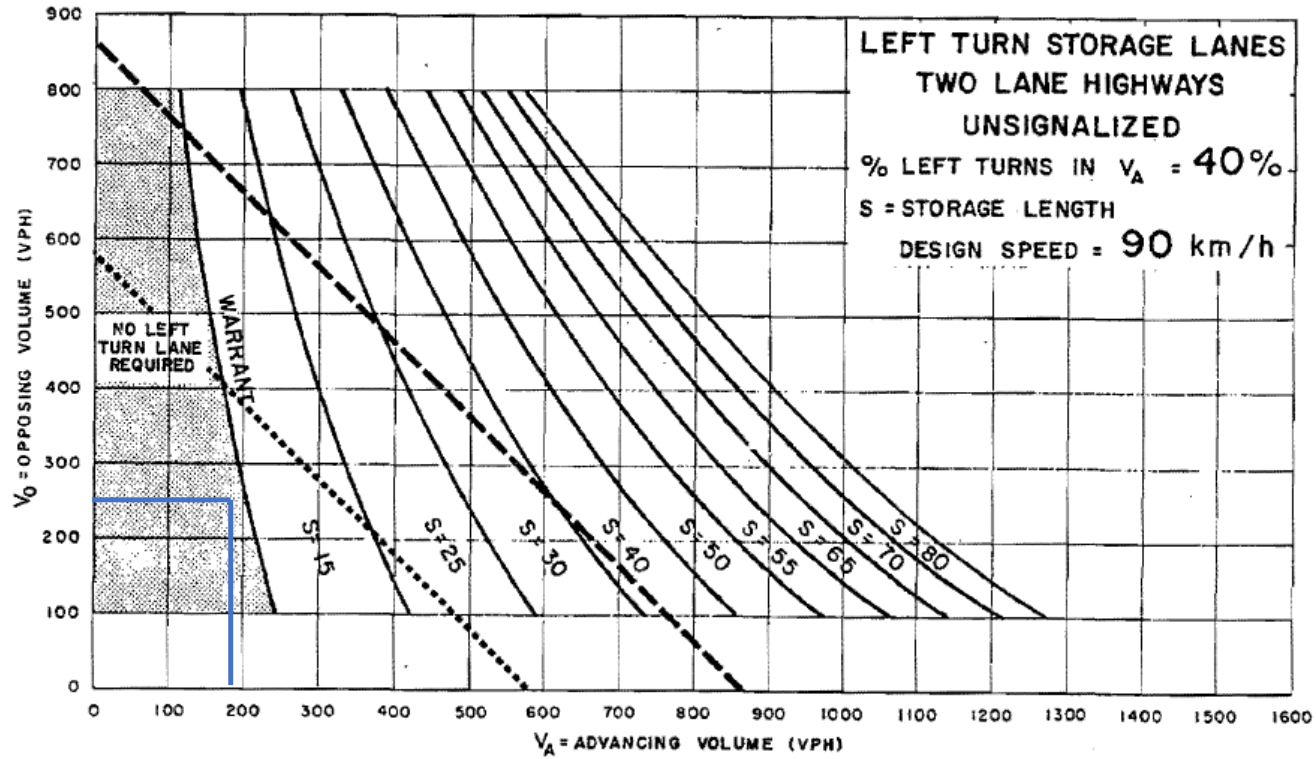
2034 AM Peak- Intersection 203 West Access 3 at Boston Church Rd



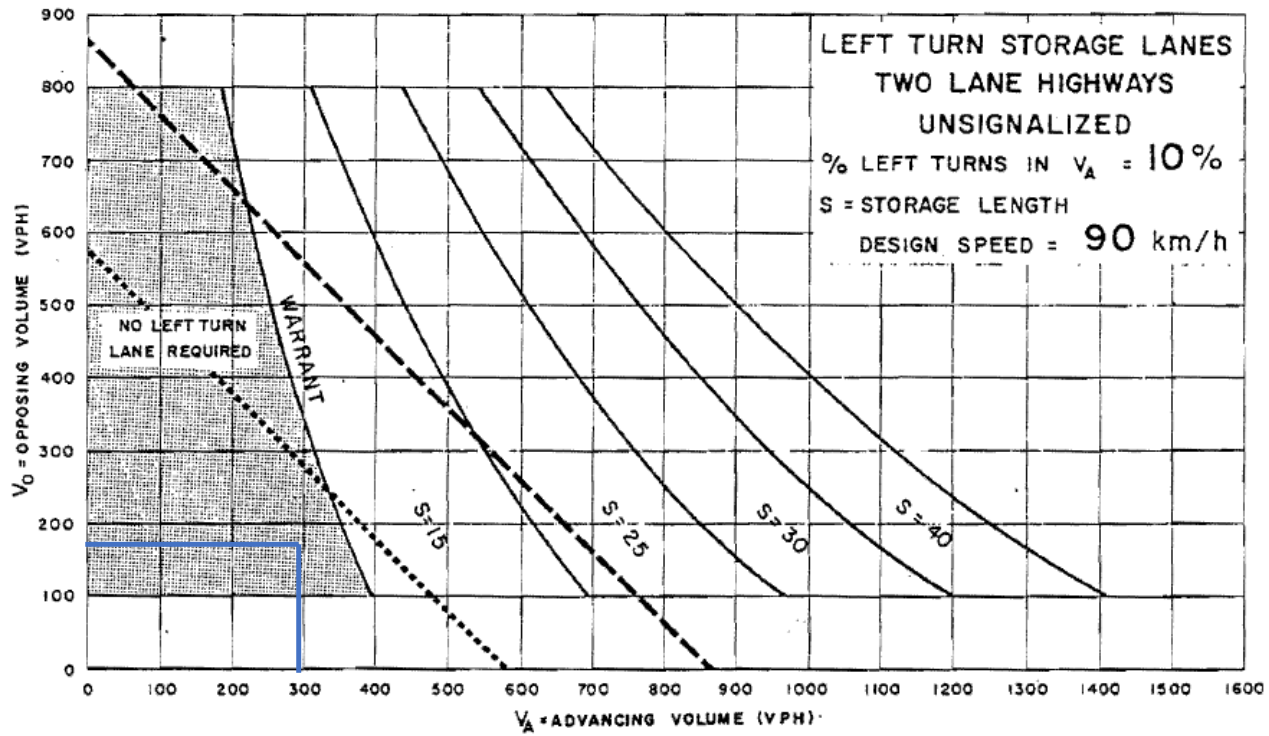
2034 PM Peak- Intersection 203 West Access 3 at Boston Church Rd



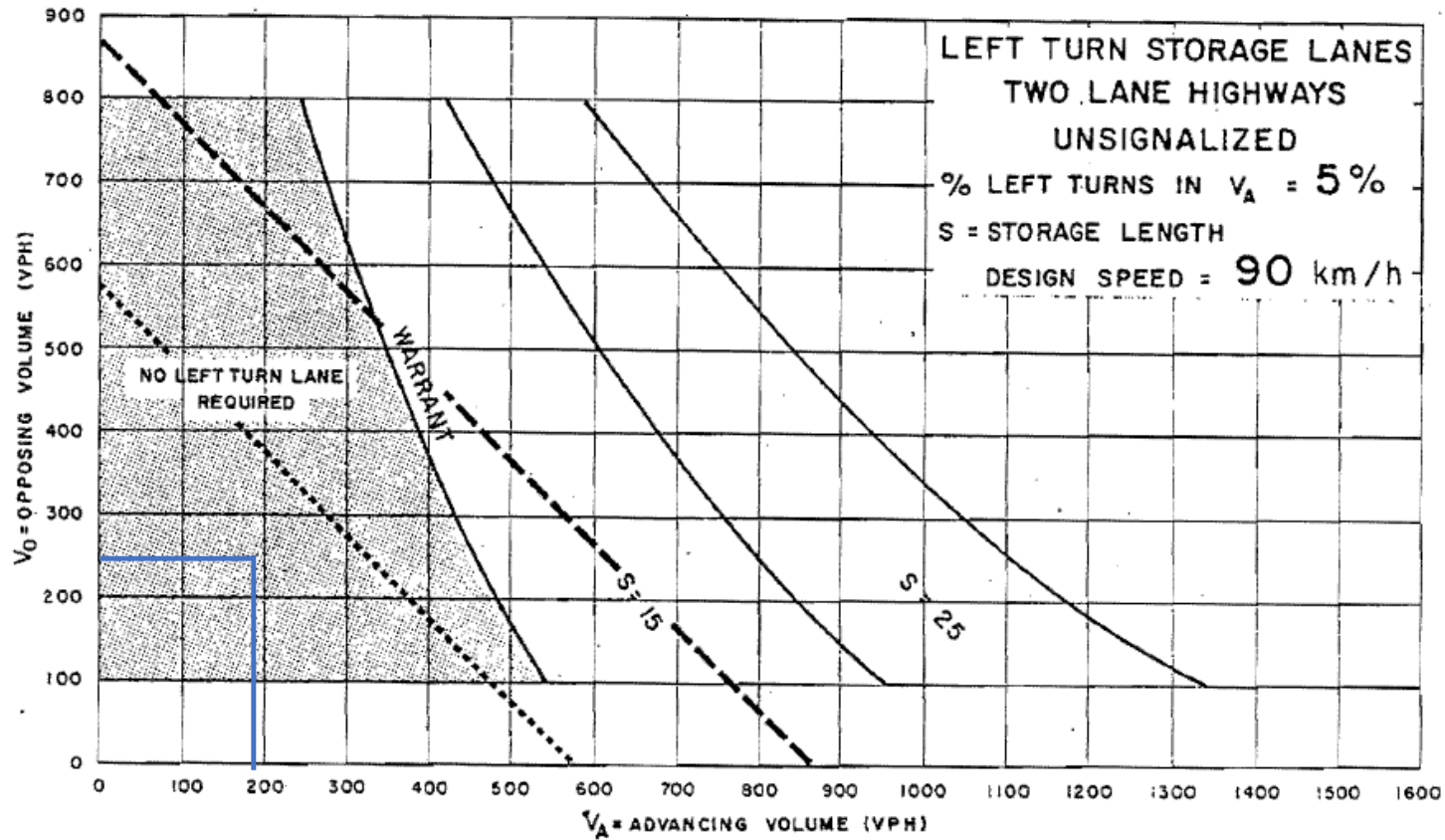
2034 AM Peak- Intersection 204 West Access 4 at Boston Church Rd



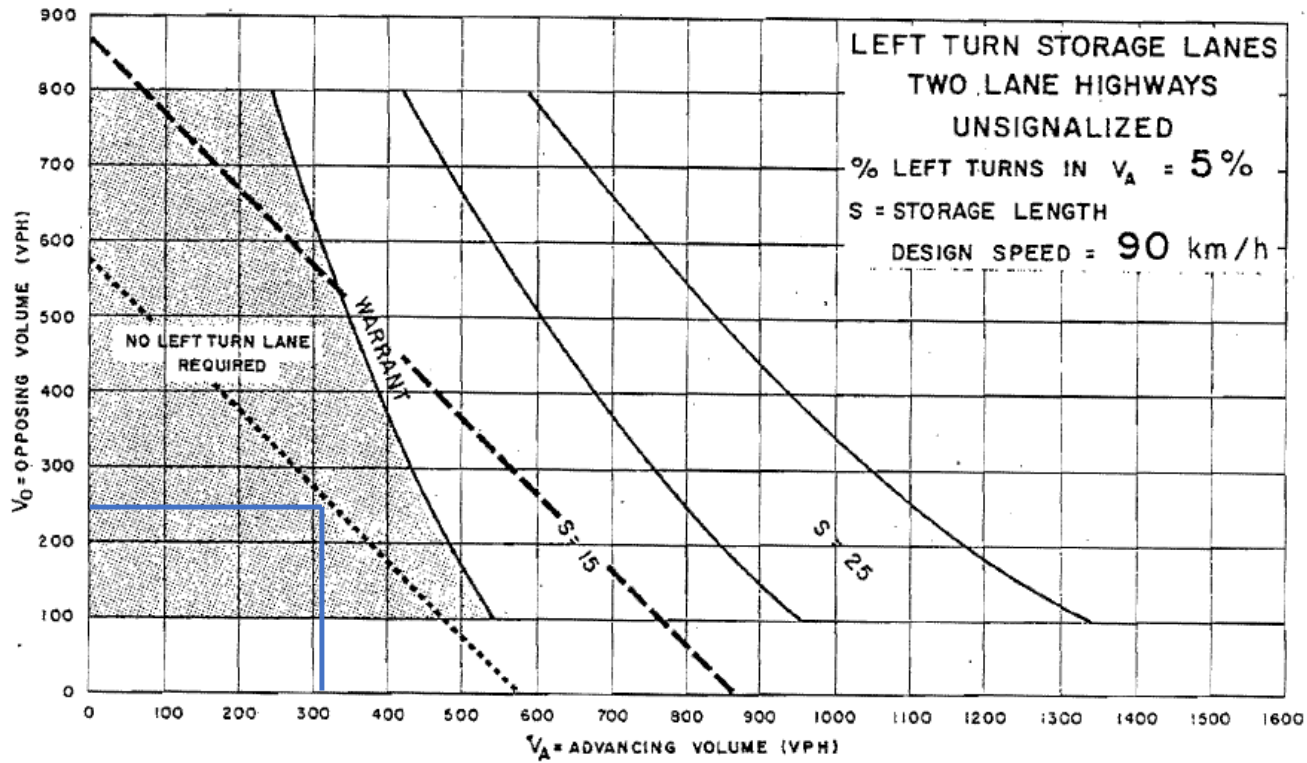
2034 PM Peak- Intersection 204 West Access 4 at Boston Church Rd



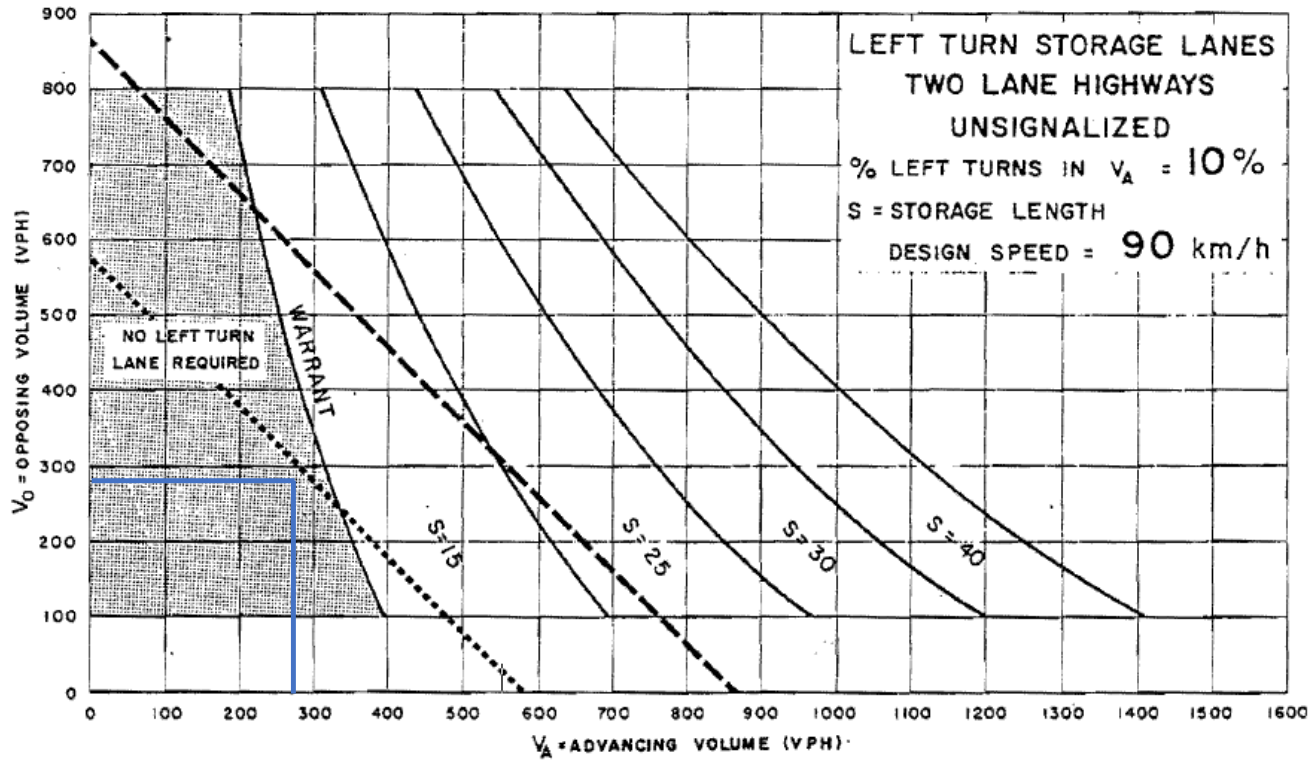
2034 AM Peak- Intersection 205 West Access 5 at Boston Church Rd



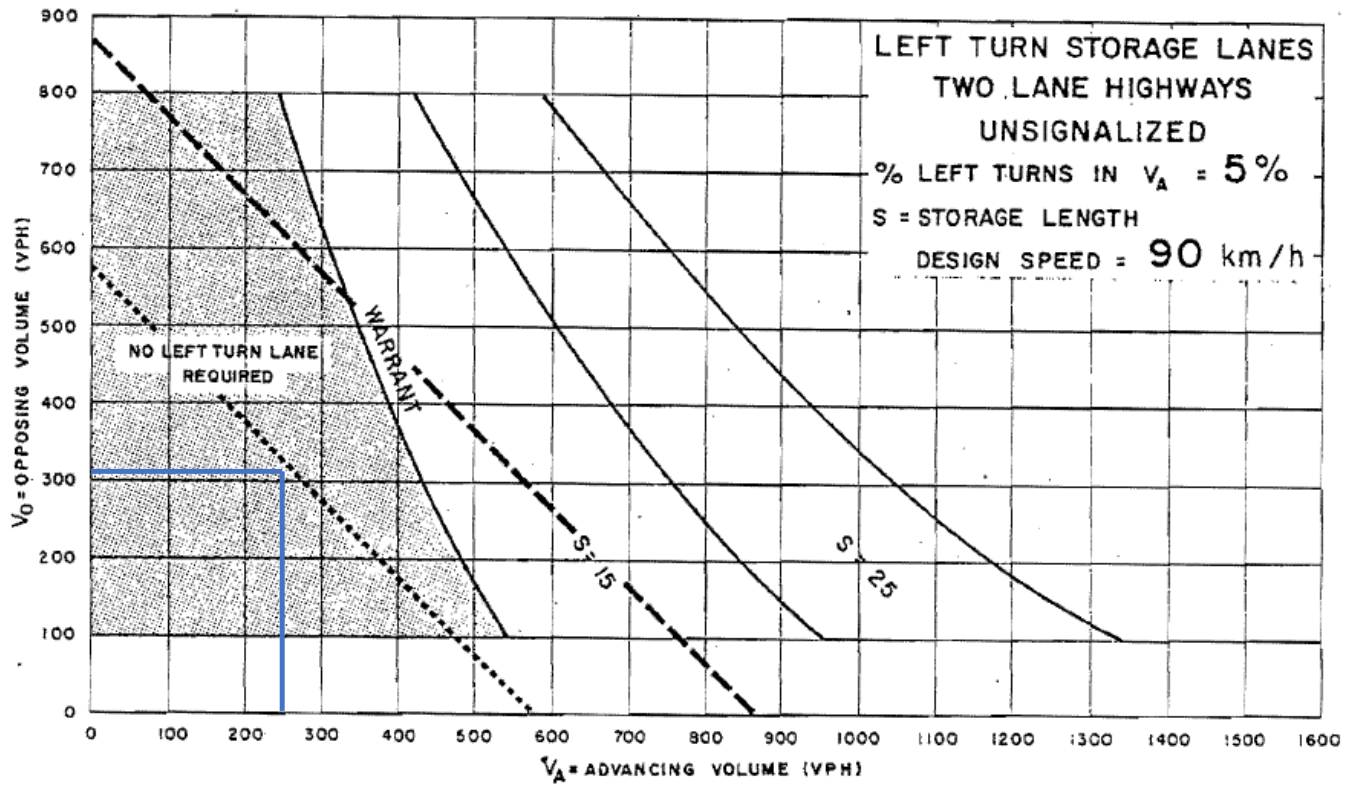
2034 PM Peak- Intersection 205 West Access 5 at Boston Church Rd



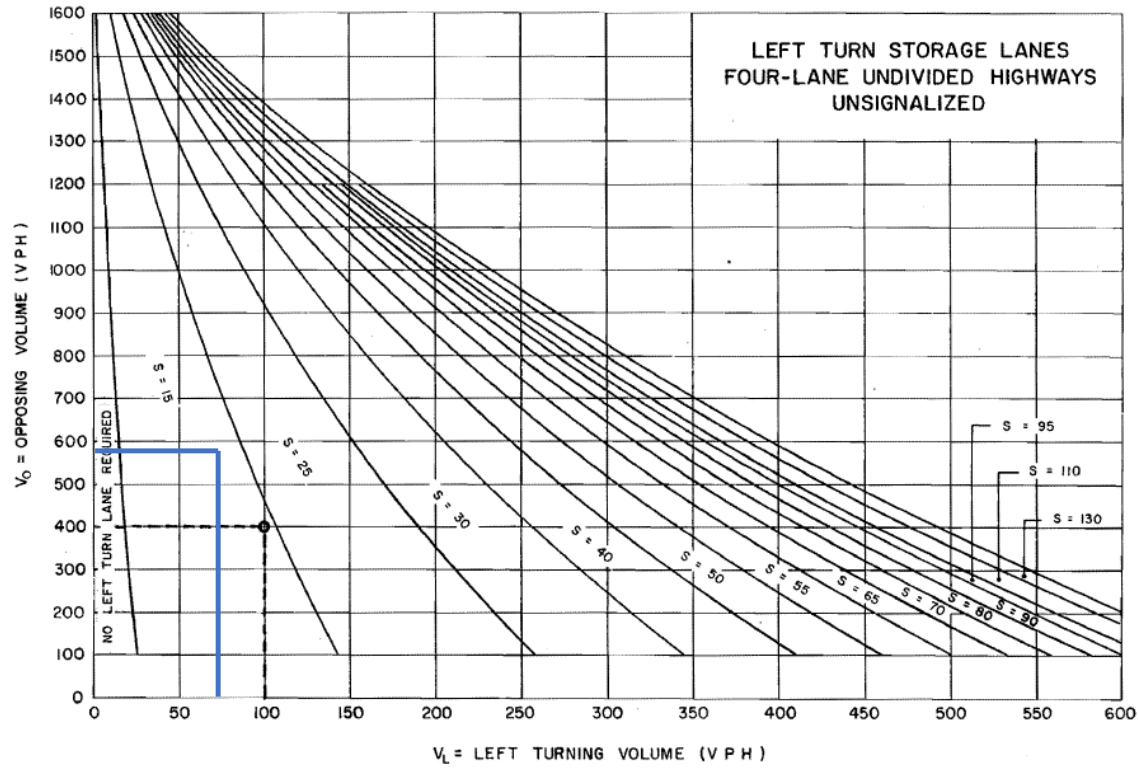
2034 AM Peak- Intersection 101 East Access 1 at Boston Church Rd



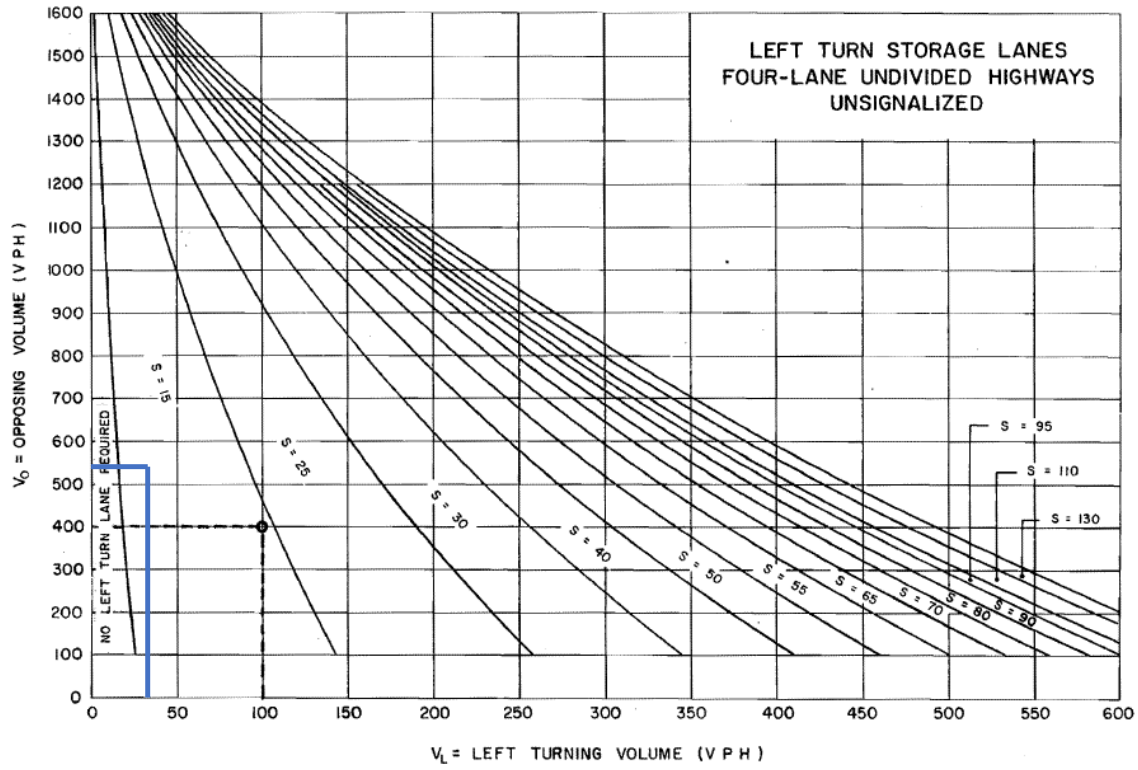
2034 PM Peak- Intersection 101 East Access 1 at Boston Church Rd



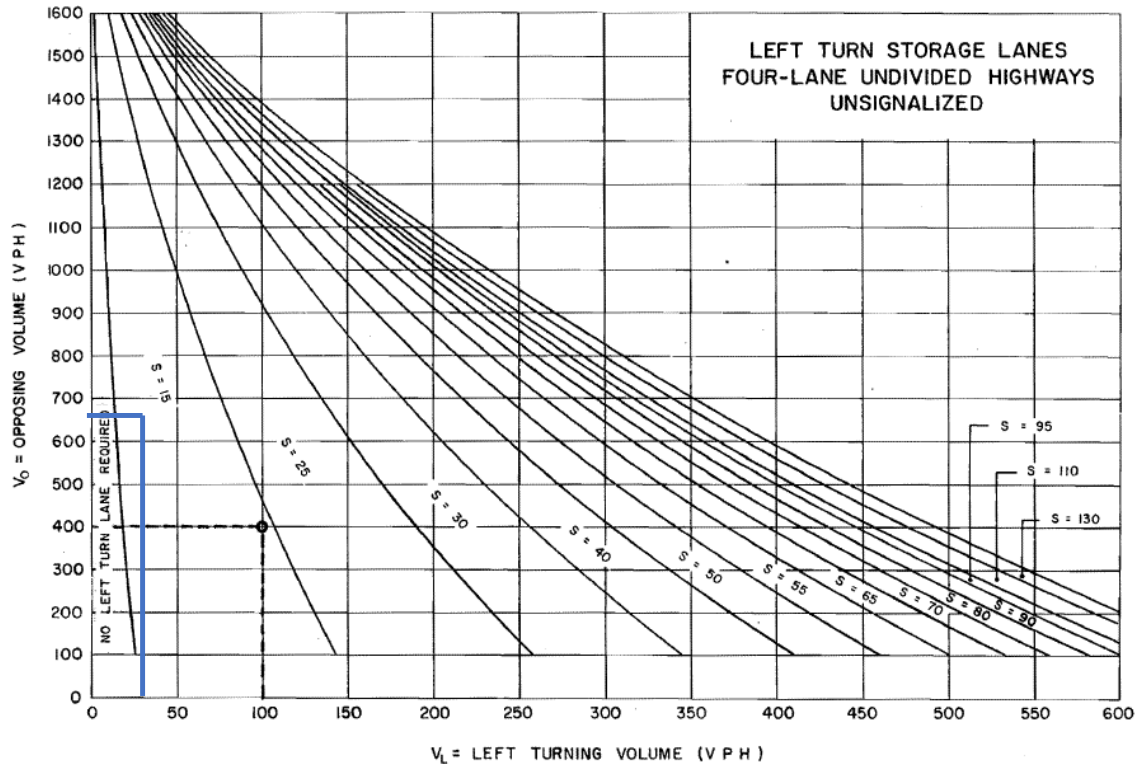
2029 AM Peak- Intersection 102 East Access 2 at James Snow Parkway- Eastbound



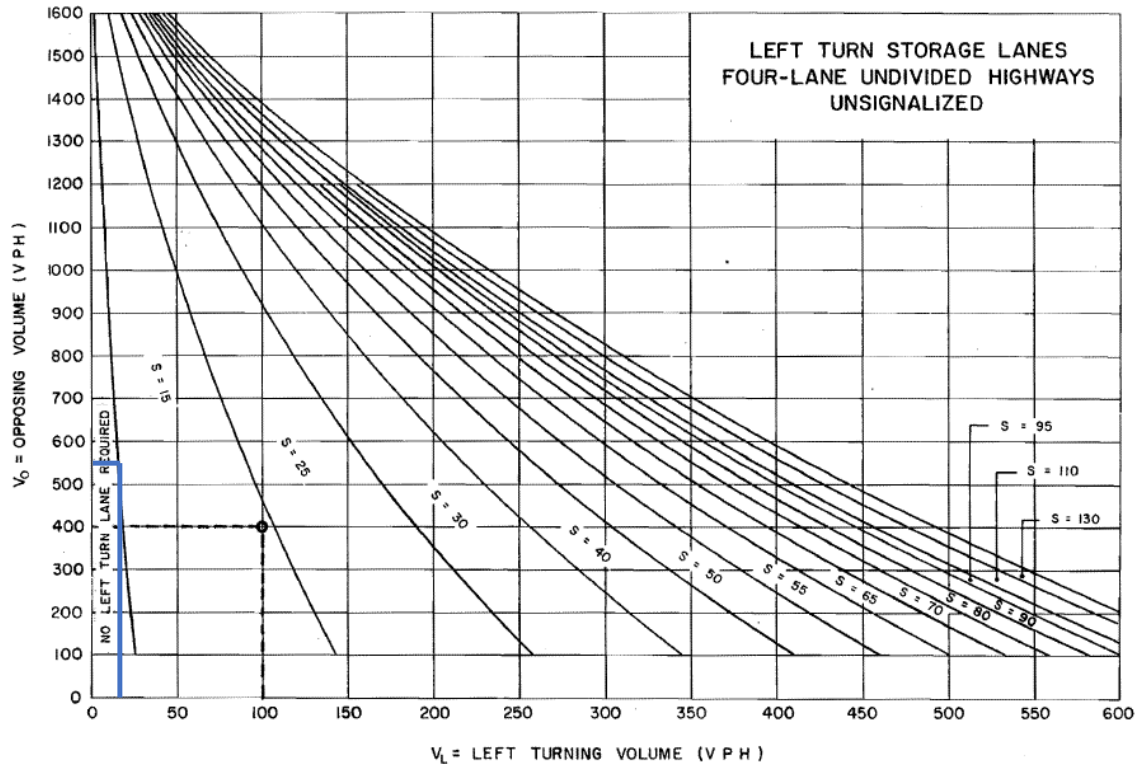
2029 PM Peak- Intersection 102 East Access 2 at James Snow Parkway- Eastbound



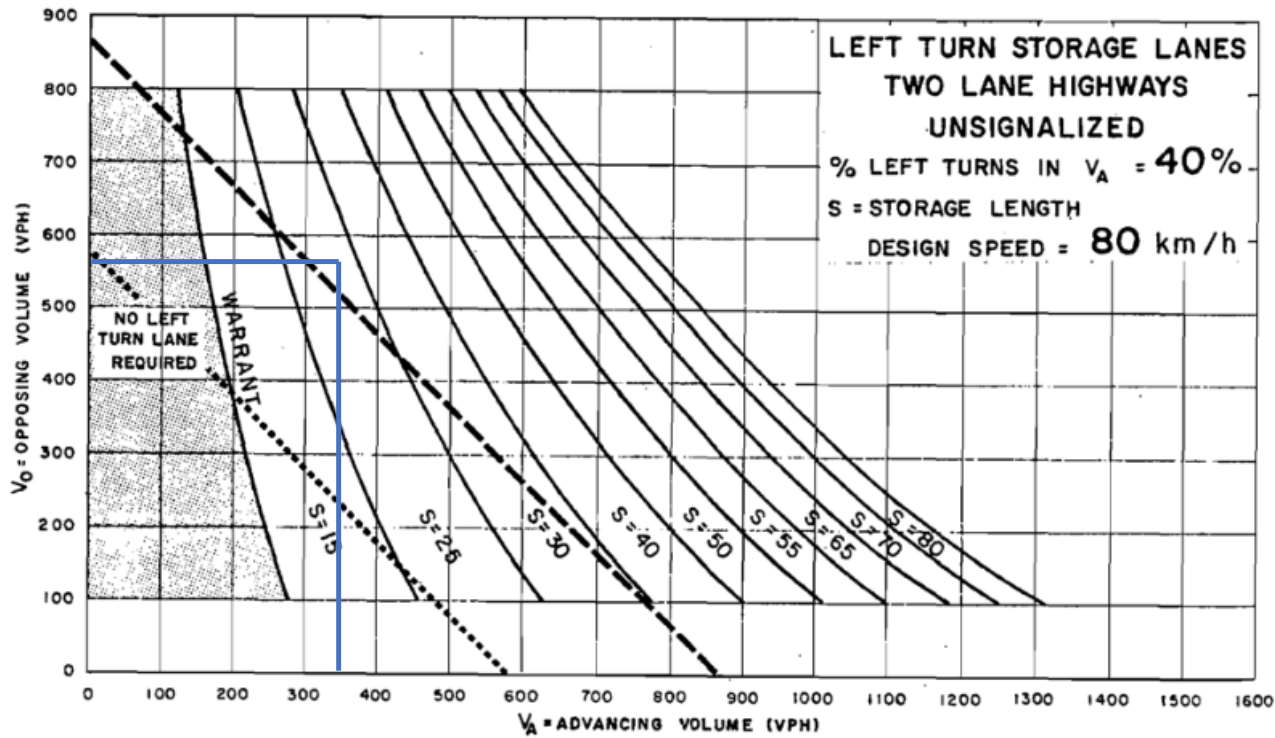
2029 AM Peak- Intersection 103 East Access 3 at James Snow Parkway- Eastbound



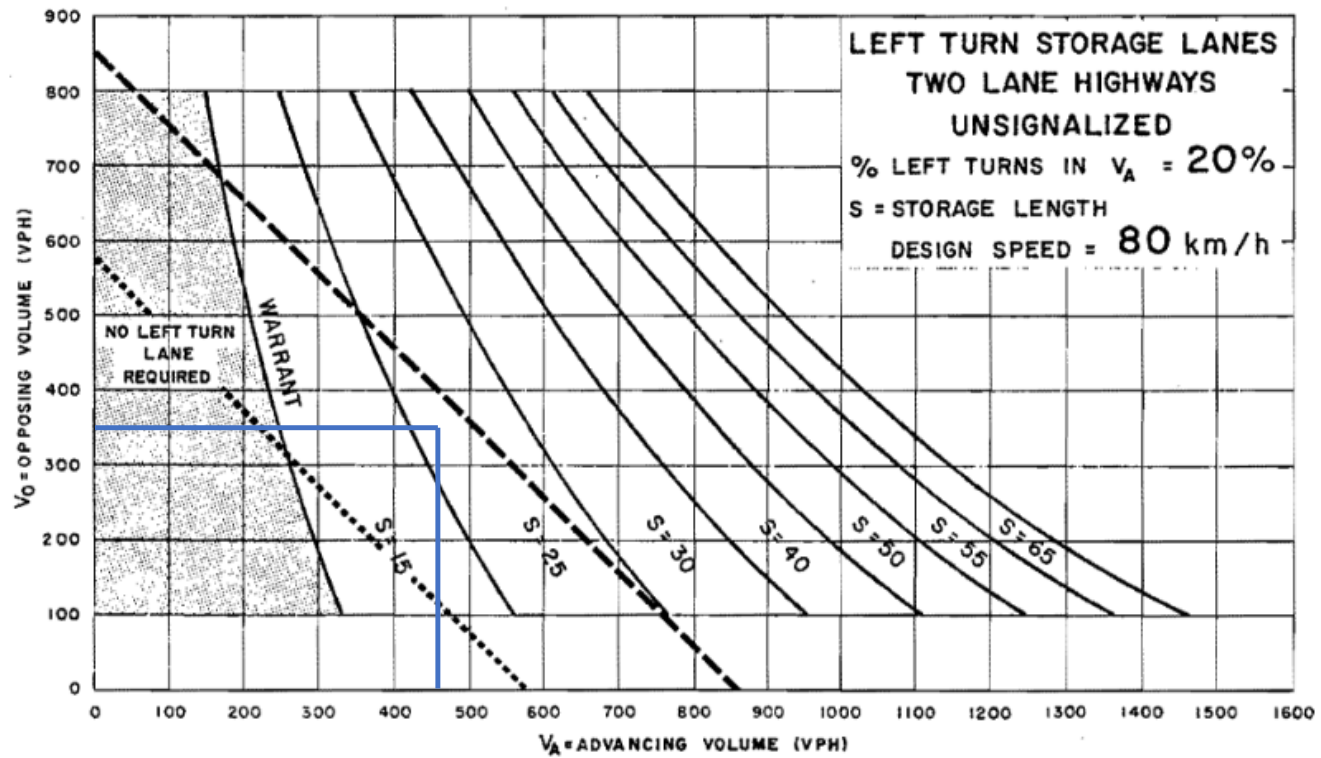
2029 PM Peak- Intersection 103 East Access 3 at James Snow Parkway- Eastbound



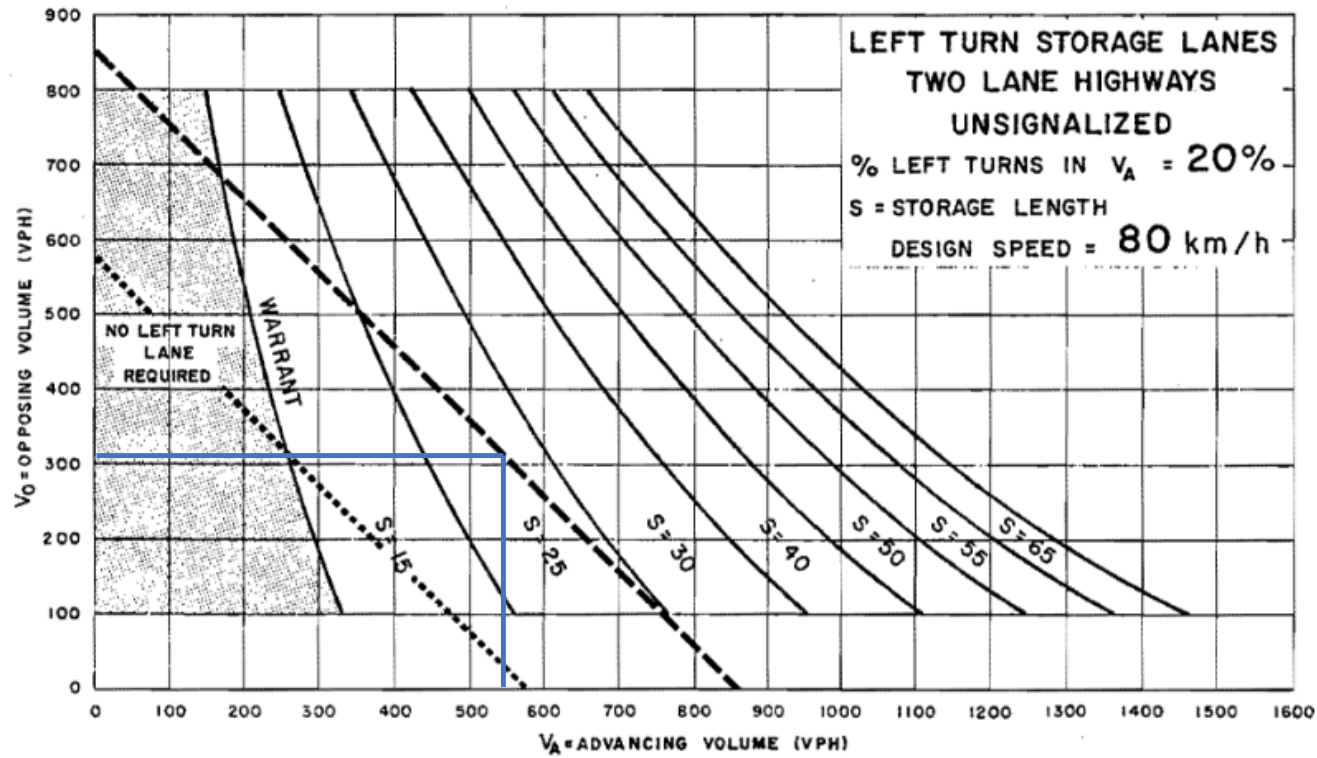
2034 AM Peak- Esquesing Line and 5 Sideroad Westbound Left Turn Lane



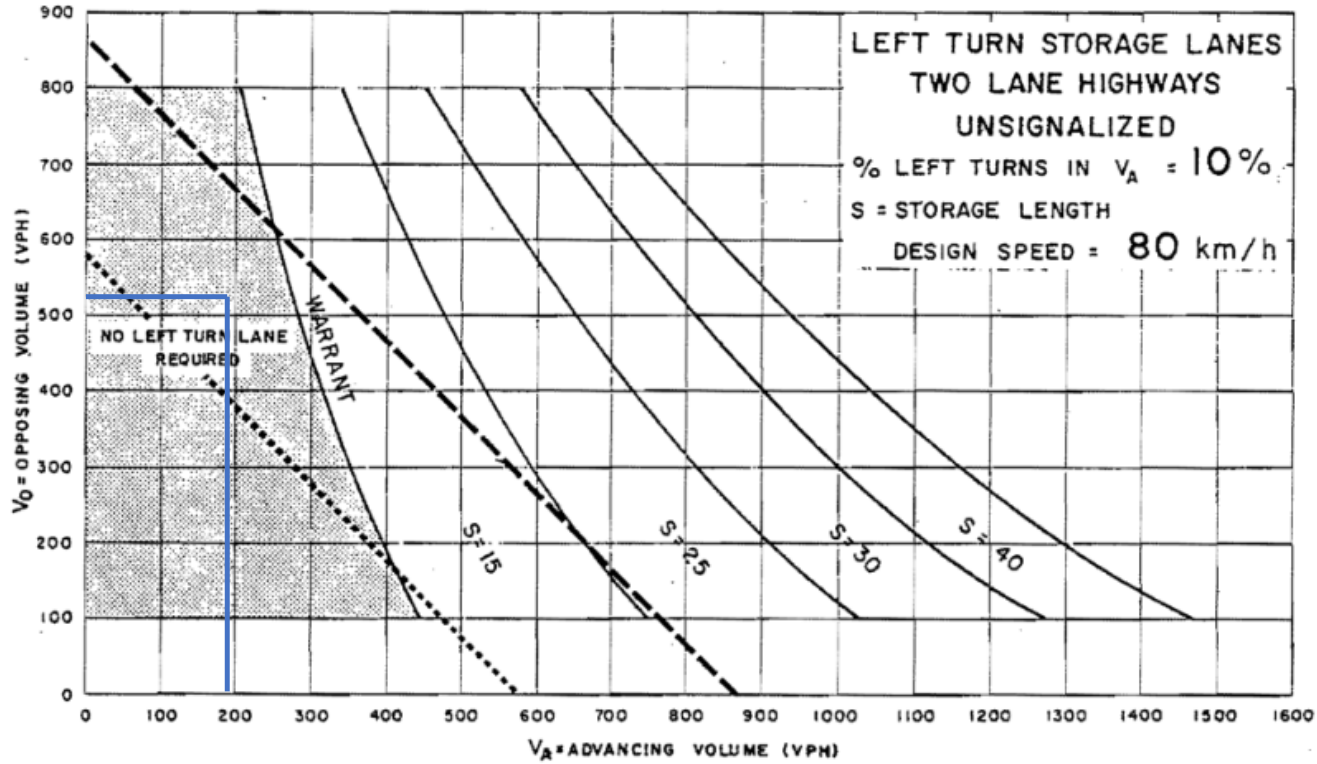
2034 PM Peak- Esquesing Line and 5 Sideroad Westbound Left Turn Lane



2034 AM Peak- Esquesing Line and 5 Sideroad Southbound Left Turn Lane



2034 PM Peak- Esquesing Line and 5 Sideroad Southbound Left Turn Lane



MTO LEFT TURN WARRANT

2034 AM PEAK HOUR

Intersection 201

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 1 at 5 Sideroad - Westbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	46	20%	Fig. EA-15	Yes	15m
VA	253				
%LT in VA	18.2%				
VO	627				

No. of Trucks in LT 0

Lane Width(m)	3.2	
TAC (2017) Standards		
Storage(m)	9	Total Storage Length (Storage + Deceleration Distance) (m)
Storage Length	15	Taper
Taper Ratio	15:1	
Taper Length(m)	48	
Total Length	63	

Intersection 202

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 2 at 5 Sideroad - Westbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	28	0%	Fig. EA-14	No	-
VA	253				
%LT in VA	0.0%				
VO	622				

Intersection 203

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 3 at Boston Church Road - Northbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	19	20%	Fig. EA-19	No	-
VA	135				
%LT in VA	16.5%				
VO	232				

Intersection 204

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 4 at Boston Church Road - Northbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	78	45%	Fig. EA-21	No	-
VA	191				
%LT in VA	40.8%				
VO	244				

Intersection 205

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 5 at Boston Church Road - Northbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	4	5%	Fig. EA-18	No	-
VA	195				
%LT in VA	2.1%				
VO	247				

Intersection 101

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 1 at Boston Church Road - Southbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	24	10%	Fig. EA-18	No	-
VA	278				
%LT in VA	8.6%				
VO	297				

2029 AM PEAK HOUR

Intersection 102

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 2 at James Snow Parkway - Eastbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	65	10%	Fig. EB-1	Yes	15
VA	797				
%LT in VA	8.2%				
VO	590				

No. of Trucks in I 10

Lane Width(m)	3.25	
TAC (2017) Standards		
Storage(m)	10	Total Storage Length (Storage + Deceleration Distance) (m)
Storage Length	41	Taper Length
Taper Ratio	27:1	
Taper Length(m)	88	
Deceleration Distance	95	
Total Length	224	

Intersection 103

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 3 at James Snow Parkway - Eastbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	18	5%	Fig. EB-1	Yes	15
VA	777				
%LT in VA	4.9%				
VO	673				

No. of Trucks in LT 2

Lane Width(m)	3.25	
TAC (2017) Standards		
Storage(m)	7	Total Storage Length (Storage + Deceleration Distance) (m)
Storage Length	41	Taper Length
Taper Ratio	27:1	
Taper Length(m)	88	

2034 PM PEAK HOUR

Intersection 201

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 1 at 5 Sideroad - Westbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	12	5%	Fig. EA-14	No	-
VA	452				
%LT in VA	2.7%				
VO	282				

15
50

Intersection 202

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 2 at 5 Sideroad - Westbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	6	0%	Fig. EA-14	No	-
VA	452				
%LT in VA	0.0%				
VO	299				

Intersection 203

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 3 at Boston Church Road - Northbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	18	10%	Fig. EA-18	No	-
VA	294				
%LT in VA	6.1%				
VO	146				

Intersection 204

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 4 at Boston Church Road - Northbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	24	10%	Fig. EA-18	No	-
VA	298				
%LT in VA	8.1%				
VO	167				

Intersection 205

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 5 at Boston Church Road - Northbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	5	5%	Fig. EA-18	No	-
VA	303				
%LT in VA	1.7%				
VO	242				

Intersection 101

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 1 at Boston Church Road - Southbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	7	5%	Fig. EA-18	No	-
VA	249				
%LT in VA	2.8%				
VO	305				

2029 PM PEAK HOUR

Intersection 102

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 2 at James Snow Parkway - Eastbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	36	10%	Fig. EB-1	Yes	15
VA	602				
%LT in VA	6.0%				
VO	554				

No. of Trucks in I 16

Lane Width(m)	3.25	
TAC (2017) Standards		
Storage(m)	4	Total Storage Length (Storage + Deceleration Distance) (m)
Storage Length	41	Taper Length
Taper Ratio	27:1	
Taper Length(m)	88	
Deceleration Lane	95	
Total Length	224	

Intersection 103

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 3 at James Snow Parkway - Eastbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Left Turn Warrant Required?	Storage Length (m)
VL	13	5%	Fig. EB-1	No	-
VA	716				
%LT in VA	2.7%				
VO	549				

Lane Width(m) 3.25

HALTON REGION AG RIGHT- TURN WARRANT - 10%

2034 AM PEAK HOUR

Intersection 201

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 1 at 5 Sideroad - Eastbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	9		No	-
VT	618			
%RT in VT	1.5%			

Intersection 202

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 2 at 5 Sideroad - Eastbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	9		No	-
VT	613			
%RT in VT	1.5%			

Intersection 203

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 3 at Boston Church Road - Southbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	0		No	-
VT	232			
%RT in VT	0.0%			

Intersection 204

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 4 at Boston Church Road - Southbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	20		No	-
VT	224			
%RT in VT	8.9%			

Intersection 205

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 5 at Boston Church Road - Southbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	0		No	-
VT	247			
%RT in VT	0.0%			

Intersection 101

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 1 at Boston Church Road - Northbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	29		Yes	-
VT	202			
%RT in VT	47.0%			

Lane Width(m) 3.2

No. of Trucks in LT	0	As per TAC- Table 9.14.2	Total Storage Length (Storage + Deceleration Distance) (m)	115
		Storage Length(m)	18	Taper Length
		Storage Length(m)	20	55
		Length of Taper	54.4	
		Parallel Lane Length (m)	95	
		Total Length	169.4	

Intersection 102

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 2 at James Snow Parkway - Westbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	143		Yes	-
VT	484			
%RT in VT	29.5%			

TAC

Lane Width (m)	3.25	Cars	Trucks	Total Storage Length (Storage + Deceleration Distance) (m)
No. of Trucks in LT	10	Storage Length(m)	25	14
		Storage Length(m)	41	Taper Length
		Length of Taper	55.25	55
		Parallel Lane Length (m)	95	
		Total Length	191.25	

Intersection 103

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 3 at James Snow Parkway - Westbound

	Total Traffic (vph)	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	39		Yes	-
VT	635			
%RT in VT	15.4%			

No. of Trucks in LT	8	As per TAC- Table 9.14.2	Cars	Trucks	Total Storage Length (Storage + Deceleration Distance) (m)
		Storage Length(m)	16	11	136
		Storage Length(m)	41	Taper Length	
		Length of Taper	55.25	55	
		Parallel Lane Length (m)	95		
		Total Length	191.25		

2034 PM PEAK HOUR

Intersection 201

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 1 at 5 Sideroad - Eastbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	4		-	No	-
VT	278				
%RT in VT	1.4%				

Intersection 202

Posted Speed 60 km/h
Design Speed 80 km/h

West Access 2 at 5 Sideroad - Eastbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	4		-	No	-
VT	295				
%RT in VT	2.4%				

Intersection 203

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 3 at Boston Church Road - Southbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	0		-	No	-
VT	146				
%RT in VT	0.0%				

Intersection 204

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 4 at Boston Church Road - Southbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	7		-	No	-
VT	160				
%RT in VT	4.4%				

Intersection 205

Posted Speed 70 km/h
Design Speed 90 km/h

West Access 5 at Boston Church Road - Southbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	0		-	No	-
VT	242				
%RT in VT	0.0%				

Intersection 101

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 1 at Boston Church Road - Northbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	29		-	Yes	-
VT	276				
%RT in VT	10.5%				

Lane Width(m) 3.2

No. of Trucks in LT	0	As per TAC- Table 9.14.2	Total Storage Length (Storage + Deceleration Distance) (m)	115
		Storage Length(m)	5	Taper Length
		Storage Length(m)	20	55
		Length of Taper	54.4	
		Parallel Lane Length (m)	95	
		Total Length	169.4	

Intersection 102

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 2 at James Snow Parkway - Westbound

	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	156		-	Yes	-
VT	557				
%RT in VT	10.1%				

TAC

Lane Width (m)	3.25	Cars	Trucks	Total Storage Length (Storage + Deceleration Distance) (m)
No. of Trucks in LT	16	Storage Length(m)	41	22
		Storage Length(m)	55.25	Taper Length
		Length of Taper	55.25	55
		Parallel Lane Length (m)	95	
		Total Length	191.25	

Intersection 103

Posted Speed 70 km/h
Design Speed 90 km/h

East Access 3 at James Snow Parkway - Westbound

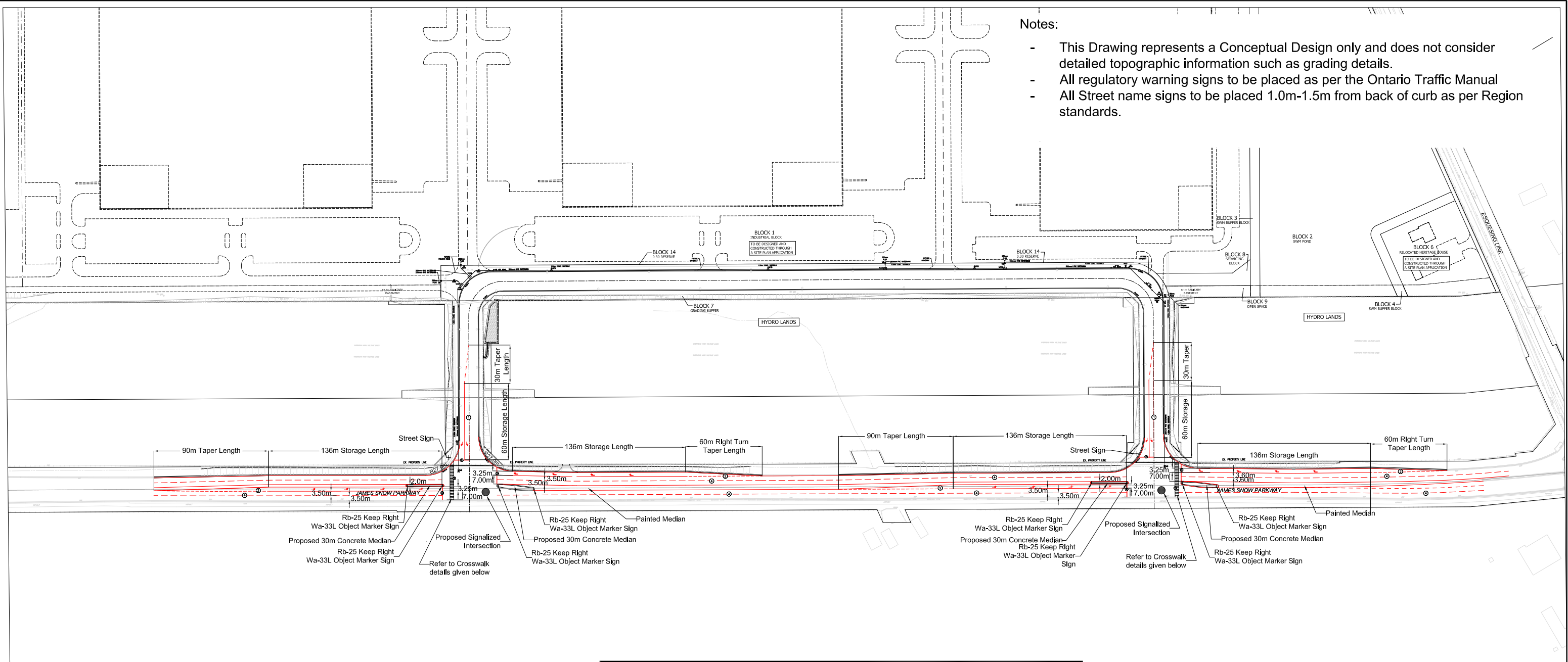
	Total Traffic (vph)	%LT in VA	Reference Figure	Right Turn Warrant Required?	Storage Length (m)
VR	39		-	No	-
VT	575				
%RT in VT	5.7%				

TAC

No. of Trucks in LT	13	As per TAC- Table 9.14.2	Cars	Trucks	Total Storage Length (Storage + Deceleration Distance) (m)
		Storage Length(m)	16	11	136
		Storage Length(m)	41	Taper Length	
		Length of Taper	55.25	55	
		Parallel Lane Length (m)	95		
		Total Length	191.25		

Notes:

- This Drawing represents a Conceptual Design only and does not consider detailed topographic information such as grading details.
- All regulatory warning signs to be placed as per the Ontario Traffic Manual
- All Street name signs to be placed 1.0m-1.5m from back of curb as per Region standards.

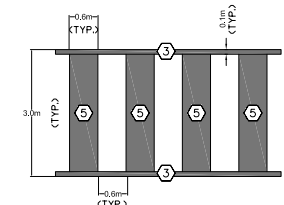


TRAFFIC SIGN SCHEDULE

SIGN NUMBER	SIGN NAME	QUANTITY	COMMENTS
Rb-25	KEEP RIGHT	8	
Wa-33L	OBJECT MARKER	8	TO LEFT
	STREET SIGNS	2	
TOTAL		18	

PAVEMENT MARKING LEGEND

IDENTIFICATION	TYPE	COLOUR	WIDTH (cm)
1	SOLID	YELLOW	10
2	3-3-3 BROKEN	WHITE	10
3	SOLID	WHITE	10
4	3-6-3 BROKEN	WHITE	10
5	SOLID	WHITE	60



CROSSWALK DETAIL
N.T.S.

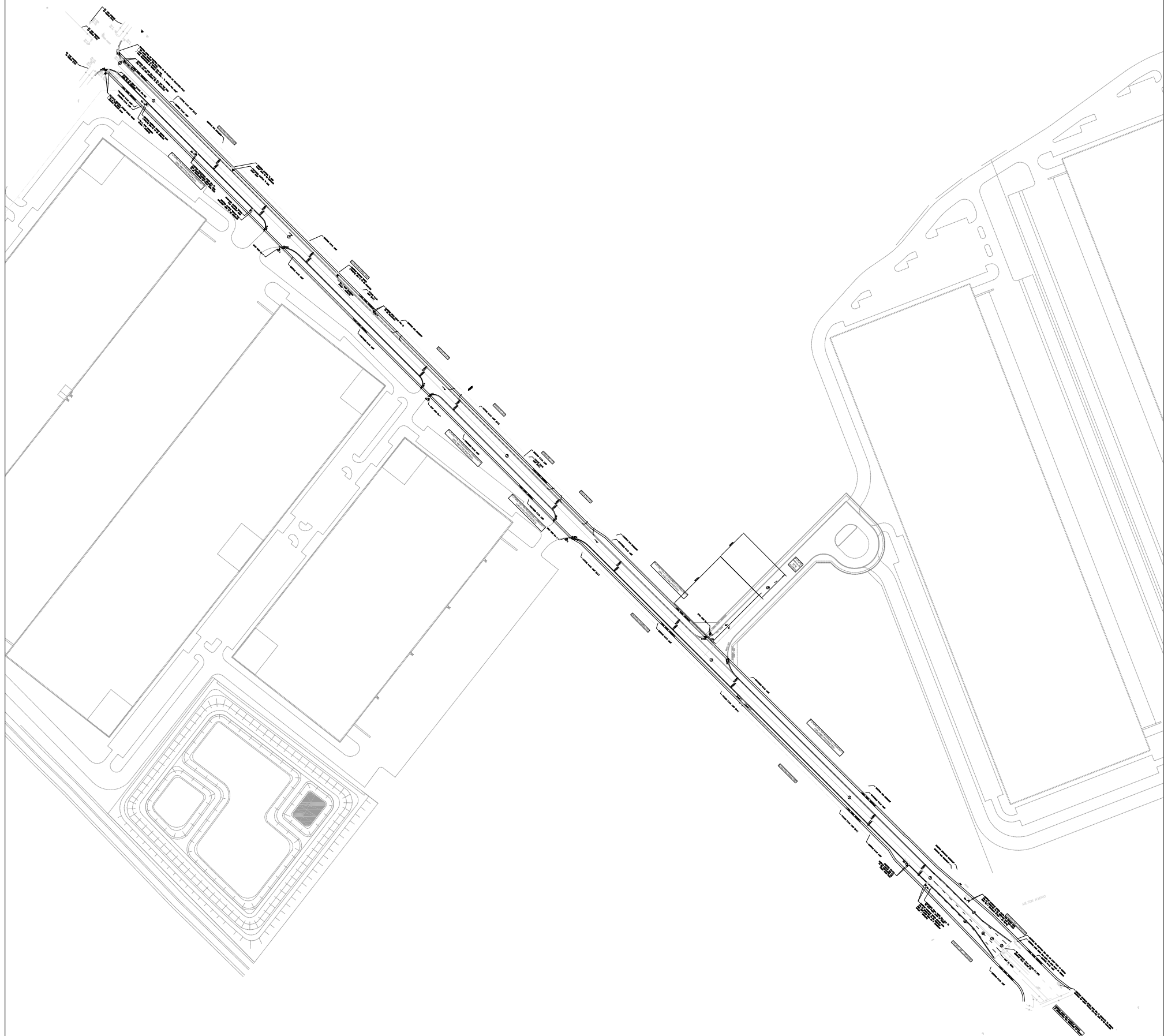
NOTES

1. 3-3-3, 3-6-3, DENOTES PAVEMENT MARKING SPACING (IE., 3m LINE, 3m GAP, 3m LINE)



Notes:

- Boston Church Road Widening Design layout as per Town of Milton STD. E-5
- This Drawing represents a Conceptual design only and does not



TRAFFIC SIGN SCHEDULE			
SIGN NUMBER	SIGN NAME	QUANTITY	COMMENTS
Rp-1	STOP SIGN	4	
Rb-1	MAXIMUM SPEED SIGN	2	
TOTAL		6	

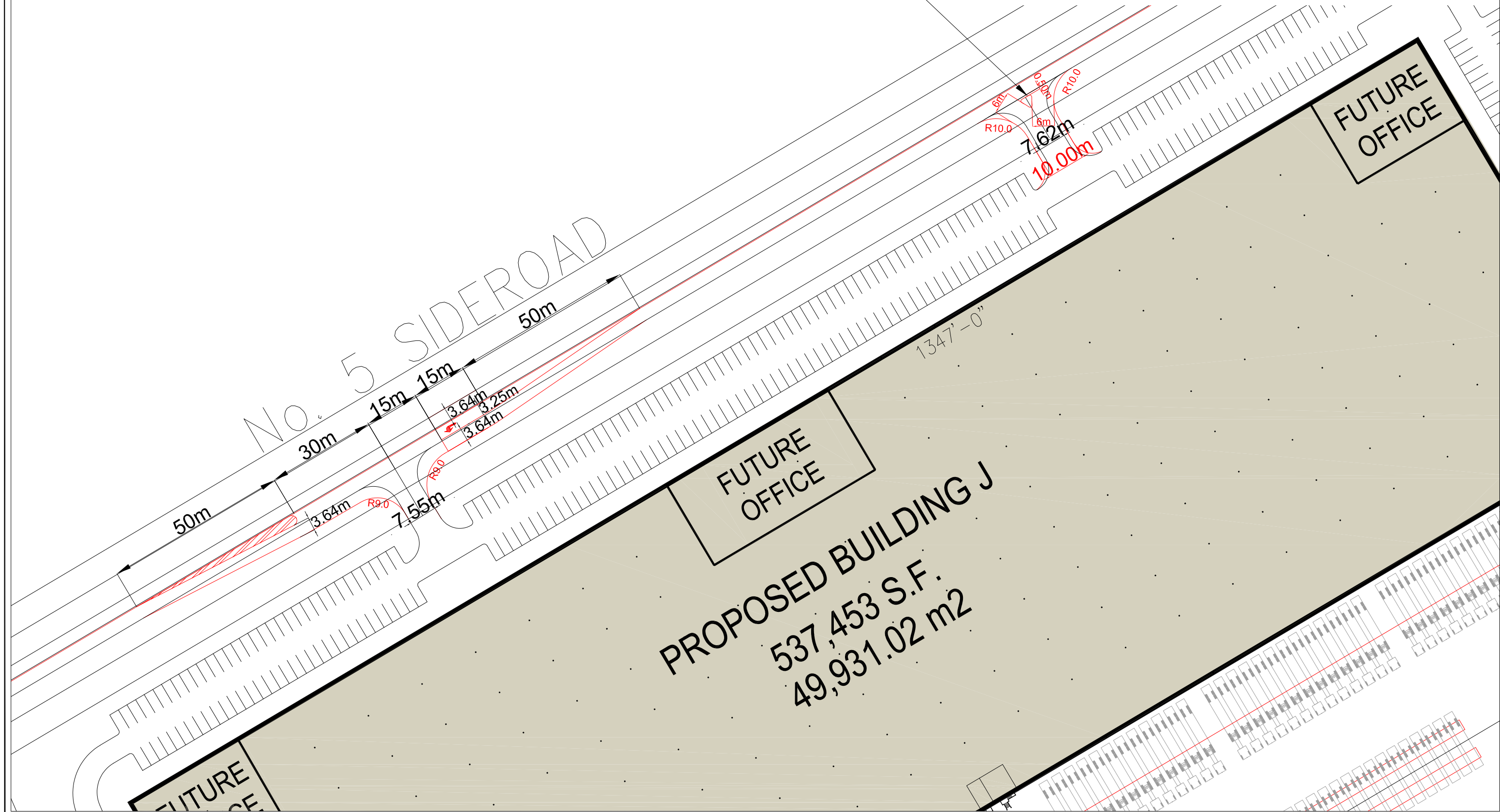
PAVEMENT MARKING LEGEND

- 1 - 10cm (4 in.) YELLOW SOLID
- 2 - 60cm SOLID WHITE STOP BAR
- 3 - 10cm (4 in.) WHITE (3m LINE, 3m GAP)
- A - EX. 10cm (4 in.) YELLOW SOLID
- B - EX. 10cm (4 in.) WHITE SOLID
- C - EX. 60cm (4 in.) WHITE STOP BAR
- D - EX. 10cm (4 in.) WHITE (3m LINE, 3m GAP)
- PROPOSED SIGN ON NEW POST
- EXISTING SIGN ON POST
- PROPOSED ROW LIMITS

Notes:

- This Drawing represents a Conceptual design only and does not consider detailed topographic information such as grading.

Right-in and Right-out Access



Appendix I **Synchro and ARCADY Capacity Analysis**

Lanes, Volumes, Timings

2021 Existing AM Peak Hour

1: Regional Road 25 & 5 Sideroad

02/03/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	82	288	247	63	80	9	89	272	105	92	468	72
Future Volume (vph)	82	288	247	63	80	9	89	272	105	92	468	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.931			0.984			0.850			0.980	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1601	1536	0	1342	1608	0	1225	2920	1338	1601	3045	0
Fit Permitted	0.695			0.113			0.311			0.575		
Satd. Flow (perm)	1171	1536	0	160	1608	0	401	2920	1338	969	3045	0
Right Turn on Red			No		Yes			Yes			Yes	
Satd. Flow (RTOR)					9			112			19	
Link Speed (k/h)	60			60			70			70		
Link Distance (m)	573.6			536.0			986.0			203.5		
Travel Time (s)	34.4			32.2			50.7			10.5		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	87	306	263	67	85	10	95	289	112	98	498	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	569	0	67	95	0	95	289	112	98	575	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7			3.7			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1		1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0		8.0
Trailing Detector (m)	-0.2	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Position(m)	-0.2	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0		-1.0
Detector 1 Size(m)	8.2	9.0		9.0	9.0		9.0	9.0	9.0	9.0		9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		0.0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm		NA
Protected Phases		4		3	8		5	2				6
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		3	8		5	2	2	6		6
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	20.0	20.0	20.0		20.0
Minimum Split (s)	38.0	38.0		11.0	38.0		11.0	38.2	38.2	38.2		38.2

Lanes, Volumes, Timings

2021 Existing AM Peak Hour

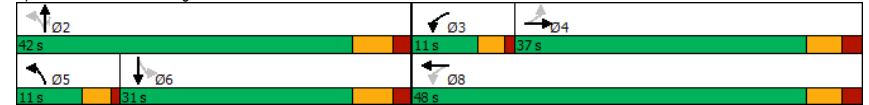
1: Regional Road 25 & 5 Sideroad

02/03/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	37.0	37.0		11.0	48.0		11.0	42.0	42.0	31.0	31.0	
Total Split (%)	41.1%	41.1%		12.2%	53.3%		12.2%	46.7%	46.7%	34.4%	34.4%	
Maximum Green (s)	31.0	31.0		7.0	42.0		7.0	35.8	35.8	24.8	24.8	
Yellow Time (s)	3.7	3.7		3.0	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	2.3	2.3		1.0	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		3.0	5.0	5.0	5.0	5.0	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)	7.0	7.0		7.0			7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0			25.0	25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0			0	0	0	0	0	
Act Effect Green (s)	31.3	31.3		41.8	39.7		43.0	40.7	40.7	32.3	32.3	
Actuated g/C Ratio	0.34	0.34		0.45	0.43		0.46	0.44	0.44	0.35	0.35	
v/c Ratio	0.22	1.10		0.41	0.14		0.38	0.23	0.17	0.29	0.54	
Control Delay	26.3	101.9		23.3	15.7		20.0	17.1	4.0	27.2	26.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	26.3	101.9		23.3	15.7		20.0	17.1	4.0	27.2	26.9	
LOS	C	F		C	B		B	B	A	C	C	
Approach Delay		91.9			18.9			14.7			26.9	
Approach LOS		F			B			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	92.8											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	1.10											
Intersection Signal Delay:	44.7						Intersection LOS: D					
Intersection Capacity Utilization:	88.1%						ICU Level of Service E					
Analysis Period (min):	15											

Splits and Phases: 1: Regional Road 25 & 5 Sideroad



Lanes, Volumes, Timings

2: Regional Road 25 & James Snow Parkway N

2021 Existing AM Peak Hour

02/03/2023

Table with 13 columns (Lane Groups: EBL, EBT, EBR, WBL, WBT, WBR, NBL, NBT, NBR, SBL, SBT, SBR) and 28 rows of traffic signal timing and volume data.

Intersection Summary

Area Type: Other
Cycle Length: 155
Actuated Cycle Length: 68.4
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 16.6 Intersection LOS: B
Intersection Capacity Utilization 62.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis

2: Regional Road 25 & James Snow Parkway N

2021 Existing AM Peak Hour

02/03/2023

Table with 13 columns (Movements) and 28 rows of capacity analysis data including traffic volume, v/c ratios, delays, and LOS.

Intersection Summary table with 2 columns and 4 rows: HCM 2000 Control Delay (19.8), HCM 2000 Level of Service (B), HCM 2000 Volume to Capacity ratio (0.46), Actuated Cycle Length (s) (71.5), Sum of lost time (s) (20.0), Intersection Capacity Utilization (62.0%), ICU Level of Service (B), Analysis Period (min) (15).

c Critical Lane Group

Lanes, Volumes, Timings

2021 Existing AM Peak Hour

3: Boston Church Road & James Snow Parkway N

02/03/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Traffic Volume (vph)	29	521	132	15	177	15	29	3	11	22	26	112
Future Volume (vph)	29	521	132	15	177	15	29	3	11	22	26	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.970			0.988				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	3001	0	1415	2971	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.586			0.327			0.737			0.583		
Satd. Flow (perm)	930	3001	0	487	2971	0	863	3650	944	941	3147	1498
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		28			8			106				124
Link Speed (k/h)		70			70			60				60
Link Distance (m)		358.9			1451.5			792.9				198.3
Travel Time (s)		18.5			74.6			47.6				11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Adj. Flow (vph)	32	579	147	17	197	17	32	3	12	24	29	124
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	726	0	17	214	0	32	3	12	24	29	124
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	7	4		4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7		4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

2021 Existing AM Peak Hour

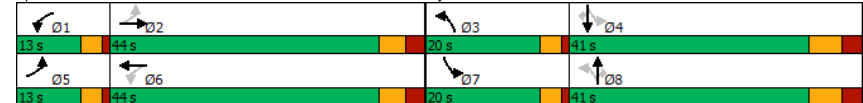
3: Boston Church Road & James Snow Parkway N

02/03/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Total Split (%)	11.0%	37.3%		11.0%	37.3%		16.9%	34.7%	34.7%	16.9%	34.7%	34.7%
Maximum Green (s)	9.0	37.5		9.0	37.5		16.0	33.4	33.4	16.0	33.4	33.4
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	32.8	29.1		31.8	26.9		19.1	16.0	16.0	22.7	15.7	15.7
Actuated g/C Ratio	0.50	0.45		0.49	0.41		0.29	0.25	0.25	0.35	0.24	0.24
v/c Ratio	0.06	0.54		0.05	0.17		0.11	0.00	0.04	0.06	0.04	0.27
Control Delay	9.4	15.7		9.5	14.6		21.8	25.7	0.3	15.7	24.8	8.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.4	15.7		9.5	14.6		21.8	25.7	0.3	15.7	24.8	8.1
LOS	A	B		A	B		C	C	A	B	C	A
Approach Delay		15.5			14.2			16.6			11.9	
Approach LOS		B			B			B			B	
Intersection Summary												
Area Type:	Other											
Cycle Length:	118											
Actuated Cycle Length:	65.2											
Natural Cycle:	90											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.54											
Intersection Signal Delay:	14.8						Intersection LOS: B					
Intersection Capacity Utilization:	52.0%						ICU Level of Service A					
Analysis Period (min):	15											

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



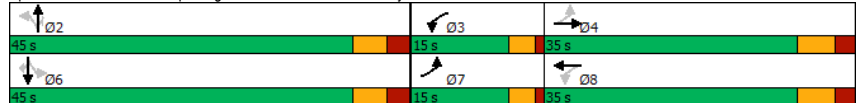
Lanes, Volumes, Timings
4: Esquesing Line & James Snow Parkway N

2021 Existing AM Peak Hour
02/03/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	15.8%	36.8%		15.8%	36.8%		47.4%	47.4%	47.4%	47.4%	47.4%	47.4%
Maximum Green (s)	11.0	28.4		11.0	28.4		38.5	38.5	38.5	38.5	38.5	38.5
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	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)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	26.8	20.3		28.0	22.7		25.4	25.4	25.4	25.4	25.4	25.4
Actuated g/C Ratio	0.41	0.31		0.43	0.35		0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.04	0.60		0.12	0.19		0.26	0.30	0.01	0.12	0.59	0.02
Control Delay	11.2	21.0		11.6	13.7		19.7	17.6	0.0	16.8	22.4	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	21.0		11.6	13.7		19.7	17.6	0.0	16.8	22.4	0.1
LOS	B	C		B	B		B	B	A	B	C	A
Approach Delay		20.7			13.3			17.7			21.1	
Approach LOS		C			B			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 65.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 19.1	Intersection LOS: B
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Esquesing Line & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
4: Esquesing Line & James Snow Parkway N

2021 Existing AM Peak Hour
02/03/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	18	349	147	40	133	41	67	177	6	42	337	12
Future Volume (vph)	18	349	147	40	133	41	67	177	6	42	337	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr't	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2904		1644	2873		1644	1731	1396	1615	1685	1396
Fit Permitted	0.63	1.00		0.36	1.00		0.43	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	1021	2904		622	2873		748	1731	1396	1074	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	20	397	167	45	151	47	76	201	7	48	383	14
RTOR Reduction (vph)	0	47	0	0	30	0	0	4	0	0	0	9
Lane Group Flow (vph)	20	517	0	45	168	0	76	201	3	48	383	5
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		6		6	
Actuated Green, G (s)	23.4	21.1		26.6	22.7		25.4	25.4	25.4	25.4	25.4	25.4
Effective Green, g (s)	23.4	21.1		26.6	22.7		25.4	25.4	25.4	25.4	25.4	25.4
Actuated g/C Ratio	0.35	0.31		0.39	0.34		0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	371	907		304	966		281	651	525	404	634	525
v/s Ratio Prot	0.00	c0.18		c0.01	0.06			0.12			c0.23	
v/s Ratio Perm	0.02			0.05			0.10		0.00	0.04		0.00
v/c Ratio	0.05	0.57		0.15	0.17		0.27	0.31	0.01	0.12	0.60	0.01
Uniform Delay, d1	14.6	19.4		12.9	15.8		14.6	14.9	13.2	13.7	17.0	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.4		0.2	0.2		1.1	0.6	0.0	0.3	2.4	0.0
Delay (s)	14.7	20.8		13.1	16.0		15.7	15.4	13.2	14.0	19.4	13.2
Level of Service	B	C		B	B		B	B	B	B	B	B
Approach Delay (s)		20.5			15.4			15.4			18.6	
Approach LOS		C			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	18.3 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.55
Actuated Cycle Length (s)	67.5 Sum of lost time (s) 17.1
Intersection Capacity Utilization	74.3% ICU Level of Service D
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
5: James Snow Parkway N & Steeles Avenue East

2021 Existing AM Peak Hour
02/03/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	1	497	284	125	277	72	404	146	437	156	134	10	
Future Volume (vph)	1	497	284	125	277	72	404	146	437	156	134	10	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3		
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95		
Frb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1825	3349	1493	2392	3147	1054	3340	3288	1458	1294	3239		
Fit Permitted	0.57	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.65	1.00		
Satd. Flow (perm)	1091	3349	1493	2392	3147	1054	3340	3288	1458	887	3239		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1	540	309	136	301	78	439	159	475	170	146	11	
RTOR Reduction (vph)	0	0	224	0	0	48	0	0	280	0	4	0	
Lane Group Flow (vph)	1	540	85	136	301	30	439	159	195	170	153	0	
Confl. Peds. (#/hr)	1		1	1		1	1		1		1	1	
Heavy Vehicles (%)	0%	9%	8%	48%	16%	53%	6%	11%	12%	41%	10%	30%	
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		
Protected Phases	5	2		1	6		3	8		7	4		
Permitted Phases	2		2			6			8	4			
Actuated Green, G (s)	29.1	28.0	28.0	11.2	39.1	39.1	18.7	25.6	25.6	32.3	19.1		
Effective Green, g (s)	29.1	28.0	28.0	11.2	39.1	39.1	18.7	25.6	25.6	32.3	19.1		
Actuated g/C Ratio	0.29	0.28	0.28	0.11	0.39	0.39	0.18	0.25	0.25	0.32	0.19		
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0		
Lane Grp Cap (vph)	320	923	411	263	1212	406	615	829	367	335	609		
v/s Ratio Prot	0.00	c0.16		c0.06	0.10		c0.13	0.05		0.07	0.05		
v/s Ratio Perm	0.00		0.06			0.03			c0.13	0.10			
v/c Ratio	0.00	0.59	0.21	0.52	0.25	0.07	0.71	0.19	0.53	0.51	0.25		
Uniform Delay, d1	25.8	31.7	28.2	42.6	21.2	19.7	38.9	29.8	32.8	27.2	35.1		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.0	1.0	0.3	1.7	0.1	0.1	3.9	0.2	2.7	1.2	0.5		
Delay (s)	25.8	32.7	28.5	44.3	21.3	19.8	42.8	30.1	35.4	28.4	35.6		
Level of Service	C	C	C	D	C	B	D	C	D	C	D		
Approach Delay (s)		31.1			27.2			37.7			31.8		
Approach LOS		C			C			D			C		
Intersection Summary													
HCM 2000 Control Delay	33.0		HCM 2000 Level of Service					C					
HCM 2000 Volume to Capacity ratio	0.61												
Actuated Cycle Length (s)	101.5				Sum of lost time (s)				24.5				
Intersection Capacity Utilization	69.9%		ICU Level of Service					C					
Analysis Period (min)	15												

Lanes, Volumes, Timings
6: Boston Church Road/3 Line & 5 Sideroad

2021 Existing AM Peak Hour
02/03/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	8	418	27	42	124	3	8	12	18	7	70	25
Future Volume (vph)	8	418	27	42	124	3	8	12	18	7	70	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.992				0.998				0.936			0.967
Fit Protected	0.999				0.988				0.990			0.997
Satd. Flow (prot)	0	1672	0	0	1672	0	0	1564	0	0	1649	0
Fit Permitted	0.999				0.988				0.990			0.997
Satd. Flow (perm)	0	1672	0	0	1672	0	0	1564	0	0	1649	0
Link Speed (k/h)	60				60				70		60	
Link Distance (m)	541.0				1343.2				1050.6		496.0	
Travel Time (s)	32.5				80.6				54.0		29.8	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	9	480	31	48	143	3	9	14	21	8	80	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	520	0	0	194	0	0	44	0	0	117	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				0.0		0.0	
Link Offset(m)	0.0				0.0				0.0		0.0	
Crosswalk Width(m)	1.6				1.6				1.6		1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14		24		14		24		14	
Sign Control	Stop				Stop				Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	45.3%					ICU Level of Service A						
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
6: Boston Church Road/3 Line & 5 Sideroad

2021 Existing AM Peak Hour
02/03/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔			↔			↔			↔			
Sign Control	Stop			Stop			Stop			Stop			
Traffic Volume (vph)	8	418	27	42	124	3	8	12	18	7	70	25	
Future Volume (vph)	8	418	27	42	124	3	8	12	18	7	70	25	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	
Hourly flow rate (vph)	9	480	31	48	143	3	9	14	21	8	80	29	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1									
Volume Total (vph)	520	194	44	117									
Volume Left (vph)	9	48	9	8									
Volume Right (vph)	31	3	21	29									
Hadj (s)	0.20	0.27	-0.01	0.07									
Departure Headway (s)	4.9	5.3	6.0	5.9									
Degree Utilization, x	0.70	0.29	0.07	0.19									
Capacity (veh/h)	719	639	528	545									
Control Delay (s)	18.6	10.5	9.4	10.2									
Approach Delay (s)	18.6	10.5	9.4	10.2									
Approach LOS	C	B	A	B									
Intersection Summary													
Delay	15.2												
Level of Service	C												
Intersection Capacity Utilization	45.3%		ICU Level of Service		A								
Analysis Period (min)	15												

Lanes, Volumes, Timings
7: Esquesing Line/Fourth Line & 5 Sideroad

2021 Existing AM Peak Hour
02/03/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	7	418	17	83	139	3	10	108	114	66	304	26
Future Volume (vph)	7	418	17	83	139	3	10	108	114	66	304	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995			0.998			0.934			0.991		
Fit Protected	0.999			0.982			0.998			0.992		
Satd. Flow (prot)	0	1701	0	0	1679	0	0	1643	0	0	1648	0
Fit Permitted	0.999			0.982			0.998			0.992		
Satd. Flow (perm)	0	1701	0	0	1679	0	0	1643	0	0	1648	0
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	7	440	18	94	158	3	11	123	130	75	345	30
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	465	0	0	255	0	0	264	0	0	450	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14			24			14		
Sign Control	Stop			Stop			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	83.3%				ICU Level of Service E							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 7: Esquesing Line/Fourth Line & 5 Sideroad

2021 Existing AM Peak Hour
 02/03/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	418	17	83	139	3	10	108	114	66	304	26
Future Volume (vph)	7	418	17	83	139	3	10	108	114	66	304	26
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	7	440	18	94	158	3	11	123	130	75	345	30
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	465	255	264	450								
Volume Left (vph)	7	94	11	75								
Volume Right (vph)	18	3	130	30								
Hadj (s)	0.19	0.27	-0.13	0.24								
Departure Headway (s)	8.0	8.9	8.5	8.1								
Degree Utilization, x	1.03	0.63	0.62	1.01								
Capacity (veh/h)	450	392	410	440								
Control Delay (s)	80.4	25.7	24.4	73.4								
Approach Delay (s)	80.4	25.7	24.4	73.4								
Approach LOS	F	D	C	F								
Intersection Summary												
Delay	58.2											
Level of Service	F											
Intersection Capacity Utilization	83.3%			ICU Level of Service				E				
Analysis Period (min)	15											

Lanes, Volumes, Timings

2021 Existing PM Peak Hour

1: Regional Road 25 & 5 Sideroad

02/03/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	95	99	118	78	239	35	199	627	89	7	281	69
Future Volume (vph)	95	99	118	78	239	35	199	627	89	7	281	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		0.0	70.0		0.0	75.0		70.0	35.0		0.0
Storage Lanes	1		0	1		0	1		1	1		0
Taper Length (m)	100.0			100.0			75.0			100.0		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	0.95
Frt		0.918			0.981			0.850			0.970	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1521	1483	0	1437	1658	0	1460	3120	1286	1601	3068	0
Fit Permitted	0.574			0.400			0.445			0.387		
Satd. Flow (perm)	919	1483	0	605	1658	0	684	3120	1286	652	3068	0
Right Turn on Red			No		Yes		Yes		Yes		Yes	Yes
Satd. Flow (RTOR)					10			99			29	
Link Speed (k/h)	60			60			70			70		
Link Distance (m)	573.6			536.0			986.0			203.5		
Travel Time (s)	34.4			32.2			50.7			10.5		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	20%	14%	23%	27%	13%	18%	25%	17%	27%	14%	15%	17%
Adj. Flow (vph)	106	110	131	87	266	39	221	697	99	8	312	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	241	0	87	305	0	221	697	99	8	389	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7			3.7			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA	Perm	Perm	NA	NA
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		3	8		5	2	2	6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		7.0	10.0		7.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	38.0	38.0		11.0	38.0		11.0	38.2	38.2	38.2	38.2	38.2

Lanes, Volumes, Timings

2021 Existing PM Peak Hour

1: Regional Road 25 & 5 Sideroad

02/03/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	38.0	38.0		16.0	44.0		14.0	46.0	46.0	32.0	32.0	
Total Split (%)	38.0%	38.0%		16.0%	44.0%		14.0%	46.0%	46.0%	32.0%	32.0%	
Maximum Green (s)	32.0	32.0		12.0	38.0		10.0	39.8	39.8	25.8	25.8	
Yellow Time (s)	3.7	3.7		3.0	3.7		3.0	4.2	4.2	4.2	4.2	
All-Red Time (s)	2.3	2.3		1.0	2.3		1.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		4.0	6.0		4.0	6.2	6.2	6.2	6.2	
Lead/Lag	Lag	Lag		Lead			Lead			Lag	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes			Yes			Yes	Yes	
Vehicle Extension (s)	5.0	5.0		3.0	5.0		3.0	5.0	5.0	5.0	5.0	
Recall Mode	None	None		None	None		None	Ped	Ped	Ped	Ped	
Walk Time (s)	7.0	7.0		7.0			7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	25.0	25.0		25.0			25.0	25.0	25.0	25.0	25.0	
Pedestrian Calls (#/hr)	0	0		0			0	0	0	0	0	
Act Effect Green (s)	21.7	21.7		34.2	32.1		48.8	46.5	46.5	32.6	32.6	
Actuated g/C Ratio	0.24	0.24		0.38	0.35		0.54	0.51	0.51	0.36	0.36	
v/c Ratio	0.49	0.68		0.28	0.52		0.49	0.44	0.14	0.03	0.35	
Control Delay	38.9	42.8		19.8	24.7		19.0	17.2	4.2	24.9	23.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay	38.9	42.8		19.8	24.7		19.0	17.2	4.2	24.9	23.1	
LOS	D	D		B	C		B	B	A	C	C	
Approach Delay		41.6			23.6			16.4			23.2	
Approach LOS		D			C			B			C	
Intersection Summary												
Area Type:	Other											
Cycle Length:	100											
Actuated Cycle Length:	91.1											
Natural Cycle:	100											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.68											
Intersection Signal Delay:	23.0						Intersection LOS: C					
Intersection Capacity Utilization:	77.4%						ICU Level of Service D					
Analysis Period (min):	15											
Splits and Phases:	1: Regional Road 25 & 5 Sideroad											

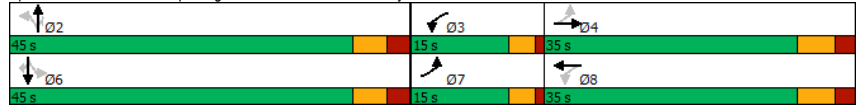
Lanes, Volumes, Timings
4: Esquesing Line & James Snow Parkway N

2021 Existing PM Peak Hour
02/03/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	15.8%	36.8%		15.8%	36.8%		47.4%	47.4%	47.4%	47.4%	47.4%	47.4%
Maximum Green (s)	11.0	28.4		11.0	28.4		38.5	38.5	38.5	38.5	38.5	38.5
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	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)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	19.7	16.0		19.7	16.0		21.9	21.9	21.9	21.9	21.9	21.9
Actuated g/C Ratio	0.37	0.30		0.37	0.30		0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.03	0.36		0.02	0.34		0.27	0.49	0.05	0.09	0.23	0.01
Control Delay	10.8	14.6		10.7	15.5		13.4	15.1	0.1	11.8	12.1	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	14.6		10.7	15.5		13.4	15.1	0.1	11.8	12.1	0.0
LOS	B	B		B	B		B	B	A	B	B	A
Approach Delay		14.4			15.3			13.7			11.5	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 53	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 13.9	Intersection LOS: B
Intersection Capacity Utilization 62.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 4: Esquesing Line & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
4: Esquesing Line & James Snow Parkway N

2021 Existing PM Peak Hour
02/03/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	10	222	78	9	223	49	109	312	31	28	143	8
Future Volume (vph)	10	222	78	9	223	49	109	312	31	28	143	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr't	1.00	0.96		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1404	2909		1825	2891		1560	1700	1526	1534	1656	1445
Fit Permitted	0.57	1.00		0.55	1.00		0.66	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	841	2909		1061	2891		1079	1700	1526	833	1656	1445
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	244	86	10	245	54	120	343	34	31	157	9
RTOR Reduction (vph)	0	38	0	0	20	0	0	21	0	0	5	
Lane Group Flow (vph)	11	292	0	10	279	0	120	343	13	31	157	4
Heavy Vehicles (%)	30%	25%	8%	0%	27%	4%	17%	13%	7%	19%	16%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.0	16.0		17.0	16.0		21.9	21.9	21.9	21.9	21.9	21.9
Effective Green, g (s)	17.0	16.0		17.0	16.0		21.9	21.9	21.9	21.9	21.9	21.9
Actuated g/C Ratio	0.30	0.29		0.30	0.29		0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	265	831		335	826		421	664	596	325	647	565
v/s Ratio Prot	c0.00	c0.10		0.00	0.10			c0.20			0.09	
v/s Ratio Perm	0.01			0.01			0.11		0.01	0.04		0.00
v/c Ratio	0.04	0.35		0.03	0.34		0.29	0.52	0.02	0.10	0.24	0.01
Uniform Delay, d1	13.7	15.9		13.7	15.8		11.7	13.0	10.5	10.8	11.5	10.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.5		0.0	0.5		0.8	1.4	0.0	0.3	0.4	0.0
Delay (s)	13.8	16.4		13.7	16.3		12.5	14.4	10.5	11.1	11.9	10.4
Level of Service	B	B		B	B		B	B	B	B	B	B
Approach Delay (s)		16.3			16.2			13.6			11.7	
Approach LOS		B			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	14.6 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.44
Actuated Cycle Length (s)	56.0 Sum of lost time (s) 17.1
Intersection Capacity Utilization	62.2% ICU Level of Service B
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
5: James Snow Parkway N & Steeles Avenue East

2021 Existing PM Peak Hour
02/03/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	369	448	385	651	136	411	172	177	100	189	14
Future Volume (vph)	11	369	448	385	651	136	411	172	177	100	189	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Frb, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	3318	1521	3278	3380	1247	3372	3544	1296	1225	3374	
Fit Permitted	0.38	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.63	1.00	
Satd. Flow (perm)	735	3318	1521	3278	3380	1247	3372	3544	1296	817	3374	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	401	487	418	708	148	447	187	192	109	205	15
RTOR Reduction (vph)	0	0	363	0	0	87	0	0	146	0	4	0
Lane Group Flow (vph)	12	401	124	418	708	61	447	187	46	109	216	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	10%	6%	8%	8%	31%	5%	3%	26%	49%	7%	8%
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8	4		
Actuated Green, G (s)	26.8	25.4	25.4	16.0	41.0	41.0	18.8	24.0	24.0	26.6	15.4	
Effective Green, g (s)	26.8	25.4	25.4	16.0	41.0	41.0	18.8	24.0	24.0	26.6	15.4	
Actuated g/C Ratio	0.27	0.25	0.25	0.16	0.41	0.41	0.19	0.24	0.24	0.27	0.15	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	212	841	385	523	1384	510	633	849	310	262	519	
v/s Ratio Prot	0.00	0.12		c0.13	c0.21		c0.13	0.05		0.05	c0.06	
v/s Ratio Perm	0.01		0.08			0.05			0.04	0.06		
v/c Ratio	0.06	0.48	0.32	0.80	0.51	0.12	0.71	0.22	0.15	0.42	0.42	
Uniform Delay, d1	27.0	31.7	30.3	40.5	22.1	18.3	38.1	30.5	30.0	29.6	38.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4	0.5	8.4	0.3	0.1	3.6	0.3	0.5	1.1	1.1	
Delay (s)	27.1	32.1	30.8	48.9	22.4	18.4	41.7	30.8	30.5	30.7	39.4	
Level of Service	C	C	C	D	C	B	D	C	C	C	D	
Approach Delay (s)		31.4			30.6			36.6			36.5	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay	32.9		HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	100.1				Sum of lost time (s)				24.5			
Intersection Capacity Utilization	74.5%		ICU Level of Service				D					
Analysis Period (min)	15											

c Critical Lane Group

Lanes, Volumes, Timings
6: Boston Church Road/3 Line & 5 Sideroad

2021 Existing PM Peak Hour
02/03/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	24	169	11	30	291	2	24	69	77	5	30	6
Future Volume (vph)	24	169	11	30	291	2	24	69	77	5	30	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993				0.999			0.939			0.980	
Fit Protected	0.994				0.995			0.993			0.994	
Satd. Flow (prot)	0	1628	0	0	1634	0	0	1594	0	0	1661	0
Fit Permitted	0.994				0.995			0.993			0.994	
Satd. Flow (perm)	0	1628	0	0	1634	0	0	1594	0	0	1661	0
Link Speed (k/h)	60			60			70			60		
Link Distance (m)	541.0			1343.2			1050.6			496.0		
Travel Time (s)	32.5			80.6			54.0			29.8		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Heavy Vehicles (%)	22%	15%	27%	7%	18%	0%	26%	8%	12%	0%	14%	17%
Adj. Flow (vph)	28	194	13	34	334	2	28	79	89	6	34	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	235	0	0	370	0	0	196	0	0	47	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6		1.6		1.6		1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Stop		Stop		Stop		Stop		Stop		Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	41.5%				ICU Level of Service A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
6: Boston Church Road/3 Line & 5 Sideroad

2021 Existing PM Peak Hour
02/03/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	24	169	11	30	291	2	24	69	77	5	30	6
Future Volume (vph)	24	169	11	30	291	2	24	69	77	5	30	6
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	28	194	13	34	334	2	28	79	89	6	34	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	235	370	196	47								
Volume Left (vph)	28	34	28	6								
Volume Right (vph)	13	2	89	7								
Hadj (s)	0.27	0.30	-0.03	0.15								
Departure Headway (s)	5.4	5.3	5.6	6.1								
Degree Utilization, x	0.36	0.54	0.30	0.08								
Capacity (veh/h)	620	656	582	507								
Control Delay (s)	11.4	14.4	11.0	9.6								
Approach Delay (s)	11.4	14.4	11.0	9.6								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay	12.5											
Level of Service	B											
Intersection Capacity Utilization	41.5%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings
7: Esquesing Line/Fourth Line & 5 Sideroad

2021 Existing PM Peak Hour
02/03/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	31	210	11	68	264	19	24	267	81	4	108	41
Future Volume (vph)	31	210	11	68	264	19	24	267	81	4	108	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994			0.993			0.971			0.964		
Fit Protected	0.994			0.990			0.997			0.999		
Satd. Flow (prot)	0	1665	0	0	1673	0	0	1655	0	0	1555	0
Fit Permitted	0.994			0.990			0.997			0.999		
Satd. Flow (perm)	0	1665	0	0	1673	0	0	1655	0	0	1555	0
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
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 (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	18%	21%
Adj. Flow (vph)	33	226	12	73	284	20	26	287	87	4	116	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	0	0	377	0	0	400	0	0	164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Stop			Stop			Stop			Stop		
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	66.9%			ICU Level of Service			C					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

2021 Existing PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

02/03/2023



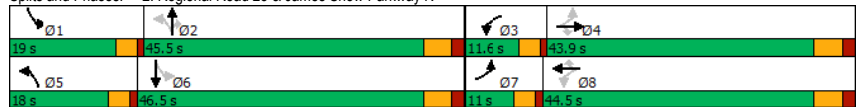
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	210	11	68	264	19	24	267	81	4	108	41
Future Volume (vph)	31	210	11	68	264	19	24	267	81	4	108	41
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	33	226	12	73	284	20	26	287	87	4	116	44
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	271	377	400	164								
Volume Left (vph)	33	73	26	4								
Volume Right (vph)	12	20	87	44								
Hadj (s)	0.24	0.23	0.09	0.17								
Departure Headway (s)	7.2	6.9	6.8	7.6								
Degree Utilization, x	0.54	0.73	0.75	0.35								
Capacity (veh/h)	448	489	497	393								
Control Delay (s)	18.5	26.1	27.8	14.6								
Approach Delay (s)	18.5	26.1	27.8	14.6								
Approach LOS	C	D	D	B								
Intersection Summary												
Delay	23.4											
Level of Service	C											
Intersection Capacity Utilization	66.9%			ICU Level of Service				C				
Analysis Period (min)	15											

Lanes, Volumes, Timings
2: Regional Road 25 & James Snow Parkway N
2024 Future Background AM Peak Hour
08/30/2023

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	11.0	43.9	43.9	11.5	43.9	43.9	11.0	42.9	42.9	11.0	35.9	
Total Split (s)	11.0	43.9	43.9	11.6	44.5	44.5	18.0	45.5	45.5	19.0	46.5	
Total Split (%)	9.2%	36.6%	36.6%	9.7%	37.1%	37.1%	15.0%	37.9%	37.9%	15.8%	38.8%	
Maximum Green (s)	7.0	37.9	37.9	7.6	38.5	38.5	14.0	39.5	39.5	15.0	40.5	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	Min	Min	None	Min	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		30.0	30.0		30.0	30.0		22.0	22.0		22.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	16.2	10.7	10.7	18.9	17.2	17.2	36.4	22.5	22.5	37.2	22.9	
Actuated g/C Ratio	0.25	0.16	0.16	0.29	0.26	0.26	0.56	0.34	0.34	0.57	0.35	
v/c Ratio	0.05	0.11	0.17	0.26	0.13	0.18	0.40	0.51	0.59	0.51	0.48	
Control Delay	18.6	29.0	1.9	21.1	23.1	4.8	10.4	22.5	5.7	12.0	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	18.6	29.0	1.9	21.1	23.1	4.8	10.4	22.5	5.7	12.0	21.4	
LOS	B	C	A	C	C	A	B	C	A	B	C	
Approach Delay		16.1			17.3			13.6			18.1	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	65.3
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	15.6
Intersection LOS:	B
Intersection Capacity Utilization:	64.5%
ICU Level of Service:	C
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N




HCM Signalized Intersection Capacity Analysis
2: Regional Road 25 & James Snow Parkway N
2024 Future Background AM Peak Hour
08/30/2023

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖	↖↗	↖	↖↗	↖↗	↖	↖	↖↗	↖↗
Traffic Volume (vph)	13	46	44	68	102	68	215	496	462	255	434	35
Future Volume (vph)	13	46	44	68	102	68	215	496	462	255	434	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1217	2684	1103	1259	3147	1192	1534	2897	1439	1472	2845	
Fit Permitted	0.69	1.00	1.00	0.51	1.00	1.00	0.45	1.00	1.00	0.41	1.00	
Satd. Flow (perm)	878	2684	1103	676	3147	1192	726	2897	1439	635	2845	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	13	47	45	70	105	70	222	511	476	263	447	36
RTOR Reduction (vph)	0	0	39	0	0	56	0	0	322	0	5	0
Lane Group Flow (vph)	13	47	6	70	105	14	222	511	154	263	478	0
Conf. Peds. (#/hr)									1		1	
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	10.7	9.5	9.5	18.9	13.7	13.7	34.2	22.5	22.5	35.0	22.9	
Effective Green, g (s)	10.7	9.5	9.5	18.9	13.7	13.7	34.2	22.5	22.5	35.0	22.9	
Actuated g/C Ratio	0.15	0.14	0.14	0.27	0.20	0.20	0.49	0.32	0.32	0.50	0.33	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	141	366	150	229	620	234	493	937	465	465	937	
v/s Ratio Prot	0.00	0.02		c0.02	0.03		0.08	0.18		c0.10	0.17	
v/s Ratio Perm	0.01		0.01	c0.06		0.01	0.15		0.11	c0.19		
v/c Ratio	0.09	0.13	0.04	0.31	0.17	0.06	0.45	0.55	0.33	0.57	0.51	
Uniform Delay, d1	25.1	26.4	26.0	19.6	23.2	22.7	10.5	19.3	17.8	10.5	18.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.8	0.1	0.1	0.7	0.7	0.4	1.6	0.5	
Delay (s)	25.4	26.5	26.2	20.4	23.3	22.8	11.2	20.0	18.2	12.1	19.3	
Level of Service	C	C	C	C	C	C	B	B	B	B	B	
Approach Delay (s)		26.2			22.3		17.7			16.7		
Approach LOS		C			C		B			B		

Intersection Summary	
HCM 2000 Control Delay	18.2
HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51
Actuated Cycle Length (s)	69.5
Sum of lost time (s)	20.0
Intersection Capacity Utilization	64.5%
ICU Level of Service	C
Analysis Period (min)	15

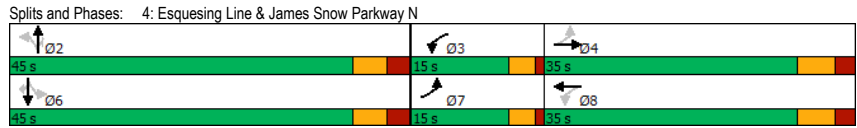
c Critical Lane Group

Lanes, Volumes, Timings
4: Esquesing Line & James Snow Parkway N
2024 Future Background AM Peak Hour
08/30/2023




Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	15.8%	36.8%		15.8%	36.8%		47.4%	47.4%	47.4%	47.4%	47.4%	47.4%
Maximum Green (s)	11.0	28.4		11.0	28.4		38.5	38.5	38.5	38.5	38.5	38.5
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	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)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	27.0	20.6		28.2	23.0		24.6	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.42	0.32		0.43	0.35		0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.05	0.62		0.13	0.20		0.24	0.29	0.01	0.11	0.56	0.02
Control Delay	10.5	21.0		11.0	13.6		19.5	17.9	0.0	17.2	22.2	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	21.0		11.0	13.6		19.5	17.9	0.0	17.2	22.2	0.1
LOS	B	C		B	B		B	B	A	B	C	A
Approach Delay		20.6			13.1			17.9			21.0	
Approach LOS		C			B			B			C	

Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 65	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 76.2%	ICU Level of Service D
Analysis Period (min) 15	



HCM Signalized Intersection Capacity Analysis
4: Esquesing Line & James Snow Parkway N
2024 Future Background AM Peak Hour
08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	19	370	156	42	141	43	71	188	7	44	358	13
Future Volume (vph)	19	370	156	42	141	43	71	188	7	44	358	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1547	2904		1644	2872		1644	1731	1396	1615	1685	1396
Fit Permitted	0.62	1.00		0.34	1.00		0.46	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	1011	2904		589	2872		792	1731	1396	1087	1685	1396
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	420	177	48	160	49	71	188	7	44	358	13
RTOR Reduction (vph)	0	48	0	0	28	0	0	0	4	0	0	8
Lane Group Flow (vph)	22	549	0	48	181	0	71	188	3	44	358	5
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	23.7	21.4		26.9	23.0		24.6	24.6	24.6	24.6	24.6	24.6
Effective Green, g (s)	23.7	21.4		26.9	23.0		24.6	24.6	24.6	24.6	24.6	24.6
Actuated g/C Ratio	0.35	0.32		0.40	0.34		0.37	0.37	0.37	0.37	0.37	0.37
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	376	927		297	985		290	635	512	399	618	512
v/s Ratio Prot	0.00	c0.19		c0.01	0.06			0.11			c0.21	
v/s Ratio Perm	0.02			0.06			0.09		0.00	0.04		0.00
v/c Ratio	0.06	0.59		0.16	0.18		0.24	0.30	0.01	0.11	0.58	0.01
Uniform Delay, d1	14.2	19.1		12.5	15.4		14.7	15.1	13.4	14.0	17.0	13.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.5		0.3	0.2		0.9	0.5	0.0	0.3	2.1	0.0
Delay (s)	14.3	20.7		12.8	15.6		15.7	15.6	13.4	14.2	19.1	13.5
Level of Service	B	C		B	B		B	B	B	B	B	B
Approach Delay (s)		20.5			15.1			15.6			18.4	
Approach LOS		C			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	18.2 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.55
Actuated Cycle Length (s)	67.0 Sum of lost time (s) 17.1
Intersection Capacity Utilization	76.2% ICU Level of Service D
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis 2024 Future Background AM Peak Hour
 6: Boston Church Road/3 Line & 5 Sideroad 08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	9	444	29	44	131	3	9	13	19	8	74	26
Future Volume (vph)	9	444	29	44	131	3	9	13	19	8	74	26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	444	29	44	131	3	9	13	19	8	74	26
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	482	178	41	108								
Volume Left (vph)	9	44	9	8								
Volume Right (vph)	29	3	19	26								
Hadj (s)	0.20	0.27	0.00	0.08								
Departure Headway (s)	4.8	5.2	5.8	5.7								
Degree Utilization, x	0.64	0.26	0.07	0.17								
Capacity (veh/h)	729	655	535	563								
Control Delay (s)	16.0	10.0	9.2	9.9								
Approach Delay (s)	16.0	10.0	9.2	9.9								
Approach LOS	C	B	A	A								
Intersection Summary												
Delay	13.5											
Level of Service	B											
Intersection Capacity Utilization	46.8%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings 2024 Future Background AM Peak Hour
 7: Esquesing Line/Fourth Line & 5 Sideroad 08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	8	444	18	88	148	3	11	115	121	70	322	28
Future Volume (vph)	8	444	18	88	148	3	11	115	121	70	322	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	40.0		0.0	0.0		0.0	60.0		0.0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (m)	2.5			50.0		2.5				50.0		
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				0.997			0.934		0.988		
Fit Protected	0.999		0.950				0.998		0.950			
Satd. Flow (prot)	0	1700	0	1659	1689	0	0	1643	0	1601	1654	0
Fit Permitted	0.996		0.347				0.979		0.381			
Satd. Flow (perm)	0	1695	0	606	1689	0	0	1612	0	642	1654	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	3				2			51			5	
Link Speed (k/h)	60				60			60			70	
Link Distance (m)	1343.2				646.3			1994.7			464.9	
Travel Time (s)	80.6				38.8			119.7			23.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	444	18	88	148	3	11	115	121	70	322	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	470	0	88	151	0	0	247	0	70	350	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7				3.7			3.7			3.7	
Link Offset(m)	0.0				0.0			0.0			0.0	
Crosswalk Width(m)	1.6				1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14		24	14		24	14		24	14
Number of Detectors	1	2			1	2			1	2		
Detector Template	Left	Thru			Left	Thru			Left	Thru		
Leading Detector (m)	6.1	30.5			6.1	30.5			6.1	30.5		
Trailing Detector (m)	0.0	0.0			0.0	0.0			0.0	0.0		
Detector 1 Position(m)	0.0	0.0			0.0	0.0			0.0	0.0		
Detector 1 Size(m)	6.1	1.8			6.1	1.8			6.1	1.8		
Detector 1 Type	CI+Ex	CI+Ex			CI+Ex	CI+Ex			CI+Ex	CI+Ex		
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0			0.0	0.0		
Detector 1 Queue (s)	0.0	0.0			0.0	0.0			0.0	0.0		
Detector 1 Delay (s)	0.0	0.0			0.0	0.0			0.0	0.0		
Detector 2 Position(m)	28.7				28.7			28.7			28.7	
Detector 2 Size(m)	1.8				1.8			1.8			1.8	
Detector 2 Type	CI+Ex				CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0				0.0			0.0			0.0	
Turn Type	Perm	NA			pm+pt	NA			Perm	NA	pm+pt	
Protected Phases	2				1	6			8	7		4

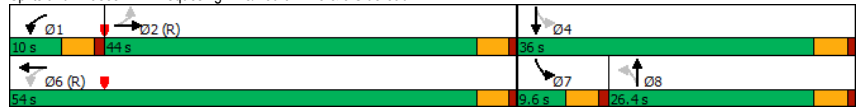
Lanes, Volumes, Timings 2024 Future Background AM Peak Hour
7: Esquesing Line/Fourth Line & 5 Sideroad 08/30/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		22.5	22.5		9.5	22.5	
Total Split (s)	44.0	44.0		10.0	54.0		26.4	26.4		9.6	36.0	
Total Split (%)	48.9%	48.9%		11.1%	60.0%		29.3%	29.3%		10.7%	40.0%	
Maximum Green (s)	39.5	39.5		5.5	49.5		21.9	21.9		5.1	31.5	
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			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		Max	Max		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	41.5			49.5	49.5		23.8			31.5	31.5	
Actuated g/C Ratio	0.46			0.55	0.55		0.26			0.35	0.35	
v/c Ratio	0.60			0.22	0.16		0.53			0.25	0.60	
Control Delay	22.8			11.1	10.5		28.1			22.4	29.0	
Queue Delay	0.0			0.0	0.0		0.0			0.0	0.0	
Total Delay	22.8			11.1	10.5		28.1			22.4	29.0	
LOS	C			B	B		C			C	C	
Approach Delay	22.8			10.7			28.1			27.9		
Approach LOS	C			B			C			C		

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60
 Intersection Signal Delay: 23.2 Intersection LOS: C
 Intersection Capacity Utilization 79.0% ICU Level of Service D
 Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis 2024 Future Background AM Peak Hour
7: Esquesing Line/Fourth Line & 5 Sideroad 08/30/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	8	444	18	88	148	3	11	115	121	70	322	28
Future Volume (vph)	8	444	18	88	148	3	11	115	121	70	322	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5		4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00		1.00
Frnt	0.99	1.00		1.00	1.00		0.93		1.00	0.99		1.00
Fit Protected	1.00	0.95		1.00	1.00		1.00		0.95	1.00		1.00
Satd. Flow (prot)	1700	1659		1689	1689		1643		1601	1654		1654
Fit Permitted	1.00	0.35		1.00	1.00		0.98		0.38	1.00		1.00
Satd. Flow (perm)	1695	607		1689	1689		1612		642	1654		1654
Peak-hour factor, PHF	1.00	1.00		1.00	1.00		1.00		1.00	1.00		1.00
Adj. Flow (vph)	8	444	18	88	148	3	11	115	121	70	322	28
RTOR Reduction (vph)	0	2	0	0	1	0	0	38	0	0	3	0
Lane Group Flow (vph)	0	468	0	88	150	0	209	0	70	347	0	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6		8		7	4		
Permitted Phases	2			6			8		4			
Actuated Green, G (s)		39.7		48.6	48.6		23.8		32.4	32.4		
Effective Green, g (s)		39.7		48.6	48.6		23.8		32.4	32.4		
Actuated g/C Ratio		0.44		0.54	0.54		0.26		0.36	0.36		
Clearance Time (s)		4.5		4.5	4.5		4.5		4.5	4.5		
Vehicle Extension (s)		3.0		3.0	3.0		3.0		3.0	3.0		
Lane Grp Cap (vph)		747		379	912		426		274	595		
v/s Ratio Prot		c0.01		0.09					0.01	c0.21		
v/s Ratio Perm		c0.28		0.11			0.13		0.08			
v/c Ratio		0.63		0.23	0.16		0.49		0.26	0.58		
Uniform Delay, d1		19.4		11.9	10.5		28.0		20.5	23.3		
Progression Factor		1.00		1.00	1.00		1.00		1.00	1.00		
Incremental Delay, d2		4.0		0.3	0.4		4.0		0.5	1.5		
Delay (s)		23.4		12.2	10.8		32.0		21.0	24.8		
Level of Service		C		B	B		C		C	C		
Approach Delay (s)		23.4		11.3			32.0		24.1			
Approach LOS		C		B			C		C			

Intersection Summary

HCM 2000 Control Delay 23.1 HCM 2000 Level of Service C
 HCM 2000 Volume to Capacity ratio 0.62
 Actuated Cycle Length (s) 90.0 Sum of lost time (s) 18.0
 Intersection Capacity Utilization 79.0% ICU Level of Service D
 Analysis Period (min) 15
 c Critical Lane Group

Lanes, Volumes, Timings
 2: Regional Road 25 & James Snow Parkway N
 2024 Future Background PM Peak Hour
 08/30/2023

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	11.0	43.9	43.9	11.5	43.9	43.9	12.0	43.0	43.0	11.0	35.9	
Total Split (s)	13.1	43.9	43.9	22.1	52.9	52.9	12.0	43.0	43.0	11.0	42.0	
Total Split (%)	10.9%	36.6%	36.6%	18.4%	44.1%	44.1%	10.0%	35.8%	35.8%	9.2%	35.0%	
Maximum Green (s)	9.1	37.9	37.9	18.1	46.9	46.9	8.0	37.0	37.0	7.0	36.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	
Flash Dont Walk (s)		30.0	30.0		30.0	30.0		22.0	22.0		22.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	20.4	10.9	10.9	30.5	21.9	21.9	40.1	30.2	30.2	39.6	32.1	
Actuated g/C Ratio	0.25	0.13	0.13	0.37	0.27	0.27	0.49	0.37	0.37	0.48	0.39	
v/c Ratio	0.12	0.39	0.56	0.51	0.13	0.47	0.28	0.77	0.29	0.66	0.42	
Control Delay	19.7	37.3	12.4	24.4	27.2	7.0	12.8	28.2	4.5	26.8	20.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.7	37.3	12.4	24.4	27.2	7.0	12.8	28.2	4.5	26.8	20.9	
LOS	B	D	B	C	C	A	B	C	A	C	C	
Approach Delay		23.6			16.9			23.3			22.4	
Approach LOS		C			B			C			C	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 82

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 21.8

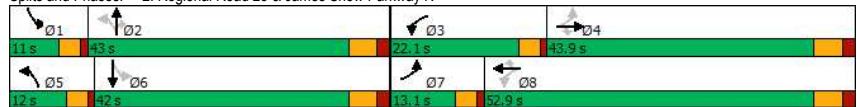
Intersection LOS: C

Intersection Capacity Utilization 65.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
 2: Regional Road 25 & James Snow Parkway N
 2024 Future Background PM Peak Hour
 08/30/2023

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖	↖↗	↖	↖	↖↗	↖	↖	↖↗	↖
Traffic Volume (vph)	33	157	179	193	89	241	86	786	158	146	442	6
Future Volume (vph)	33	157	179	193	89	241	86	786	158	146	442	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1521	3411	1396	1547	2808	1396	1250	3093	1355	1484	2997	
Fit Permitted	0.69	1.00	1.00	0.49	1.00	1.00	0.44	1.00	1.00	0.19	1.00	
Satd. Flow (perm)	1104	3411	1396	795	2808	1396	578	3093	1355	299	2997	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	37	174	199	214	99	268	96	873	176	162	491	7
RTOR Reduction (vph)	0	0	169	0	0	199	0	0	111	0	1	0
Lane Group Flow (vph)	37	174	30	214	99	69	96	873	65	162	497	0
Conf. Peds. (#/hr)									1		1	
Heavy Vehicles (%)	20%	7%	17%	18%	30%	17%	46%	18%	19%	23%	21%	60%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	17.0	12.7	12.7	30.2	21.9	21.9	37.4	31.2	31.2	39.2	32.1	
Effective Green, g (s)	17.0	12.7	12.7	30.2	21.9	21.9	37.4	31.2	31.2	39.2	32.1	
Actuated g/C Ratio	0.20	0.15	0.15	0.36	0.26	0.26	0.44	0.37	0.37	0.46	0.38	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	243	512	209	404	727	361	305	1142	500	238	1138	
v/s Ratio Prot	0.01	0.05		c0.08	0.04		0.02	c0.28		c0.06	0.17	
v/s Ratio Perm	0.02		0.02	c0.10		0.05	0.12		0.05	0.26		
v/c Ratio	0.15	0.34	0.14	0.53	0.14	0.19	0.31	0.76	0.13	0.68	0.44	
Uniform Delay, d1	27.6	32.1	31.2	20.4	24.0	24.4	14.2	23.4	17.7	15.1	19.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.4	0.3	1.3	0.1	0.3	0.6	3.1	0.1	7.8	0.3	
Delay (s)	27.9	32.5	31.5	21.6	24.1	24.7	14.8	26.5	17.8	22.9	19.8	
Level of Service	C	C	C	C	C	C	B	C	B	C	B	
Approach Delay (s)		31.6			23.5		24.2			20.5		
Approach LOS		C			C		C			C		

Intersection Summary

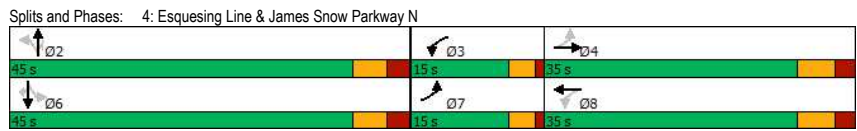
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	84.5	Sum of lost time (s)	20.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
 4: Esquesing Line & James Snow Parkway N
 2024 Future Background PM Peak Hour
 08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	15.8%	36.8%		15.8%	36.8%		47.4%	47.4%	47.4%	47.4%	47.4%	47.4%
Maximum Green (s)	11.0	28.4		11.0	28.4		38.5	38.5	38.5	38.5	38.5	38.5
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	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)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	19.8	16.1		19.8	16.1		21.9	21.9	21.9	21.9	21.9	21.9
Actuated g/C Ratio	0.37	0.30		0.37	0.30		0.41	0.41	0.41	0.41	0.41	0.41
v/c Ratio	0.03	0.38		0.02	0.35		0.26	0.47	0.05	0.09	0.22	0.01
Control Delay	10.6	14.8		10.6	15.6		13.4	15.0	0.1	11.8	12.1	0.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	14.8		10.6	15.6		13.4	15.0	0.1	11.8	12.1	0.0
LOS	B	B		B	B		B	B	A	B	B	A
Approach Delay		14.6			15.4			13.6			11.5	
Approach LOS		B			B			B			B	

Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 53	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.47	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 62.9%	ICU Level of Service B
Analysis Period (min) 15	



HCM Signalized Intersection Capacity Analysis
 4: Esquesing Line & James Snow Parkway N
 2024 Future Background PM Peak Hour
 08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	235	83	10	236	52	116	331	33	30	151	9
Future Volume (vph)	11	235	83	10	236	52	116	331	33	30	151	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Fr't	1.00	0.96		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1404	2909		1825	2891		1560	1700	1526	1534	1656	1445
Fit Permitted	0.56	1.00		0.54	1.00		0.66	1.00	1.00	0.53	1.00	1.00
Satd. Flow (perm)	828	2909		1042	2891		1085	1700	1526	856	1656	1445
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	12	258	91	11	259	57	116	331	33	30	151	9
RTOR Reduction (vph)	0	38	0	0	20	0	0	0	20	0	0	5
Lane Group Flow (vph)	12	311	0	11	296	0	116	331	13	30	151	4
Heavy Vehicles (%)	30%	25%	8%	0%	27%	4%	17%	13%	7%	19%	16%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	17.1	16.1		17.1	16.1		21.9	21.9	21.9	21.9	21.9	21.9
Effective Green, g (s)	17.1	16.1		17.1	16.1		21.9	21.9	21.9	21.9	21.9	21.9
Actuated g/C Ratio	0.30	0.29		0.30	0.29		0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	262	834		331	829		423	663	595	334	646	564
v/s Ratio Prot	c0.00	c0.11		0.00	0.10			c0.19			0.09	
v/s Ratio Perm	0.01			0.01			0.11		0.01	0.04		0.00
v/c Ratio	0.05	0.37		0.03	0.36		0.27	0.50	0.02	0.09	0.23	0.01
Uniform Delay, d1	13.7	16.0		13.6	15.9		11.7	12.9	10.5	10.8	11.5	10.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.6		0.0	0.6		0.7	1.2	0.0	0.2	0.4	0.0
Delay (s)	13.7	16.6		13.7	16.4		12.4	14.2	10.5	11.0	11.9	10.5
Level of Service	B	B		B	B		B	B	B	B	B	B
Approach Delay (s)		16.5			16.3			13.5			11.7	
Approach LOS		B			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	14.7 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.44
Actuated Cycle Length (s)	56.1 Sum of lost time (s) 17.1
Intersection Capacity Utilization	62.9% ICU Level of Service B
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 5: James Snow Parkway N & Steeles Avenue East
 2024 Future Background PM Peak Hour
 08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	12	392	476	409	691	145	436	182	188	106	201	14
Future Volume (vph)	12	392	476	409	691	145	436	182	188	106	201	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	3318	1521	3278	3380	1247	3372	3544	1296	1225	3376	
Fit Permitted	0.37	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.63	1.00	
Satd. Flow (perm)	704	3318	1521	3278	3380	1247	3372	3544	1296	809	3376	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	426	517	445	751	158	474	198	204	115	218	15
RTOR Reduction (vph)	0	0	342	0	0	90	0	0	154	0	4	0
Lane Group Flow (vph)	13	426	175	445	751	68	474	198	50	115	229	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	10%	6%	8%	8%	31%	5%	3%	26%	49%	7%	8%
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8	4		
Actuated Green, G (s)	27.7	26.4	26.4	18.0	44.1	44.1	18.0	25.1	25.1	25.1	15.6	
Effective Green, g (s)	27.7	26.4	26.4	18.0	44.1	44.1	18.0	25.1	25.1	25.1	15.6	
Actuated g/C Ratio	0.27	0.26	0.26	0.18	0.43	0.43	0.18	0.24	0.24	0.24	0.15	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	204	854	391	575	1454	536	592	867	317	236	513	
v/s Ratio Prot	0.00	0.13		c0.14	c0.22		c0.14	0.06		0.05	0.07	
v/s Ratio Perm	0.02		0.11			0.05			0.04	c0.07		
v/c Ratio	0.06	0.50	0.45	0.77	0.52	0.13	0.80	0.23	0.16	0.49	0.45	
Uniform Delay, d1	27.5	32.4	31.9	40.3	21.4	17.6	40.5	31.0	30.4	32.3	39.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.5	0.8	6.4	0.3	0.1	7.7	0.3	0.5	1.6	1.3	
Delay (s)	27.6	32.9	32.7	46.7	21.7	17.7	48.2	31.2	30.9	33.8	40.8	
Level of Service	C	C	C	D	C	B	D	C	C	C	D	
Approach Delay (s)		32.7			29.5			40.3			38.5	
Approach LOS		C			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			33.9	HCM 2000 Level of Service				C				
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			102.5	Sum of lost time (s)				24.5				
Intersection Capacity Utilization			75.8%	ICU Level of Service				D				
Analysis Period (min)			15									

Lanes, Volumes, Timings
 6: Boston Church Road/3 Line & 5 Sideroad
 2024 Future Background PM Peak Hour
 08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	25	179	12	32	309	2	25	73	82	6	32	7
Future Volume (vph)	25	179	12	32	309	2	25	73	82	6	32	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.999			0.938			0.979	
Fit Protected		0.994			0.995			0.993			0.993	
Satd. Flow (prot)	0	1626	0	0	1634	0	0	1593	0	0	1659	0
Fit Permitted		0.994			0.995			0.993			0.993	
Satd. Flow (perm)	0	1626	0	0	1634	0	0	1593	0	0	1659	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	15%	27%	7%	18%	0%	26%	8%	12%	0%	14%	17%
Adj. Flow (vph)	25	179	12	32	309	2	25	73	82	6	32	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	216	0	0	343	0	0	180	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization			43.3%	ICU Level of Service A								
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis 2024 Future Background PM Peak Hour
6: Boston Church Road/3 Line & 5 Sideroad 08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	25	179	12	32	309	2	25	73	82	6	32	7
Future Volume (vph)	25	179	12	32	309	2	25	73	82	6	32	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	179	12	32	309	2	25	73	82	6	32	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	216	343	180	45								
Volume Left (vph)	25	32	25	6								
Volume Right (vph)	12	2	82	7								
Hadj (s)	0.27	0.30	-0.04	0.15								
Departure Headway (s)	5.3	5.2	5.4	5.9								
Degree Utilization, x	0.32	0.49	0.27	0.07								
Capacity (veh/h)	636	669	599	532								
Control Delay (s)	10.8	13.1	10.4	9.3								
Approach Delay (s)	10.8	13.1	10.4	9.3								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay	11.6											
Level of Service	B											
Intersection Capacity Utilization	43.3%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings 2024 Future Background PM Peak Hour
7: Esquesing Line/Fourth Line & 5 Sideroad 08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	33	223	12	72	280	20	25	284	86	4	115	43
Future Volume (vph)	33	223	12	72	280	20	25	284	86	4	115	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0	0.0	0.0	0.0	0.0	60.0	0.0	0.0	0.0	0.0
Storage Lanes	0	0	1	0	0	0	0	1	0	0	0	0
Taper Length (m)	2.5		50.0		2.5			50.0				
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	0.994		0.990		0.971			0.959				
Fit Protected	0.994		0.950		0.997			0.950				
Satd. Flow (prot)	0	1664	0	1674	1671	0	0	1656	0	1460	1652	0
Fit Permitted	0.937		0.499		0.976			0.286				
Satd. Flow (perm)	0	1569	0	879	1671	0	0	1621	0	440	1652	0
Right Turn on Red	Yes		Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	3		6		15		23					
Link Speed (k/h)	60		60		60		70					
Link Distance (m)	1343.2		646.3		1994.7		464.9					
Travel Time (s)	80.6		38.8		119.7		23.9					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	8%	21%
Adj. Flow (vph)	33	223	12	72	280	20	25	284	86	4	115	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	268	0	72	300	0	0	395	0	4	158	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7		3.7		3.7		3.7					
Link Offset(m)	0.0		0.0		0.0		0.0					
Crosswalk Width(m)	1.6		1.6		1.6		1.6					
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7		28.7		28.7		28.7					
Detector 2 Size(m)	1.8		1.8		1.8		1.8					
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex					
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0					
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	2		1		6		8		7		4	

Lanes, Volumes, Timings 2024 Future Background PM Peak Hour
7: Esquesing Line/Fourth Line & 5 Sideroad 08/30/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		22.5	22.5		9.5	22.5	
Total Split (s)	44.0	44.0		10.0	54.0		26.4	26.4		9.6	36.0	
Total Split (%)	48.9%	48.9%		11.1%	60.0%		29.3%	29.3%		10.7%	40.0%	
Maximum Green (s)	39.5	39.5		5.5	49.5		21.9	21.9		5.1	31.5	
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			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		None	None		None	None	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	43.6			52.1	52.1		27.0			28.9	28.9	
Actuated g/C Ratio	0.48			0.58	0.58		0.30			0.32	0.32	
v/c Ratio	0.35			0.13	0.31		0.80			0.02	0.29	
Control Delay	17.4			9.8	11.1		42.1			19.5	20.3	
Queue Delay	0.0			0.0	0.0		0.0			0.0	0.0	
Total Delay	17.4			9.8	11.1		42.1			19.5	20.3	
LOS	B			A	B		D			B	C	
Approach Delay	17.4			10.9			42.1			20.3		
Approach LOS	B			B			D			C		

Intersection Summary
 Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 44 (49%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 23.9 Intersection LOS: C
 Intersection Capacity Utilization 75.5% ICU Level of Service D
 Analysis Period (min) 15



HCM Signalized Intersection Capacity Analysis 2024 Future Background PM Peak Hour
7: Esquesing Line/Fourth Line & 5 Sideroad 08/30/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (vph)	33	223	12	72	280	20	25	284	86	4	115	43
Future Volume (vph)	33	223	12	72	280	20	25	284	86	4	115	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5		4.5	4.5		4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00		1.00	1.00		1.00
Fr't	0.99	1.00		0.99	0.97		0.97		1.00	0.96		0.96
Flt Protected	0.99	0.95		1.00	1.00		0.98		0.29	1.00		1.00
Satd. Flow (prot)	1664	1674		1671	1655		1655		1460	1652		1652
Flt Permitted	0.94	0.50		1.00	0.98		0.29		0.29	1.00		1.00
Satd. Flow (perm)	1568	879		1671	1619		1619		440	1652		1652
Peak-hour factor, PHF	1.00	1.00		1.00	1.00		1.00		1.00	1.00		1.00
Adj. Flow (vph)	33	223		72	280		25	284	86	4	115	43
RTOR Reduction (vph)	0	2		0	3		0	11	0	0	15	0
Lane Group Flow (vph)	0	266		0	72		297	0	385	0	143	0
Heavy Vehicles (%)	30%	11%		27%	9%		14%	11%	39%	11%	9%	25%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA	pm+pt	NA		NA
Protected Phases	2			1	6		8		7	4		
Permitted Phases	2			6			8		4			
Actuated Green, G (s)	39.1			48.5	48.5		27.0		32.5	32.5		32.5
Effective Green, g (s)	39.1			48.5	48.5		27.0		32.5	32.5		32.5
Actuated g/C Ratio	0.43			0.54	0.54		0.30		0.36	0.36		0.36
Clearance Time (s)	4.5			4.5	4.5		4.5		4.5	4.5		4.5
Vehicle Extension (s)	3.0			3.0	3.0		3.0		3.0	3.0		3.0
Lane Grp Cap (vph)	681			516	900		485		170	596		596
v/s Ratio Prot	0.01			c0.18			0.00		c0.09			c0.09
v/s Ratio Perm	c0.17			0.07			c0.24		0.01			0.01
v/c Ratio	0.39			0.14	0.33		0.79		0.02	0.24		0.24
Uniform Delay, d1	17.3			10.8	11.6		28.9		20.5	20.1		20.1
Progression Factor	1.00			1.00	1.00		1.00		1.00	1.00		1.00
Incremental Delay, d2	1.7			0.1	1.0		8.7		0.1	0.2		0.2
Delay (s)	19.0			10.9	12.6		37.6		20.6	20.3		20.3
Level of Service	B			B	B		D		C	C		C
Approach Delay (s)	19.0			12.3			37.6		20.3			20.3
Approach LOS	B			B			D		C			C

Intersection Summary
 HCM 2000 Control Delay 23.2 HCM 2000 Level of Service C
 HCM 2000 Volume to Capacity ratio 0.55
 Actuated Cycle Length (s) 90.0 Sum of lost time (s) 18.0
 Intersection Capacity Utilization 75.5% ICU Level of Service D
 Analysis Period (min) 15
 c Critical Lane Group

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2029 FB AM Peak Hour
08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Volume (vph)	96	338	289	74	94	11	105	307	123	107	529	84
Future Volume (vph)	96	338	289	74	94	11	105	307	123	107	529	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.946			0.992			0.966			0.983		
Fit Protected	0.993			0.980			0.990			0.993		
Satd. Flow (prot)	0	1554	0	0	1492	0	0	2705	0	0	3047	0
Fit Permitted	0.993			0.980			0.990			0.993		
Satd. Flow (perm)	0	1554	0	0	1492	0	0	2705	0	0	3047	0
Link Speed (k/h)	60			60			70			70		
Link Distance (m)	573.6			536.0			47.1			203.5		
Travel Time (s)	34.4			32.2			2.4			10.5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	96	338	289	74	94	11	112	327	131	114	563	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	723	0	0	179	0	0	570	0	0	766	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Yield			Yield			Yield			Yield		

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	88.4%
Analysis Period (min)	15
ICU Level of Service	E

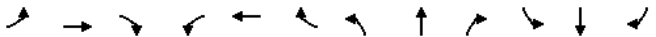
HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2029 FB AM Peak Hour
08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	96	338	289	74	94	11	105	307	123	107	529	84
Future Volume (veh/h)	96	338	289	74	94	11	105	307	123	107	529	84
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	96	338	289	74	94	11	112	327	131	114	563	89
Approach Volume (veh/h)	723			179			570			766		
Crossing Volume (veh/h)	751			535			488			280		
High Capacity (veh/h)	763			908			898			1112		
High v/c (veh/h)	0.95			0.20			0.63			0.69		
Low Capacity (veh/h)	604			732			723			914		
Low v/c (veh/h)	1.20			0.24			0.79			0.84		
Intersection Summary												
Maximum v/c High	0.95											
Maximum v/c Low	1.20											
Intersection Capacity Utilization	88.4%		ICU Level of Service				E					

Lanes, Volumes, Timings
3: Boston Church Road & James Snow Parkway N

2029 FB AM Peak Hour
08/30/2023

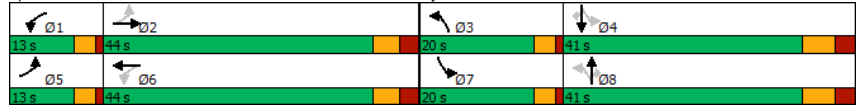


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Total Split (%)	11.0%	37.3%		11.0%	37.3%		16.9%	34.7%	34.7%	16.9%	34.7%	34.7%
Maximum Green (s)	9.0	37.5		9.0	37.5		16.0	33.4	33.4	16.0	33.4	33.4
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effct Green (s)	38.0	33.0		36.7	30.2		19.7	16.1	16.1	22.8	15.8	15.8
Actuated g/C Ratio	0.53	0.46		0.52	0.42		0.28	0.23	0.23	0.32	0.22	0.22
v/c Ratio	0.07	0.61		0.06	0.20		0.13	0.00	0.04	0.06	0.04	0.30
Control Delay	8.7	17.8		9.0	14.9		25.4	29.2	0.3	19.0	28.7	8.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	17.8		9.0	14.9		25.4	29.2	0.3	19.0	28.7	8.7
LOS	A	B		A	B		C	C	A	B	C	A
Approach Delay		17.4			14.5			19.3			13.3	
Approach LOS		B			B			B			B	

Intersection Summary

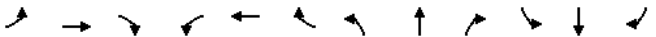
Area Type:	Other
Cycle Length: 118	
Actuated Cycle Length: 71.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.61	
Intersection Signal Delay: 16.4	Intersection LOS: B
Intersection Capacity Utilization 55.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
3: Boston Church Road & James Snow Parkway N

2029 FB AM Peak Hour
08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	34	611	155	17	207	17	34	4	13	26	30	132
Future Volume (vph)	34	611	155	17	207	17	34	4	13	26	30	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1508	3000		1415	2973		1113	3650	944	1534	3147	1498
Flt Permitted	0.56	1.00		0.26	1.00		0.74	1.00	1.00	0.60	1.00	1.00
Satd. Flow (perm)	897	3000		394	2973		863	3650	944	977	3147	1498
Peak-hour factor, PHF	0.90	0.90		0.90	0.90		0.90	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	679	172	19	230	19	34	4	13	26	30	132
RTOR Reduction (vph)	0	16	0	0	5	0	0	0	11	0	0	103
Lane Group Flow (vph)	38	835	0	19	244	0	34	4	2	26	30	29
Heavy Vehicles (%)	21%	18%	18%	29%	22%	14%	64%	0%	73%	19%	16%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	37.0	33.0		33.4	31.2		16.5	13.7	13.7	23.3	17.1	17.1
Effective Green, g (s)	37.0	33.0		33.4	31.2		16.5	13.7	13.7	23.3	17.1	17.1
Actuated g/C Ratio	0.48	0.43		0.43	0.40		0.21	0.18	0.18	0.30	0.22	0.22
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	461	1282		199	1201		193	647	167	339	697	331
v/s Ratio Prot	c0.00	c0.28		0.00	0.08		c0.01	0.00		c0.01	0.01	
v/s Ratio Perm	0.04			0.04			c0.03		0.00	0.02		0.02
v/c Ratio	0.08	0.65		0.10	0.20		0.18	0.01	0.01	0.08	0.04	0.09
Uniform Delay, d1	10.8	17.5		12.9	14.9		24.6	26.1	26.2	19.2	23.6	23.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.6		0.2	0.2		0.4	0.0	0.1	0.1	0.1	0.2
Delay (s)	10.8	19.1		13.1	15.1		25.1	26.2	26.2	19.3	23.7	24.1
Level of Service	B	B		B	B		C	C	C	B	C	C
Approach Delay (s)		18.8			15.0			25.4			23.4	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	22.1
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

2029 FB AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	10	490	32	49	145	4	10	15	21	9	82	29
Future Volume (vph)	10	490	32	49	145	4	10	15	21	9	82	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.997			0.938			0.967	
Flt Protected		0.999			0.988			0.989			0.996	
Satd. Flow (prot)	0	1672	0	0	1669	0	0	1565	0	0	1644	0
Flt Permitted		0.999			0.988			0.989			0.996	
Satd. Flow (perm)	0	1672	0	0	1669	0	0	1565	0	0	1644	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			1050.6			496.0	
Travel Time (s)		32.5			80.6			54.0			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	10	490	32	49	145	4	10	15	21	9	82	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	532	0	0	198	0	0	46	0	0	120	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	Right	Left	Left	Right	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2029 FB AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	490	32	49	145	4	10	15	21	9	82	29
Future Volume (vph)	10	490	32	49	145	4	10	15	21	9	82	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	490	32	49	145	4	10	15	21	9	82	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	532	198	46	120								
Volume Left (vph)	10	49	10	9								
Volume Right (vph)	32	4	21	29								
Hadj (s)	0.20	0.27	0.00	0.08								
Departure Headway (s)	4.9	5.4	6.0	5.9								
Degree Utilization, x	0.73	0.30	0.08	0.20								
Capacity (veh/h)	532	628	526	538								
Control Delay (s)	19.7	10.6	9.5	10.4								
Approach Delay (s)	19.7	10.6	9.5	10.4								
Approach LOS	C	B	A	B								

Intersection Summary

Delay	15.9
Level of Service	C
Intersection Capacity Utilization	51.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis

2029 FB AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕		↕	↕	
Traffic Volume (vph)	9	490	20	98	163	4	12	127	134	77	356	30
Future Volume (vph)	9	490	20	98	163	4	12	127	134	77	356	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.99		1.00	1.00			0.93		1.00	0.99	
Fit Protected		1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1700		1659	1687			1643		1601	1654	
Fit Permitted		1.00		0.32	1.00			0.98		0.35	1.00	
Satd. Flow (perm)		1694		559	1687			1608		591	1654	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	490	20	98	163	4	12	127	134	77	356	30
RTOR Reduction (vph)	0	2	0	0	1	0	0	38	0	0	3	0
Lane Group Flow (vph)	0	517	0	98	166	0	0	235	0	77	383	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		39.7		48.6	48.6			23.8		32.4	32.4	
Effective Green, g (s)		39.7		48.6	48.6			23.8		32.4	32.4	
Actuated g/C Ratio		0.44		0.54	0.54			0.26		0.36	0.36	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		747		355	910			425		258	595	
v/s Ratio Prot				c0.01	0.10					0.01	c0.23	
v/s Ratio Perm		c0.31		0.14				0.15		0.09		
v/c Ratio		0.69		0.28	0.18			0.55		0.30	0.64	
Uniform Delay, d1		20.2		12.3	10.6			28.5		20.8	24.0	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		5.2		0.4	0.4			5.1		0.7	5.3	
Delay (s)		25.5		12.7	11.0			33.7		21.4	29.3	
Level of Service		C		B	B			C		C	C	
Approach Delay (s)		25.5			11.6			33.7			28.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2029 FB PM Peak Hour
08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Volume (vph)	111	116	138	91	280	41	233	709	105	9	317	80
Future Volume (vph)	111	116	138	91	280	41	233	709	105	9	317	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.949		0.987		0.985		0.985		0.970		0.999	
Fit Protected	0.985		0.989		0.989		0.989		0.999		0.999	
Satd. Flow (prot)	0	1506	0	0	1608	0	0	2968	0	0	3066	0
Fit Permitted	0.985		0.989		0.989		0.989		0.999		0.999	
Satd. Flow (perm)	0	1506	0	0	1608	0	0	2968	0	0	3066	0
Link Speed (k/h)	60		60		60		70		70		70	
Link Distance (m)	573.6		536.0		52.2		203.5		203.5		203.5	
Travel Time (s)	34.4		32.2		2.7		10.5		10.5		10.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	20%	14%	23%	27%	13%	18%	25%	17%	27%	14%	15%	17%
Adj. Flow (vph)	111	116	138	91	280	41	259	788	117	10	352	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	365	0	0	412	0	0	1164	0	0	451	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6		1.6		1.6		1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24	14	24	14	24	14	24	14	24	14
Sign Control	Yield		Yield		Yield		Yield		Yield		Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	82.7% ICU Level of Service E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2029 FB PM Peak Hour
08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	111	116	138	91	280	41	233	709	105	9	317	80
Future Volume (veh/h)	111	116	138	91	280	41	233	709	105	9	317	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	111	116	138	91	280	41	259	788	117	10	352	89
Approach Volume (veh/h)	365			412			1164			451		
Crossing Volume (veh/h)	453			1158			237			630		
High Capacity (veh/h)	969			547			1150			841		
High v/c (veh/h)	0.38			0.75			1.01			0.54		
Low Capacity (veh/h)	786			418			948			673		
Low v/c (veh/h)	0.46			0.99			1.23			0.67		
Intersection Summary												
Maximum v/c High	1.01											
Maximum v/c Low	1.23											
Intersection Capacity Utilization	82.7%			ICU Level of Service			E					

Lanes, Volumes, Timings

2029 FB PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	28	197	13	35	341	2	28	80	90	6	35	7
Future Volume (vph)	28	197	13	35	341	2	28	80	90	6	35	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit		0.993			0.999			0.939			0.980	
Fit Protected		0.994			0.995			0.993			0.994	
Satd. Flow (prot)	0	1628	0	0	1634	0	0	1594	0	0	1661	0
Fit Permitted		0.994			0.995			0.993			0.994	
Satd. Flow (perm)	0	1628	0	0	1634	0	0	1594	0	0	1661	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			1050.6			496.0	
Travel Time (s)		32.5			80.6			54.0			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	15%	27%	7%	18%	0%	26%	8%	12%	0%	14%	17%
Adj. Flow (vph)	28	197	13	35	341	2	28	80	90	6	35	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	238	0	0	378	0	0	198	0	0	48	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2029 FB PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	197	13	35	341	2	28	80	90	6	35	7
Future Volume (vph)	28	197	13	35	341	2	28	80	90	6	35	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	28	197	13	35	341	2	28	80	90	6	35	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	238	378	198	48								
Volume Left (vph)	28	35	28	6								
Volume Right (vph)	13	2	90	7								
Hadj (s)	0.27	0.30	-0.03	0.15								
Departure Headway (s)	5.5	5.3	5.6	6.1								
Degree Utilization, x	0.36	0.56	0.31	0.08								
Capacity (veh/h)	616	654	578	502								
Control Delay (s)	11.6	14.8	11.1	9.7								
Approach Delay (s)	11.6	14.8	11.1	9.7								
Approach LOS	B	B	B	A								

Intersection Summary

Delay	12.8
Level of Service	B
Intersection Capacity Utilization	47.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis

2029 FB PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕		↕	↕	
Traffic Volume (vph)	37	246	13	79	310	22	28	313	95	5	127	48
Future Volume (vph)	37	246	13	79	310	22	28	313	95	5	127	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.99		1.00	0.99			0.97		1.00	0.96	
Fit Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1664		1674	1671			1654		1460	1550	
Fit Permitted		0.93		0.47	1.00			0.97		0.29	1.00	
Satd. Flow (perm)		1554		821	1671			1616		443	1550	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	37	246	13	79	310	22	28	313	95	5	127	48
RTOR Reduction (vph)	0	2	0	0	3	0	0	10	0	0	14	0
Lane Group Flow (vph)	0	294	0	79	329	0	0	426	0	5	161	0
Heavy Vehicles (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	18%	21%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		37.0		45.9	45.9			29.6		35.1	35.1	
Effective Green, g (s)		37.0		45.9	45.9			29.6		35.1	35.1	
Actuated g/C Ratio		0.41		0.51	0.51			0.33		0.39	0.39	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		638		460	852			531		184	604	
v/s Ratio Prot				0.01	c0.20					0.00	c0.10	
v/s Ratio Perm		c0.19		0.08				c0.26		0.01		
v/c Ratio		0.46		0.17	0.39			0.80		0.03	0.27	
Uniform Delay, d1		19.3		12.3	13.5			27.5		19.0	18.7	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.4		0.2	1.3			12.1		0.1	1.1	
Delay (s)		21.6		12.5	14.8			39.6		19.1	19.8	
Level of Service		C		B	B			D		B	B	
Approach Delay (s)		21.6			14.3			39.6			19.7	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2034 FB AM Peak Hour
08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Volume (vph)	106	373	319	82	104	12	116	360	136	118	621	93
Future Volume (vph)	106	373	319	82	104	12	116	360	136	118	621	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.946			0.992			0.967			0.983		
Fit Protected	0.993			0.980			0.991			0.993		
Satd. Flow (prot)	0	1554	0	0	1492	0	0	2714	0	0	3046	0
Fit Permitted	0.993			0.980			0.991			0.993		
Satd. Flow (perm)	0	1554	0	0	1492	0	0	2714	0	0	3046	0
Link Speed (k/h)	60			60			70			70		
Link Distance (m)	573.6			536.0			54.0			203.5		
Travel Time (s)	34.4			32.2			2.8			10.5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	106	373	319	82	104	12	123	383	145	126	661	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	798	0	0	198	0	0	651	0	0	886	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Yield			Yield			Yield			Yield		

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	98.2%
Analysis Period (min)	15
ICU Level of Service	F

HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2034 FB AM Peak Hour
08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	106	373	319	82	104	12	116	360	136	118	621	93
Future Volume (veh/h)	106	373	319	82	104	12	116	360	136	118	621	93
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	106	373	319	82	104	12	123	383	145	126	661	99
Approach Volume (veh/h)	798			198			651			886		
Crossing Volume (veh/h)	869			612			605			309		
High Capacity (veh/h)	693			853			858			1087		
High v/c (veh/h)	1.15			0.23			0.76			0.82		
Low Capacity (veh/h)	543			684			688			891		
Low v/c (veh/h)	1.47			0.29			0.95			0.99		
Intersection Summary												
Maximum v/c High	1.15											
Maximum v/c Low	1.47											
Intersection Capacity Utilization	98.2%			ICU Level of Service			F					

Lanes, Volumes, Timings

2034 FB AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	11	541	35	54	160	4	11	16	23	9	90	32
Future Volume (vph)	11	541	35	54	160	4	11	16	23	9	90	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.998			0.938			0.967	
Flt Protected		0.999			0.988			0.989			0.997	
Satd. Flow (prot)	0	1672	0	0	1671	0	0	1566	0	0	1649	0
Flt Permitted		0.999			0.988			0.989			0.997	
Satd. Flow (perm)	0	1672	0	0	1671	0	0	1566	0	0	1649	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			1050.6			496.0	
Travel Time (s)		32.5			80.6			54.0			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	11	541	35	54	160	4	11	16	23	9	90	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	587	0	0	218	0	0	50	0	0	131	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.7%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2034 FB AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	541	35	54	160	4	11	16	23	9	90	32
Future Volume (vph)	11	541	35	54	160	4	11	16	23	9	90	32
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	541	35	54	160	4	11	16	23	9	90	32
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	587	218	50	131								
Volume Left (vph)	11	54	11	9								
Volume Right (vph)	35	4	23	32								
Hadj (s)	0.20	0.27	0.00	0.08								
Departure Headway (s)	5.0	5.6	6.3	6.2								
Degree Utilization, x	0.82	0.34	0.09	0.22								
Capacity (veh/h)	703	613	517	535								
Control Delay (s)	26.5	11.4	9.9	10.9								
Approach Delay (s)	26.5	11.4	9.9	10.9								
Approach LOS	D	B	A	B								
Intersection Summary												
Delay		20.2										
Level of Service		C										
Intersection Capacity Utilization		55.7%			ICU Level of Service					B		
Analysis Period (min)		15										

HCM Signalized Intersection Capacity Analysis

2034 FB AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	9	541	22	108	180	4	13	140	148	85	393	34
Future Volume (vph)	9	541	22	108	180	4	13	140	148	85	393	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.99		1.00	1.00			0.93		1.00	0.99	
Fit Protected		1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1701		1659	1688			1643		1601	1654	
Fit Permitted		1.00		0.29	1.00			0.97		0.32	1.00	
Satd. Flow (perm)		1695		510	1688			1605		540	1654	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	541	22	108	180	4	13	140	148	85	393	34
RTOR Reduction (vph)	0	2	0	0	1	0	0	38	0	0	3	0
Lane Group Flow (vph)	0	570	0	108	183	0	0	263	0	85	424	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		39.7		48.6	48.6			23.8		32.4	32.4	
Effective Green, g (s)		39.7		48.6	48.6			23.8		32.4	32.4	
Actuated g/C Ratio		0.44		0.54	0.54			0.26		0.36	0.36	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		747		331	911			424		242	595	
v/s Ratio Prot				c0.02	0.11					0.02	c0.26	
v/s Ratio Perm		c0.34		0.16				0.16		0.11		
v/c Ratio		0.76		0.33	0.20			0.62		0.35	0.71	
Uniform Delay, d1		21.2		12.8	10.7			29.1		21.1	24.8	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		7.3		0.6	0.5			6.7		0.9	7.1	
Delay (s)		28.5		13.3	11.2			35.8		22.0	31.9	
Level of Service		C		B	B			D		C	C	
Approach Delay (s)		28.5			12.0			35.8			30.2	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2034 FB PM Peak Hour
08/30/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Volume (vph)	122	128	152	101	310	46	257	832	116	9	372	89
Future Volume (vph)	122	128	152	101	310	46	257	832	116	9	372	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.949				0.986		0.986				0.972	
Flt Protected	0.985				0.989		0.989				0.999	
Satd. Flow (prot)	0	1506	0	0	1607	0	0	2974	0	0	3072	0
Flt Permitted	0.985				0.989		0.989				0.999	
Satd. Flow (perm)	0	1506	0	0	1607	0	0	2974	0	0	3072	0
Link Speed (k/h)	60				60		70				70	
Link Distance (m)	573.6				536.0		52.0				203.5	
Travel Time (s)	34.4				32.2		2.7				10.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	20%	14%	23%	27%	13%	18%	25%	17%	27%	14%	15%	17%
Adj. Flow (vph)	122	128	152	101	310	46	286	924	129	10	413	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	402	0	0	457	0	0	1339	0	0	522	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0		0.0				0.0	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	1.6				1.6		1.6				1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Yield				Yield		Yield				Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	92.1% ICU Level of Service F
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2034 FB PM Peak Hour
08/30/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	122	128	152	101	310	46	257	832	116	9	372	89
Future Volume (veh/h)	122	128	152	101	310	46	257	832	116	9	372	89
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	122	128	152	101	310	46	286	924	129	10	413	99
Approach Volume (veh/h)	402				457		1339				522	
Crossing Volume (veh/h)	524				1332#		260				697	
High Capacity (veh/h)	916				473		1129				797	
High v/c (veh/h)	0.44				0.97		1.19				0.66	
Low Capacity (veh/h)	739				356		930				634	
Low v/c (veh/h)	0.54				1.28		1.44				0.82	
Intersection Summary												
Maximum v/c High	1.19											
Maximum v/c Low	1.44											
Intersection Capacity Utilization	92.1%				ICU Level of Service						F	
# Crossing flow exceeds 1200, method is not applicable												

Lanes, Volumes, Timings

2034 FB PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	31	218	15	39	377	3	31	89	100	7	39	8
Future Volume (vph)	31	218	15	39	377	3	31	89	100	7	39	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.992			0.999			0.939			0.980	
Fit Protected		0.994			0.995			0.993			0.994	
Satd. Flow (prot)	0	1626	0	0	1634	0	0	1594	0	0	1662	0
Fit Permitted		0.994			0.995			0.993			0.994	
Satd. Flow (perm)	0	1626	0	0	1634	0	0	1594	0	0	1662	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		541.0			1343.2			1050.6			496.0	
Travel Time (s)		32.5			80.6			54.0			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	15%	27%	7%	18%	0%	26%	8%	12%	0%	14%	17%
Adj. Flow (vph)	31	218	15	39	377	3	31	89	100	7	39	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	264	0	0	419	0	0	220	0	0	54	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2034 FB PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	218	15	39	377	3	31	89	100	7	39	8
Future Volume (vph)	31	218	15	39	377	3	31	89	100	7	39	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	31	218	15	39	377	3	31	89	100	7	39	8
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	264	419	220	54								
Volume Left (vph)	31	39	31	7								
Volume Right (vph)	15	3	100	8								
Hadj (s)	0.27	0.30	-0.03	0.15								
Departure Headway (s)	5.7	5.5	5.9	6.5								
Degree Utilization, x	0.42	0.64	0.36	0.10								
Capacity (veh/h)	592	632	553	457								
Control Delay (s)	12.7	17.7	12.1	10.2								
Approach Delay (s)	12.7	17.7	12.1	10.2								
Approach LOS	B	C	B	B								
Intersection Summary												
Delay				14.6								
Level of Service				B								
Intersection Capacity Utilization				51.6%				ICU Level of Service				A
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis
7: Esquesing Line/Fourth Line & 5 Sideroad

2034 FB PM Peak Hour
08/30/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	40	272	15	87	342	24	31	346	105	5	140	52
Future Volume (vph)	40	272	15	87	342	24	31	346	105	5	140	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Frt		0.99		1.00	0.99			0.97		1.00	0.96	
Fit Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1664		1674	1671			1654		1460	1551	
Fit Permitted		0.92		0.37	1.00			0.97		0.33	1.00	
Satd. Flow (perm)		1538		654	1671			1615		505	1551	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	272	15	87	342	24	31	346	105	5	140	52
RTOR Reduction (vph)	0	2	0	0	3	0	0	9	0	0	12	0
Lane Group Flow (vph)	0	325	0	87	363	0	0	473	0	5	180	0
Heavy Vehicles (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	18%	21%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		28.0		38.4	38.4			36.8		42.6	42.6	
Effective Green, g (s)		28.0		38.4	38.4			36.8		42.6	42.6	
Actuated g/C Ratio		0.31		0.43	0.43			0.41		0.47	0.47	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		478		345	712			660		252	734	
v/s Ratio Prot				0.02	c0.22					0.00	c0.12	
v/s Ratio Perm		c0.21		0.09				c0.29		0.01		
v/c Ratio		0.68		0.25	0.51			0.72		0.02	0.25	
Uniform Delay, d1		27.1		17.2	18.9			22.2		14.5	14.1	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		7.6		0.4	0.6			3.7		0.0	0.2	
Delay (s)		34.7		17.6	19.5			26.0		14.5	14.3	
Level of Service		C		B	B			C		B	B	
Approach Delay (s)		34.7			19.1			26.0			14.3	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

2024 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	9	445	60	66	137	3	53	13	21	8	74	26
Future Volume (vph)	9	445	60	66	137	3	53	13	21	8	74	26
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	445	60	66	137	3	53	13	21	8	74	26
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	514	206	87	108								
Volume Left (vph)	9	66	53	8								
Volume Right (vph)	60	3	21	26								
Hadj (s)	0.18	0.28	0.20	0.08								
Departure Headway (s)	5.0	5.5	6.2	6.1								
Degree Utilization, x	0.72	0.32	0.15	0.18								
Capacity (veh/h)	514	611	500	522								
Control Delay (s)	19.6	11.0	10.3	10.4								
Approach Delay (s)	19.6	11.0	10.3	10.4								
Approach LOS	C	B	B	B								

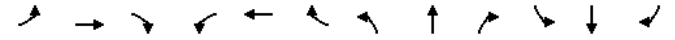
Intersection Summary			
Delay		15.7	
Level of Service		C	
Intersection Capacity Utilization	60.2%		ICU Level of Service
Analysis Period (min)	15		B

Lanes, Volumes, Timings

2024 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	8	447	18	103	162	3	11	115	124	70	337	42
Future Volume (vph)	8	447	18	103	162	3	11	115	124	70	337	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	40.0		0.0	0.0		0.0	60.0		0.0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (m)	2.5			50.0		2.5				50.0		
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			0.997			0.933			0.983	
Fit Protected		0.999		0.950				0.998		0.950		
Satd. Flow (prot)	0	1701	0	1659	1690	0	0	1642	0	1601	1647	0
Fit Permitted		0.996		0.346				0.978		0.377		
Satd. Flow (perm)	0	1695	0	604	1690	0	0	1609	0	635	1647	0
Right Turn on Red			Yes		Yes			Yes		Yes		Yes
Satd. Flow (RTOR)		3			2			52				8
Link Speed (k/h)		60			60			60				70
Link Distance (m)		1343.2			646.3			1994.7				464.9
Travel Time (s)		80.6			38.8			119.7				23.9
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	8	447	18	103	162	3	11	115	124	70	337	42
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	473	0	103	165	0	0	250	0	70	379	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7		3.7		3.7		3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0		0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6		1.6		1.6		1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7		28.7		28.7		28.7		28.7		28.7	
Detector 2 Size(m)	1.8		1.8		1.8		1.8		1.8		1.8	
Detector 2 Type	Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex		Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0		0.0		0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	2		1		6		8		7		4	

Lanes, Volumes, Timings
101: Boston Church Road & East Access 1

2024 FT AM Peak Hour
11/29/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	4	190	95	24	217
Future Volume (vph)	26	4	190	95	24	217
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0	0.0	115.0	0.0		
Storage Lanes	1	1		0	0	
Taper Length (m)	55.0				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.955			
Fit Protected	0.950					0.995
Satd. Flow (prot)	1825	1633	1835	0	0	1671
Fit Permitted	0.950					0.995
Satd. Flow (perm)	1825	1633	1835	0	0	1671
Link Speed (k/h)	48		70			70
Link Distance (m)	173.1		269.9			183.3
Travel Time (s)	13.0		13.9			9.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	16%
Adj. Flow (vph)	26	4	190	95	24	217
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	4	285	0	0	241
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	41.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
101: Boston Church Road & East Access 1

2024 FT AM Peak Hour
11/29/2023

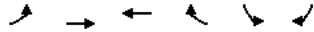
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	4	190	95	24	217
Future Volume (Veh/h)	26	4	190	95	24	217
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	26	4	190	95	24	217
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	502	238			285	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	502	238			285	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			98	
cM capacity (veh/h)	522	806			1289	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	26	4	285	241
Volume Left	26	0	0	24
Volume Right	0	4	95	0
cSH	522	806	1700	1289
Volume to Capacity	0.05	0.00	0.17	0.02
Queue Length 95th (m)	1.2	0.1	0.0	0.4
Control Delay (s)	12.3	9.5	0.0	0.9
Lane LOS	B	A		A
Approach Delay (s)	11.9		0.0	0.9
Approach LOS	B			

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	41.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

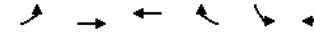
2024 FT AM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↔	↔
Traffic Volume (vph)	65	676	424	143	45	23
Future Volume (vph)	65	676	424	143	45	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Friction			0.850		0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1573	3093	2992	1471	1352	1150
Fit Permitted	0.487				0.950	
Satd. Flow (perm)	807	3093	2992	1471	1352	1150
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				155		25
Link Speed (k/h)		70	70		48	
Link Distance (m)		547.4	558.8		147.4	
Travel Time (s)		28.2	28.7		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	18%	22%	11%	35%	42%
Adj. Flow (vph)	71	735	461	155	49	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	735	461	155	49	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2024 FT AM Peak Hour
11/28/2023

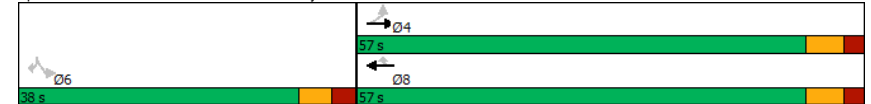


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	57.0	57.0	57.0	57.0	38.0	38.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Maximum Green (s)	50.4	50.4	50.4	50.4	31.5	31.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	64.3	64.3	64.3	64.3	8.3	8.3
Actuated g/C Ratio	0.83	0.83	0.83	0.83	0.11	0.11
v/c Ratio	0.11	0.29	0.19	0.12	0.34	0.17
Control Delay	3.8	3.5	3.1	1.0	38.5	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	3.5	3.1	1.0	38.5	15.3
LOS	A	A	A	A	D	B
Approach Delay		3.5	2.6		30.6	
Approach LOS		A	A		C	

Intersection Summary

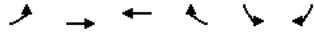
Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 77.4
 Natural Cycle: 65
 Control Type: Semi Act-Uncoord
 Maximum v/c Ratio: 0.34
 Intersection Signal Delay: 4.5
 Intersection Capacity Utilization 36.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis
102: James Snow Parkway N & East Access 2

2024 FT AM Peak Hour
11/28/2023

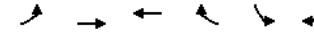


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↔	↔
Traffic Volume (vph)	65	676	424	143	45	23
Future Volume (vph)	65	676	424	143	45	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1573	3093	2992	1471	1352	1150
Fit Permitted	0.49	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	806	3093	2992	1471	1352	1150
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	735	461	155	49	25
RTOR Reduction (vph)	0	0	0	36	0	23
Lane Group Flow (vph)	71	735	461	119	49	2
Heavy Vehicles (%)	16%	18%	22%	11%	35%	42%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases	4		8			
Permitted Phases	4		8		6	
Actuated Green, G (s)	61.5	61.5	61.5	61.5	5.6	5.6
Effective Green, g (s)	61.5	61.5	61.5	61.5	5.6	5.6
Actuated g/C Ratio	0.77	0.77	0.77	0.77	0.07	0.07
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	618	2371	2294	1128	94	80
v/s Ratio Prot	c0.24		0.15			
v/s Ratio Perm	0.09		0.08		c0.04	
v/c Ratio	0.11	0.31	0.20	0.11	0.52	0.02
Uniform Delay, d1	2.4	2.9	2.6	2.4	36.0	34.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.3	0.2	0.2	5.1	0.1
Delay (s)	2.8	3.2	2.8	2.6	41.1	34.9
Level of Service	A	A	A	A	D	C
Approach Delay (s)	3.2		2.7		39.0	
Approach LOS	A		A		D	

Intersection Summary			
HCM 2000 Control Delay	4.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	80.2	Sum of lost time (s)	13.1
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

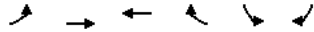
2024 FT AM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↔	↔
Traffic Volume (vph)	38	683	555	95	27	12
Future Volume (vph)	38	683	555	95	27	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt			0.850		0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1738	3017	2852	1498	1437	1361
Fit Permitted	0.424				0.950	
Satd. Flow (perm)	776	3017	2852	1498	1437	1361
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				103		13
Link Speed (k/h)	70		70		48	
Link Distance (m)	558.8		346.4		152.7	
Travel Time (s)	28.7		17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	21%	28%	9%	27%	20%
Adj. Flow (vph)	41	742	603	103	29	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	742	603	103	29	13
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14		24	
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)	28.7		28.7			
Detector 2 Size(m)	1.8		1.8			
Detector 2 Type	CI+Ex		CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)	0.0		0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases	4		8			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

2024 FT AM Peak Hour
11/28/2023

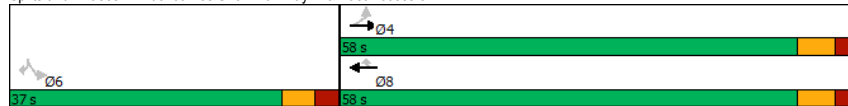


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	58.0	58.0	58.0	58.0	37.0	37.0
Total Split (%)	61.1%	61.1%	61.1%	61.1%	38.9%	38.9%
Maximum Green (s)	51.4	51.4	51.4	51.4	30.5	30.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	68.4	68.4	68.4	68.4	7.2	7.2
Actuated g/C Ratio	0.85	0.85	0.85	0.85	0.09	0.09
v/c Ratio	0.06	0.29	0.25	0.08	0.23	0.10
Control Delay	3.0	2.9	2.8	0.9	39.3	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	2.9	2.8	0.9	39.3	19.2
LOS	A	A	A	A	D	B
Approach Delay		2.9	2.5		33.1	
Approach LOS		A	A		C	

Intersection Summary

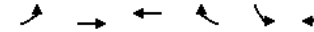
Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	80.5
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.29
Intersection Signal Delay:	3.6
Intersection Capacity Utilization:	40.1%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis
103: James Snow Parkway N & East Access 3

2024 FT AM Peak Hour
11/28/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↔
Traffic Volume (vph)	38	683	555	95	27	12
Future Volume (vph)	38	683	555	95	27	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1738	3017	2852	1498	1437	1361
Flt Permitted	0.42	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	776	3017	2852	1498	1437	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	742	603	103	29	13
RTOR Reduction (vph)	0	0	0	22	0	12
Lane Group Flow (vph)	41	742	603	81	29	1
Heavy Vehicles (%)	5%	21%	28%	9%	27%	20%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	65.5	65.5	65.5	65.5	4.7	4.7
Effective Green, g (s)	65.5	65.5	65.5	65.5	4.7	4.7
Actuated g/C Ratio	0.79	0.79	0.79	0.79	0.06	0.06
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	610	2372	2242	1177	81	76
v/s Ratio Prot		c0.25	0.21			
v/s Ratio Perm	0.05			0.05	c0.02	0.00
v/c Ratio	0.07	0.31	0.27	0.07	0.36	0.01
Uniform Delay, d1	2.0	2.5	2.4	2.0	37.8	37.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.3	0.1	2.7	0.1
Delay (s)	2.2	2.9	2.7	2.1	40.5	37.2
Level of Service	A	A	A	A	D	D
Approach Delay (s)		2.8	2.6		39.5	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	3.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	83.3	Sum of lost time (s)	13.1
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
201: West Access 1 & 5 Sideroad

2024 FT AM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖		↗	↖	↗	
Traffic Volume (vph)	513	9	46	170	6	4
Future Volume (vph)	513	9	46	170	6	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			50.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.946	
Fit Protected			0.950		0.971	
Satd. Flow (prot)	1700	0	1825	1700	1765	0
Fit Permitted			0.950		0.971	
Satd. Flow (perm)	1700	0	1825	1700	1765	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	513	9	46	170	6	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	522	0	46	170	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	44.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
201: West Access 1 & 5 Sideroad

2024 FT AM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖		↗	↖	↗	
Traffic Volume (veh/h)	513	9	46	170	6	4
Future Volume (Veh/h)	513	9	46	170	6	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	513	9	46	170	6	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			522		780	518
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			522		780	518
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		98	99
cM capacity (veh/h)			1055		351	562

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	522	46	170	10
Volume Left	0	46	0	6
Volume Right	9	0	0	4
cSH	1700	1055	1700	413
Volume to Capacity	0.31	0.04	0.10	0.02
Queue Length 95th (m)	0.0	1.0	0.0	0.6
Control Delay (s)	0.0	8.6	0.0	13.9
Lane LOS		A		B
Approach Delay (s)	0.0	1.8		13.9
Approach LOS				B

Intersection Summary

Average Delay		0.7		
Intersection Capacity Utilization		44.2%	ICU Level of Service	A
Analysis Period (min)		15		

Lanes, Volumes, Timings
202: West Access 2 & 5 Sideroad

2024 FT AM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	508	9	0	216	0	6
Future Volume (vph)	508	9	0	216	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998			0.865		
Fit Protected						
Satd. Flow (prot)	1700	0	0	1700	1662	0
Fit Permitted						
Satd. Flow (perm)	1700	0	0	1700	1662	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	175.4			166.9	91.3	
Travel Time (s)	10.5			10.0	6.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	508	9	0	216	0	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	517	0	0	216	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.3%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
202: West Access 2 & 5 Sideroad

2024 FT AM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	508	9	0	216	0	6
Future Volume (Veh/h)	508	9	0	216	0	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	508	9	0	216	0	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			517		728	512
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			517		728	512
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1059		393	566

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	517	216	6
Volume Left	0	0	0
Volume Right	9	0	6
cSH	1700	1059	566
Volume to Capacity	0.30	0.00	0.01
Queue Length 95th (m)	0.0	0.0	0.2
Control Delay (s)	0.0	0.0	11.4
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.4
Approach LOS			B

Intersection Summary

Average Delay	0.1
Intersection Capacity Utilization	37.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
203: Boston Church Road & West Access 3

2024 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	12	19	87	200	0
Future Volume (vph)	0	12	19	87	200	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		85.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr't	0.865					
Fit Protected				0.991		
Satd. Flow (prot)	908	0	0	1520	1762	0
Fit Permitted				0.991		
Satd. Flow (perm)	908	0	0	1520	1762	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	99.5			207.3	219.2	
Travel Time (s)	7.5			10.7	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	83%	63%	17%	9%	0%
Adj. Flow (vph)	0	12	19	87	200	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	0	106	200	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.5%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
203: Boston Church Road & West Access 3

2024 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	0	12	19	87	200	0
Future Volume (Veh/h)	0	12	19	87	200	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	12	19	87	200	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	325	200	200			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	200	200			
tC, single (s)	6.4	7.0	4.7			
tC, 2 stage (s)						
tF (s)	3.5	4.0	2.8			
p0 queue free %	100	98	98			
cM capacity (veh/h)	661	672	1079			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	106	200
Volume Left	0	19	0
Volume Right	12	0	0
cSH	672	1079	1700
Volume to Capacity	0.02	0.02	0.12
Queue Length 95th (m)	0.4	0.4	0.0
Control Delay (s)	10.5	1.6	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	1.6	0.0
Approach LOS	B		

Intersection Summary	
Average Delay	0.9
Intersection Capacity Utilization	29.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
204: Boston Church Road & West Access 4

2024 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕		
Traffic Volume (vph)	2	23	78	104	192	20
Future Volume (vph)	2	23	78	104	192	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.876		0.987			
Fit Protected	0.996		0.979			
Satd. Flow (prot)	1669		0	0	1714	1753
Fit Permitted	0.996		0.979			
Satd. Flow (perm)	1669		0	0	1714	1753
Link Speed (k/h)	48		70		70	
Link Distance (m)	101.5		171.0		207.3	
Travel Time (s)	7.6		8.8		10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	5%	0%	0%	17%	9%	0%
Adj. Flow (vph)	2	23	78	104	192	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	182	212	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	1.6		1.6			
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free			

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.4%
Analysis Period (min)	15
ICU Level of Service A	

HCM Unsignalized Intersection Capacity Analysis
204: Boston Church Road & West Access 4

2024 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	↔			↕		
Lane Configurations	↔			↕		
Traffic Volume (veh/h)	2	23	78	104	192	20
Future Volume (Veh/h)	2	23	78	104	192	20
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	23	78	104	192	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	462	202	212			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	462	202	212			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	94			
cM capacity (veh/h)	521	844	1370			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	182	212
Volume Left	2	78	0
Volume Right	23	0	20
cSH	804	1370	1700
Volume to Capacity	0.03	0.06	0.12
Queue Length 95th (m)	0.7	1.4	0.0
Control Delay (s)	9.6	3.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.6	3.6	0.0
Approach LOS	A		

Intersection Summary

Average Delay	2.1	
Intersection Capacity Utilization	34.4%	ICU Level of Service A
Analysis Period (min)	15	

Lanes, Volumes, Timings
205: Boston Church Road & West Access 5

2024 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	3	4	182	215	0
Future Volume (vph)	0	3	4	182	215	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.999		
Satd. Flow (prot)	831	0	0	1879	1656	0
Flt Permitted				0.999		
Satd. Flow (perm)	831	0	0	1879	1656	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	100.3			183.3	171.0	
Travel Time (s)	7.5			9.4	8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	100%	100%	0%	16%	0%
Adj. Flow (vph)	0	3	4	182	215	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	0	186	215	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 22.8% ICU Level of Service A
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
205: Boston Church Road & West Access 5

2024 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	3	4	182	215	0
Future Volume (Veh/h)	0	3	4	182	215	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	3	4	182	215	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	405	215	215			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	405	215	215			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	100	100			
cM capacity (veh/h)	603	630	938			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	3	186	215
Volume Left	0	4	0
Volume Right	3	0	0
cSH	630	938	1700
Volume to Capacity	0.00	0.00	0.13
Queue Length 95th (m)	0.1	0.1	0.0
Control Delay (s)	10.7	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.7	0.2	0.0
Approach LOS	B		

Intersection Summary

Average Delay 0.2
Intersection Capacity Utilization 22.8% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings

2024 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

11/29/2023

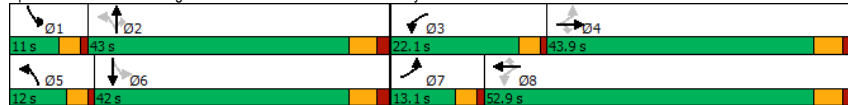


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	
Minimum Split (s)	11.0	43.9	43.9	11.5	43.9	43.9	12.0	43.0	43.0	11.0	35.9	
Total Split (s)	13.1	43.9	43.9	22.1	52.9	52.9	12.0	43.0	43.0	11.0	42.0	
Total Split (%)	10.9%	36.6%	36.6%	18.4%	44.1%	44.1%	10.0%	35.8%	35.8%	9.2%	35.0%	
Maximum Green (s)	9.1	37.9	37.9	18.1	46.9	46.9	8.0	37.0	37.0	7.0	36.0	
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		30.0	30.0		30.0	30.0		22.0	22.0		22.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	20.5	11.0	11.0	34.0	25.3	25.3	41.9	32.0	32.0	41.3	33.8	
Actuated g/C Ratio	0.24	0.13	0.13	0.39	0.29	0.29	0.48	0.37	0.37	0.47	0.39	
v/c Ratio	0.13	0.44	0.57	0.78	0.15	0.48	0.29	0.77	0.37	0.74	0.44	
Control Delay	20.1	40.0	12.7	35.7	27.0	6.7	13.9	29.9	4.5	34.9	22.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.1	40.0	12.7	35.7	27.0	6.7	13.9	29.9	4.5	34.9	22.3	
LOS	C	D	B	D	C	A	B	C	A	C	C	
Approach Delay		25.5			23.3			23.7			25.4	
Approach LOS		C			C			C			C	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	87.2
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.78
Intersection Signal Delay:	24.2
Intersection LOS:	C
Intersection Capacity Utilization:	73.1%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N

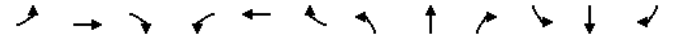


HCM Signalized Intersection Capacity Analysis

2024 FT PM Peak Hour

2: Regional Road 25 & James Snow Parkway N

11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔	↔	↔↔	↔
Traffic Volume (vph)	33	170	179	317	107	262	86	791	214	155	457	6
Future Volume (vph)	33	170	179	317	107	262	86	791	214	155	457	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1521	3411	1396	1547	2808	1396	1250	3093	1355	1484	2997	
Fit Permitted	0.68	1.00	1.00	0.48	1.00	1.00	0.42	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	1083	3411	1396	785	2808	1396	552	3093	1355	287	2997	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	37	189	199	352	119	291	96	879	238	172	508	7
RTOR Reduction (vph)	0	0	171	0	0	209	0	0	151	0	1	0
Lane Group Flow (vph)	37	189	28	352	119	82	96	879	87	172	514	0
Conf. Peds. (#/hr)							1		1			
Heavy Vehicles (%)	20%	7%	17%	18%	30%	17%	46%	18%	19%	23%	21%	60%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		
Actuated Green, G (s)	17.2	12.8	12.8	33.7	25.3	25.3	39.1	32.9	32.9	40.9	33.8	
Effective Green, g (s)	17.2	12.8	12.8	33.7	25.3	25.3	39.1	32.9	32.9	40.9	33.8	
Actuated g/C Ratio	0.19	0.14	0.14	0.38	0.28	0.28	0.44	0.37	0.37	0.46	0.38	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	229	486	199	438	792	393	288	1134	496	225	1129	
v/s Ratio Prot	0.01	0.06		c0.15	0.04		0.02	0.28		c0.06	0.17	
v/s Ratio Perm	0.02		0.02	c0.15		0.06	0.12		0.06	c0.29		
v/c Ratio	0.16	0.39	0.14	0.80	0.15	0.21	0.33	0.78	0.18	0.76	0.46	
Uniform Delay, d1	30.0	34.9	33.6	22.8	24.1	24.6	15.5	25.1	19.2	16.8	21.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.5	0.3	10.2	0.1	0.3	0.7	3.4	0.2	14.3	0.3	
Delay (s)	30.4	35.4	34.0	33.0	24.2	24.8	16.2	28.5	19.4	31.1	21.3	
Level of Service	C	D	C	C	C	C	B	C	B	C	C	
Approach Delay (s)		34.3			28.5		25.7			23.8		
Approach LOS		C			C		C			C		

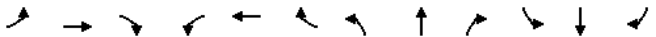
Intersection Summary

HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Esquesing Line & James Snow Parkway N

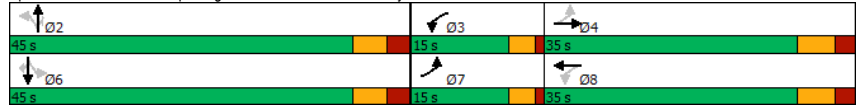
2024 FT PM Peak Hour
11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	15.0	35.0		15.0	35.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	15.8%	36.8%		15.8%	36.8%		47.4%	47.4%	47.4%	47.4%	47.4%	47.4%
Maximum Green (s)	11.0	28.4		11.0	28.4		38.5	38.5	38.5	38.5	38.5	38.5
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	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)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effect Green (s)	30.9	26.9		28.6	22.0		23.3	23.3	23.3	23.3	23.3	23.3
Actuated g/C Ratio	0.47	0.41		0.44	0.34		0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	0.12	0.67		0.03	0.49		0.30	0.55	0.06	0.11	0.26	0.02
Control Delay	10.5	19.9		10.0	20.4		19.6	22.1	0.2	17.5	17.9	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	19.9		10.0	20.4		19.6	22.1	0.2	17.5	17.9	0.1
LOS	B	B		A	C		B	C	A	B	B	A
Approach Delay		19.4			20.2			20.0			16.7	
Approach LOS		B			C			C			B	

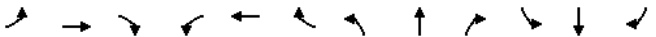
Intersection Summary	
Area Type:	Other
Cycle Length: 95	
Actuated Cycle Length: 65.3	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 80.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 4: Esquesing Line & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
4: Esquesing Line & James Snow Parkway N

2024 FT PM Peak Hour
11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	43	651	83	10	386	52	116	331	33	30	151	12
Future Volume (vph)	43	651	83	10	386	52	116	331	33	30	151	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1404	2915		1825	2885		1560	1700	1526	1534	1656	1445
Fit Permitted	0.41	1.00		0.30	1.00		0.66	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	603	2915		583	2885		1085	1700	1526	763	1656	1445
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	47	715	91	11	424	57	116	331	33	30	151	12
RTOR Reduction (vph)	0	9	0	0	10	0	0	0	22	0	0	8
Lane Group Flow (vph)	47	797	0	11	471	0	116	331	11	30	151	4
Heavy Vehicles (%)	30%	25%	8%	0%	27%	4%	17%	13%	7%	19%	16%	13%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	31.2	26.9		24.8	23.7		23.3	23.3	23.3	23.3	23.3	23.3
Effective Green, g (s)	31.2	26.9		24.8	23.7		23.3	23.3	23.3	23.3	23.3	23.3
Actuated g/C Ratio	0.46	0.39		0.36	0.35		0.34	0.34	0.34	0.34	0.34	0.34
Clearance Time (s)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	325	1146		231	999		369	579	519	259	564	492
v/s Ratio Prot	c0.01	c0.27		0.00	0.16			c0.19			0.09	
v/s Ratio Perm	0.06			0.02			0.11		0.01	0.04		0.00
v/c Ratio	0.14	0.70		0.05	0.47		0.31	0.57	0.02	0.12	0.27	0.01
Uniform Delay, d1	10.6	17.3		14.0	17.5		16.7	18.5	15.0	15.5	16.4	14.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	2.4		0.1	0.7		1.0	2.2	0.0	0.4	0.5	0.0
Delay (s)	10.8	19.7		14.1	18.2		17.7	20.6	15.0	15.9	16.9	14.9
Level of Service	B	B		B	B		B	C	B	B	B	B
Approach Delay (s)		19.2			18.1			19.5			16.6	
Approach LOS		B			B			B			B	

Intersection Summary	
HCM 2000 Control Delay	18.8 HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio	0.63
Actuated Cycle Length (s)	68.4 Sum of lost time (s) 17.1
Intersection Capacity Utilization	80.2% ICU Level of Service D
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
5: James Snow Parkway N & Steeles Avenue East

2024 FT PM Peak Hour
11/29/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	392	476	409	691	145	436	332	188	106	617	14
Future Volume (vph)	12	392	476	409	691	145	436	332	188	106	617	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1825	3318	1521	3278	3380	1247	3372	3544	1296	1225	3399	
Satd. Flow (perm)	704	3318	1521	3278	3380	1247	3372	3544	1296	691	3399	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	426	517	445	751	158	474	361	204	115	671	15
RTOR Reduction (vph)	0	0	186	0	0	95	0	0	137	0	1	0
Lane Group Flow (vph)	13	426	331	445	751	63	474	361	67	115	685	0
Conf. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	10%	6%	8%	8%	31%	5%	3%	26%	49%	7%	8%
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6			8		4		
Actuated Green, G (s)	37.2	34.7	34.7	18.2	51.4	51.4	18.2	42.4	42.4	42.4	32.8	
Effective Green, g (s)	37.2	34.7	34.7	18.2	51.4	51.4	18.2	42.4	42.4	42.4	32.8	
Actuated g/C Ratio	0.29	0.27	0.27	0.14	0.40	0.40	0.14	0.33	0.33	0.33	0.26	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	225	896	411	464	1353	499	477	1170	427	268	868	
v/s Ratio Prot	0.00	0.13		c0.14	0.22		c0.14	0.10		0.03	c0.20	
v/s Ratio Perm	0.02		c0.22		0.05			0.05	0.11			
v/c Ratio	0.06	0.48	0.81	0.96	0.56	0.13	0.99	0.31	0.16	0.43	0.79	
Uniform Delay, d1	32.6	39.2	43.7	54.7	29.7	24.3	55.0	32.1	30.4	31.8	44.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.4	10.9	31.1	0.5	0.1	39.4	0.3	0.4	1.1	5.6	
Delay (s)	32.7	39.6	54.6	85.8	30.2	24.4	94.4	32.4	30.7	32.9	50.1	
Level of Service	C	D	D	F	C	C	F	C	C	C	D	
Approach Delay (s)		47.7			47.8			60.4			47.6	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	50.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	128.4	Sum of lost time (s)	24.5
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
6: Boston Church Road/3 Line & 5 Sideroad

2024 FT PM Peak Hour
11/29/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	185	61	36	310	2	60	73	105	6	32	7
Future Volume (vph)	25	185	61	36	310	2	60	73	105	6	32	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970			0.999			0.940			0.979	
Fit Protected		0.995			0.995			0.988			0.993	
Satd. Flow (prot)	0	1567	0	0	1636	0	0	1561	0	0	1659	0
Fit Permitted		0.995			0.995			0.988			0.993	
Satd. Flow (perm)	0	1567	0	0	1636	0	0	1561	0	0	1659	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	15%	27%	7%	18%	0%	26%	8%	12%	0%	14%	17%
Adj. Flow (vph)	25	185	61	36	310	2	60	73	105	6	32	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	271	0	0	348	0	0	238	0	0	45	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	52.0%
	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
6: Boston Church Road/3 Line & 5 Sideroad

2024 FT PM Peak Hour
11/29/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	25	185	61	36	310	2	60	73	105	6	32	7
Future Volume (vph)	25	185	61	36	310	2	60	73	105	6	32	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	25	185	61	36	310	2	60	73	105	6	32	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	271	348	238	45								
Volume Left (vph)	25	36	60	6								
Volume Right (vph)	61	2	105	7								
Hadj (s)	0.20	0.30	0.03	0.15								
Departure Headway (s)	5.5	5.5	5.7	6.3								
Degree Utilization, x	0.42	0.53	0.38	0.08								
Capacity (veh/h)	613	626	574	473								
Control Delay (s)	12.4	14.6	12.2	9.8								
Approach Delay (s)	12.4	14.6	12.2	9.8								
Approach LOS	B	B	B	A								
Intersection Summary												
Delay	13.0											
Level of Service	B											
Intersection Capacity Utilization	52.0%			ICU Level of Service			A					
Analysis Period (min)	15											

Lanes, Volumes, Timings
7: Esquesing Line/Fourth Line & 5 Sideroad

2024 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Traffic Volume (vph)	47	238	12	75	285	20	25	299	103	4	115	43
Future Volume (vph)	47	238	12	75	285	20	25	299	103	4	115	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	40.0		0.0	0.0		0.0	60.0		0.0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (m)	2.5			50.0		2.5				50.0		
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				0.990				0.967		0.959	
Fit Protected	0.992		0.950				0.997		0.950			
Satd. Flow (prot)	0	1654	0	1674	1671	0	0	1651	0	1460	1551	0
Fit Permitted	0.909		0.471				0.978		0.293			
Satd. Flow (perm)	0	1515	0	830	1671	0	0	1620	0	450	1551	0
Right Turn on Red			Yes		Yes		Yes		Yes		Yes	
Satd. Flow (RTOR)	3		6		17		23					
Link Speed (k/h)	60		60		60		70					
Link Distance (m)	1343.2		646.3		1994.7		464.9					
Travel Time (s)	80.6		38.8		119.7		23.9					
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	18%	21%
Adj. Flow (vph)	47	238	12	75	285	20	25	299	103	4	115	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	297	0	75	305	0	0	427	0	4	158	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	3.7		3.7		3.7		3.7					
Link Offset(m)	0.0		0.0		0.0		0.0					
Crosswalk Width(m)	1.6		1.6		1.6		1.6					
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14		24		14		24		14	
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)	28.7		28.7		28.7		28.7					
Detector 2 Size(m)	1.8		1.8		1.8		1.8					
Detector 2 Type	CI+Ex		CI+Ex		CI+Ex		CI+Ex					
Detector 2 Channel												
Detector 2 Extend (s)	0.0		0.0		0.0		0.0					
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases	2		1		6		8		7		4	

Lanes, Volumes, Timings
101: Boston Church Road & East Access 1

2024 FT PM Peak Hour
11/29/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	98	25	237	29	7	226
Future Volume (vph)	98	25	237	29	7	226
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	30.0		115.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850	0.985			
Fit Protected	0.950					0.999
Satd. Flow (prot)	1825	1633	1594	0	0	1781
Fit Permitted	0.950					0.999
Satd. Flow (perm)	1825	1633	1594	0	0	1781
Link Speed (k/h)	48		70			70
Link Distance (m)	169.5		269.9			183.3
Travel Time (s)	12.7		13.9			9.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	21%	0%	0%	8%
Adj. Flow (vph)	98	25	237	29	7	226
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	25	266	0	0	233
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.6%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
101: Boston Church Road & East Access 1

2024 FT PM Peak Hour
11/29/2023

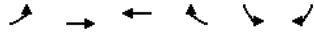
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	98	25	237	29	7	226
Future Volume (Veh/h)	98	25	237	29	7	226
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	98	25	237	29	7	226
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	492	252			266	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	492	252			266	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	97			99	
cM capacity (veh/h)	537	792			1310	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	123	266	233
Volume Left	98	0	7
Volume Right	25	29	0
cSH	674	1700	1310
Volume to Capacity	0.18	0.16	0.01
Queue Length 95th (m)	5.0	0.0	0.1
Control Delay (s)	12.5	0.0	0.3
Lane LOS	B		A
Approach Delay (s)	12.5	0.0	0.3
Approach LOS	B		

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization	29.6%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

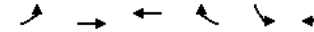
2024 FT PM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↔
Traffic Volume (vph)	36	532	462	56	150	73
Future Volume (vph)	36	532	462	56	150	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Friction			0.850		0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1267	3042	3017	1158	1601	1350
Fit Permitted	0.468				0.950	
Satd. Flow (perm)	624	3042	3017	1158	1601	1350
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				61		79
Link Speed (k/h)	70	70			48	
Link Distance (m)	548.1	558.1			147.4	
Travel Time (s)		28.2	28.7		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	44%	20%	21%	41%	14%	21%
Adj. Flow (vph)	39	578	502	61	163	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	578	502	61	163	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2024 FT PM Peak Hour
11/28/2023

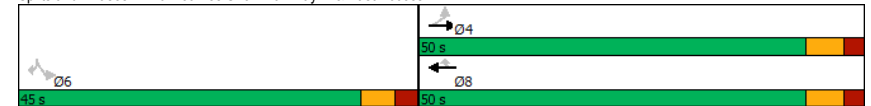


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	50.0	50.0	50.0	50.0	45.0	45.0
Total Split (%)	52.6%	52.6%	52.6%	52.6%	47.4%	47.4%
Maximum Green (s)	43.4	43.4	43.4	43.4	38.5	38.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	46.4	46.4	46.4	46.4	12.5	12.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.17	0.17
v/c Ratio	0.10	0.30	0.26	0.08	0.59	0.26
Control Delay	6.7	6.6	6.4	2.2	35.4	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	6.6	6.4	2.2	35.4	8.7
LOS	A	A	A	A	D	A
Approach Delay		6.6	5.9		26.7	
Approach LOS		A	A		C	

Intersection Summary

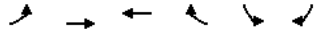
Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 72
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.59
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 41.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis
102: James Snow Parkway N & East Access 2

2024 FT PM Peak Hour
11/28/2023



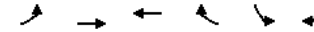
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↗
Traffic Volume (vph)	36	532	462	56	150	73
Future Volume (vph)	36	532	462	56	150	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1267	3042	3017	1158	1601	1350
Fit Permitted	0.47	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	624	3042	3017	1158	1601	1350
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	578	502	61	163	79
RTOR Reduction (vph)	0	0	0	22	0	65
Lane Group Flow (vph)	39	578	502	39	163	14
Heavy Vehicles (%)	44%	20%	21%	41%	14%	21%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4		8		
Permitted Phases	4			8	6	6
Actuated Green, G (s)	46.4	46.4	46.4	46.4	12.5	12.5
Effective Green, g (s)	46.4	46.4	46.4	46.4	12.5	12.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.17	0.17
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	402	1960	1944	746	277	234
v/s Ratio Prot		c0.19	0.17			
v/s Ratio Perm	0.06			0.03	c0.10	0.01
v/c Ratio	0.10	0.29	0.26	0.05	0.59	0.06
Uniform Delay, d1	4.9	5.6	5.5	4.7	27.4	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.4	0.3	0.1	3.2	0.1
Delay (s)	5.3	6.0	5.8	4.8	30.6	24.9
Level of Service	A	A	A	A	C	C
Approach Delay (s)		6.0	5.7		28.7	
Approach LOS		A	A		C	

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	13.1
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

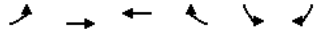
2024 FT PM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↗	↗	↘	↘	↗
Traffic Volume (vph)	19	663	480	33	105	38
Future Volume (vph)	19	663	480	33	105	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850	0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1630	2920	2874	1150	1630	1555
Fit Permitted	0.459				0.950	
Satd. Flow (perm)	787	2920	2874	1150	1630	1555
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				36		41
Link Speed (k/h)		70	70		48	
Link Distance (m)		558.1	346.4		152.7	
Travel Time (s)		28.7	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	25%	27%	42%	12%	5%
Adj. Flow (vph)	21	721	522	36	114	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	721	522	36	114	41
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

2024 FT PM Peak Hour
11/28/2023

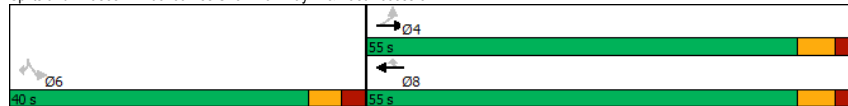


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	24.6	24.6	33.5	33.5
Total Split (s)	55.0	55.0	55.0	55.0	40.0	40.0
Total Split (%)	57.9%	57.9%	57.9%	57.9%	42.1%	42.1%
Maximum Green (s)	48.4	48.4	48.4	48.4	33.5	33.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	11.0	11.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	55.6	55.6	55.6	55.6	10.5	10.5
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.14	0.14
v/c Ratio	0.04	0.33	0.25	0.04	0.50	0.16
Control Delay	4.8	5.4	4.9	2.0	37.0	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	5.4	4.9	2.0	37.0	10.8
LOS	A	A	A	A	D	B
Approach Delay		5.4	4.7		30.1	
Approach LOS		A	A		C	

Intersection Summary

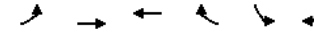
Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	75
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.50
Intersection Signal Delay:	7.7
Intersection Capacity Utilization:	35.1%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis
103: James Snow Parkway N & East Access 3

2024 FT PM Peak Hour
11/28/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↔
Traffic Volume (vph)	19	663	480	33	105	38
Future Volume (vph)	19	663	480	33	105	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr't	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1630	2920	2874	1150	1630	1555
Fit Permitted	0.46	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	787	2920	2874	1150	1630	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	721	522	36	114	41
RTOR Reduction (vph)	0	0	0	10	0	36
Lane Group Flow (vph)	21	721	522	26	114	5
Heavy Vehicles (%)	12%	25%	27%	42%	12%	5%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	54.2	54.2	54.2	54.2	9.1	9.1
Effective Green, g (s)	54.2	54.2	54.2	54.2	9.1	9.1
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.12	0.12
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	558	2071	2038	815	194	185
v/s Ratio Prot		c0.25	0.18			
v/s Ratio Perm	0.03			0.02	c0.07	0.00
v/c Ratio	0.04	0.35	0.26	0.03	0.59	0.03
Uniform Delay, d1	3.3	4.3	3.9	3.3	31.9	29.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.5	0.3	0.1	4.5	0.1
Delay (s)	3.4	4.7	4.2	3.4	36.4	29.8
Level of Service	A	A	A	A	D	C
Approach Delay (s)		4.7	4.2		34.6	
Approach LOS		A	A		C	

Intersection Summary

HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	13.1
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
201: West Access 1 & 5 Sideroad

2024 FT PM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖		↖	↗	↖	↗
Traffic Volume (vph)	230	4	12	365	21	21
Future Volume (vph)	230	4	12	365	21	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			50.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.932	
Fit Protected			0.950		0.976	
Satd. Flow (prot)	1671	0	1825	1628	1748	0
Fit Permitted			0.950		0.976	
Satd. Flow (perm)	1671	0	1825	1628	1748	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	0%	0%	18%	0%	0%
Adj. Flow (vph)	230	4	12	365	21	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	234	0	12	365	42	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
201: West Access 1 & 5 Sideroad

2024 FT PM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖		↖	↗	↖	↗
Traffic Volume (veh/h)	230	4	12	365	21	21
Future Volume (Veh/h)	230	4	12	365	21	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	230	4	12	365	21	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			234		621	232
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			234		621	232
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	97
cM capacity (veh/h)			1345		450	812

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	234	12	365	42
Volume Left	0	12	0	21
Volume Right	4	0	0	21
cSH	1700	1345	1700	579
Volume to Capacity	0.14	0.01	0.21	0.07
Queue Length 95th (m)	0.0	0.2	0.0	1.8
Control Delay (s)	0.0	7.7	0.0	11.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.2		11.7
Approach LOS				B

Intersection Summary	
Average Delay	0.9
Intersection Capacity Utilization	29.2%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
202: West Access 2 & 5 Sideroad

2024 FT PM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (vph)	247	4	0	377	0	24
Future Volume (vph)	247	4	0	377	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998			0.865		
Fit Protected						
Satd. Flow (prot)	1671	0	0	1628	1662	0
Fit Permitted						
Satd. Flow (perm)	1671	0	0	1628	1662	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	175.4			166.9	91.3	
Travel Time (s)	10.5			10.0	6.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	0%	0%	18%	0%	0%
Adj. Flow (vph)	247	4	0	377	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	251	0	0	377	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	29.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
202: West Access 2 & 5 Sideroad

2024 FT PM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↖	↗	↗
Traffic Volume (veh/h)	247	4	0	377	0	24
Future Volume (Veh/h)	247	4	0	377	0	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	247	4	0	377	0	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			251		626	249
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			251		626	249
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1326		451	795

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	251	377	24
Volume Left	0	0	0
Volume Right	4	0	24
cSH	1700	1326	795
Volume to Capacity	0.15	0.00	0.03
Queue Length 95th (m)	0.0	0.0	0.7
Control Delay (s)	0.0	0.0	9.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.7
Approach LOS			A

Intersection Summary

Average Delay	0.4
Intersection Capacity Utilization	29.8%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
203: Boston Church Road & West Access 3

2024 FT PM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	21	18	236	129	0
Future Volume (vph)	2	21	18	236	129	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.877					
Fit Protected	0.996			0.996		
Satd. Flow (prot)	991	0	0	1681	1685	0
Fit Permitted	0.996			0.996		
Satd. Flow (perm)	991	0	0	1681	1685	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	99.5			207.3	219.2	
Travel Time (s)	7.5			10.7	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	76%	90%	8%	14%	0%
Adj. Flow (vph)	2	21	18	236	129	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	0	0	254	129	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.5%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
203: Boston Church Road & West Access 3

2024 FT PM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	21	18	236	129	0
Future Volume (Veh/h)	2	21	18	236	129	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	21	18	236	129	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	401	129	129			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	401	129	129			
tC, single (s)	6.4	7.0	5.0			
tC, 2 stage (s)						
tF (s)	3.5	4.0	3.0			
p0 queue free %	100	97	98			
cM capacity (veh/h)	599	756	1055			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	254	129
Volume Left	2	18	0
Volume Right	21	0	0
cSH	739	1055	1700
Volume to Capacity	0.03	0.02	0.08
Queue Length 95th (m)	0.7	0.4	0.0
Control Delay (s)	10.0	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.0	0.8	0.0
Approach LOS	B		

Intersection Summary

Average Delay	1.0
Intersection Capacity Utilization	33.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings
204: Boston Church Road & West Access 4

2024 FT PM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕		
Traffic Volume (vph)	20	82	24	234	143	7
Future Volume (vph)	20	82	24	234	143	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.891		0.994			
Flt Protected	0.990		0.995			
Satd. Flow (prot)	1695		0	0	1782	1685
Flt Permitted	0.990		0.995			
Satd. Flow (perm)	1695		0	0	1782	1685
Link Speed (k/h)	48		70		70	
Link Distance (m)	101.5		171.0		207.3	
Travel Time (s)	7.6		8.8		10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	8%	14%	0%
Adj. Flow (vph)	20	82	24	234	143	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	258	150	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	1.6		1.6			
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	37.8%
Analysis Period (min)	15
	ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
204: Boston Church Road & West Access 4

2024 FT PM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↕		
Traffic Volume (veh/h)	20	82	24	234	143	7
Future Volume (Veh/h)	20	82	24	234	143	7
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	82	24	234	143	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	428	146	150			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428	146	150			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	91	98			
cM capacity (veh/h)	577	906	1444			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	102	258	150
Volume Left	20	24	0
Volume Right	82	0	7
cSH	815	1444	1700
Volume to Capacity	0.13	0.02	0.09
Queue Length 95th (m)	3.2	0.4	0.0
Control Delay (s)	10.0	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.0	0.8	0.0
Approach LOS	B		

Intersection Summary

Average Delay	2.4	
Intersection Capacity Utilization	37.8%	ICU Level of Service A
Analysis Period (min)	15	

Lanes, Volumes, Timings
205: Boston Church Road & West Access 5

2024 FT PM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	5	258	225	0
Future Volume (vph)	0	5	5	258	225	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected				0.999		
Satd. Flow (prot)	831	0	0	1567	1779	0
Fit Permitted				0.999		
Satd. Flow (perm)	831	0	0	1567	1779	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	100.3			183.3	171.0	
Travel Time (s)	7.5			9.4	8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	100%	100%	21%	8%	0%
Adj. Flow (vph)	0	5	5	258	225	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	263	225	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 27.6% ICU Level of Service A
Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
205: Boston Church Road & West Access 5

2024 FT PM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	0	5	5	258	225	0
Future Volume (Veh/h)	0	5	5	258	225	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	5	5	258	225	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	493	225	225			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	493	225	225			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	99			
cM capacity (veh/h)	536	621	929			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	5	263	225
Volume Left	0	5	0
Volume Right	5	0	0
cSH	621	929	1700
Volume to Capacity	0.01	0.01	0.13
Queue Length 95th (m)	0.2	0.1	0.0
Control Delay (s)	10.8	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.8	0.2	0.0
Approach LOS	B		

Intersection Summary

Average Delay 0.2
Intersection Capacity Utilization 27.6% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2029 FT AM Peak Hour
11/28/2023

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕			↕			↕			↕		
Traffic Volume (vph)	96	352	289	79	94	16	105	311	135	121	545	84
Future Volume (vph)	96	352	289	79	94	16	105	311	135	121	545	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.947			0.989			0.963			0.983		
Fit Protected	0.994			0.980			0.991			0.992		
Satd. Flow (prot)	0	1559	0	0	1485	0	0	2704	0	0	3045	0
Fit Permitted	0.994			0.980			0.991			0.992		
Satd. Flow (perm)	0	1559	0	0	1485	0	0	2704	0	0	3045	0
Link Speed (k/h)	60			60			70			70		
Link Distance (m)	573.6			536.0			47.1			203.5		
Travel Time (s)	34.4			32.2			2.4			10.5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	96	352	289	79	94	16	112	331	144	129	580	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	737	0	0	189	0	0	587	0	0	798	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	Right	Left	Left	Right	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Yield			Yield			Yield			Yield		

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	90.4%
Analysis Period (min)	15
ICU Level of Service	E

HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2029 FT AM Peak Hour
11/28/2023

	↖	→	↘	↙	←	↖	↙	↘	↙	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	96	352	289	79	94	16	105	311	135	121	545	84
Future Volume (veh/h)	96	352	289	79	94	16	105	311	135	121	545	84
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	96	352	289	79	94	16	112	331	144	129	580	89
Approach Volume (veh/h)	737			189			587			798		
Crossing Volume (veh/h)	788			539			577			285		
High Capacity (veh/h)	740			905			878			1107		
High v/c (veh/h)	1.00			0.21			0.67			0.72		
Low Capacity (veh/h)	584			729			705			910		
Low v/c (veh/h)	1.26			0.26			0.83			0.88		
Intersection Summary												
Maximum v/c High	1.00											
Maximum v/c Low	1.26											
Intersection Capacity Utilization	90.4%			ICU Level of Service			E					

Lanes, Volumes, Timings

2029 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	10	491	63	71	151	4	54	15	23	9	82	29
Future Volume (vph)	10	491	63	71	151	4	54	15	23	9	82	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.985			0.998			0.966			0.967	
Fit Protected		0.999			0.985			0.971			0.996	
Satd. Flow (prot)	0	1650	0	0	1666	0	0	1589	0	0	1644	0
Fit Permitted		0.999			0.985			0.971			0.996	
Satd. Flow (perm)	0	1650	0	0	1666	0	0	1589	0	0	1644	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	10	491	63	71	151	4	54	15	23	9	82	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	564	0	0	226	0	0	92	0	0	120	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	64.2%
ICU Level of Service	C
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2029 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	491	63	71	151	4	54	15	23	9	82	29
Future Volume (vph)	10	491	63	71	151	4	54	15	23	9	82	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	10	491	63	71	151	4	54	15	23	9	82	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	564	226	92	120								
Volume Left (vph)	10	71	54	9								
Volume Right (vph)	63	4	23	29								
Hadj (s)	0.18	0.28	0.20	0.08								
Departure Headway (s)	5.2	5.7	6.5	6.3								
Degree Utilization, x	0.81	0.36	0.17	0.21								
Capacity (veh/h)	684	594	504	517								
Control Delay (s)	26.0	11.9	10.8	11.0								
Approach Delay (s)	26.0	11.9	10.8	11.0								
Approach LOS	D	B	B	B								

Intersection Summary

Delay	19.6
Level of Service	C
Intersection Capacity Utilization	64.2%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings
 7: Esquesing Line/Fourth Line & 5 Sideroad
 2029 FT AM Peak Hour
 11/29/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	493	20	113	177	4	12	127	137	77	371	44
Future Volume (vph)	9	493	20	113	177	4	12	127	137	77	371	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0			0.0			0.0			60.0		
Storage Lanes	0			1			0			1		
Taper Length (m)	2.5			50.0			2.5			50.0		
Lane Util. Factor	1.00			1.00			1.00			1.00		
Fr t	0.995			0.997			0.933			0.984		
Fit Protected	0.999			0.950			0.998			0.950		
Satd. Flow (prot)	0			1700			0			1642		
Fit Permitted	0.995			0.318			0.976			0.348		
Satd. Flow (perm)	0			1694			0			1606		
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	3			2			52			7		
Link Speed (k/h)	60			60			60			70		
Link Distance (m)	1343.2			646.3			1994.7			464.9		
Travel Time (s)	80.6			38.8			119.7			23.9		
Peak Hour Factor	1.00			1.00			1.00			1.00		
Heavy Vehicles (%)	43%			12%			6%			10%		
Adj. Flow (vph)	9			493			20			113		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0			522			0			113		
Enter Blocked Intersection	No			No			No			No		
Lane Alignment	Left			Left			Right			Left		
Median Width(m)	3.7			3.7			3.7			3.7		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99			0.99			0.99			0.99		
Turning Speed (k/h)	24			14			24			14		
Number of Detectors	1			2			1			2		
Detector Template	Left Thru			Left Thru			Left Thru			Left Thru		
Leading Detector (m)	6.1			30.5			6.1			30.5		
Trailing Detector (m)	0.0			0.0			0.0			0.0		
Detector 1 Position(m)	0.0			0.0			0.0			0.0		
Detector 1 Size(m)	6.1			1.8			6.1			1.8		
Detector 1 Type	CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 1 Channel												
Detector 1 Extend (s)	0.0			0.0			0.0			0.0		
Detector 1 Queue (s)	0.0			0.0			0.0			0.0		
Detector 1 Delay (s)	0.0			0.0			0.0			0.0		
Detector 2 Position(m)	28.7			28.7			28.7			28.7		
Detector 2 Size(m)	1.8			1.8			1.8			1.8		
Detector 2 Type	CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel												
Detector 2 Extend (s)	0.0			0.0			0.0			0.0		
Turn Type	Perm			NA			pm+pt			NA		
Protected Phases	2			1			6			8		

Lanes, Volumes, Timings
 7: Esquesing Line/Fourth Line & 5 Sideroad
 2029 FT AM Peak Hour
 11/29/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2		2		1		6		8		8	
Switch Phase												
Minimum Initial (s)	5.0			5.0			5.0			5.0		
Minimum Split (s)	22.5			22.5			9.5			22.5		
Total Split (s)	44.0			44.0			10.0			54.0		
Total Split (%)	48.9%			48.9%			11.1%			60.0%		
Maximum Green (s)	39.5			39.5			5.5			49.5		
Yellow Time (s)	3.5			3.5			3.5			3.5		
All-Red Time (s)	1.0			1.0			1.0			1.0		
Lost Time Adjust (s)	0.0			0.0			0.0			0.0		
Total Lost Time (s)	4.5			4.5			4.5			4.5		
Lead/Lag	Lag		Lag		Lead		Lag		Lag		Lead	
Lead-Lag Optimize?	Yes			Yes			Yes			Yes		
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Recall Mode	C-Max			C-Max			None			C-Max		
Walk Time (s)	7.0			7.0			7.0			7.0		
Flash Dont Walk (s)	11.0			11.0			11.0			11.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effect Green (s)	41.5			49.5			49.5			23.8		
Actuated g/C Ratio	0.46			0.55			0.55			0.26		
v/c Ratio	0.67			0.30			0.19			0.60		
Control Delay	24.8			12.1			10.8			30.3		
Queue Delay	0.0			0.0			0.0			0.0		
Total Delay	24.8			12.1			10.8			30.3		
LOS	C			B			B			C		
Approach Delay	24.8			11.3			30.3			31.5		
Approach LOS	C			B			C			C		
Intersection Summary												
Area Type:	Other											
Cycle Length:	90											
Actuated Cycle Length:	90											
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle:	70											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	0.71											
Intersection Signal Delay:	25.3						Intersection LOS: C					
Intersection Capacity Utilization:	87.2%						ICU Level of Service E					
Analysis Period (min):	15											
Splits and Phases:	7: Esquesing Line/Fourth Line & 5 Sideroad											

HCM Signalized Intersection Capacity Analysis
7: Esquesing Line/Fourth Line & 5 Sideroad

2029 FT AM Peak Hour
11/28/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔		↔		↔		↔		↔	
Traffic Volume (vph)	9	493	20	113	177	4	12	127	137	77	371	44
Future Volume (vph)	9	493	20	113	177	4	12	127	137	77	371	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5			4.5			4.5			4.5		
Lane Util. Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Frt	0.99		1.00		1.00		0.93		1.00		0.98	
Fit Protected	1.00		0.95		1.00		1.00		0.95		1.00	
Satd. Flow (prot)	1700		1659		1688		1642		1601		1649	
Fit Permitted	1.00		0.32		1.00		0.98		0.35		1.00	
Satd. Flow (perm)	1694		556		1688		1606		586		1649	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	493	20	113	177	4	12	127	137	77	371	44
RTOR Reduction (vph)	0	2	0	0	1	0	0	38	0	0	4	0
Lane Group Flow (vph)	0	520	0	113	180	0	0	238	0	77	411	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	pm+pt	NA				
Protected Phases	2		1		6		8		7		4	
Permitted Phases	2		6		8		4					
Actuated Green, G (s)	39.7		48.6		48.6		23.8		32.4		32.4	
Effective Green, g (s)	39.7		48.6		48.6		23.8		32.4		32.4	
Actuated g/C Ratio	0.44		0.54		0.54		0.26		0.36		0.36	
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5	
Vehicle Extension (s)	3.0		3.0		3.0		3.0		3.0		3.0	
Lane Grp Cap (vph)	747		354		911		424		257		593	
v/s Ratio Prot	c0.02		0.16		0.11				0.01		c0.25	
v/s Ratio Perm	c0.31		0.16				0.15		0.09			
v/c Ratio	0.70		0.32		0.20		0.56		0.30		0.69	
Uniform Delay, d1	20.3		12.5		10.7		28.6		20.8		24.6	
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	5.3		0.5		0.5		5.3		0.7		6.5	
Delay (s)	25.6		13.0		11.1		33.9		21.4		31.1	
Level of Service	C		B		B		C		C		C	
Approach Delay (s)	25.6		11.9				33.9				29.6	
Approach LOS	C		B				C				C	
Intersection Summary												
HCM 2000 Control Delay			25.7		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			90.0		Sum of lost time (s)				18.0			
Intersection Capacity Utilization			87.2%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
101: Boston Church Road & East Access 1

2029 FT AM Peak Hour
11/28/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	26	4	196	95	24	235	
Future Volume (vph)	26	4	196	95	24	235	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (m)	30.0		0.0		115.0		
Storage Lanes	1		1		0		
Taper Length (m)	55.0			75.0			
Lane Util. Factor	1.00		1.00		1.00		
Frt	0.850		0.956				
Fit Protected	0.950				0.995		
Satd. Flow (prot)	1825		1633		1837		
Fit Permitted	0.950				0.995		
Satd. Flow (perm)	1825		1633		1837		
Link Speed (k/h)	48		70		70		
Link Distance (m)	168.8		269.9		183.3		
Travel Time (s)	12.7		13.9		9.4		
Peak Hour Factor	1.00		1.00		1.00		
Heavy Vehicles (%)	0%		0%		16%		
Adj. Flow (vph)	26		4		196		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	26		4		291		
Enter Blocked Intersection	No		No		No		
Lane Alignment	Left		Right		Left		
Median Width(m)	3.7		0.0		0.0		
Link Offset(m)	0.0		0.0		0.0		
Crosswalk Width(m)	1.6		1.6		1.6		
Two way Left Turn Lane							
Headway Factor	0.99		0.99		0.99		
Turning Speed (k/h)	24		14		24		
Sign Control	Stop		Free		Free		
Intersection Summary							
Area Type:	Other						
Control Type:	Unsignalized						
Intersection Capacity Utilization	42.3%			ICU Level of Service A			
Analysis Period (min)	15						

HCM Unsignalized Intersection Capacity Analysis
101: Boston Church Road & East Access 1

2029 FT AM Peak Hour
11/28/2023

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (veh/h)	26	4	196	95	24	235
Future Volume (Veh/h)	26	4	196	95	24	235
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	26	4	196	95	24	235
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	526	244			291	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	526	244			291	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			98	
cM capacity (veh/h)	506	800			1282	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1		
Volume Total	26	4	291	259		
Volume Left	26	0	0	24		
Volume Right	0	4	95	0		
cSH	506	800	1700	1282		
Volume to Capacity	0.05	0.00	0.17	0.02		
Queue Length 95th (m)	1.2	0.1	0.0	0.4		
Control Delay (s)	12.5	9.5	0.0	0.9		
Lane LOS	B	A		A		
Approach Delay (s)	12.1		0.0	0.9		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			42.3%		ICU Level of Service	A
Analysis Period (min)			15			

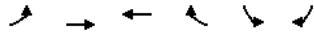
Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2029 FT AM Peak Hour
11/28/2023

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	65	732	447	143	45	23
Future Volume (vph)	65	732	447	143	45	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1573	3093	2992	1471	1352	1150
Fit Permitted	0.475				0.950	
Satd. Flow (perm)	787	3093	2992	1471	1352	1150
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				155		25
Link Speed (k/h)		70	70		48	
Link Distance (m)		546.2	560.0		147.4	
Travel Time (s)		28.1	28.8		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	18%	22%	11%	35%	42%
Adj. Flow (vph)	71	796	486	155	49	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	796	486	155	49	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2029 FT AM Peak Hour
11/28/2023

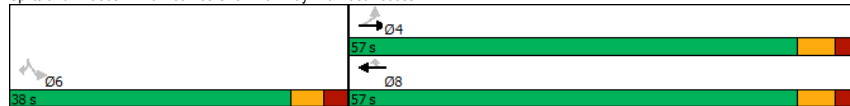


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	57.0	57.0	57.0	57.0	38.0	38.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%
Maximum Green (s)	50.4	50.4	50.4	50.4	31.5	31.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	16.1	16.1	16.1	16.1	7.1	7.1
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.19	0.19
v/c Ratio	0.21	0.58	0.37	0.21	0.19	0.10
Control Delay	8.0	9.7	7.7	2.3	15.6	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.0	9.7	7.7	2.3	15.6	8.3
LOS	A	A	A	A	B	A
Approach Delay		9.6	6.4		13.1	
Approach LOS		A	A		B	

Intersection Summary

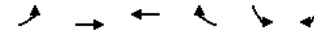
Area Type:	Other		
Cycle Length:	95		
Actuated Cycle Length:	36.6		
Natural Cycle:	65		
Control Type:	Actuated-Uncoordinated		
Maximum v/c Ratio:	0.58		
Intersection Signal Delay:	8.5	Intersection LOS:	A
Intersection Capacity Utilization:	37.1%	ICU Level of Service:	A
Analysis Period (min):	15		

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis
102: James Snow Parkway N & East Access 2

2029 FT AM Peak Hour
11/28/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕	↕	↕	↕	↕
Traffic Volume (vph)	65	732	447	143	45	23
Future Volume (vph)	65	732	447	143	45	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr't	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1573	3093	2992	1471	1352	1150
Fit Permitted	0.48	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	787	3093	2992	1471	1352	1150
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	796	486	155	49	25
RTOR Reduction (vph)	0	0	0	86	0	20
Lane Group Flow (vph)	71	796	486	69	49	5
Heavy Vehicles (%)	16%	18%	22%	11%	35%	42%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	16.1	16.1	16.1	16.1	7.2	7.2
Effective Green, g (s)	16.1	16.1	16.1	16.1	7.2	7.2
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.20	0.20
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	348	1368	1323	650	267	227
v/s Ratio Prot		c0.26	0.16			
v/s Ratio Perm	0.09			0.05	c0.04	0.00
v/c Ratio	0.20	0.58	0.37	0.11	0.18	0.02
Uniform Delay, d1	6.2	7.6	6.8	5.9	12.2	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.6	0.2	0.1	0.3	0.0
Delay (s)	6.5	8.3	6.9	6.0	12.5	11.8
Level of Service	A	A	A	A	B	B
Approach Delay (s)		8.1	6.7		12.3	
Approach LOS		A	A		B	

Intersection Summary

HCM 2000 Control Delay	7.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	36.4	Sum of lost time (s)	13.1
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

2029 FT AM Peak Hour
11/28/2023

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↕	↔	↕
Traffic Volume (vph)	38	739	578	95	27	12
Future Volume (vph)	38	739	578	95	27	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1738	3017	2852	1498	1437	1361
Fit Permitted	0.414				0.950	
Satd. Flow (perm)	757	3017	2852	1498	1437	1361
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				103		13
Link Speed (k/h)	70	70			48	
Link Distance (m)		560.0	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	21%	28%	9%	27%	20%
Adj. Flow (vph)	41	803	628	103	29	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	803	628	103	29	13
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

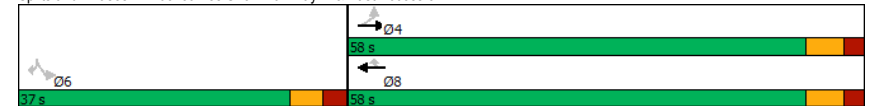
2029 FT AM Peak Hour
11/28/2023

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	58.0	58.0	58.0	58.0	37.0	37.0
Total Split (%)	61.1%	61.1%	61.1%	61.1%	38.9%	38.9%
Maximum Green (s)	51.4	51.4	51.4	51.4	30.5	30.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	68.4	68.4	68.4	68.4	7.2	7.2
Actuated g/C Ratio	0.85	0.85	0.85	0.85	0.09	0.09
v/c Ratio	0.06	0.31	0.26	0.08	0.23	0.10
Control Delay	3.0	3.0	2.8	0.9	39.3	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.0	3.0	2.8	0.9	39.3	19.2
LOS	A	A	A	A	D	B
Approach Delay		3.0	2.6		33.1	
Approach LOS		A	A		C	

Intersection Summary

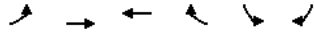
Area Type: Other
 Cycle Length: 95
 Actuated Cycle Length: 80.5
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.31
 Intersection Signal Delay: 3.6
 Intersection Capacity Utilization 40.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis
103: James Snow Parkway N & East Access 3

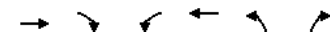
2029 FT AM Peak Hour
11/29/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔	↔↔	↔	↔↔	↔↔
Traffic Volume (vph)	38	739	578	95	27	12
Future Volume (vph)	38	739	578	95	27	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1738	3017	2852	1498	1437	1361
Fit Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	757	3017	2852	1498	1437	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	803	628	103	29	13
RTOR Reduction (vph)	0	0	0	22	0	12
Lane Group Flow (vph)	41	803	628	81	29	1
Heavy Vehicles (%)	5%	21%	28%	9%	27%	20%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4		8		6
Permitted Phases	4			8	6	6
Actuated Green, G (s)	65.5	65.5	65.5	65.5	4.7	4.7
Effective Green, g (s)	65.5	65.5	65.5	65.5	4.7	4.7
Actuated g/C Ratio	0.79	0.79	0.79	0.79	0.06	0.06
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	595	2372	2242	1177	81	76
v/s Ratio Prot		c0.27	0.22			
v/s Ratio Perm	0.05			0.05	c0.02	0.00
v/c Ratio	0.07	0.34	0.28	0.07	0.36	0.01
Uniform Delay, d1	2.0	2.6	2.4	2.0	37.8	37.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.3	0.1	2.7	0.1
Delay (s)	2.2	3.0	2.8	2.1	40.5	37.2
Level of Service	A	A	A	A	D	D
Approach Delay (s)		2.9	2.7		39.5	
Approach LOS		A	A		D	
Intersection Summary						
HCM 2000 Control Delay			3.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.34			
Actuated Cycle Length (s)			83.3		Sum of lost time (s)	13.1
Intersection Capacity Utilization			40.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
201: West Access 1 & 5 Sideroad

2029 FT AM Peak Hour
11/28/2023



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	563	9	46	188	6	4
Future Volume (vph)	563	9	46	188	6	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			50.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.946	
Fit Protected			0.950		0.971	
Satd. Flow (prot)	1700	0	1825	1700	1765	0
Fit Permitted			0.950		0.971	
Satd. Flow (perm)	1700	0	1825	1700	1765	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	563	9	46	188	6	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	572	0	46	188	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
201: West Access 1 & 5 Sideroad

2029 FT AM Peak Hour
11/29/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘		↘	↘	↘	↘
Traffic Volume (veh/h)	563	9	46	188	6	4
Future Volume (Veh/h)	563	9	46	188	6	4
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	563	9	46	188	6	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			572	848	568	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			572	848	568	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			95	98	99	
cM capacity (veh/h)			1011	319	527	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	572	46	188	10		
Volume Left	0	46	0	6		
Volume Right	9	0	0	4		
cSH	1700	1011	1700	379		
Volume to Capacity	0.34	0.05	0.11	0.03		
Queue Length 95th (m)	0.0	1.1	0.0	0.6		
Control Delay (s)	0.0	8.7	0.0	14.8		
Lane LOS	A		B			
Approach Delay (s)	0.0	1.7	14.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			46.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
202: West Access 2 & 5 Sideroad

2029 FT AM Peak Hour
11/28/2023

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘		↘	↘	↘	↘
Traffic Volume (vph)	558	9	0	234	0	6
Future Volume (vph)	558	9	0	234	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.865			
Fit Protected						
Satd. Flow (prot)	1700	0	0	1700	1662	0
Fit Permitted						
Satd. Flow (perm)	1700	0	0	1700	1662	0
Link Speed (k/h)	60		60		48	
Link Distance (m)	175.4		166.9		91.3	
Travel Time (s)	10.5		10.0		6.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	558	9	0	234	0	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	567	0	0	234	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	14		24		24	
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 39.9%					ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
202: West Access 2 & 5 Sideroad

2029 FT AM Peak Hour
11/28/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	558	9	0	234	0	6
Future Volume (Veh/h)	558	9	0	234	0	6
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	558	9	0	234	0	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			567		796	562
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			567		796	562
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			1015		359	530
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	567	234	6			
Volume Left	0	0	0			
Volume Right	9	0	6			
cSH	1700	1015	530			
Volume to Capacity	0.33	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	11.9			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	11.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			39.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
203: Boston Church Road & West Access 3

2029 FT AM Peak Hour
11/28/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	0	12	19	92	216	0
Future Volume (vph)	0	12	19	92	216	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction	0.865					
Fit Protected			0.992			
Satd. Flow (prot)	908	0	0	1526	1762	0
Fit Permitted	0.992					
Satd. Flow (perm)	908	0	0	1526	1762	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	99.5		207.3		219.2	
Travel Time (s)	7.5		10.7		11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	83%	63%	17%	9%	0%
Adj. Flow (vph)	0	12	19	92	216	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	0	111	216	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 30.6%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
203: Boston Church Road & West Access 3

2029 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	T			T	T	
Traffic Volume (veh/h)	0	12	19	92	216	0
Future Volume (Veh/h)	0	12	19	92	216	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	12	19	92	216	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	346	216	216			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	346	216	216			
tC, single (s)	6.4	7.0	4.7			
tC, 2 stage (s)						
tF (s)	3.5	4.0	2.8			
p0 queue free %	100	98	98			
cM capacity (veh/h)	643	657	1063			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	12	111	216			
Volume Left	0	19	0			
Volume Right	12	0	0			
cSH	657	1063	1700			
Volume to Capacity	0.02	0.02	0.13			
Queue Length 95th (m)	0.4	0.4	0.0			
Control Delay (s)	10.6	1.6	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.6	1.6	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		30.6%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
204: Boston Church Road & West Access 4

2029 FT AM Peak Hour
11/28/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group						
Lane Configurations	T			T	T	
Traffic Volume (vph)	2	23	78	109	208	20
Future Volume (vph)	2	23	78	109	208	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.876				0.988	
Fit Protected	0.996			0.980		
Satd. Flow (prot)	1676	0	0	1713	1754	0
Fit Permitted	0.996			0.980		
Satd. Flow (perm)	1676	0	0	1713	1754	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	101.5			171.0	207.3	
Travel Time (s)	7.6			8.8	10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	17%	9%	0%
Adj. Flow (vph)	2	23	78	109	208	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	187	228	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	35.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
204: Boston Church Road & West Access 4

2029 FT AM Peak Hour
11/29/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations	T			T	T	
Traffic Volume (veh/h)	2	23	78	109	208	20
Future Volume (Veh/h)	2	23	78	109	208	20
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	23	78	109	208	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	483	218	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	483	218	228			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	94			
cM capacity (veh/h)	515	827	1352			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	25	187	228			
Volume Left	2	78	0			
Volume Right	23	0	20			
cSH	789	1352	1700			
Volume to Capacity	0.03	0.06	0.13			
Queue Length 95th (m)	0.7	1.4	0.0			
Control Delay (s)	9.7	3.5	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.7	3.5	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			35.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
205: Boston Church Road & West Access5

2029 FT AM Peak Hour
11/29/2023

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group						
Lane Configurations	T			T	T	
Traffic Volume (vph)	0	3	4	187	231	0
Future Volume (vph)	0	3	4	187	231	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected				0.999		
Satd. Flow (prot)	831	0	0	1880	1656	0
Fit Permitted	0.999					
Satd. Flow (perm)	831	0	0	1880	1656	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	100.3		183.3		171.0	
Travel Time (s)	7.5		9.4		8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	100%	100%	0%	16%	0%
Adj. Flow (vph)	0	3	4	187	231	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	0	191	231	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 23.1%					ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 205: Boston Church Road & West Access5

2029 FT AM Peak Hour
 11/29/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	0	3	4	187	231	0
Future Volume (Veh/h)	0	3	4	187	231	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	3	4	187	231	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	426	231	231			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	231	231			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	100	100			
cM capacity (veh/h)	587	616	923			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	3	191	231			
Volume Left	0	4	0			
Volume Right	3	0	0			
cSH	616	923	1700			
Volume to Capacity	0.00	0.00	0.14			
Queue Length 95th (m)	0.1	0.1	0.0			
Control Delay (s)	10.9	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.9	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		23.1%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2029 FT PM Peak Hour
11/29/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Volume (vph)	111	124	138	106	296	55	233	730	110	14	326	80
Future Volume (vph)	111	124	138	106	296	55	233	730	110	14	326	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.950				0.984		0.985				0.971	
Flt Protected	0.985				0.989		0.989				0.998	
Satd. Flow (prot)	0	1509	0	0	1600	0	0	2969	0	0	3067	0
Flt Permitted	0.985				0.989		0.989				0.998	
Satd. Flow (perm)	0	1509	0	0	1600	0	0	2969	0	0	3067	0
Link Speed (k/h)	60				60		70				70	
Link Distance (m)	573.6				536.0		52.2				203.5	
Travel Time (s)	34.4				32.2		2.7				10.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	20%	14%	23%	27%	13%	18%	25%	17%	27%	14%	15%	17%
Adj. Flow (vph)	111	124	138	106	296	55	259	811	122	16	362	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	373	0	0	457	0	0	1192	0	0	467	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0		0.0				0.0	
Link Offset(m)	0.0				0.0		0.0				0.0	
Crosswalk Width(m)	1.6				1.6		1.6				1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Yield				Yield		Yield				Yield	

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	83.5% ICU Level of Service E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2029 FT PM Peak Hour
11/29/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	111	124	138	106	296	55	233	730	110	14	326	80
Future Volume (veh/h)	111	124	138	106	296	55	233	730	110	14	326	80
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	111	124	138	106	296	55	259	811	122	16	362	89
Approach Volume (veh/h)	373				457		1192				467	
Crossing Volume (veh/h)	484				1181		251				661	
High Capacity (veh/h)	945				536		1137				820	
High v/c (veh/h)	0.39				0.85		1.05				0.57	
Low Capacity (veh/h)	765				409		937				654	
Low v/c (veh/h)	0.49				1.12		1.27				0.71	
Intersection Summary												
Maximum v/c High	1.05											
Maximum v/c Low	1.27											
Intersection Capacity Utilization	83.5%				ICU Level of Service						E	

Lanes, Volumes, Timings
3: Boston Church Road & James Snow Parkway N

2029 FT PM Peak Hour
11/29/2023

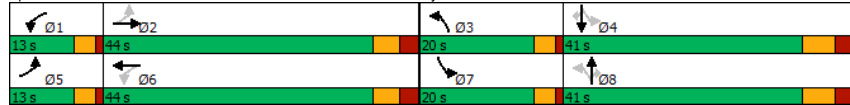


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	13.0	44.0		13.0	44.0		20.0	41.0	41.0	20.0	41.0	41.0
Total Split (%)	11.0%	37.3%		11.0%	37.3%		16.9%	34.7%	34.7%	16.9%	34.7%	34.7%
Maximum Green (s)	9.0	37.5		9.0	37.5		16.0	33.4	33.4	16.0	33.4	33.4
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (/hr)		0			0			0	0		0	0
Act Effect Green (s)	39.6	32.1		35.6	25.2		26.5	15.7	15.7	29.1	17.0	17.0
Actuated g/C Ratio	0.49	0.40		0.44	0.31		0.33	0.20	0.20	0.36	0.21	0.21
v/c Ratio	0.42	0.44		0.12	0.62		0.43	0.09	0.13	0.50	0.05	0.28
Control Delay	16.4	21.8		13.4	27.5		20.3	32.2	1.0	21.8	31.0	9.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	21.8		13.4	27.5		20.3	32.2	1.0	21.8	31.0	9.5
LOS	B	C		B	C		C	C	A	C	C	A
Approach Delay		20.5			26.6			20.0			19.2	
Approach LOS		C			C			C			B	

Intersection Summary

Area Type:	Other
Cycle Length: 118	
Actuated Cycle Length: 80.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 22.1	Intersection LOS: C
Intersection Capacity Utilization 57.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
3: Boston Church Road & James Snow Parkway N

2029 FT PM Peak Hour
11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	361	89	35	435	91	177	48	34	205	32	95
Future Volume (vph)	146	361	89	35	435	91	177	48	34	205	32	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	2839		1259	2968		1601	3017	1014	1521	3380	1432
Flt Permitted	0.30	1.00		0.47	1.00		0.73	1.00	1.00	0.64	1.00	1.00
Satd. Flow (perm)	536	2839		617	2968		1234	3017	1014	1023	3380	1432
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	164	406	100	39	489	102	199	54	38	230	36	107
RTOR Reduction (vph)	0	17	0	0	15	0	0	0	33	0	0	91
Lane Group Flow (vph)	164	489	0	39	576	0	199	54	5	230	36	16
Heavy Vehicles (%)	8%	20%	44%	45%	21%	14%	14%	21%	61%	20%	8%	14%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	40.3	32.1		31.4	27.2		23.8	11.1	11.1	26.6	12.5	12.5
Effective Green, g (s)	40.3	32.1		31.4	27.2		23.8	11.1	11.1	26.6	12.5	12.5
Actuated g/C Ratio	0.48	0.38		0.38	0.33		0.28	0.13	0.13	0.32	0.15	0.15
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	383	1090		263	965		407	400	134	409	505	214
v/s Ratio Prot	c0.05	0.17		0.01	c0.19		0.07	0.02		c0.09	0.01	
v/s Ratio Perm	0.16			0.05			0.06		0.00	c0.08		0.01
v/c Ratio	0.43	0.45		0.15	0.60		0.49	0.14	0.04	0.56	0.07	0.07
Uniform Delay, d1	13.1	19.2		16.8	23.6		24.4	32.0	31.6	22.9	30.6	30.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.6		0.3	1.5		0.9	0.3	0.2	1.8	0.1	0.3
Delay (s)	13.8	19.8		17.1	25.1		25.4	32.3	31.8	24.7	30.7	30.9
Level of Service	B	B		B	C		C	C	C	C	C	C
Approach Delay (s)		18.3			24.6			27.5			27.0	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	22.1
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings

2029 FT PM Peak Hour

4: Esquesing Line & James Snow Parkway N

11/29/2023



Table with 13 columns (Lane Group) and 30 rows (Lane Configurations, Traffic Volume, Future Volume, etc.)

Lanes, Volumes, Timings

2029 FT PM Peak Hour

4: Esquesing Line & James Snow Parkway N

11/29/2023

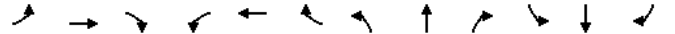
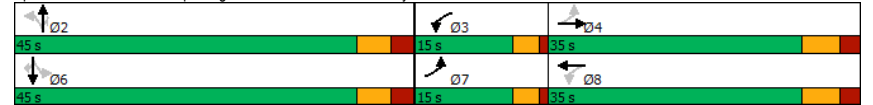


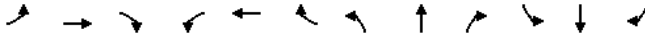
Table with 13 columns (Lane Group) and 40 rows (Total Split, Maximum Green, Pedestrian Calls, etc.)

Splits and Phases: 4: Esquesing Line & James Snow Parkway N



Lanes, Volumes, Timings
5: James Snow Parkway N & Steeles Avenue East

2029 FT PM Peak Hour
11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	23.0	46.3	46.3	11.0	46.3	
Total Split (s)	11.0	47.7	47.7	23.0	59.7	59.7	23.0	55.3	55.3	14.0	46.3	
Total Split (%)	7.9%	34.1%	34.1%	16.4%	42.6%	42.6%	16.4%	39.5%	39.5%	10.0%	33.1%	
Maximum Green (s)	7.0	40.5	40.5	18.0	52.5	52.5	18.0	48.0	48.0	10.0	39.0	
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	
Act Effect Green (s)	46.7	36.4	36.4	18.1	55.5	55.5	18.1	43.9	43.9	47.4	34.4	
Actuated g/C Ratio	0.35	0.28	0.28	0.14	0.42	0.42	0.14	0.33	0.33	0.36	0.26	
v/c Ratio	0.05	0.36	0.95	1.09	0.41	0.28	1.13	0.32	0.39	0.45	0.80	
Control Delay	20.5	39.3	52.6	120.7	28.5	5.2	133.4	34.2	6.0	29.5	53.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.5	39.3	52.6	120.7	28.5	5.2	133.4	34.2	6.0	29.5	53.3	
LOS	C	D	D	F	C	A	F	C	A	C	D	
Approach Delay		46.2			56.1			74.6			49.7	
Approach LOS		D			E			E			D	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 131.8

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 57.2

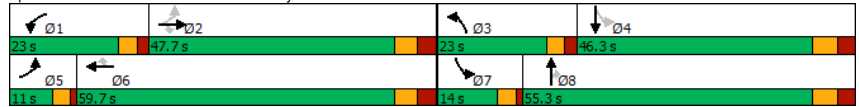
Intersection LOS: E

Intersection Capacity Utilization 84.0%

ICU Level of Service E

Analysis Period (min) 15


Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



Ø1	Ø2	Ø3	Ø4
23 s	47.7 s	23 s	46.3 s
Ø5	Ø6	Ø7	Ø8
11 s	59.7 s	14 s	55.3 s

HCM Signalized Intersection Capacity Analysis
5: James Snow Parkway N & Steeles Avenue East

2029 FT PM Peak Hour
11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↑	↑↑↑	↑	↑↑	↑↑	↑	↑	↑↑	↑
Traffic Volume (vph)	13	433	525	451	763	160	482	351	207	117	638	16
Future Volume (vph)	13	433	525	451	763	160	482	351	207	117	638	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.95	1.00	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1825	4768	1521	3278	4856	1247	3372	3544	1296	1225	3398	
Fit Permitted	0.33	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	629	4768	1521	3278	4856	1247	3372	3544	1296	678	3398	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	471	571	490	829	174	524	382	225	127	693	17
RTOR Reduction (vph)	0	0	178	0	0	102	0	0	151	0	1	0
Lane Group Flow (vph)	14	471	393	490	829	72	524	382	74	127	709	0
Conf. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	10%	6%	8%	8%	31%	5%	3%	26%	49%	7%	8%
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		8	4				
Actuated Green, G (s)	41.6	39.0	39.0	18.1	55.5	55.5	18.1	43.9	43.9	44.2	34.5	
Effective Green, g (s)	41.6	39.0	39.0	18.1	55.5	55.5	18.1	43.9	43.9	44.2	34.5	
Actuated g/C Ratio	0.31	0.29	0.29	0.13	0.41	0.41	0.13	0.33	0.33	0.33	0.26	
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	
Lane Grp Cap (vph)	218	1385	442	442	2008	515	454	1159	423	262	873	
v/s Ratio Prot	0.00	0.10		c0.15	0.17		c0.16	0.11		0.03	c0.21	
v/s Ratio Perm	0.02		c0.26			0.06			0.06	0.12		
v/c Ratio	0.06	0.34	0.89	1.11	0.41	0.14	1.15	0.33	0.17	0.48	0.81	
Uniform Delay, d1	32.2	37.5	45.5	58.0	27.8	24.5	58.0	34.1	32.2	33.7	46.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1	19.1	75.7	0.1	0.1	91.8	0.4	0.4	1.4	6.5	
Delay (s)	32.3	37.6	64.6	133.8	28.0	24.6	149.9	34.4	32.6	35.1	53.3	
Level of Service	C	D	E	F	C	C	F	C	C	D	D	
Approach Delay (s)		52.1			62.3		87.5			50.6		
Approach LOS		D			E		F			D		

Intersection Summary

HCM 2000 Control Delay: 64.1

HCM 2000 Volume to Capacity ratio: 0.94

Actuated Cycle Length (s): 134.2

Intersection Capacity Utilization: 84.0%

Analysis Period (min): 15

HCM 2000 Level of Service: E

Sum of lost time (s): 24.5

ICU Level of Service: E

c Critical Lane Group

Lanes, Volumes, Timings

2029 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/28/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	28	203	62	39	342	2	63	80	113	6	35	7
Future Volume (vph)	28	203	62	39	342	2	63	80	113	6	35	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.971			0.999			0.940			0.980	
Flt Protected		0.995			0.995			0.988			0.994	
Satd. Flow (prot)	0	1570	0	0	1635	0	0	1562	0	0	1661	0
Flt Permitted		0.995			0.995			0.988			0.994	
Satd. Flow (perm)	0	1570	0	0	1635	0	0	1562	0	0	1661	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	15%	27%	7%	18%	0%	26%	8%	12%	0%	14%	17%
Adj. Flow (vph)	28	203	62	39	342	2	63	80	113	6	35	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	293	0	0	383	0	0	256	0	0	48	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.2%
Analysis Period (min)	15
ICU Level of Service	B

HCM Unsignalized Intersection Capacity Analysis

2029 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/28/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	203	62	39	342	2	63	80	113	6	35	7
Future Volume (vph)	28	203	62	39	342	2	63	80	113	6	35	7
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	28	203	62	39	342	2	63	80	113	6	35	7
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	293	383	256	48								
Volume Left (vph)	28	39	63	6								
Volume Right (vph)	62	2	113	7								
Hadj (s)	0.20	0.30	0.03	0.15								
Departure Headway (s)	5.7	5.7	5.9	6.6								
Degree Utilization, x	0.46	0.60	0.42	0.09								
Capacity (veh/h)	592	610	554	446								
Control Delay (s)	13.6	16.9	13.2	10.2								
Approach Delay (s)	13.6	16.9	13.2	10.2								
Approach LOS	B	C	B	B								

Intersection Summary

Delay	14.6
Level of Service	B
Intersection Capacity Utilization	55.2%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings

2029 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

11/28/2023



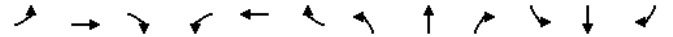
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	51	261	13	82	315	22	28	328	112	5	127	48
Future Volume (vph)	51	261	13	82	315	22	28	328	112	5	127	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0	0.0		0.0	60.0		0.0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (m)	2.5			50.0			2.5			50.0		
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			0.990			0.968			0.959	
Fit Protected		0.992		0.950				0.997		0.950		
Satd. Flow (prot)	0	1654	0	1674	1671	0	0	1653	0	1460	1550	0
Fit Permitted		0.902		0.451				0.976		0.266		
Satd. Flow (perm)	0	1504	0	795	1671	0	0	1618	0	409	1550	0
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		3			6			17			23	
Link Speed (k/h)		60			60			60			70	
Link Distance (m)		1343.2			646.3			1994.7			464.9	
Travel Time (s)		80.6			38.8			119.7			23.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	18%	21%
Adj. Flow (vph)	51	261	13	82	315	22	28	328	112	5	127	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	325	0	82	337	0	0	468	0	5	175	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	

Lanes, Volumes, Timings

2029 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

11/28/2023

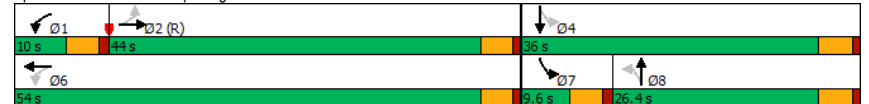


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		22.5	22.5		9.5	22.5	
Total Split (s)	44.0	44.0		10.0	54.0		26.4	26.4		9.6	36.0	
Total Split (%)	48.9%	48.9%		11.1%	60.0%		29.3%	29.3%		10.7%	40.0%	
Maximum Green (s)	39.5	39.5		5.5	49.5		21.9	21.9		5.1	31.5	
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	
Total Lost Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	Max		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effect Green (s)		41.5		49.5	49.5		29.6			31.5	31.5	
Actuated g/C Ratio		0.46		0.55	0.55		0.33			0.35	0.35	
v/c Ratio		0.47		0.17	0.37		0.86			0.02	0.31	
Control Delay		20.1		10.5	12.6		46.3			19.4	20.3	
Queue Delay		0.0		0.0	0.0		0.0			0.0	0.0	
Total Delay		20.1		10.5	12.6		46.3			19.4	20.3	
LOS		C		B	B		D			B	C	
Approach Delay		20.1			12.2		46.3				20.3	
Approach LOS		C			B		D				C	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 44 (49%), Referenced to phase 2:EBTL, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 26.5
 Intersection LOS: C
 Intersection Capacity Utilization 85.5%
 ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis
7: Esquesing Line/Fourth Line & 5 Sideroad

2029 FT PM Peak Hour
11/28/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	51	261	13	82	315	22	28	328	112	5	127	48
Future Volume (vph)	51	261	13	82	315	22	28	328	112	5	127	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Friction		0.99		1.00	0.99			0.97		1.00	0.96	
Fit Protected		0.99		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1654		1674	1672			1652		1460	1550	
Fit Permitted		0.90		0.45	1.00			0.98		0.27	1.00	
Satd. Flow (perm)		1503		794	1672			1616		409	1550	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	51	261	13	82	315	22	28	328	112	5	127	48
RTOR Reduction (vph)	0	2	0	0	3	0	0	11	0	0	14	0
Lane Group Flow (vph)	0	323	0	82	334	0	0	457	0	5	161	0
Heavy Vehicles (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	18%	21%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		37.0		45.9	45.9			29.6		35.1	35.1	
Effective Green, g (s)		37.0		45.9	45.9			29.6		35.1	35.1	
Actuated g/C Ratio		0.41		0.51	0.51			0.33		0.39	0.39	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		617		447	852			531		171	604	
v/s Ratio Prot				0.01	c0.20					0.00	c0.10	
v/s Ratio Perm		c0.22		0.08				c0.28		0.01		
v/c Ratio		0.52		0.18	0.39			0.86		0.03	0.27	
Uniform Delay, d1		19.9		12.5	13.5			28.3		19.3	18.7	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		3.2		0.2	1.4			16.5		0.1	1.1	
Delay (s)		23.1		12.7	14.9			44.7		19.4	19.8	
Level of Service		C		B	B			D		B	B	
Approach Delay (s)		23.1			14.4			44.7			19.8	
Approach LOS		C			B			D			B	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
101: Boston Church Road & East Access 1

2029 FT PM Peak Hour
11/28/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔		↔	↔
Traffic Volume (vph)	98	25	256	29	7	234
Future Volume (vph)	98	25	256	29	7	234
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0	0.0		115.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	55.0				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction		0.850	0.986			
Fit Protected	0.950					0.999
Satd. Flow (prot)	1825	1633	1594	0	0	1781
Fit Permitted	0.950					0.999
Satd. Flow (perm)	1825	1633	1594	0	0	1781
Link Speed (k/h)	48		70			70
Link Distance (m)	168.8		269.9			183.3
Travel Time (s)	12.7		13.9			9.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	21%	0%	0%	8%
Adj. Flow (vph)	98	25	256	29	7	234
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	25	285	0	0	241
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	30.1%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
101: Boston Church Road & East Access 1

2029 FT PM Peak Hour
11/28/2023

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔		↔	↔
Traffic Volume (veh/h)	98	25	256	29	7	234
Future Volume (Veh/h)	98	25	256	29	7	234
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	98	25	256	29	7	234
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	518	270			285	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	270			285	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	81	97			99	
cM capacity (veh/h)	518	773			1289	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1		
Volume Total	98	25	285	241		
Volume Left	98	0	0	7		
Volume Right	0	25	29	0		
cSH	518	773	1700	1289		
Volume to Capacity	0.19	0.03	0.17	0.01		
Queue Length 95th (m)	5.2	0.8	0.0	0.1		
Control Delay (s)	13.6	9.8	0.0	0.3		
Lane LOS	B	A		A		
Approach Delay (s)	12.8		0.0	0.3		
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			30.1%		ICU Level of Service	A
Analysis Period (min)			15			

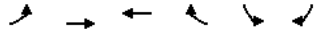
Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2029 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	36	566	498	56	150	73
Future Volume (vph)	36	566	498	56	150	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1267	3042	3017	1158	1601	1350
Fit Permitted	0.450				0.950	
Satd. Flow (perm)	600	3042	3017	1158	1601	1350
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				61		79
Link Speed (k/h)		70	70		48	
Link Distance (m)		546.2	560.0		147.4	
Travel Time (s)		28.1	28.8		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	44%	20%	21%	41%	14%	21%
Adj. Flow (vph)	39	615	541	61	163	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	615	541	61	163	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)						
Detector 2 Size(m)		28.7	28.7			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2029 FT PM Peak Hour
11/28/2023

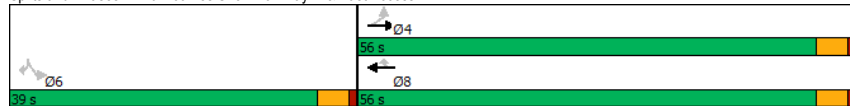


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	56.0	56.0	56.0	56.0	39.0	39.0
Total Split (%)	58.9%	58.9%	58.9%	58.9%	41.1%	41.1%
Maximum Green (s)	51.5	51.5	51.5	51.5	34.5	34.5
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	13.0	13.0	13.0	13.0	9.0	9.0
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.29	0.29
v/c Ratio	0.16	0.49	0.43	0.12	0.35	0.18
Control Delay	7.8	8.3	7.9	2.9	12.1	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	8.3	7.9	2.9	12.1	4.4
LOS	A	A	A	A	B	A
Approach Delay		8.3	7.4		9.6	
Approach LOS		A	A		A	

Intersection Summary

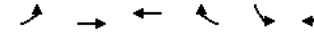
Area Type:	Other
Cycle Length:	95
Actuated Cycle Length:	31.3
Natural Cycle:	45
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.49
Intersection Signal Delay:	8.1
Intersection Capacity Utilization:	37.5%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis
102: James Snow Parkway N & East Access 2

2029 FT PM Peak Hour
11/28/2023



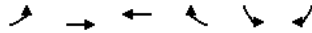
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔	↔↔	↔	↔	↔
Traffic Volume (vph)	36	566	498	56	150	73
Future Volume (vph)	36	566	498	56	150	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Fr	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1267	3042	3017	1158	1601	1350
Flt Permitted	0.45	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	601	3042	3017	1158	1601	1350
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	615	541	61	163	79
RTOR Reduction (vph)	0	0	0	35	0	56
Lane Group Flow (vph)	39	615	541	26	163	23
Heavy Vehicles (%)	44%	20%	21%	41%	14%	21%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	13.0	13.0	13.0	13.0	9.0	9.0
Effective Green, g (s)	13.0	13.0	13.0	13.0	9.0	9.0
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.29	0.29
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	252	1275	1265	485	464	391
v/s Ratio Prot		c0.20	0.18			
v/s Ratio Perm	0.06			0.02	c0.10	0.02
v/c Ratio	0.15	0.48	0.43	0.05	0.35	0.06
Uniform Delay, d1	5.6	6.6	6.4	5.3	8.7	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3	0.2	0.0	0.5	0.1
Delay (s)	5.9	6.8	6.6	5.4	9.2	8.0
Level of Service	A	A	A	A	A	A
Approach Delay (s)		6.8	6.5		8.8	
Approach LOS		A	A		A	

Intersection Summary

HCM 2000 Control Delay	7.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	31.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

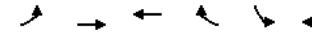
2029 FT PM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↕↕	↕↕	↔	↔	↔
Traffic Volume (vph)	19	697	516	33	105	38
Future Volume (vph)	19	697	516	33	105	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1630	2920	2874	1150	1630	1555
Fit Permitted	0.442				0.950	
Satd. Flow (perm)	758	2920	2874	1150	1630	1555
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				36		41
Link Speed (k/h)		70	70		48	
Link Distance (m)		560.0	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	25%	27%	42%	12%	5%
Adj. Flow (vph)	21	758	561	36	114	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	758	561	36	114	41
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

2029 FT PM Peak Hour
11/28/2023

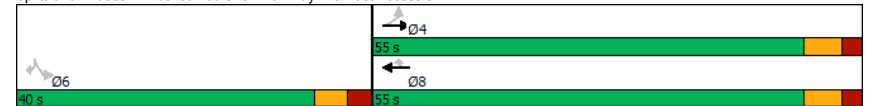


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	55.0	55.0	55.0	55.0	40.0	40.0
Total Split (%)	57.9%	57.9%	57.9%	57.9%	42.1%	42.1%
Maximum Green (s)	48.4	48.4	48.4	48.4	33.5	33.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	55.6	55.6	55.6	55.6	10.5	10.5
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.14	0.14
v/c Ratio	0.04	0.35	0.26	0.04	0.50	0.16
Control Delay	4.8	5.5	5.0	2.0	37.0	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.8	5.5	5.0	2.0	37.0	10.8
LOS	A	A	A	A	D	B
Approach Delay		5.5	4.8		30.1	
Approach LOS		A	A		C	

Intersection Summary

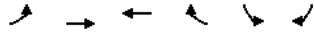
Area Type:	Other	
Cycle Length:	95	
Actuated Cycle Length:	75	
Natural Cycle:	65	
Control Type:	Actuated-Uncoordinated	
Maximum v/c Ratio:	0.50	
Intersection Signal Delay:	7.7	Intersection LOS: A
Intersection Capacity Utilization:	36.0%	ICU Level of Service A
Analysis Period (min):	15	

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis
103: James Snow Parkway N & East Access 3

2029 FT PM Peak Hour
11/28/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔	↔↔	↔	↔	↔
Traffic Volume (vph)	19	697	516	33	105	38
Future Volume (vph)	19	697	516	33	105	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1630	2920	2874	1150	1630	1555
Fit Permitted	0.44	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	757	2920	2874	1150	1630	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	758	561	36	114	41
RTOR Reduction (vph)	0	0	0	10	0	36
Lane Group Flow (vph)	21	758	561	26	114	5
Heavy Vehicles (%)	12%	25%	27%	42%	12%	5%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4		8		6
Permitted Phases	4			8	6	6
Actuated Green, G (s)	54.2	54.2	54.2	54.2	9.1	9.1
Effective Green, g (s)	54.2	54.2	54.2	54.2	9.1	9.1
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.12	0.12
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	537	2071	2038	815	194	185
v/s Ratio Prot		c0.26	0.20			
v/s Ratio Perm	0.03			0.02	c0.07	0.00
v/c Ratio	0.04	0.37	0.28	0.03	0.59	0.03
Uniform Delay, d1	3.3	4.4	4.0	3.3	31.9	29.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.5	0.3	0.1	4.5	0.1
Delay (s)	3.5	4.9	4.3	3.4	36.4	29.8
Level of Service	A	A	A	A	D	C
Approach Delay (s)		4.8	4.3		34.6	
Approach LOS		A	A		C	
Intersection Summary						
HCM 2000 Control Delay			7.6	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.40			
Actuated Cycle Length (s)			76.4	Sum of lost time (s)		13.1
Intersection Capacity Utilization			36.0%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
201: West Access 1 & 5 Sideroad

2029 FT PM Peak Hour
11/28/2023



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	252	4	12	400	21	21
Future Volume (vph)	252	4	12	400	21	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			50.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.932	
Fit Protected			0.950		0.976	
Satd. Flow (prot)	1671	0	1825	1628	1748	0
Fit Permitted			0.950		0.976	
Satd. Flow (perm)	1671	0	1825	1628	1748	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	0%	0%	18%	0%	0%
Adj. Flow (vph)	252	4	12	400	21	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	256	0	12	400	42	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.1%			ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
201: West Access 1 & 5 Sideroad

2029 FT PM Peak Hour
11/28/2023

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘		↘	↗	↘	↘
Traffic Volume (veh/h)	252	4	12	400	21	21
Future Volume (Veh/h)	252	4	12	400	21	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	252	4	12	400	21	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			256		678	254
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			256		678	254
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		95	97
cM capacity (veh/h)			1321		417	790
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	256	12	400	42		
Volume Left	0	12	0	21		
Volume Right	4	0	0	21		
cSH	1700	1321	1700	546		
Volume to Capacity	0.15	0.01	0.24	0.08		
Queue Length 95th (m)	0.0	0.2	0.0	1.9		
Control Delay (s)	0.0	7.8	0.0	12.1		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.2		12.1		
Approach LOS				B		
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			31.1%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
202: West Access 2 & 5 Sideroad

2029 FT PM Peak Hour
11/28/2023

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘		↘	↗	↘	↘
Traffic Volume (vph)	269	4	0	412	0	24
Future Volume (vph)	269	4	0	412	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t	0.998				0.865	
Fit Protected						
Satd. Flow (prot)	1670	0	0	1628	1662	0
Fit Permitted						
Satd. Flow (perm)	1670	0	0	1628	1662	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	175.4			166.9	91.3	
Travel Time (s)	10.5			10.0	6.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	0%	0%	18%	0%	0%
Adj. Flow (vph)	269	4	0	412	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	273	0	0	412	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.7%				ICU Level of Service A		
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
202: West Access 2 & 5 Sideroad

2029 FT PM Peak Hour
11/28/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	269	4	0	412	0	24
Future Volume (Veh/h)	269	4	0	412	0	24
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	269	4	0	412	0	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			273	683	271	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			273	683	271	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	97	
cM capacity (veh/h)			1302	418	773	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	273	412	24			
Volume Left	0	0	0			
Volume Right	4	0	24			
cSH	1700	1302	773			
Volume to Capacity	0.16	0.00	0.03			
Queue Length 95th (m)	0.0	0.0	0.7			
Control Delay (s)	0.0	0.0	9.8			
Lane LOS	A					
Approach Delay (s)	0.0	0.0	9.8			
Approach LOS	A					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			31.7%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
203: Boston Church Road & West Access 3

2029 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	2	21	18	254	136	0
Future Volume (vph)	2	21	18	254	136	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.877					
Fit Protected	0.996		0.997			
Satd. Flow (prot)	991	0	0	1689	1685	0
Fit Permitted	0.997					
Satd. Flow (perm)	991	0	0	1689	1685	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	99.5		207.3		219.2	
Travel Time (s)	7.5		10.7		11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	76%	90%	8%	14%	0%
Adj. Flow (vph)	2	21	18	254	136	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	0	0	272	136	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	34.9%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
203: Boston Church Road & West Access 3

2029 FT PM Peak Hour
11/28/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	21	18	254	136	0
Future Volume (Veh/h)	2	21	18	254	136	0
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	21	18	254	136	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	426	136	136			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	136	136			
tC, single (s)	6.4	7.0	5.0			
tC, 2 stage (s)						
tF (s)	3.5	4.0	3.0			
p0 queue free %	100	97	98			
cM capacity (veh/h)	579	748	1048			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	23	272	136			
Volume Left	2	18	0			
Volume Right	21	0	0			
cSH	730	1048	1700			
Volume to Capacity	0.03	0.02	0.08			
Queue Length 95th (m)	0.7	0.4	0.0			
Control Delay (s)	10.1	0.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.1	0.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			34.9%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
204: Boston Church Road & West Access 4

2029 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	20	82	24	252	150	7
Future Volume (vph)	20	82	24	252	150	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.891		0.994			
Fit Protected	0.990		0.996			
Satd. Flow (prot)	1695	0	0	1783	1684	0
Fit Permitted	0.990		0.996			
Satd. Flow (perm)	1695	0	0	1783	1684	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	101.5		171.0		207.3	
Travel Time (s)	7.6		8.8		10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	8%	14%	0%
Adj. Flow (vph)	20	82	24	252	150	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	276	157	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 39.1%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
204: Boston Church Road & West Access 4

2029 FT PM Peak Hour
11/28/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	82	24	252	150	7
Future Volume (Veh/h)	20	82	24	252	150	7
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	82	24	252	150	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	454	154	157			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	454	154	157			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	91	98			
cM capacity (veh/h)	558	898	1435			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	102	276	157			
Volume Left	20	24	0			
Volume Right	82	0	7			
cSH	802	1435	1700			
Volume to Capacity	0.13	0.02	0.09			
Queue Length 95th (m)	3.3	0.4	0.0			
Control Delay (s)	10.1	0.8	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.1	0.8	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			39.1%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
205: Boston Church Road & West Access5

2029 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	5	276	232	0
Future Volume (vph)	0	5	5	276	232	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0	0.0		
Storage Lanes	1	0	0	0		
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Friction	0.865					
Fit Protected				0.999		
Satd. Flow (prot)	831	0	0	1568	1779	0
Fit Permitted	0.999					
Satd. Flow (perm)	831	0	0	1568	1779	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	100.3		183.3		171.0	
Travel Time (s)	7.5		9.4		8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	100%	100%	21%	8%	0%
Adj. Flow (vph)	0	5	5	276	232	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	281	232	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	28.5%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 205: Boston Church Road & West Access5

2029 FT PM Peak Hour
 11/29/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	RT			LT	RT	
Traffic Volume (veh/h)	0	5	5	276	232	0
Future Volume (Veh/h)	0	5	5	276	232	0
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	5	5	276	232	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	518	232	232			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	232	232			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	99			
cM capacity (veh/h)	518	615	922			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	5	281	232			
Volume Left	0	5	0			
Volume Right	5	0	0			
cSH	615	922	1700			
Volume to Capacity	0.01	0.01	0.14			
Queue Length 95th (m)	0.2	0.1	0.0			
Control Delay (s)	10.9	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.9	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			28.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2034 FT AM Peak Hour
11/28/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↕			↕		
Traffic Volume (vph)	106	387	319	87	104	17	116	364	148	132	637	93
Future Volume (vph)	106	387	319	87	104	17	116	364	148	132	637	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frt	0.947			0.989			0.965			0.984		
Fit Protected	0.994			0.980			0.991			0.992		
Satd. Flow (prot)	0	1559	0	0	1485	0	0	2712	0	0	3046	0
Fit Permitted	0.994			0.980			0.991			0.992		
Satd. Flow (perm)	0	1559	0	0	1485	0	0	2712	0	0	3046	0
Link Speed (k/h)	60			60			70			70		
Link Distance (m)	573.6			536.0			54.0			203.5		
Travel Time (s)	34.4			32.2			2.8			10.5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	14%	10%	24%	36%	17%	22%	49%	25%	22%	14%	18%	14%
Adj. Flow (vph)	106	387	319	87	104	17	123	387	157	140	678	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	812	0	0	208	0	0	667	0	0	917	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	1.6			1.6			1.6			1.6		
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control	Yield			Yield			Yield			Yield		

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	100.2% ICU Level of Service G
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2034 FT AM Peak Hour
11/28/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	106	387	319	87	104	17	116	364	148	132	637	93
Future Volume (veh/h)	106	387	319	87	104	17	116	364	148	132	637	93
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	106	387	319	87	104	17	123	387	157	140	678	99
Approach Volume (veh/h)	812			208			667			917		
Crossing Volume (veh/h)	905			616			633			314		
High Capacity (veh/h)	673			851			839			1082		
High v/c (veh/h)	1.21			0.24			0.80			0.85		
Low Capacity (veh/h)	526			681			671			887		
Low v/c (veh/h)	1.54			0.31			0.99			1.03		
Intersection Summary												
Maximum v/c High	1.21											
Maximum v/c Low	1.54											
Intersection Capacity Utilization	100.2%		ICU Level of Service				G					

Lanes, Volumes, Timings
2: Regional Road 25 & James Snow Parkway N
2034 FT AM Peak Hour
11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↑↑	↔	↔	↕↑↑	↔	↔	↕↑↑	↔	↔	↕↑↑	↔
Traffic Volume (vph)	17	76	57	138	131	92	269	632	695	335	547	44
Future Volume (vph)	17	76	57	138	131	92	269	632	695	335	547	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		30.0	75.0		75.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1217	3856	1103	1259	4521	1192	1534	4162	1458	1472	4196	1089
Flt Permitted	0.663			0.497			0.430			0.317		
Satd. Flow (perm)	849	3856	1103	658	4521	1192	694	4162	1439	491	4196	1089
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100			100			663			100
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		452.4			1065.5			592.1			485.4	
Travel Time (s)		27.1			63.9			30.5			25.0	
Conf. Peds. (#/hr)									1	1		
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 (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Adj. Flow (vph)	18	78	59	142	135	95	277	652	716	345	564	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	18	78	59	142	135	95	277	652	716	345	564	45
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												Right
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.1
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	0.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	0.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												

Lanes, Volumes, Timings
2: Regional Road 25 & James Snow Parkway N
2034 FT AM Peak Hour
11/29/2023

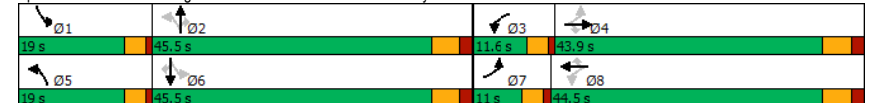


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	11.0	43.9	43.9	11.5	43.9	43.9	11.0	42.9	42.9	11.0	35.9	35.9
Total Split (s)	11.0	43.9	43.9	11.6	44.5	44.5	19.0	45.5	45.5	19.0	45.5	45.5
Total Split (%)	9.2%	36.6%	36.6%	9.7%	37.1%	37.1%	15.8%	37.9%	37.9%	15.8%	37.9%	37.9%
Maximum Green (s)	7.0	37.9	37.9	7.6	38.5	38.5	15.0	39.5	39.5	15.0	39.5	39.5
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	16.4	10.1	10.1	20.6	17.3	17.3	37.7	23.2	23.2	42.5	26.0	26.0
Actuated g/C Ratio	0.22	0.14	0.14	0.28	0.23	0.23	0.51	0.31	0.31	0.58	0.35	0.35
v/c Ratio	0.08	0.15	0.25	0.56	0.13	0.27	0.56	0.50	0.79	0.71	0.38	0.10
Control Delay	22.0	31.8	5.1	33.5	25.3	9.1	12.7	22.2	10.1	18.7	19.7	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	31.8	5.1	33.5	25.3	9.1	12.7	22.2	10.1	18.7	19.7	0.5
LOS	C	C	A	C	C	A	B	C	B	B	B	A
Approach Delay		20.5			24.3			15.3			18.4	
Approach LOS		C			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	73.8
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	17.6
Intersection LOS:	B
Intersection Capacity Utilization:	83.4%
ICU Level of Service:	E
Analysis Period:	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
2: Regional Road 25 & James Snow Parkway N

2034 FT AM Peak Hour
11/29/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔	↔		↔	↔		↔	↔		↔
Traffic Volume (vph)	17	76	57	138	131	92	269	632	695	335	547	44
Future Volume (vph)	17	76	57	138	131	92	269	632	695	335	547	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1217	3856	1103	1259	4521	1192	1534	4162	1439	1472	4196	1089
Fit Permitted	0.66	1.00	1.00	0.50	1.00	1.00	0.43	1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)	849	3856	1103	658	4521	1192	694	4162	1439	491	4196	1089
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	18	78	59	142	135	95	277	652	716	345	564	45
RTOR Reduction (vph)	0	0	52	0	0	74	0	0	463	0	0	30
Lane Group Flow (vph)	18	78	7	142	135	21	277	652	253	345	564	15
Confl. Peds. (#/hr)							1	1		1		
Heavy Vehicles (%)	50%	36%	48%	45%	16%	37%	19%	26%	12%	24%	25%	50%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	10.9	9.7	9.7	22.5	17.3	17.3	35.6	23.2	23.2	41.2	26.0	26.0
Effective Green, g (s)	10.9	9.7	9.7	22.5	17.3	17.3	35.6	23.2	23.2	41.2	26.0	26.0
Actuated g/C Ratio	0.14	0.13	0.13	0.29	0.22	0.22	0.46	0.30	0.30	0.54	0.34	0.34
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	126	486	139	261	1017	268	456	1255	434	456	1418	368
v/s Ratio Prot	0.00	0.02		c0.06	0.03		0.10	0.16		c0.15	0.13	
v/s Ratio Perm	0.02		0.01	c0.10		0.02	0.18		0.18	c0.26		0.01
v/c Ratio	0.14	0.16	0.05	0.54	0.13	0.08	0.61	0.52	0.58	0.76	0.40	0.04
Uniform Delay, d1	28.7	30.0	29.6	21.8	23.8	23.5	13.5	22.2	22.8	11.2	19.5	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	0.2	2.3	0.1	0.1	2.3	0.4	2.0	7.0	0.2	0.0
Delay (s)	29.3	30.1	29.7	24.1	23.9	23.6	15.8	22.6	24.7	18.2	19.6	17.1
Level of Service	C	C	C	C	C	C	B	C	C	B	B	B
Approach Delay (s)		29.9			23.9			22.4			19.0	
Approach LOS		C			C			C			B	

Intersection Summary		
HCM 2000 Control Delay	21.9	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.75	
Actuated Cycle Length (s)	76.9	Sum of lost time (s)
Intersection Capacity Utilization	83.4%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

Lanes, Volumes, Timings
3: Boston Church Road & James Snow Parkway N

2034 FT AM Peak Hour
11/29/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔		↔	↔		↔	↔		↔	↔		↔
Traffic Volume (vph)	86	811	171	19	275	207	38	4	15	81	34	165
Future Volume (vph)	86	811	171	19	275	207	38	4	15	81	34	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.974			0.936			0.850				0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1508	4329	0	1415	4140	0	1113	3650	944	1534	3147	1498
Fit Permitted	0.387			0.226			0.734			0.576		
Satd. Flow (perm)	614	4329	0	337	4140	0	860	3650	944	930	3147	1498
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)		49			198				105			165
Link Speed (k/h)		70			70		60		60			60
Link Distance (m)		358.9			545.5		792.9		198.3			198.3
Travel Time (s)		18.5			28.1		47.6		11.9			11.9
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	21%	18%	18%	29%	22%	29%	14%	64%	0%	73%	19%	16%
Adj. Flow (vph)	96	901	190	21	306	230	38	4	15	81	34	165
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	1091	0	21	536	0	38	4	15	81	34	165
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7		3.7		3.7
Link Offset(m)		0.0			0.0			0.0		0.0		0.0
Crosswalk Width(m)		1.6			1.6			1.6		1.6		1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	8	7	4	4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings

3: Boston Church Road & James Snow Parkway N

2034 FT AM Peak Hour

11/29/2023



Table with 13 columns (Lane Groups: EBL, EBT, EBR, WBL, WBT, WBR, NBL, NBT, NBR, SBL, SBT, SBR) and 28 rows (Total Split, Maximum Green, Yellow Time, etc.)

Intersection Summary

Summary table with fields: Area Type: Other, Cycle Length: 120, Actuated Cycle Length: 73.1, Control Type: Actuated-Uncoordinated, etc.

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis

3: Boston Church Road & James Snow Parkway N

2034 FT AM Peak Hour

11/29/2023



Table with 13 columns (Movements) and 33 rows (Lane Configurations, Traffic Volume, Future Volume, Ideal Flow, etc.)

Intersection Summary

Summary table with fields: HCM 2000 Control Delay: 19.1, HCM 2000 Level of Service: B, Actuated Cycle Length: 78.4, etc.

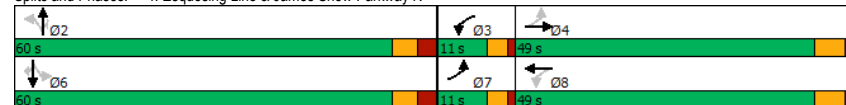
Lanes, Volumes, Timings 2034 FT AM Peak Hour
 4: Esquesing Line & James Snow Parkway N 11/29/2023

Lane Group	<div style="display: flex; justify-content: space-around; align-items: center;"> </div>											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖ ↗	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙	↖ ↗ ↘ ↙
Traffic Volume (vph)	26	595	190	51	577	52	86	229	8	54	436	46
Future Volume (vph)	26	595	190	51	577	52	86	229	8	54	436	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.964			0.988				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1547	4204	0	1644	4109	0	1644	1731	1396	1615	1685	1396
Fit Permitted	0.368			0.227			0.347			0.598		
Satd. Flow (perm)	599	4204	0	393	4109	0	601	1731	1396	1017	1685	1396
Right Turn on Red		Yes		Yes		Yes		Yes		Yes		Yes
Satd. Flow (RTOR)		74			13				69			69
Link Speed (k/h)		70			70				60			60
Link Distance (m)		346.4			1421.7				292.4			1994.7
Travel Time (s)		17.8			73.1				17.5			119.7
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%
Adj. Flow (vph)	30	676	216	58	656	59	86	229	8	54	436	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	892	0	58	715	0	86	229	8	54	436	46
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7				3.7			3.7
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		1.6			1.6				1.6			1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6	6	6
Permitted Phases	4			8			2	2	2	6	6	6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings 2034 FT AM Peak Hour
 4: Esquesing Line & James Snow Parkway N 11/29/2023

Lane Group	<div style="display: flex; justify-content: space-around; align-items: center;"> </div>											
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	11.0	49.0		11.0	49.0		60.0	60.0	60.0	60.0	60.0	60.0
Total Split (%)	9.2%	40.8%		9.2%	40.8%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	7.0	42.4		7.0	42.4		53.5	53.5	53.5	53.5	53.5	53.5
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	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)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Efft Green (s)	34.4	26.4		36.1	31.1		30.3	30.3	30.3	30.3	30.3	30.3
Actuated g/C Ratio	0.44	0.33		0.46	0.39		0.38	0.38	0.38	0.38	0.38	0.38
v/c Ratio	0.09	0.61		0.19	0.44		0.37	0.34	0.01	0.14	0.67	0.08
Control Delay	13.5	23.2		14.3	20.0		25.6	20.7	0.0	19.1	27.8	2.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.5	23.2		14.3	20.0		25.6	20.7	0.0	19.1	27.8	2.4
LOS	B	C		B	B		C	C	A	B	C	A
Approach Delay		22.9			19.5			21.5				24.8
Approach LOS		C			B			C				C
Intersection Summary												
Area Type:	Other											
Cycle Length:	120											
Actuated Cycle Length:	79											
Natural Cycle:	80											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.67											
Intersection Signal Delay:	22.1				Intersection LOS: C							
Intersection Capacity Utilization:	80.9%				ICU Level of Service D							
Analysis Period (min):	15											

Splits and Phases: 4: Esquesing Line & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
4: Esquising Line & James Snow Parkway N

2034 FT AM Peak Hour
11/29/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR										
Lane Configurations																						
Traffic Volume (vph)	26	595	190	51	577	52	86	229	8	54	436	46										
Future Volume (vph)	26	595	190	51	577	52	86	229	8	54	436	46										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900										
Total Lost time (s)	4.0	6.6	4.0	6.6	4.0	6.6	6.5	6.5	6.5	6.5	6.5	6.5										
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00										
Frt	1.00	0.96	1.00	0.99	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00										
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00										
Satd. Flow (prot)	1547	4202	1644	4108	1644	1731	1396	1615	1685	1396	1685	1396										
Fit Permitted	0.37	1.00	0.23	1.00	0.35	1.00	1.00	0.60	1.00	1.00	0.60	1.00										
Satd. Flow (perm)	600	4202	393	4108	601	1731	1396	1017	1685	1396	1685	1396										
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	1.00	1.00	1.00	1.00	1.00	1.00										
Adj. Flow (vph)	30	676	216	58	656	59	86	229	8	54	436	46										
RTOR Reduction (vph)	0	48	0	0	8	0	0	0	5	0	0	29										
Lane Group Flow (vph)	30		844		0		58		707		86		229		3		54		436		17	
Heavy Vehicles (%)	18%	21%	18%	11%	28%	5%	11%	11%	17%	13%	14%	17%										
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm										
Protected Phases	7	4	3	8			2		6			6										
Permitted Phases	4		8		2		2		6			6										
Actuated Green, G (s)	30.4	28.1	36.4	31.1	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3										
Effective Green, g (s)	30.4	28.1	36.4	31.1	30.3	30.3	30.3	30.3	30.3	30.3	30.3	30.3										
Actuated g/C Ratio	0.38	0.35	0.45	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38										
Clearance Time (s)	4.0	6.6	4.0	6.6	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5										
Vehicle Extension (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0										
Lane Grp Cap (vph)	252	1461	259	1581	225	649	523	381	631	523	631	523										
v/s Ratio Prot	0.00	c0.20	c0.01	0.17			0.13		c0.26													
v/s Ratio Perm	0.04		0.09		0.14		0.00	0.05			0.01											
v/c Ratio	0.12	0.58	0.22	0.45	0.38	0.35	0.01	0.14	0.69	0.03												
Uniform Delay, d1	16.0	21.5	13.1	18.5	18.4	18.2	15.8	16.7	21.3	16.0												
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00										
Incremental Delay, d2	0.2	0.9	0.4	0.4	2.3	0.7	0.0	0.4	4.1	0.1												
Delay (s)	16.2	22.4	13.5	18.9	20.7	18.9	15.8	17.0	25.4	16.0												
Level of Service	B	C	B	B	C	B	B	B	C	B												
Approach Delay (s)	22.2		18.5		19.3		23.8															
Approach LOS	C		B		B		C															
Intersection Summary																						
HCM 2000 Control Delay	21.0		HCM 2000 Level of Service				C															
HCM 2000 Volume to Capacity ratio	0.60																					
Actuated Cycle Length (s)	80.8		Sum of lost time (s)				17.1															
Intersection Capacity Utilization	80.9%		ICU Level of Service				D															
Analysis Period (min)	15																					
c Critical Lane Group																						

Lanes, Volumes, Timings

5: James Snow Parkway N & Steeles Avenue East

2034 FT AM Peak Hour
11/29/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	604	345	152	336	87	548	594	593	212	304	14
Future Volume (vph)	1	604	345	152	336	87	548	594	593	212	304	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0	72.0	170.0	130.0	105.0	260.0	160.0	70.0				
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (m)	60.0		70.0		80.0		80.0		80.0			
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00
Frt			0.850			0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1825	4812	1512	2392	4521	1067	3340	4725	1458	1294	4768	1256
Fit Permitted	0.526			0.950			0.950			0.395		
Satd. Flow (perm)	1010	4812	1492	2391	4521	1053	3338	4725	1458	538	4768	1240
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			375			135			213			134
Link Speed (k/h)		60			70			60			70	
Link Distance (m)		729.0			881.4			342.7			1421.7	
Travel Time (s)		43.7			45.3			20.6			73.1	
Conf. Peds. (#/hr)	1		1	1		1	1		1		1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	9%	8%	48%	16%	53%	6%	11%	12%	41%	10%	30%
Adj. Flow (vph)	1	657	375	165	365	95	596	646	645	230	330	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	657	375	165	365	95	596	646	645	230	330	15
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.0			4.0			4.0			4.0	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												Right
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												

Lanes, Volumes, Timings

2034 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	46.3
Total Split (s)	11.0	47.7	47.7	15.0	51.7	51.7	31.0	62.3	62.3	15.0	46.3	46.3
Total Split (%)	7.9%	34.1%	34.1%	10.7%	36.9%	36.9%	22.1%	44.5%	44.5%	10.7%	33.1%	33.1%
Maximum Green (s)	7.0	40.5	40.5	10.0	44.5	44.5	26.0	55.0	55.0	11.0	39.0	39.0
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		33.0	33.0		33.0	33.0		32.0	32.0		32.0	32.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	34.8	24.5	24.5	10.1	37.6	37.6	25.2	50.0	50.0	49.3	34.9	34.9
Actuated g/C Ratio	0.29	0.21	0.21	0.08	0.32	0.32	0.21	0.42	0.42	0.41	0.29	0.29
v/c Ratio	0.00	0.66	0.62	0.82	0.26	0.22	0.85	0.33	0.88	0.79	0.24	0.03
Control Delay	26.0	47.9	9.0	85.3	32.6	3.3	58.2	23.7	35.6	39.8	32.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	47.9	9.0	85.3	32.6	3.3	58.2	23.7	35.6	39.8	32.7	0.1
LOS	C	D	A	F	C	A	E	C	D	D	C	A
Approach Delay		33.8			42.1			38.7			34.7	
Approach LOS		C			D			D			C	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 119.3

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 37.4

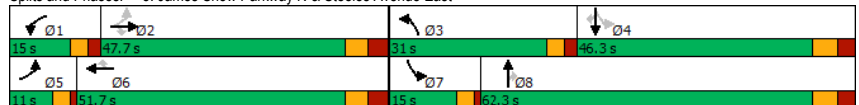
Intersection LOS: D

Intersection Capacity Utilization 82.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis

2034 FT AM Peak Hour

5: James Snow Parkway N & Steeles Avenue East

11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑↑	↑	↑	↑↑↑↑	↑	↑↑↑↑	↑↑↑↑	↑	↑↑↑↑	↑↑↑↑	↑
Traffic Volume (vph)	1	604	345	152	336	87	548	594	593	212	304	14
Future Volume (vph)	1	604	345	152	336	87	548	594	593	212	304	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	4812	1492	2392	4521	1054	3340	4725	1458	1294	4768	1240
Fit Permitted	0.53	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.40	1.00	1.00
Satd. Flow (perm)	1010	4812	1492	2392	4521	1054	3340	4725	1458	539	4768	1240
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	657	375	165	365	95	596	646	646	230	330	15
RTOR Reduction (vph)	0	0	290	0	0	66	0	0	126	0	0	11
Lane Group Flow (vph)	1	657	85	165	365	29	596	646	519	230	330	4
Conf. Peds. (#/hr)	1		1	1		1	1					1
Heavy Vehicles (%)	0%	9%	8%	48%	16%	53%	6%	11%	12%	41%	10%	30%
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2		6		8	4		4		4
Actuated Green, G (s)	29.1	27.8	27.8	10.1	37.6	37.6	25.2	50.0	46.0	34.9	34.9	29.1
Effective Green, g (s)	29.1	27.8	27.8	10.1	37.6	37.6	25.2	50.0	46.0	34.9	34.9	29.1
Actuated g/C Ratio	0.24	0.23	0.23	0.08	0.31	0.31	0.21	0.41	0.41	0.38	0.28	0.28
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	248	1092	338	197	1387	323	687	1928	595	270	1358	353
v/s Ratio Prot	0.00	c0.14		c0.07	0.08		c0.18	0.14		0.08	0.07	
v/s Ratio Perm	0.00		0.06		0.03		c0.36	0.24		0.00		0.00
v/c Ratio	0.00	0.60	0.25	0.84	0.26	0.09	0.87	0.34	0.87	0.85	0.24	0.01
Uniform Delay, d1	35.6	42.4	38.8	55.4	32.0	30.3	47.0	24.9	33.3	30.4	33.7	31.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.9	0.4	25.4	0.1	0.1	11.2	0.2	14.3	21.9	0.2	0.0
Delay (s)	35.6	43.3	39.2	80.8	32.1	30.4	58.2	25.1	47.6	52.3	33.8	31.5
Level of Service	D	D	D	F	C	C	E	C	D	D	C	C
Approach Delay (s)		41.8			44.7		43.2			41.2		
Approach LOS		D			D		D			D		

Intersection Summary

HCM 2000 Control Delay 42.8

HCM 2000 Level of Service D

HCM 2000 Volume to Capacity ratio 0.81

Actuated Cycle Length (s) 122.5

Sum of lost time (s) 24.5

Intersection Capacity Utilization 82.7%

ICU Level of Service E

Analysis Period (min) 15

c Critical Lane Group

Lanes, Volumes, Timings

2034 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/28/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	11	542	66	76	166	4	55	16	25	9	90	32
Future Volume (vph)	11	542	66	76	166	4	55	16	25	9	90	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.986			0.998			0.965			0.967	
Flt Protected		0.999			0.985			0.972			0.997	
Satd. Flow (prot)	0	1653	0	0	1666	0	0	1589	0	0	1649	0
Flt Permitted		0.999			0.985			0.972			0.997	
Satd. Flow (perm)	0	1653	0	0	1666	0	0	1589	0	0	1649	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	13%	27%	13%	13%	33%	13%	17%	12%	43%	9%	13%
Adj. Flow (vph)	11	542	66	76	166	4	55	16	25	9	90	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	619	0	0	246	0	0	96	0	0	131	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	72.2%
ICU Level of Service	C
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2034 FT AM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/28/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	11	542	66	76	166	4	55	16	25	9	90	32
Future Volume (vph)	11	542	66	76	166	4	55	16	25	9	90	32
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	542	66	76	166	4	55	16	25	9	90	32
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	619	246	96	131								
Volume Left (vph)	11	76	55	9								
Volume Right (vph)	66	4	25	32								
Hadj (s)	0.19	0.28	0.19	0.08								
Departure Headway (s)	5.3	5.9	6.8	6.6								
Degree Utilization, x	0.91	0.40	0.18	0.24								
Capacity (veh/h)	671	586	495	512								
Control Delay (s)	38.6	12.9	11.3	11.6								
Approach Delay (s)	38.6	12.9	11.3	11.6								
Approach LOS	E	B	B	B								

Intersection Summary

Delay	27.2
Level of Service	D
Intersection Capacity Utilization	72.2%
ICU Level of Service	C
Analysis Period (min)	15

Lanes, Volumes, Timings

2034 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	9	544	22	123	194	4	13	140	151	85	408	48
Future Volume (vph)	9	544	22	123	194	4	13	140	151	85	408	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	40.0		0.0	0.0		0.0	60.0		0.0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (m)	2.5			50.0			2.5			50.0		
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			0.997			0.933			0.984	
Fit Protected		0.999		0.950				0.998		0.950		
Satd. Flow (prot)	0	1701	0	1659	1689	0	0	1642	0	1601	1648	0
Fit Permitted		0.996		0.282				0.974		0.317		
Satd. Flow (perm)	0	1696	0	493	1689	0	0	1603	0	534	1648	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		3			2			52			7	
Link Speed (k/h)		60			60			60			70	
Link Distance (m)		1343.2			646.3			1994.7			464.9	
Travel Time (s)		80.6			38.8			119.7			23.9	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Adj. Flow (vph)	9	544	22	123	194	4	13	140	151	85	408	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	575	0	123	198	0	0	304	0	85	456	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	Right	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	

Lanes, Volumes, Timings

2034 FT AM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases		2			6			8			4	
Detector Phase	2	2		1	6		8	8		7	4	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5		9.5	22.5		22.5	22.5		9.5	22.5	
Total Split (s)	44.0	44.0		10.0	54.0		26.4	26.4		9.6	36.0	
Total Split (%)	48.9%	48.9%		11.1%	60.0%		29.3%	29.3%		10.7%	40.0%	
Maximum Green (s)	39.5	39.5		5.5	49.5		21.9	21.9		5.1	31.5	
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	
Total Lost Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	Max		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0			11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0			0	
Act Effect Green (s)		39.5			49.5			23.8			31.5	
Actuated g/C Ratio		0.44			0.55			0.26			0.35	
v/c Ratio		0.77			0.36			0.21			0.34	
Control Delay		29.8			13.0			11.0			33.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		29.8			13.0			11.0			33.1	
LOS		C			B			B			C	
Approach Delay		29.8			11.7			33.1			35.2	
Approach LOS		C			B			C			D	

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

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

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 28.7

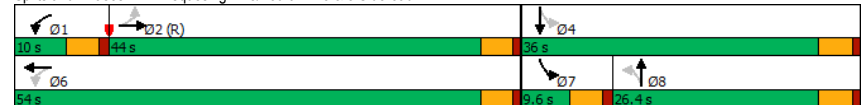
Intersection LOS: C

Intersection Capacity Utilization 95.2%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis
7: Esquesing Line/Fourth Line & 5 Sideroad

2034 FT AM Peak Hour
11/28/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Traffic Volume (vph)	9	544	22	123	194	4	13	140	151	85	408	48
Future Volume (vph)	9	544	22	123	194	4	13	140	151	85	408	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Fr't		0.99		1.00	1.00			0.93		1.00	0.98	
Fit Protected		1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1701		1659	1689			1642		1601	1649	
Fit Permitted		1.00		0.28	1.00			0.97		0.32	1.00	
Satd. Flow (perm)		1695		492	1689			1602		535	1649	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	544	22	123	194	4	13	140	151	85	408	48
RTOR Reduction (vph)	0	2	0	0	1	0	0	38	0	0	4	0
Lane Group Flow (vph)	0	573	0	123	197	0	0	266	0	85	452	0
Heavy Vehicles (%)	43%	12%	6%	10%	13%	33%	10%	12%	6%	14%	15%	12%
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		38.6		48.6	48.6			23.8		32.4	32.4	
Effective Green, g (s)		38.6		48.6	48.6			23.8		32.4	32.4	
Actuated g/C Ratio		0.43		0.54	0.54			0.26		0.36	0.36	
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5	
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		726		336	912			423		241	593	
v/s Ratio Prot				c0.02	0.12					0.02	c0.27	
v/s Ratio Perm		c0.34		0.17				0.17		0.11		
v/c Ratio		0.79		0.37	0.22			0.63		0.35	0.76	
Uniform Delay, d1		22.2		13.0	10.8			29.2		21.1	25.4	
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2		8.5		0.7	0.5			6.9		0.9	8.9	
Delay (s)		30.7		13.7	11.3			36.1		22.0	34.3	
Level of Service		C		B	B			D		C	C	
Approach Delay (s)		30.7			12.2			36.1			32.4	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
101: Boston Church Road & East Access 1

2034 FT AM Peak Hour
11/28/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔		↔	↔
Traffic Volume (vph)	26	4	202	95	24	254
Future Volume (vph)	26	4	202	95	24	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	30.0	0.0		115.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	55.0				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr't		0.850	0.957			
Fit Protected	0.950					0.996
Satd. Flow (prot)	1825	1633	1839	0	0	1669
Fit Permitted	0.950					0.996
Satd. Flow (perm)	1825	1633	1839	0	0	1669
Link Speed (k/h)	48		70			70
Link Distance (m)	117.5		269.9			183.3
Travel Time (s)	8.8		13.9			9.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	0%	0%	16%
Adj. Flow (vph)	26	4	202	95	24	254
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	4	297	0	0	278
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.3%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
101: Boston Church Road & East Access 1

2034 FT AM Peak Hour
11/28/2023

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	26	4	202	95	24	254
Future Volume (Veh/h)	26	4	202	95	24	254
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	26	4	202	95	24	254
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	552	250			297	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552	250			297	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	99			98	
cM capacity (veh/h)	489	794			1276	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1		
Volume Total	26	4	297	278		
Volume Left	26	0	0	24		
Volume Right	0	4	95	0		
cSH	489	794	1700	1276		
Volume to Capacity	0.05	0.01	0.17	0.02		
Queue Length 95th (m)	1.3	0.1	0.0	0.4		
Control Delay (s)	12.8	9.6	0.0	0.8		
Lane LOS	B	A		A		
Approach Delay (s)	12.3		0.0	0.8		
Approach LOS	B					
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			43.3%		ICU Level of Service	A
Analysis Period (min)			15			

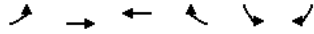
Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2034 FT AM Peak Hour
11/28/2023

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	65	817	484	143	45	23
Future Volume (vph)	65	817	484	143	45	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1573	4445	4299	1471	1352	1150
Fit Permitted	0.447				0.950	
Satd. Flow (perm)	740	4445	4299	1471	1352	1150
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				155		25
Link Speed (k/h)		70	70		48	
Link Distance (m)		545.5	560.8		147.4	
Travel Time (s)		28.1	28.8		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	16%	18%	22%	11%	35%	42%
Adj. Flow (vph)	71	888	526	155	49	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	71	888	526	155	49	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2034 FT AM Peak Hour
11/28/2023

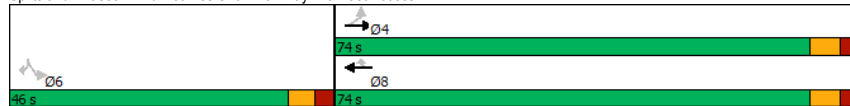


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	74.0	74.0	74.0	74.0	46.0	46.0
Total Split (%)	61.7%	61.7%	61.7%	61.7%	38.3%	38.3%
Maximum Green (s)	67.4	67.4	67.4	67.4	39.5	39.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	80.2	80.2	80.2	80.2	8.9	8.9
Actuated g/C Ratio	0.82	0.82	0.82	0.82	0.09	0.09
v/c Ratio	0.12	0.24	0.15	0.13	0.40	0.20
Control Delay	3.7	3.1	2.8	0.8	51.2	18.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.7	3.1	2.8	0.8	51.2	18.7
LOS	A	A	A	A	D	B
Approach Delay		3.2	2.4		40.2	
Approach LOS		A	A		D	

Intersection Summary

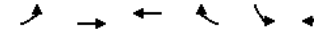
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	98.2
Natural Cycle:	65
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.40
Intersection Signal Delay:	4.5
Intersection Capacity Utilization:	34.1%
Analysis Period (min):	15
Intersection LOS:	A
ICU Level of Service:	A

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis
102: James Snow Parkway N & East Access 2

2034 FT AM Peak Hour
11/28/2023



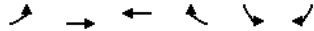
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔↔	↔↔↔	↔	↔	↔
Traffic Volume (vph)	65	817	484	143	45	23
Future Volume (vph)	65	817	484	143	45	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1573	4445	4299	1471	1352	1150
Fit Permitted	0.45	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	740	4445	4299	1471	1352	1150
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	888	526	155	49	25
RTOR Reduction (vph)	0	0	0	32	0	23
Lane Group Flow (vph)	71	888	526	123	49	2
Heavy Vehicles (%)	16%	18%	22%	11%	35%	42%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	78.7	78.7	78.7	78.7	7.7	7.7
Effective Green, g (s)	78.7	78.7	78.7	78.7	7.7	7.7
Actuated g/C Ratio	0.79	0.79	0.79	0.79	0.08	0.08
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	585	3515	3400	1163	104	88
v/s Ratio Prot		c0.20	0.12			
v/s Ratio Perm	0.10			0.08	c0.04	0.00
v/c Ratio	0.12	0.25	0.15	0.11	0.47	0.02
Uniform Delay, d1	2.4	2.7	2.5	2.4	44.0	42.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.2	0.1	0.2	3.3	0.1
Delay (s)	2.8	2.9	2.6	2.6	47.3	42.5
Level of Service	A	A	A	A	D	D
Approach Delay (s)		2.9	2.6		45.7	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	4.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	99.5	Sum of lost time (s)	13.1
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

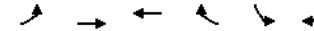
2034 FT AM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔↔	↔↔↔	↔	↔	↔
Traffic Volume (vph)	38	824	615	95	27	12
Future Volume (vph)	38	824	615	95	27	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Friction			0.850		0.850	
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1738	4334	4097	1498	1437	1361
Fit Permitted	0.386				0.950	
Satd. Flow (perm)	706	4334	4097	1498	1437	1361
Right Turn on Red			Yes		Yes	
Satd. Flow (RTOR)			103		13	
Link Speed (k/h)		70	70		48	
Link Distance (m)		560.8	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	21%	28%	9%	27%	20%
Adj. Flow (vph)	41	896	668	103	29	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	41	896	668	103	29	13
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

2034 FT AM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	79.0	79.0	79.0	79.0	41.0	41.0
Total Split (%)	65.8%	65.8%	65.8%	65.8%	34.2%	34.2%
Maximum Green (s)	72.4	72.4	72.4	72.4	34.5	34.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	89.6	89.6	89.6	89.6	7.6	7.6
Actuated g/C Ratio	0.88	0.88	0.88	0.88	0.07	0.07
v/c Ratio	0.07	0.24	0.19	0.08	0.27	0.12
Control Delay	2.6	2.1	2.0	0.7	52.2	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.6	2.1	2.0	0.7	52.2	23.8
LOS	A	A	A	A	D	C
Approach Delay		2.2	1.8		43.4	
Approach LOS		A	A		D	

Intersection Summary

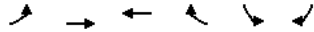
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 102.1
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.27
 Intersection Signal Delay: 3.0
 Intersection Capacity Utilization 36.6%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis
103: James Snow Parkway N & East Access 3

2034 FT AM Peak Hour
11/28/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↘↘↘	↘↘↘	↘	↘	↘
Traffic Volume (vph)	38	824	615	95	27	12
Future Volume (vph)	38	824	615	95	27	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1738	4334	4097	1498	1437	1361
Fit Permitted	0.39	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	707	4334	4097	1498	1437	1361
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	896	668	103	29	13
RTOR Reduction (vph)	0	0	0	18	0	12
Lane Group Flow (vph)	41	896	668	85	29	1
Heavy Vehicles (%)	5%	21%	28%	9%	27%	20%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4		8		6
Permitted Phases	4			8	6	6
Actuated Green, G (s)	86.7	86.7	86.7	86.7	5.0	5.0
Effective Green, g (s)	86.7	86.7	86.7	86.7	5.0	5.0
Actuated g/C Ratio	0.83	0.83	0.83	0.83	0.05	0.05
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	584	3585	3389	1239	68	64
v/s Ratio Prot		c0.21	0.16			
v/s Ratio Perm	0.06			0.06	c0.02	0.00
v/c Ratio	0.07	0.25	0.20	0.07	0.43	0.01
Uniform Delay, d1	1.7	2.0	1.9	1.7	48.5	47.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.1	0.1	4.3	0.1
Delay (s)	1.9	2.1	2.0	1.8	52.8	47.6
Level of Service	A	A	A	A	D	D
Approach Delay (s)		2.1	2.0		51.2	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay		3.2	HCM 2000 Level of Service A
HCM 2000 Volume to Capacity ratio		0.26	
Actuated Cycle Length (s)		104.8	Sum of lost time (s) 13.1
Intersection Capacity Utilization		36.6%	ICU Level of Service A
Analysis Period (min)		15	

c Critical Lane Group

Lanes, Volumes, Timings
201: West Access 1 & 5 Sideroad

2034 FT AM Peak Hour
11/28/2023



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘	↘	↘	↘	↘	↘
Traffic Volume (vph)	618	9	46	207	6	4
Future Volume (vph)	618	9	46	207	6	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			50.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.946	
Fit Protected			0.950		0.971	
Satd. Flow (prot)	1700	0	1825	1700	1765	0
Fit Permitted			0.950		0.971	
Satd. Flow (perm)	1700	0	1825	1700	1765	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	618	9	46	207	6	4
Shared Lane Traffic (%)						
Lane Group Flow (vph)	627	0	46	207	10	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	48.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
201: West Access 1 & 5 Sideroad

2034 FT AM Peak Hour
11/28/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	618	9	46	207	6	4
Future Volume (Veh/h)	618	9	46	207	6	4
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	618	9	46	207	6	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			627	922	622	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			627	922	622	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			95	98	99	
cM capacity (veh/h)			965	288	490	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	627	46	207	10		
Volume Left	0	46	0	6		
Volume Right	9	0	0	4		
cSH	1700	965	1700	345		
Volume to Capacity	0.37	0.05	0.12	0.03		
Queue Length 95th (m)	0.0	1.1	0.0	0.7		
Control Delay (s)	0.0	8.9	0.0	15.7		
Lane LOS	A		C			
Approach Delay (s)	0.0	1.6	15.7			
Approach LOS			C			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			48.2%	ICU Level of Service	A	
Analysis Period (min)			15			

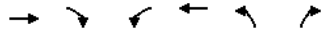
Lanes, Volumes, Timings
202: West Access 2 & 5 Sideroad

2034 FT AM Peak Hour
11/28/2023

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	613	9	0	253	0	6
Future Volume (vph)	613	9	0	253	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998		0.865			
Fit Protected						
Satd. Flow (prot)	1700	0	0	1700	1662	0
Fit Permitted						
Satd. Flow (perm)	1700	0	0	1700	1662	0
Link Speed (k/h)	60		60		48	
Link Distance (m)	175.4		166.9		91.3	
Travel Time (s)	10.5		10.0		6.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	13%	0%	0%	13%	0%	0%
Adj. Flow (vph)	613	9	0	253	0	6
Shared Lane Traffic (%)						
Lane Group Flow (vph)	622	0	0	253	6	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		3.7		3.7	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	14		24		24	
Sign Control	Free		Free		Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 42.8%					ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
202: West Access 2 & 5 Sideroad

2034 FT AM Peak Hour
11/28/2023



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	613	9	0	253	0	6
Future Volume (Veh/h)	613	9	0	253	0	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	613	9	0	253	0	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			622		870	618
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			622		870	618
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	99
cM capacity (veh/h)			969		324	493
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	622	253	6			
Volume Left	0	0	0			
Volume Right	9	0	6			
cSH	1700	969	493			
Volume to Capacity	0.37	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	12.4			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	12.4			
Approach LOS			B			
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		42.8%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
203: Boston Church Road & West Access 3

2034 FT AM Peak Hour
11/28/2023



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔			↔	↔	
Traffic Volume (vph)	0	12	19	96	232	0
Future Volume (vph)	0	12	19	96	232	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr	0.865					
Fit Protected				0.992		
Satd. Flow (prot)	908	0	0	1529	1762	0
Fit Permitted				0.992		
Satd. Flow (perm)	908	0	0	1529	1762	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	99.5			207.3	219.2	
Travel Time (s)	7.5			10.7	11.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	83%	63%	17%	9%	0%
Adj. Flow (vph)	0	12	19	96	232	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	12	0	0	115	232	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 31.3%				ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
203: Boston Church Road & West Access 3

2034 FT AM Peak Hour
11/29/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	12	19	96	232	0
Future Volume (Veh/h)	0	12	19	96	232	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	12	19	96	232	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	366	232	232			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	366	232	232			
tC, single (s)	6.4	7.0	4.7			
tC, 2 stage (s)						
tF (s)	3.5	4.0	2.8			
p0 queue free %	100	98	98			
cM capacity (veh/h)	626	642	1047			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	12	115	232			
Volume Left	0	19	0			
Volume Right	12	0	0			
cSH	642	1047	1700			
Volume to Capacity	0.02	0.02	0.14			
Queue Length 95th (m)	0.4	0.4	0.0			
Control Delay (s)	10.7	1.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.7	1.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			31.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
204: Boston Church Road & West Access 4

2034 FT AM Peak Hour
11/29/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	2	23	78	113	224	20
Future Volume (vph)	2	23	78	113	224	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.876			0.989		
Fit Protected	0.996			0.980		
Satd. Flow (prot)	1676	0	0	1711	1755	0
Fit Permitted	0.996			0.980		
Satd. Flow (perm)	1676	0	0	1711	1755	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	101.5			171.0	207.3	
Travel Time (s)	7.6			8.8	10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	17%	9%	0%
Adj. Flow (vph)	2	23	78	113	224	20
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	0	0	191	244	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 36.6%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
204: Boston Church Road & West Access 4

2034 FT AM Peak Hour
11/28/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	2	23	78	113	224	20
Future Volume (Veh/h)	2	23	78	113	224	20
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	23	78	113	224	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	503	234	244			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	503	234	244			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	97	94			
cM capacity (veh/h)	501	810	1334			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	25	191	244			
Volume Left	2	78	0			
Volume Right	23	0	20			
cSH	772	1334	1700			
Volume to Capacity	0.03	0.06	0.14			
Queue Length 95th (m)	0.8	1.4	0.0			
Control Delay (s)	9.8	3.5	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.8	3.5	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay		2.0				
Intersection Capacity Utilization		36.6%		ICU Level of Service	A	
Analysis Period (min)		15				

Lanes, Volumes, Timings
205: Boston Church Road & West Access 5

2034 FT AM Peak Hour
11/28/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	3	4	191	247	0
Future Volume (vph)	0	3	4	191	247	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected				0.999		
Satd. Flow (prot)	831	0	0	1881	1656	0
Fit Permitted				0.999		
Satd. Flow (perm)	831	0	0	1881	1656	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	100.3			183.3	171.0	
Travel Time (s)	7.5			9.4	8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	100%	100%	0%	16%	0%
Adj. Flow (vph)	0	3	4	191	247	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	3	0	0	195	247	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	23.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 205: Boston Church Road & West Access 5

2034 FT AM Peak Hour
 11/29/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	1	2	1	2	2	1
Traffic Volume (veh/h)	0	3	4	191	247	0
Future Volume (Veh/h)	0	3	4	191	247	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	3	4	191	247	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	446	247	247			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	446	247	247			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	100	100			
cM capacity (veh/h)	571	602	909			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	3	195	247			
Volume Left	0	4	0			
Volume Right	3	0	0			
cSH	602	909	1700			
Volume to Capacity	0.00	0.00	0.15			
Queue Length 95th (m)	0.1	0.1	0.0			
Control Delay (s)	11.0	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.0	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			23.3%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Regional Road 25 & 5 Sideroad

2034 FT PM Peak Hour
11/29/2023

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕			↕			↕		
Traffic Volume (vph)	122	136	152	116	326	60	257	853	121	14	381	89	
Future Volume (vph)	122	136	152	116	326	60	257	853	121	14	381	89	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	
Frt		0.950			0.984			0.985			0.972		
Flt Protected		0.985			0.989			0.990			0.999		
Satd. Flow (prot)	0	1509	0	0	1600	0	0	2975	0	0	3073	0	
Flt Permitted		0.985			0.989			0.990			0.999		
Satd. Flow (perm)	0	1509	0	0	1600	0	0	2975	0	0	3073	0	
Link Speed (k/h)		60			60			70			70		
Link Distance (m)		573.6			536.0			52.0			203.5		
Travel Time (s)		34.4			32.2			2.7			10.5		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Heavy Vehicles (%)	20%	14%	23%	27%	13%	18%	25%	17%	27%	14%	15%	17%	
Adj. Flow (vph)	122	136	152	116	326	60	286	948	134	16	423	99	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	410	0	0	502	0	0	1368	0	0	538	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	Right	Left	Left	Right	Right	
Median Width(m)		0.0			0.0			0.0			0.0		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		1.6			1.6			1.6			1.6		
Two way Left Turn Lane													
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Turning Speed (k/h)	24		14	24		14	24		14	24		14	
Sign Control		Yield			Yield			Yield			Yield		

Intersection Summary	
Area Type:	Other
Control Type:	Roundabout
Intersection Capacity Utilization	92.9% ICU Level of Service F
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
1: Regional Road 25 & 5 Sideroad

2034 FT PM Peak Hour
11/29/2023

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Right Turn Channelized														
Traffic Volume (veh/h)	122	136	152	116	326	60	257	853	121	14	381	89		
Future Volume (veh/h)	122	136	152	116	326	60	257	853	121	14	381	89		
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.90	0.90	0.90	0.90	0.90	0.90		
Hourly flow rate (vph)	122	136	152	116	326	60	286	948	134	16	423	99		
Approach Volume (veh/h)		410			502			1368			538			
Crossing Volume (veh/h)		555			1356#			274			728			
High Capacity (veh/h)		893			464			1117			777			
High v/c (veh/h)		0.46			1.08			1.22			0.69			
Low Capacity (veh/h)		719			348			919			617			
Low v/c (veh/h)		0.57			1.44			1.49			0.87			
Intersection Summary														
Maximum v/c High													1.22	
Maximum v/c Low													1.49	
Intersection Capacity Utilization	92.9%												ICU Level of Service	F
# Crossing flow exceeds 1200, method is not applicable														

Lanes, Volumes, Timings
 2: Regional Road 25 & James Snow Parkway N
 2034 FT PM Peak Hour
 11/28/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔
Traffic Volume (vph)	43	214	229	371	132	329	108	987	253	191	567	7
Future Volume (vph)	43	214	229	371	132	329	108	987	253	191	567	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	80.0		115.0	85.0		35.0	30.0		30.0	75.0		75.0
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (m)	40.0			90.0			70.0			100.0		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor									0.99	1.00		
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1521	4902	1396	1547	4034	1396	1250	4445	1372	1484	4334	1021
Flt Permitted	0.655			0.456			0.344			0.161		
Satd. Flow (perm)	1049	4902	1396	742	4034	1396	453	4445	1354	251	4334	1021
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			254			366			150			136
Link Speed (k/h)		60			60			70			70	
Link Distance (m)		452.4			1065.5			592.1			505.5	
Travel Time (s)		27.1			63.9			30.5			26.0	
Confl. Peds. (#/hr)								1		1		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	20%	7%	17%	18%	30%	17%	46%	18%	19%	23%	21%	60%
Adj. Flow (vph)	48	238	254	412	147	366	120	1097	281	212	630	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	238	254	412	147	366	120	1097	281	212	630	8
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												Right
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.1
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	0.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-0.2	-1.0	-1.0	-1.0	0.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	8.2	9.0	9.0	9.0	6.1
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												

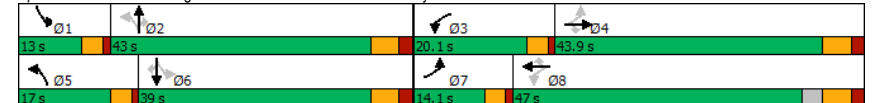
Lanes, Volumes, Timings
 2: Regional Road 25 & James Snow Parkway N
 2034 FT PM Peak Hour
 11/28/2023

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0	10.0	7.0	20.0	20.0	7.0	20.0	20.0
Minimum Split (s)	11.0	43.9	43.9	11.5	43.9	43.9	12.0	43.0	43.0	11.0	35.9	35.9
Total Split (s)	14.1	43.9	43.9	20.1	47.0	47.0	17.0	43.0	43.0	13.0	39.0	39.0
Total Split (%)	11.8%	36.6%	36.6%	16.8%	39.2%	39.2%	14.2%	35.8%	35.8%	10.8%	32.5%	32.5%
Maximum Green (s)	10.1	37.9	37.9	16.1	41.0	41.0	13.0	37.0	37.0	9.0	33.0	33.0
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Dont Walk (s)		30.0	30.0		30.0	30.0		22.0	22.0		22.0	22.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effect Green (s)	21.0	11.2	11.2	33.3	24.2	24.2	40.5	28.2	28.2	38.0	26.9	26.9
Actuated g/C Ratio	0.25	0.13	0.13	0.39	0.29	0.29	0.48	0.33	0.33	0.45	0.32	0.32
v/c Ratio	0.16	0.37	0.63	0.93	0.13	0.55	0.38	0.74	0.51	0.87	0.46	0.02
Control Delay	19.8	36.1	12.6	53.7	26.3	7.2	15.0	28.4	13.8	51.7	24.6	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	36.1	12.6	53.7	26.3	7.2	15.0	28.4	13.8	51.7	24.6	0.1
LOS	B	D	B	D	C	A	B	C	B	D	C	A
Approach Delay		23.6			31.0			24.6			31.1	
Approach LOS		C			C			C			C	

Intersection Summary

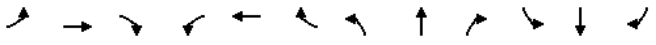
Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	84.6
Natural Cycle:	110
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	0.93
Intersection Signal Delay:	27.4
Intersection LOS:	C
Intersection Capacity Utilization:	75.4%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 2: Regional Road 25 & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
2: Regional Road 25 & James Snow Parkway N

2034 FT PM Peak Hour
11/29/2023




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔
Traffic Volume (vph)	43	214	229	371	132	329	108	987	253	191	567	7
Future Volume (vph)	43	214	229	371	132	329	108	987	253	191	567	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.91	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1521	4902	1396	1547	4034	1396	1250	4445	1355	1484	4334	1021
Fit Permitted	0.65	1.00	1.00	0.46	1.00	1.00	0.34	1.00	1.00	0.16	1.00	1.00
Satd. Flow (perm)	1048	4902	1396	743	4034	1396	453	4445	1355	252	4334	1021
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	48	238	254	412	147	366	120	1097	281	212	630	8
RTOR Reduction (vph)	0	0	216	0	0	263	0	0	101	0	0	6
Lane Group Flow (vph)	48	238	38	412	147	103	120	1097	180	212	630	2
Confl. Peds. (#/hr)									1	1		
Heavy Vehicles (%)	20%	7%	17%	18%	30%	17%	46%	18%	19%	23%	21%	60%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	17.7	12.9	12.9	33.0	24.2	24.2	38.6	28.2	28.2	36.0	26.9	26.9
Effective Green, g (s)	17.7	12.9	12.9	33.0	24.2	24.2	38.6	28.2	28.2	36.0	26.9	26.9
Actuated g/C Ratio	0.21	0.15	0.15	0.38	0.28	0.28	0.45	0.33	0.33	0.42	0.31	0.31
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	241	732	208	434	1131	391	298	1452	442	235	1350	318
v/s Ratio Prot	0.01	0.05		c0.18	0.04		0.05	0.25		c0.10	0.15	
v/s Ratio Perm	0.03		0.03	c0.19		0.07	0.13		0.13	c0.28		0.00
v/c Ratio	0.20	0.33	0.18	0.95	0.13	0.26	0.40	0.76	0.41	0.90	0.47	0.01
Uniform Delay, d1	28.2	32.8	32.1	23.5	23.2	24.1	14.7	26.0	22.6	18.2	23.9	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.3	0.4	30.2	0.1	0.4	0.9	2.3	0.6	33.6	0.3	0.0
Delay (s)	28.6	33.1	32.5	53.7	23.2	24.5	15.6	28.3	23.2	51.9	24.2	20.5
Level of Service	C	C	C	D	C	C	B	C	C	D	C	C
Approach Delay (s)		32.4			37.3			26.3			31.0	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	86.3	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
3: Boston Church Road & James Snow Parkway N

2034 FT PM Peak Hour
11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔	↔	↔↔↔	↔
Traffic Volume (vph)	159	409	98	39	487	94	195	52	38	206	35	99
Future Volume (vph)	159	409	98	39	487	94	195	52	38	206	35	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	70.0		0.0	70.0		0.0	60.0		25.0	60.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			70.0			90.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.971			0.976			0.850			0.850	
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1690	4086	0	1259	4270	0	1601	3017	1014	1521	3380	1432
Fit Permitted	0.303			0.427			0.733			0.656		
Satd. Flow (perm)	539	4086	0	566	4270	0	1235	3017	1014	1050	3380	1432
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			34				141			141
Link Speed (k/h)		70			70		60				60	
Link Distance (m)		358.9			546.0		792.9				198.3	
Travel Time (s)		18.5			28.1		47.6				11.9	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	8%	20%	44%	45%	21%	14%	14%	21%	61%	20%	8%	14%
Adj. Flow (vph)	179	460	110	44	547	106	195	52	38	206	35	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	179	570	0	44	653	0	195	52	38	206	35	99
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7				3.7
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		1.6			1.6			1.6				1.6
Two way Left Turn Lane												
Headway Factor	0.99	0.99		0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8	8	7	4	4
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		3	8	8	7	4	4
Switch Phase												
Minimum Initial (s)	7.0	20.0		7.0	20.0		7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	33.5		11.0	33.5		11.0	31.6	31.6	11.0	31.6	31.6

Lanes, Volumes, Timings
3: Boston Church Road & James Snow Parkway N

2034 FT PM Peak Hour
11/29/2023

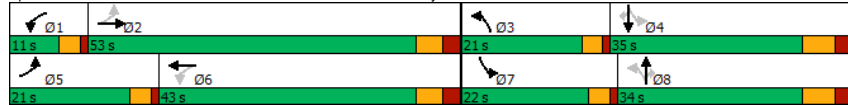


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	21.0	53.0		11.0	43.0		21.0	34.0	34.0	22.0	35.0	35.0
Total Split (%)	17.5%	44.2%		9.2%	35.8%		17.5%	28.3%	28.3%	18.3%	29.2%	29.2%
Maximum Green (s)	17.0	46.5		7.0	36.5		17.0	26.4	26.4	18.0	27.4	27.4
Yellow Time (s)	3.0	3.7		3.0	3.7		3.0	4.6	4.6	3.0	4.6	4.6
All-Red Time (s)	1.0	2.8		1.0	2.8		1.0	3.0	3.0	1.0	3.0	3.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min		None	Min		None	None	None	None	None	None
Walk Time (s)		7.0			7.0			7.0	7.0		7.0	7.0
Flash Dont Walk (s)		20.0			20.0			17.0	17.0		17.0	17.0
Pedestrian Calls (#/hr)		0			0			0	0		0	0
Act Effect Green (s)	42.3	33.8		33.0	23.0		26.6	15.8	15.8	28.8	16.8	16.8
Actuated g/C Ratio	0.52	0.42		0.41	0.28		0.33	0.19	0.19	0.35	0.21	0.21
v/c Ratio	0.39	0.33		0.15	0.53		0.42	0.09	0.12	0.46	0.05	0.24
Control Delay	15.6	18.3		14.5	27.3		20.9	33.5	0.8	21.6	32.1	4.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	18.3		14.5	27.3		20.9	33.5	0.8	21.6	32.1	4.1
LOS	B	B		B	C		C	C	A	C	C	A
Approach Delay		17.6			26.5			20.5			17.6	
Approach LOS		B			C			C			B	

Intersection Summary

Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 81.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 21.0	Intersection LOS: C
Intersection Capacity Utilization 58.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Boston Church Road & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
3: Boston Church Road & James Snow Parkway N

2034 FT PM Peak Hour
11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	159	409	98	39	487	94	195	52	38	206	35	99
Future Volume (vph)	159	409	98	39	487	94	195	52	38	206	35	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Lane Util. Factor	1.00	0.91		1.00	0.91		1.00	0.95	1.00	1.00	0.95	1.00
Fr't	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	4086		1259	4269		1601	3017	1014	1521	3380	1432
Flt Permitted	0.30	1.00		0.43	1.00		0.73	1.00	1.00	0.66	1.00	1.00
Satd. Flow (perm)	538	4086		566	4269		1235	3017	1014	1051	3380	1432
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	460	110	44	547	106	195	52	38	206	35	99
RTOR Reduction (vph)	0	32	0	0	24	0	0	0	33	0	0	85
Lane Group Flow (vph)	179	538	0	44	629	0	195	52	5	206	35	14
Heavy Vehicles (%)	8%	20%	44%	45%	21%	14%	14%	21%	61%	20%	8%	14%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	41.5	33.8		28.7	25.0		23.9	11.1	11.1	26.1	12.2	12.2
Effective Green, g (s)	41.5	33.8		28.7	25.0		23.9	11.1	11.1	26.1	12.2	12.2
Actuated g/C Ratio	0.49	0.40		0.34	0.30		0.28	0.13	0.13	0.31	0.14	0.14
Clearance Time (s)	4.0	6.5		4.0	6.5		4.0	7.6	7.6	4.0	7.6	7.6
Vehicle Extension (s)	3.0	5.0		3.0	5.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	434	1632		222	1261		404	395	133	401	487	206
v/s Ratio Prot	c0.06	0.13		0.01	c0.15		0.07	0.02		c0.08	0.01	
v/s Ratio Perm	0.14			0.06			0.06		0.00	c0.07		0.01
v/c Ratio	0.41	0.33		0.20	0.50		0.48	0.13	0.04	0.51	0.07	0.07
Uniform Delay, d1	12.6	17.6		19.1	24.6		24.8	32.5	32.1	23.4	31.3	31.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2		0.4	0.7		0.9	0.3	0.2	1.1	0.1	0.3
Delay (s)	13.3	17.8		19.6	25.3		25.7	32.8	32.3	24.5	31.4	31.6
Level of Service	B	B		B	C		C	C	C	C	C	C
Approach Delay (s)		16.7			24.9			27.9			27.3	
Approach LOS		B			C			C			C	

Intersection Summary

HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	84.6	Sum of lost time (s)	22.1
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lanes, Volumes, Timings
4: Esquesing Line & James Snow Parkway N

2034 FT PM Peak Hour
11/29/2023

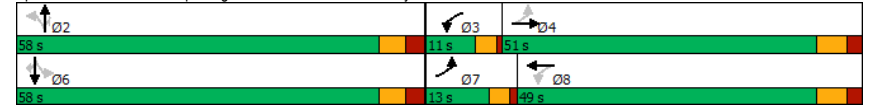
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagrammatic arrows]											
Traffic Volume (vph)	45	717	101	12	452	63	141	404	40	36	184	14
Future Volume (vph)	45	717	101	12	452	63	141	404	40	36	184	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	85.0		0.0	70.0		0.0	40.0		25.0	25.0		25.0
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (m)	100.0			100.0			80.0			100.0		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.982				0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1404	4186	0	1825	4147	0	1560	1700	1526	1534	1656	1445
Fit Permitted	0.374			0.303			0.641			0.399		
Satd. Flow (perm)	553	4186	0	582	4147	0	1053	1700	1526	644	1656	1445
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		24			23			69			69	
Link Speed (k/h)		70			70			60			60	
Link Distance (m)		346.4			1421.7			292.4			1994.7	
Travel Time (s)		17.8			73.1			17.5			119.7	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	30%	25%	8%	0%	27%	4%	17%	13%	7%	19%	16%	13%
Adj. Flow (vph)	49	788	111	13	497	69	141	404	40	36	184	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	899	0	13	566	0	141	404	40	36	184	14
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0		9.0	9.0		9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8		2	2	2	6	6	6
Permitted Phases	4			8			2	2	2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	7.0	15.0		7.0	15.0		20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	11.0	30.6		11.0	30.6		33.5	33.5	33.5	33.5	33.5	33.5

Lanes, Volumes, Timings
4: Esquesing Line & James Snow Parkway N

2034 FT PM Peak Hour
11/29/2023

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (s)	13.0	51.0		11.0	49.0		58.0	58.0	58.0	58.0	58.0	58.0
Total Split (%)	10.8%	42.5%		9.2%	40.8%		48.3%	48.3%	48.3%	48.3%	48.3%	48.3%
Maximum Green (s)	9.0	44.4		7.0	42.4		51.5	51.5	51.5	51.5	51.5	51.5
Yellow Time (s)	3.0	4.2		3.0	4.2		3.7	3.7	3.7	3.7	3.7	3.7
All-Red Time (s)	1.0	2.4		1.0	2.4		2.8	2.8	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)	4.0	6.6		4.0	6.6		6.5	6.5	6.5	6.5	6.5	6.5
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	5.0		3.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
Recall Mode	None	None		None	None		Min	Min	Min	Min	Min	Min
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		17.0			17.0		20.0	20.0	20.0	20.0	20.0	20.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	31.3	27.3		28.8	22.3		27.6	27.6	27.6	27.6	27.6	27.6
Actuated g/C Ratio	0.44	0.39		0.41	0.32		0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	0.14	0.55		0.04	0.43		0.34	0.61	0.06	0.14	0.28	0.02
Control Delay	13.2	18.8		12.7	21.1		20.3	23.4	1.9	18.6	18.0	0.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.2	18.8		12.7	21.1		20.3	23.4	1.9	18.6	18.0	0.1
LOS	B	B		B	C		C	C	A	B	B	A
Approach Delay		18.5			21.0			21.2			17.0	
Approach LOS		B			C			C			B	
Intersection Summary	Area Type: Other											
Cycle Length: 120												
Actuated Cycle Length: 70.5												
Natural Cycle: 80												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.61												
Intersection Signal Delay: 19.6	Intersection LOS: B											
Intersection Capacity Utilization 79.5%	ICU Level of Service D											
Analysis Period (min) 15												

Splits and Phases: 4: Esquesing Line & James Snow Parkway N



HCM Signalized Intersection Capacity Analysis
4: Esquesing Line & James Snow Parkway N

2034 FT PM Peak Hour
11/29/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔		↔	↔↔↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	45	717	101	12	452	63	141	404	40	36	184	14
Future Volume (vph)	45	717	101	12	452	63	141	404	40	36	184	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.6	4.0	6.6	4.0	6.6	6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1404	4188	1825	4146	1560	1700	1526	1534	1656	1445		
Fit Permitted	0.37	1.00	0.30	1.00	0.64	1.00	1.00	0.40	1.00	1.00	1.00	1.00
Satd. Flow (perm)	553	4188	583	4146	1053	1700	1526	644	1656	1445		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	49	788	111	13	497	69	141	404	40	36	184	14
RTOR Reduction (vph)	0	15	0	0	15	0	0	0	25	0	0	9
Lane Group Flow (vph)	49	884	0	13	551	0	141	404	15	36	184	5
Heavy Vehicles (%)	30%	25%	8%	0%	27%	4%	17%	13%	7%	19%	16%	13%
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	7	4	3	8		2	2	6			6	
Permitted Phases	4		8		2		2	6			6	
Actuated Green, G (s)	31.7	27.3	24.7	23.8	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Effective Green, g (s)	31.7	27.3	24.7	23.8	27.6	27.6	27.6	27.6	27.6	27.6	27.6	27.6
Actuated g/C Ratio	0.43	0.37	0.34	0.33	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.0	6.6	4.0	6.6	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	291	1568	212	1353	398	643	577	243	626	547		
v/s Ratio Prot	c0.01	c0.21	0.00	0.13	c0.24				0.11			
v/s Ratio Perm	0.06		0.02		0.13		0.01	0.06			0.00	
v/c Ratio	0.17	0.56	0.06	0.41	0.35	0.63	0.03	0.15	0.29	0.01		
Uniform Delay, d1	12.2	18.1	16.0	19.1	16.3	18.5	14.2	14.9	15.8	14.1		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.3	0.8	0.1	0.4	1.1	2.7	0.0	0.6	0.5	0.0		
Delay (s)	12.4	18.8	16.2	19.5	17.4	21.2	14.3	15.5	16.4	14.1		
Level of Service	B	B	B	B	B	C	B	B	B	B		
Approach Delay (s)		18.5		19.4		19.8		16.1				
Approach LOS		B		B		B		B				
Intersection Summary												
HCM 2000 Control Delay		18.8				HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		72.9			Sum of lost time (s)			17.1				
Intersection Capacity Utilization		79.5%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings


5: James Snow Parkway N & Steeles Avenue East

2034 FT PM Peak Hour
11/29/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔↔↔	↔	↔	↔↔↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	14	449	545	468	791	166	558	383	240	136	673	18
Future Volume (vph)	14	449	545	468	791	166	558	383	240	136	673	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	122.0		72.0	170.0		130.0	105.0		260.0	160.0		70.0
Storage Lanes	1		1	2		1	2		1	1		1
Taper Length (m)	60.0			70.0			80.0			80.0		
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Ped Bike Factor			0.99	1.00								
Frt		0.850			0.850			0.850				0.850
Fit Protected	0.950			0.950			0.950		0.950			0.950
Satd. Flow (prot)	1825	4768	1541	3278	4856	1247	3372	5092	1296	1225	4902	1512
Fit Permitted	0.317			0.950			0.950		0.500			0.500
Satd. Flow (perm)	609	4768	1520	3277	4856	1247	3372	5092	1296	645	4902	1512
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			267			180			261			173
Link Speed (k/h)		60			70			60				70
Link Distance (m)		729.0			881.4			342.7				1421.7
Travel Time (s)		43.7			45.3			20.6				73.1
Confl. Peds. (#/hr)			1		1							
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	10%	6%	8%	8%	31%	5%	3%	26%	49%	7%	8%
Adj. Flow (vph)	15	488	592	509	860	180	607	416	261	148	732	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	488	592	509	860	180	607	416	261	148	732	20
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		7.4			7.4			7.4				7.4
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.0			4.0			4.0				4.0
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template												
Leading Detector (m)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Trailing Detector (m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Position(m)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Detector 1 Size(m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8	4		4
Detector Phase	5	2	2	1	6	6	3	8	8	7	4	4
Switch Phase												

Lanes, Volumes, Timings
5: James Snow Parkway N & Steeles Avenue East

2034 FT PM Peak Hour
11/29/2023

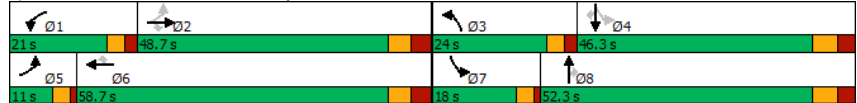


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	7.0	22.0	22.0	7.0	22.0	22.0	7.0	15.0	15.0	7.0	15.0	15.0
Minimum Split (s)	11.0	47.2	47.2	12.0	47.2	47.2	12.0	46.3	46.3	11.0	46.3	46.3
Total Split (s)	11.0	48.7	48.7	21.0	58.7	58.7	24.0	52.3	52.3	18.0	46.3	46.3
Total Split (%)	7.9%	34.8%	34.8%	15.0%	41.9%	41.9%	17.1%	37.4%	37.4%	12.9%	33.1%	33.1%
Maximum Green (s)	7.0	41.5	41.5	16.0	51.5	51.5	19.0	45.0	45.0	14.0	39.0	39.0
Yellow Time (s)	3.0	3.7	3.7	3.0	3.7	3.7	3.0	4.2	4.2	3.0	4.2	4.2
All-Red Time (s)	1.0	3.5	3.5	2.0	3.5	3.5	2.0	3.1	3.1	1.0	3.1	3.1
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Recall Mode	None	Min	Min	None	Min	Min	None	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	33.0	33.0	33.0	33.0	33.0	33.0	32.0	32.0	32.0	32.0	32.0	32.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Act Effect Green (s)	47.0	36.7	36.7	16.1	53.8	53.8	19.2	35.2	35.2	43.9	27.8	27.8
Actuated g/C Ratio	0.38	0.29	0.29	0.13	0.43	0.43	0.15	0.28	0.28	0.35	0.22	0.22
v/c Ratio	0.05	0.35	0.93	1.20	0.41	0.28	1.17	0.29	0.47	0.52	0.67	0.04
Control Delay	18.6	35.4	45.9	156.6	26.3	5.0	141.9	36.3	7.2	30.7	47.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.6	35.4	45.9	156.6	26.3	5.0	141.9	36.3	7.2	30.7	47.8	0.2
LOS	B	D	D	F	C	A	F	D	A	C	D	A
Approach Delay		40.8			66.6			80.3			43.9	
Approach LOS		D			E			F			D	

Intersection Summary

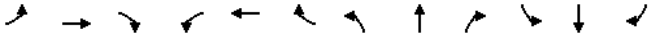
Area Type:	Other
Cycle Length:	140
Actuated Cycle Length:	124.5
Natural Cycle:	150
Control Type:	Actuated-Uncoordinated
Maximum v/c Ratio:	1.20
Intersection Signal Delay:	60.2
Intersection LOS:	E
Intersection Capacity Utilization:	81.5%
ICU Level of Service:	D
Analysis Period (min):	15

Splits and Phases: 5: James Snow Parkway N & Steeles Avenue East



HCM Signalized Intersection Capacity Analysis
5: James Snow Parkway N & Steeles Avenue East

2034 FT PM Peak Hour
11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑		↑↑↑	↑	↑↑↑	↑↑↑	↑		↑↑↑	↑
Traffic Volume (vph)	14	449	545	468	791	166	558	383	240	136	673	18
Future Volume (vph)	14	449	545	468	791	166	558	383	240	136	673	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Lane Util. Factor	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frbp, ped/bikes	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1825	4768	1521	3278	4856	1247	3372	5092	1296	1225	4902	1512
Fit Permitted	0.32	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)	609	4768	1521	3278	4856	1247	3372	5092	1296	644	4902	1512
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	488	592	509	860	180	607	416	261	148	732	20
RTOR Reduction (vph)	0	0	184	0	0	104	0	0	189	0	0	16
Lane Group Flow (vph)	15	488	408	509	860	76	607	416	72	148	732	4
Conf. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	10%	6%	8%	8%	31%	5%	3%	26%	49%	7%	8%
Turn Type	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2			6			8	4		4
Actuated Green, G (s)	41.9	39.3	39.3	16.1	53.8	53.8	19.2	35.2	35.2	40.6	27.8	27.8
Effective Green, g (s)	41.9	39.3	39.3	16.1	53.8	53.8	19.2	35.2	35.2	40.6	27.8	27.8
Actuated g/C Ratio	0.33	0.31	0.31	0.13	0.42	0.42	0.15	0.28	0.28	0.32	0.22	0.22
Clearance Time (s)	4.0	7.2	7.2	5.0	7.2	7.2	5.0	7.3	7.3	4.0	7.3	7.3
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	225	1476	471	415	2058	528	510	1412	359	264	1073	331
v/s Ratio Prot	0.00	0.10		c0.16	0.18		c0.18	0.08		0.06	c0.15	
v/s Ratio Perm	0.02		c0.27			0.06			0.06	0.12		0.00
v/c Ratio	0.07	0.33	0.87	1.23	0.42	0.14	1.19	0.29	0.20	0.56	0.68	0.01
Uniform Delay, d1	28.7	33.7	41.3	55.4	25.6	22.4	53.9	36.1	35.1	33.4	45.5	38.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	15.3	121.6	0.1	0.1	103.8	0.2	0.6	2.7	2.3	0.0
Delay (s)	28.8	33.8	56.6	177.0	25.7	22.6	157.6	36.3	35.7	36.1	47.8	38.8
Level of Service	C	C	E	F	C	C	F	D	D	D	D	D
Approach Delay (s)		46.0			75.1			93.5			45.7	
Approach LOS		D			E			F			D	

Intersection Summary

HCM 2000 Control Delay	67.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	126.9	Sum of lost time (s)	24.5
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings

2034 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/29/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (vph)	31	224	64	43	378	3	66	89	123	7	39	8
Future Volume (vph)	31	224	64	43	378	3	66	89	123	7	39	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.973			0.999			0.940			0.980	
Flt Protected		0.995			0.995			0.988			0.994	
Satd. Flow (prot)	0	1575	0	0	1636	0	0	1564	0	0	1662	0
Flt Permitted		0.995			0.995			0.988			0.994	
Satd. Flow (perm)	0	1575	0	0	1636	0	0	1564	0	0	1662	0
Link Speed (k/h)		60			60			70			60	
Link Distance (m)		166.9			1343.2			219.2			496.0	
Travel Time (s)		10.0			80.6			11.3			29.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	22%	15%	27%	7%	18%	0%	26%	8%	12%	0%	14%	17%
Adj. Flow (vph)	31	224	64	43	378	3	66	89	123	7	39	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	319	0	0	424	0	0	278	0	0	54	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		1.6			1.6			1.6			1.6	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Sign Control		Stop			Stop			Stop			Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	59.2%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

2034 FT PM Peak Hour

6: Boston Church Road/3 Line & 5 Sideroad

11/29/2023



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	224	64	43	378	3	66	89	123	7	39	8
Future Volume (vph)	31	224	64	43	378	3	66	89	123	7	39	8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	31	224	64	43	378	3	66	89	123	7	39	8
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	319	424	278	54								
Volume Left (vph)	31	43	66	7								
Volume Right (vph)	64	3	123	8								
Hadj (s)	0.21	0.30	0.02	0.15								
Departure Headway (s)	6.0	5.9	6.2	7.0								
Degree Utilization, x	0.53	0.70	0.48	0.11								
Capacity (veh/h)	567	590	531	410								
Control Delay (s)	15.6	21.3	14.9	10.8								
Approach Delay (s)	15.6	21.3	14.9	10.8								
Approach LOS	C	C	B	B								

Intersection Summary

Delay	17.4
Level of Service	C
Intersection Capacity Utilization	59.2%
ICU Level of Service	B
Analysis Period (min)	15

Lanes, Volumes, Timings

2034 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

11/29/2023



Table with 13 columns (Lane Group: EBL, EBT, EBR, WBL, WBT, WBR, NBL, NBT, NBR, SBL, SBT, SBR) and multiple rows of traffic data including volume, delay, and timing.

Lanes, Volumes, Timings

2034 FT PM Peak Hour

7: Esquesing Line/Fourth Line & 5 Sideroad

11/29/2023

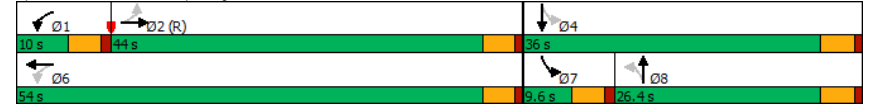


Table with 13 columns (Lane Group: EBL, EBT, EBR, WBL, WBT, WBR, NBL, NBT, NBR, SBL, SBT, SBR) and multiple rows of traffic data including volume, delay, and timing.

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 44 (49%), Referenced to phase 2:EBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 26.0
Intersection LOS: C
Intersection Capacity Utilization 92.4%
ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 7: Esquesing Line/Fourth Line & 5 Sideroad



HCM Signalized Intersection Capacity Analysis
7: Esquesing Line/Fourth Line & 5 Sideroad

2034 FT PM Peak Hour
11/28/2023

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔		↔	↔			↔		↔	↔		
Traffic Volume (vph)	54	287	15	90	347	24	31	361	122	5	140	52	
Future Volume (vph)	54	287	15	90	347	24	31	361	122	5	140	52	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.5		4.5	4.5			4.5		4.5	4.5		
Lane Util. Factor		1.00		1.00	1.00			1.00		1.00	1.00		
Fr't		0.99		1.00	0.99			0.97		1.00	0.96		
Fit Protected		0.99		0.95	1.00			1.00		0.95	1.00		
Satd. Flow (prot)		1655		1674	1672			1652		1460	1551		
Fit Permitted		0.89		0.33	1.00			0.97		0.33	1.00		
Satd. Flow (perm)		1484		587	1672			1616		511	1551		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	54	287	15	90	347	24	31	361	122	5	140	52	
RTOR Reduction (vph)	0	2	0	0	4	0	0	9	0	0	11	0	
Lane Group Flow (vph)	0	354	0	90	367	0	0	505	0	5	181	0	
Heavy Vehicles (%)	30%	11%	27%	9%	14%	11%	39%	11%	9%	25%	18%	21%	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		pm+pt	NA		
Protected Phases		2		1	6			8		7	4		
Permitted Phases	2			6			8			4			
Actuated Green, G (s)		25.6		35.4	35.4			39.8		45.6	45.6		
Effective Green, g (s)		25.6		35.4	35.4			39.8		45.6	45.6		
Actuated g/C Ratio		0.28		0.39	0.39			0.44		0.51	0.51		
Clearance Time (s)		4.5		4.5	4.5			4.5		4.5	4.5		
Vehicle Extension (s)		3.0		3.0	3.0			3.0		3.0	3.0		
Lane Grp Cap (vph)		422		294	657			714		272	785		
v/s Ratio Prot				0.02	c0.22					0.00	c0.12		
v/s Ratio Perm		c0.24		0.10				c0.31		0.01			
v/c Ratio		0.84		0.31	0.56			0.71		0.02	0.23		
Uniform Delay, d1		30.3		19.5	21.2			20.4		12.9	12.4		
Progression Factor		1.00		1.00	1.00			1.00		1.00	1.00		
Incremental Delay, d2		17.8		0.6	1.0			3.2		0.0	0.2		
Delay (s)		48.0		20.1	22.3			23.6		13.0	12.5		
Level of Service		D		C	C			C		B	B		
Approach Delay (s)		48.0			21.8			23.6			12.6		
Approach LOS		D			C			C			B		
Intersection Summary													
HCM 2000 Control Delay				27.3	HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio				0.76									
Actuated Cycle Length (s)				90.0	Sum of lost time (s)						18.0		
Intersection Capacity Utilization				92.4%	ICU Level of Service						F		
Analysis Period (min)				15									
c Critical Lane Group													

Lanes, Volumes, Timings
101: Boston Church Road & East Access 1

2034 FT PM Peak Hour
11/28/2023

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔		↔	↔
Traffic Volume (vph)	98	25	276	29	7	242
Future Volume (vph)	98	25	276	29	7	242
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	30.0		115.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	2.5				75.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr't		0.850	0.987			
Fit Protected	0.950					0.999
Satd. Flow (prot)	1825	1633	1593	0	0	1781
Fit Permitted	0.950					0.999
Satd. Flow (perm)	1825	1633	1593	0	0	1781
Link Speed (k/h)	48		70			70
Link Distance (m)	117.5		269.9			183.3
Travel Time (s)	8.8		13.9			9.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	21%	0%	0%	8%
Adj. Flow (vph)	98	25	276	29	7	242
Shared Lane Traffic (%)						
Lane Group Flow (vph)	98	25	305	0	0	249
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.7		0.0			0.0
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	1.6		1.6			1.6
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14		14	24	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	30.5%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
101: Boston Church Road & East Access 1

2034 FT PM Peak Hour
11/28/2023

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Traffic Volume (veh/h)	98	25	276	29	7	242
Future Volume (Veh/h)	98	25	276	29	7	242
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	98	25	276	29	7	242
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	4					
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	546	290	305			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	546	290	305			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	80	97	99			
cM capacity (veh/h)	499	753	1267			
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	123	305	249			
Volume Left	98	0	7			
Volume Right	25	29	0			
cSH	626	1700	1267			
Volume to Capacity	0.20	0.18	0.01			
Queue Length 95th (m)	5.5	0.0	0.1			
Control Delay (s)	13.1	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	13.1	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			30.5%		ICU Level of Service A	
Analysis Period (min)	15					

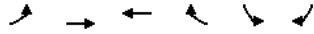
Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2034 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↕	↕	↔	↔
Traffic Volume (vph)	36	618	557	56	150	73
Future Volume (vph)	36	618	557	56	150	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1267	4371	4334	1158	1601	1350
Fit Permitted	0.412				0.950	
Satd. Flow (perm)	550	4371	4334	1158	1601	1350
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				61		79
Link Speed (k/h)		70	70		48	
Link Distance (m)		546.0	560.2		147.4	
Travel Time (s)		28.1	28.8		11.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	44%	20%	21%	41%	14%	21%
Adj. Flow (vph)	39	672	605	61	163	79
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	672	605	61	163	79
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
102: James Snow Parkway N & East Access 2

2034 FT PM Peak Hour
11/28/2023

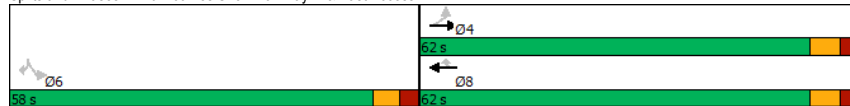


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	62.0	62.0	62.0	62.0	58.0	58.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%
Maximum Green (s)	55.4	55.4	55.4	55.4	51.5	51.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effct Green (s)	58.1	58.1	58.1	58.1	13.8	13.8
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.16	0.16
v/c Ratio	0.10	0.23	0.20	0.08	0.63	0.28
Control Delay	6.4	5.6	5.5	1.9	43.4	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.4	5.6	5.5	1.9	43.4	9.9
LOS	A	A	A	A	D	A
Approach Delay		5.7	5.2		32.5	
Approach LOS		A	A		C	

Intersection Summary

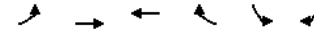
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 85
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 9.5
 Intersection Capacity Utilization 39.7%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 102: James Snow Parkway N & East Access 2



HCM Signalized Intersection Capacity Analysis
102: James Snow Parkway N & East Access 2

2034 FT PM Peak Hour
11/28/2023



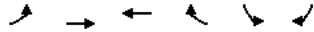
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔↔	↔↔↔	↔	↔	↔
Traffic Volume (vph)	36	618	557	56	150	73
Future Volume (vph)	36	618	557	56	150	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Fr't	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1267	4371	4334	1158	1601	1350
Fit Permitted	0.41	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	550	4371	4334	1158	1601	1350
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	672	605	61	163	79
RTOR Reduction (vph)	0	0	0	19	0	66
Lane Group Flow (vph)	39	672	605	42	163	13
Heavy Vehicles (%)	44%	20%	21%	41%	14%	21%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			
Permitted Phases	4			8	6	6
Actuated Green, G (s)	58.1	58.1	58.1	58.1	13.8	13.8
Effective Green, g (s)	58.1	58.1	58.1	58.1	13.8	13.8
Actuated g/C Ratio	0.68	0.68	0.68	0.68	0.16	0.16
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	375	2987	2962	791	259	219
v/s Ratio Prot		c0.15	0.14			
v/s Ratio Perm	0.07			0.04	c0.10	0.01
v/c Ratio	0.10	0.22	0.20	0.05	0.63	0.06
Uniform Delay, d1	4.6	5.0	4.9	4.4	33.2	30.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.2	0.2	0.1	4.7	0.1
Delay (s)	5.1	5.2	5.1	4.5	37.9	30.2
Level of Service	A	A	A	A	D	C
Approach Delay (s)		5.2	5.1		35.4	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay 9.7
 HCM 2000 Volume to Capacity ratio 0.30
 Actuated Cycle Length (s) 85.0
 Intersection Capacity Utilization 39.7%
 Analysis Period (min) 15
 HCM 2000 Level of Service A
 Sum of lost time (s) 13.1
 ICU Level of Service A
 c Critical Lane Group

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

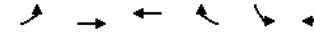
2034 FT PM Peak Hour
11/28/2023



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔↔	↔↔↔	↔	↔	↔
Traffic Volume (vph)	19	749	575	33	105	38
Future Volume (vph)	19	749	575	33	105	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	136.0			136.0	0.0	0.0
Storage Lanes	1			1	1	1
Taper Length (m)	90.0				2.5	
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt				0.850		0.850
Fit Protected	0.950				0.950	
Satd. Flow (prot)	1630	4196	4130	1150	1630	1555
Fit Permitted	0.404				0.950	
Satd. Flow (perm)	693	4196	4130	1150	1630	1555
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				36		41
Link Speed (k/h)		70	70		48	
Link Distance (m)		560.2	346.4		152.7	
Travel Time (s)		28.8	17.8		11.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	12%	25%	27%	42%	12%	5%
Adj. Flow (vph)	21	814	625	36	114	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	814	625	36	114	41
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(m)		3.7	3.7		3.7	
Link Offset(m)		0.0	0.0		0.0	
Crosswalk Width(m)		1.6	1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24			14	24	14
Number of Detectors	1	2	2	1	1	1
Detector Template	Left	Thru	Thru	Right	Left	Right
Leading Detector (m)	6.1	30.5	30.5	6.1	6.1	6.1
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8	1.8	6.1	6.1	6.1
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7	28.7			
Detector 2 Size(m)		1.8	1.8			
Detector 2 Type		CI+Ex	CI+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4	8			

Lanes, Volumes, Timings
103: James Snow Parkway N & East Access 3

2034 FT PM Peak Hour
11/28/2023

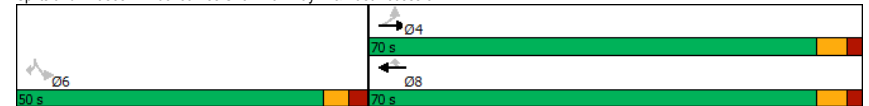


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Permitted Phases	4			8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	30.6	30.6	30.6	30.6	33.5	33.5
Total Split (s)	70.0	70.0	70.0	70.0	50.0	50.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%
Maximum Green (s)	63.4	63.4	63.4	63.4	43.5	43.5
Yellow Time (s)	4.2	4.2	4.2	4.2	3.7	3.7
All-Red Time (s)	2.4	2.4	2.4	2.4	2.8	2.8
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	Max	Max	Max	Max	None	None
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	17.0	17.0	17.0	17.0	20.0	20.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0
Act Effect Green (s)	68.6	68.6	68.6	68.6	11.8	11.8
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.13	0.13
v/c Ratio	0.04	0.26	0.21	0.04	0.56	0.18
Control Delay	4.5	4.6	4.4	1.7	47.6	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	4.6	4.4	1.7	47.6	12.7
LOS	A	A	A	A	D	B
Approach Delay		4.6	4.2		38.3	
Approach LOS		A	A		D	

Intersection Summary

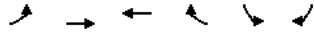
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 93.5
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.56
 Intersection Signal Delay: 7.6
 Intersection Capacity Utilization 32.5%
 Analysis Period (min) 15
 Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 103: James Snow Parkway N & East Access 3



HCM Signalized Intersection Capacity Analysis
103: James Snow Parkway N & East Access 3

2034 FT PM Peak Hour
11/28/2023



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔↔↔	↔↔↔	↔	↔	↔
Traffic Volume (vph)	19	749	575	33	105	38
Future Volume (vph)	19	749	575	33	105	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Fit Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1630	4196	4130	1150	1630	1555
Fit Permitted	0.40	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	693	4196	4130	1150	1630	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	814	625	36	114	41
RTOR Reduction (vph)	0	0	0	10	0	36
Lane Group Flow (vph)	21	814	625	26	114	5
Heavy Vehicles (%)	12%	25%	27%	42%	12%	5%
Turn Type	Perm	NA	NA	Perm	Perm	Perm
Protected Phases		4		8		6
Permitted Phases	4			8	6	6
Actuated Green, G (s)	68.6	68.6	68.6	68.6	11.8	11.8
Effective Green, g (s)	68.6	68.6	68.6	68.6	11.8	11.8
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.13	0.13
Clearance Time (s)	6.6	6.6	6.6	6.6	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	508	3078	3030	843	205	196
v/s Ratio Prot		c0.19	0.15			
v/s Ratio Perm	0.03			0.02	c0.07	0.00
v/c Ratio	0.04	0.26	0.21	0.03	0.56	0.03
Uniform Delay, d1	3.4	4.1	3.9	3.4	38.4	35.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.2	0.1	3.2	0.1
Delay (s)	3.6	4.3	4.1	3.5	41.6	35.9
Level of Service	A	A	A	A	D	D
Approach Delay (s)		4.3	4.0		40.1	
Approach LOS		A	A		D	

Intersection Summary			
HCM 2000 Control Delay	7.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	93.5	Sum of lost time (s)	13.1
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
201: West Access 1 & 5 Sideroad

2034 FT PM Peak Hour
11/28/2023



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	278	4	12	440	21	21
Future Volume (vph)	278	4	12	440	21	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)		0.0	15.0		0.0	0.0
Storage Lanes		0	1		1	0
Taper Length (m)			50.0		2.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.932	
Fit Protected			0.950		0.976	
Satd. Flow (prot)	1670	0	1825	1543	1748	0
Fit Permitted			0.950		0.976	
Satd. Flow (perm)	1670	0	1825	1543	1748	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	198.7			175.4	89.6	
Travel Time (s)	11.9			10.5	6.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	0%	0%	18%	0%	0%
Bus Blockages (#/hr)	0	0	0	13	0	0
Adj. Flow (vph)	278	4	12	440	21	21
Shared Lane Traffic (%)						
Lane Group Flow (vph)	282	0	12	440	42	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	1.06	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.2%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
201: West Access 1 & 5 Sideroad

2034 FT PM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖		↖	↖	↖	↖
Traffic Volume (veh/h)	278	4	12	440	21	21
Future Volume (Veh/h)	278	4	12	440	21	21
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	278	4	12	440	21	21
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			282		744	280
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			282		744	280
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		94	97
cM capacity (veh/h)			1292		381	764
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	282	12	440	42		
Volume Left	0	12	0	21		
Volume Right	4	0	0	21		
cSH	1700	1292	1700	509		
Volume to Capacity	0.17	0.01	0.26	0.08		
Queue Length 95th (m)	0.0	0.2	0.0	2.0		
Control Delay (s)	0.0	7.8	0.0	12.7		
Lane LOS		A		B		
Approach Delay (s)	0.0	0.2		12.7		
Approach LOS				B		
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			33.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
202: West Access 2 & 5 Sideroad

2034 FT PM Peak Hour
11/28/2023

	→	↖	↗	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖		↖	↖	↖	↖
Traffic Volume (vph)	295	4	0	452	0	24
Future Volume (vph)	295	4	0	452	0	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998				0.865	
Fit Protected						
Satd. Flow (prot)	1583	0	0	1628	1662	0
Fit Permitted						
Satd. Flow (perm)	1583	0	0	1628	1662	0
Link Speed (k/h)	60			60	48	
Link Distance (m)	175.4			166.9	91.3	
Travel Time (s)	10.5			10.0	6.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	15%	0%	0%	18%	0%	0%
Bus Blockages (#/hr)	13	0	0	0	0	0
Adj. Flow (vph)	295	4	0	452	0	24
Shared Lane Traffic (%)						
Lane Group Flow (vph)	299	0	0	452	24	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			3.7	3.7	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	1.06	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)		14	24		24	14
Sign Control	Free			Free	Stop	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	33.8%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
202: West Access 2 & 5 Sideroad

2034 FT PM Peak Hour
11/28/2023

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔		↔	
Traffic Volume (veh/h)	295	4	0	452	0	24
Future Volume (Veh/h)	295	4	0	452	0	24
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	295	4	0	452	0	24
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			299		749	297
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			299		749	297
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1274		382	747
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	299	452	24			
Volume Left	0	0	0			
Volume Right	4	0	24			
cSH	1700	1274	747			
Volume to Capacity	0.18	0.00	0.03			
Queue Length 95th (m)	0.0	0.0	0.8			
Control Delay (s)	0.0	0.0	10.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	10.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			33.8%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
203: Boston Church Road & West Access 3

2034 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔		↔	
Traffic Volume (vph)	2	21	18	276	146	0
Future Volume (vph)	2	21	18	276	146	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.877					
Fit Protected	0.996		0.997			
Satd. Flow (prot)	991	0	0	1695	1685	0
Fit Permitted	0.996					
Satd. Flow (perm)	991	0	0	1695	1685	0
Link Speed (k/h)	48		70			
Link Distance (m)	99.5		207.3		219.2	
Travel Time (s)	7.5		10.7			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	76%	90%	8%	14%	0%
Adj. Flow (vph)	2	21	18	276	146	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	0	0	294	146	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0			
Link Offset(m)	0.0		0.0			
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 36.5%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
203: Boston Church Road & West Access 3

2034 FT PM Peak Hour
11/28/2023

	↖	↗	↙	↘	↕	↔
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↘	↔	↔
Traffic Volume (veh/h)	2	21	18	276	146	0
Future Volume (Veh/h)	2	21	18	276	146	0
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	21	18	276	146	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	458	146	146			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	458	146	146			
tC, single (s)	6.4	7.0	5.0			
tC, 2 stage (s)						
tF (s)	3.5	4.0	3.0			
p0 queue free %	100	97	98			
cM capacity (veh/h)	555	738	1037			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	23	294	146			
Volume Left	2	18	0			
Volume Right	21	0	0			
cSH	717	1037	1700			
Volume to Capacity	0.03	0.02	0.09			
Queue Length 95th (m)	0.8	0.4	0.0			
Control Delay (s)	10.2	0.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.2	0.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			36.5%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
204: Boston Church Road & West Access 4

2034 FT PM Peak Hour
11/28/2023

	↖	↗	↙	↘	↕	↔
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖			↘	↔	↔
Traffic Volume (vph)	20	82	24	274	160	7
Future Volume (vph)	20	82	24	274	160	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	15.0			0.0
Storage Lanes	1	0	0			0
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.891			0.994		
Fit Protected	0.990			0.996		
Satd. Flow (prot)	1695	0	0	1782	1684	0
Fit Permitted	0.990			0.996		
Satd. Flow (perm)	1695	0	0	1782	1684	0
Link Speed (k/h)	48			70	70	
Link Distance (m)	101.5			171.0	207.3	
Travel Time (s)	7.6			8.8	10.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	0%	0%	8%	14%	0%
Adj. Flow (vph)	20	82	24	274	160	7
Shared Lane Traffic (%)						
Lane Group Flow (vph)	102	0	0	298	167	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	1.6			1.6	1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	40.8%		ICU Level of Service A			
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
204: Boston Church Road & West Access 4

2034 FT PM Peak Hour
11/28/2023

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	82	24	274	160	7
Future Volume (Veh/h)	20	82	24	274	160	7
Sign Control	Stop		Free			
Grade	0%		0%			
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	82	24	274	160	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	486	164	167			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	164	167			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	91	98			
cM capacity (veh/h)	535	886	1423			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	102	298	167			
Volume Left	20	24	0			
Volume Right	82	0	7			
cSH	785	1423	1700			
Volume to Capacity	0.13	0.02	0.10			
Queue Length 95th (m)	3.4	0.4	0.0			
Control Delay (s)	10.3	0.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.3	0.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	2.2					
Intersection Capacity Utilization	40.8%		ICU Level of Service	A		
Analysis Period (min)	15					

Lanes, Volumes, Timings
205: Boston Church Road & West Access 5

2034 FT PM Peak Hour
11/28/2023

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	5	5	298	242	0
Future Volume (vph)	0	5	5	298	242	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	40.0	0.0		
Storage Lanes	1	0	0	0		
Taper Length (m)	2.5	75.0				
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Fit Protected				0.999		
Satd. Flow (prot)	831	0	0	1569	1779	0
Fit Permitted	0.999					
Satd. Flow (perm)	831	0	0	1569	1779	0
Link Speed (k/h)	48		70		70	
Link Distance (m)	100.3		183.3		171.0	
Travel Time (s)	7.5		9.4		8.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	0%	100%	100%	21%	8%	0%
Adj. Flow (vph)	0	5	5	298	242	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	5	0	0	303	242	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.7		0.0		0.0	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	1.6		1.6		1.6	
Two way Left Turn Lane						
Headway Factor	0.99	0.99	0.99	0.99	0.99	0.99
Turning Speed (k/h)	24	14	24			14
Sign Control	Stop		Free		Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 29.7%					ICU Level of Service A	
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
 205: Boston Church Road & West Access 5

2034 FT PM Peak Hour
 11/29/2023



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↔
Traffic Volume (veh/h)	0	5	5	298	242	0
Future Volume (Veh/h)	0	5	5	298	242	0
Sign Control	Stop			Free		Free
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	5	5	298	242	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	550	242	242			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	550	242	242			
tC, single (s)	6.4	7.2	5.1			
tC, 2 stage (s)						
tF (s)	3.5	4.2	3.1			
p0 queue free %	100	99	99			
cM capacity (veh/h)	497	606	913			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	5	303	242			
Volume Left	0	5	0			
Volume Right	5	0	0			
cSH	606	913	1700			
Volume to Capacity	0.01	0.01	0.14			
Queue Length 95th (m)	0.2	0.1	0.0			
Control Delay (s)	11.0	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.0	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			29.7%	ICU Level of Service	A	
Analysis Period (min)			15			

<h1>Junctions 9</h1>
<h2>ARCADY 9 - Roundabout Module</h2>
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Filename: 2029 FB RR25-5SR_90int.j9

Path: G:\Projects\2017\17197 - Orlando - North Porta\9. Transportation\03 TIS Update 20220916 3rd Sub\03 Analysis\05 ARCADY

Report generation date: 2023-10-19 11:18:42 AM

»FB 2029 - 90% intercept - , AM Peak

»FB 2029 - 90% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FB 2029 - 90% intercept																
Leg WB	0.3	1.3	5.49	0.23	A	22.98	C	-5 % [Leg EB]	3.3	17.6	26.01	0.79	D	10.84	B	4 % [Leg W]
Leg SB	0.8	1.5	3.85	0.45	A				0.4	1.7	3.56	0.31	A			
Leg EB	12.7	59.9	61.47	0.98	F				0.8	1.6	7.00	0.44	A			
Leg NB	0.8	1.5	5.15	0.45	A				2.9	9.4	9.08	0.75	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	TYL\kyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FB 2029 - 90% intercept	✓	100.000	100.000

FB 2029 - 90% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	22.98	C

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-5	Leg EB

Legs

Legs

Leg	Name	Description
WB	WB 5 SR	
SB	SB RR 25	
EB	EB 5 SR	
NB	NB RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB	3.40	7.05	12.2	35.0	58.7	37.0	
SB	7.89	9.01	6.5	29.0	52.2	43.0	
EB	4.00	7.62	6.6	25.0	58.7	47.0	
NB	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB	Percentage		90.00
SB	Percentage		90.00
EB	Percentage		90.00
NB	Percentage		90.00

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB	0.544	1432
SB	0.745	2278
EB	0.522	1377
NB	0.705	2071

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	179	100.000
SB		PHF	✓	720	100.000
EB		PHF	✓	723	100.000
NB		PHF	✓	535	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	179	0.94	SecondQuarter
SB	720	0.94	SecondQuarter
EB	723	0.94	SecondQuarter
NB	535	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

	To				
	WB	SB	EB	NB	
From	WB	0	11	94	74
	SB	107	0	84	529
	EB	338	96	0	289
	NB	123	307	105	0

Vehicle Mix

Truck Percentages

	To				
	WB	SB	EB	NB	
From	WB	0	22	17	36
	SB	14	0	14	18
	EB	10	14	0	24
	NB	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.23	5.49	0.3	1.3	A	179	179
SB	0.45	3.85	0.8	1.5	A	720	720
EB	0.98	61.47	12.7	59.9	F	723	723
NB	0.45	5.15	0.8	1.5	A	535	535

FB 2029 - 90% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	10.84	B

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	4	Leg WB

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	412	100.000
SB		PHF	✓	406	100.000
EB		PHF	✓	365	100.000
NB		PHF	✓	1047	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	412	0.90	SecondQuarter
SB	406	0.90	SecondQuarter
EB	365	0.90	SecondQuarter
NB	1047	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	41	280	91
	SB	9	0	80	317
	EB	116	111	0	138
	NB	105	709	233	0

Vehicle Mix

Truck Percentages

From	To			
	WB	SB	EB	NB
WB	0	18	13	27
SB	14	0	17	15
EB	14	20	0	23
NB	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.79	26.01	3.3	17.6	D	412	412
SB	0.31	3.56	0.4	1.7	A	406	406
EB	0.44	7.00	0.8	1.6	A	365	365
NB	0.75	9.08	2.9	9.4	A	1047	1047



Junctions 9
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Filename: 2029 FB RR25-5SR_100int.j9

Path: G:\Projects\2017\17197 - Orlando - North Porta\9. Transportation\03 TIS Update 20220916 3rd Sub\03 Analysis\05 ARCADY

Report generation date: 2023-10-19 11:36:39 AM

»FB 2029 - 100% intercept - , AM Peak

»FB 2029 - 100% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FB 2029 - 100% intercept																
Leg WB	0.2	1.1	4.61	0.20	A	9.72	A	6 % [Leg EB]	1.7	5.2	13.60	0.64	B	6.85	A	17 % [Leg W]
Leg SB	0.7	1.5	3.13	0.40	A				0.4	1.4	2.93	0.27	A			
Leg EB	4.7	25.2	22.29	0.84	C				0.6	2.0	5.61	0.39	A			
Leg NB	0.7	1.7	4.15	0.40	A				2.0	3.7	6.16	0.67	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	TYL\kyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FB 2029 - 100% intercept	✓	100.000	100.000

FB 2029 - 100% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	9.72	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	6	Leg EB

Legs

Legs

Leg	Name	Description
WB	WB 5 SR	
SB	SB RR 25	
EB	EB 5 SR	
NB	NB RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB	3.40	7.05	12.2	35.0	58.7	37.0	
SB	7.89	9.01	6.5	29.0	52.2	43.0	
EB	4.00	7.62	6.6	25.0	58.7	47.0	
NB	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB	Percentage		100.00
SB	Percentage		100.00
EB	Percentage		100.00
NB	Percentage		100.00

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB	0.544	1591
SB	0.745	2531
EB	0.522	1530
NB	0.705	2301

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	179	100.000
SB		PHF	✓	720	100.000
EB		PHF	✓	723	100.000
NB		PHF	✓	535	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	179	0.94	SecondQuarter
SB	720	0.94	SecondQuarter
EB	723	0.94	SecondQuarter
NB	535	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	11	94	74
	SB	107	0	84	529
	EB	338	96	0	289
	NB	123	307	105	0

Vehicle Mix

Truck Percentages

		To			
		WB	SB	EB	NB
From	WB	0	22	17	36
	SB	14	0	14	18
	EB	10	14	0	24
	NB	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.20	4.61	0.2	1.1	A	179	179
SB	0.40	3.13	0.7	1.5	A	720	720
EB	0.84	22.29	4.7	25.2	C	723	723
NB	0.40	4.15	0.7	1.7	A	535	535

FB 2029 - 100% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	6.85	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	17	Leg WB

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	412	100.000
SB		PHF	✓	406	100.000
EB		PHF	✓	365	100.000
NB		PHF	✓	1047	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	412	0.90	SecondQuarter
SB	406	0.90	SecondQuarter
EB	365	0.90	SecondQuarter
NB	1047	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	41	280	91
	SB	9	0	80	317
	EB	116	111	0	138
	NB	105	709	233	0

Vehicle Mix

Truck Percentages

		To			
		WB	SB	EB	NB
From	WB	0	18	13	27
	SB	14	0	17	15
	EB	14	20	0	23
	NB	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.64	13.60	1.7	5.2	B	412	412
SB	0.27	2.93	0.4	1.4	A	406	406
EB	0.39	5.61	0.6	2.0	A	365	365
NB	0.67	6.16	2.0	3.7	A	1047	1047



Junctions 9
ARCADY 9 - Roundabout Module
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Filename: 2029 FT RR25-5SR_90int.j9
Path: \\TYLI.COM\Files\O\TYLin-TOR\Company\Projects\2017\17197 - Orlando - North Porta\9. Transportation\02 TIS Update 20220916 2nd Sub\03 Analysis\05 ARCADY
Report generation date: 2023-03-06 7:48:40 PM

- »FT 2029 - 90% intercept - , AM Peak
- »FT 2029 - 90% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FT 2029 - 90% intercept																
Leg WB	0.3	1.4	5.60	0.24	A	33.24	D	-8 % [Leg EB]	5.9	26.9	40.41	0.90	E	14.36	B	-2 % [Leg W]
Leg SB	0.9	1.5	4.01	0.47	A				0.5	1.9	3.69	0.32	A			
Leg EB	18.8	71.1	94.04	1.03	F				0.8	1.5	7.33	0.46	A			
Leg NB	0.9	1.4	5.36	0.47	A				3.3	12.9	10.00	0.77	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	TYLI\kyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FT 2029 - 90% intercept	✓	100.000	100.000

FT 2029 - 90% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	33.24	D

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-8	Leg EB

Legs

Legs

Leg	Name	Description
WB	WB 5 SR	
SB	SB RR 25	
EB	EB 5 SR	
NB	NB RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB	3.40	7.05	12.2	35.0	58.7	37.0	
SB	7.89	9.01	6.5	29.0	52.2	43.0	
EB	4.00	7.62	6.6	25.0	58.7	47.0	
NB	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB	Percentage		90.00
SB	Percentage		90.00
EB	Percentage		90.00
NB	Percentage		90.00

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB	0.544	1432
SB	0.745	2278
EB	0.522	1377
NB	0.705	2071

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	189	100.000
SB		PHF	✓	750	100.000
EB		PHF	✓	737	100.000
NB		PHF	✓	551	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	189	0.94	SecondQuarter
SB	750	0.94	SecondQuarter
EB	737	0.94	SecondQuarter
NB	551	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	16	94	79
	SB	121	0	84	545
	EB	352	96	0	289
	NB	135	311	105	0

Vehicle Mix

Truck Percentages

		To			
		WB	SB	EB	NB
From	WB	0	22	17	36
	SB	14	0	14	18
	EB	10	14	0	24
	NB	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.24	5.60	0.3	1.4	A	189	189
SB	0.47	4.01	0.9	1.5	A	750	750
EB	1.03	94.04	18.8	71.1	F	737	737
NB	0.47	5.36	0.9	1.4	A	551	551

FT 2029 - 90% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	14.36	B

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-2	Leg WB

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	457	100.000
SB		PHF	✓	420	100.000
EB		PHF	✓	373	100.000
NB		PHF	✓	1073	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	457	0.90	SecondQuarter
SB	420	0.90	SecondQuarter
EB	373	0.90	SecondQuarter
NB	1073	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	55	296	106
	SB	14	0	80	326
	EB	124	111	0	138
	NB	110	730	233	0

Vehicle Mix

Truck Percentages

		To			
		WB	SB	EB	NB
From	WB	0	18	13	27
	SB	14	0	17	15
	EB	14	20	0	23
	NB	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.90	40.41	5.9	26.9	E	457	457
SB	0.32	3.69	0.5	1.9	A	420	420
EB	0.46	7.33	0.8	1.5	A	373	373
NB	0.77	10.00	3.3	12.9	A	1073	1073



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Filename: 2029FT RR25-5SR_100int.j9
Path: \\TYLI.COM\Files\O\TYLin-TOR\Company\Projects\2017\17197 - Orlando - North Porta\9. Transportation\02 TIS Update 20220916 2nd Sub\03 Analysis\05 ARCADY
Report generation date: 2023-03-06 7:51:37 PM

- »FT 2029 - 100% intercept - , AM Peak
- »FT 2029 - 100% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FT 2029 - 100% intercept																
Leg WB	0.3	1.2	4.69	0.21	A	11.23	B	3 % [Leg EB]	2.5	11.8	17.59	0.72	C	7.98	A	10 % [Leg W]
Leg SB	0.7	1.5	3.23	0.42	A				0.4	1.2	3.03	0.28	A			
Leg EB	5.8	30.2	27.00	0.88	D				0.7	1.9	5.83	0.40	A			
Leg NB	0.7	1.5	4.31	0.41	A				2.2	4.2	6.59	0.69	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	TYLI\kyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FT 2029 - 100% intercept	✓	100.000	100.000

FT 2029 - 100% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	11.23	B

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	3	Leg EB

Legs

Legs

Leg	Name	Description
WB	WB 5 SR	
SB	SB RR 25	
EB	EB 5 SR	
NB	NB RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB	3.40	7.05	12.2	35.0	58.7	37.0	
SB	7.89	9.01	6.5	29.0	52.2	43.0	
EB	4.00	7.62	6.6	25.0	58.7	47.0	
NB	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB	Percentage		100.00
SB	Percentage		100.00
EB	Percentage		100.00
NB	Percentage		100.00

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB	0.544	1591
SB	0.745	2531
EB	0.522	1530
NB	0.705	2301

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	189	100.000
SB		PHF	✓	750	100.000
EB		PHF	✓	737	100.000
NB		PHF	✓	551	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	189	0.94	SecondQuarter
SB	750	0.94	SecondQuarter
EB	737	0.94	SecondQuarter
NB	551	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	16	94	79
	SB	121	0	84	545
	EB	352	96	0	289
	NB	135	311	105	0

Vehicle Mix

Truck Percentages

		To			
		WB	SB	EB	NB
From	WB	0	22	17	36
	SB	14	0	14	18
	EB	10	14	0	24
	NB	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.21	4.69	0.3	1.2	A	189	189
SB	0.42	3.23	0.7	1.5	A	750	750
EB	0.88	27.00	5.8	30.2	D	737	737
NB	0.41	4.31	0.7	1.5	A	551	551

FT 2029 - 100% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	7.98	A

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	10	Leg WB

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	457	100.000
SB		PHF	✓	420	100.000
EB		PHF	✓	373	100.000
NB		PHF	✓	1073	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	457	0.90	SecondQuarter
SB	420	0.90	SecondQuarter
EB	373	0.90	SecondQuarter
NB	1073	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	55	296	106
	SB	14	0	80	326
	EB	124	111	0	138
	NB	110	730	233	0

Vehicle Mix

Truck Percentages

From	To			
	WB	SB	EB	NB
WB	0	18	13	27
SB	14	0	17	15
EB	14	20	0	23
NB	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.72	17.59	2.5	11.8	C	457	457
SB	0.28	3.03	0.4	1.2	A	420	420
EB	0.40	5.83	0.7	1.9	A	373	373
NB	0.69	6.59	2.2	4.2	A	1073	1073



Junctions 9

ARCADY 9 - Roundabout Module

Version: 9.5.1.7462
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Filename: 2034 FB RR25-5SR_90int.j9

Path: G:\Projects\2017\17197 - Orlando - North Porta9. Transportation\03 TIS Update 20220916 3rd Sub\03 Analysis\05 ARCADY

Report generation date: 2023-10-19 2:46:41 PM

»FB 2034 - 90% intercept - , AM Peak

»FB 2034 - 90% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FB 2034 - 90% intercept																
WB - 5 SR	0.3	1.2	6.01	0.26	A	105.95	F	-16 % [EB - 5 SR]	13.8	49.2	89.87	1.04	F	25.79	D	-8 % [WB - 5 SR]
SB - RR 25	1.1	1.5	4.56	0.53	A				0.6	2.2	3.94	0.36	A			
EB - 5 SR	67.9	200.0	324.42	1.18	F				1.0	1.4	8.14	0.50	A			
NB - RR 25	1.0	1.5	5.81	0.51	A				6.0	33.0	16.20	0.87	C			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	

Analyst	TYL\Nkyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queuing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FB 2034 - 90% intercept	✓	100.000	100.000

FB 2034 - 90% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	105.95	F

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-16	EB - 5 SR

Legs

Legs

Leg	Name	Description
WB	5 SR	
SB	RR 25	
EB	5 SR	
NB	RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB - 5 SR	3.40	7.05	12.2	35.0	58.7	37.0	
SB - RR 25	7.89	9.01	6.5	29.0	52.2	43.0	
EB - 5 SR	4.00	7.62	6.6	25.0	58.7	47.0	
NB - RR 25	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB - 5 SR	Percentage		90.00
SB - RR 25	Percentage		90.00
EB - 5 SR	Percentage		90.00

NB - RR 25	Percentage		90.00
------------	------------	--	-------

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB - 5 SR	0.544	1432
SB - RR 25	0.745	2278
EB - 5 SR	0.522	1377
NB - RR 25	0.705	2071

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB - 5 SR		PHF	✓	198	100.000
SB - RR 25		PHF	✓	832	100.000
EB - 5 SR		PHF	✓	798	100.000
NB - RR 25		PHF	✓	612	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB - 5 SR	198	0.94	SecondQuarter
SB - RR 25	832	0.94	SecondQuarter
EB - 5 SR	798	0.94	SecondQuarter
NB - RR 25	612	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	12	104	82
	SB - RR 25	118	0	93	621
	EB - 5 SR	373	106	0	319
	NB - RR 25	136	360	116	0

Vehicle Mix

Truck Percentages

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	22	17	36
	SB - RR 25	14	0	14	18
	EB - 5 SR	10	14	0	24
	NB - RR 25	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB - 5 SR	0.26	6.01	0.3	1.2	A	198	198
SB - RR 25	0.53	4.56	1.1	1.5	A	832	832
EB - 5 SR	1.18	324.42	67.9	200.0	F	798	798
NB - RR 25	0.51	5.81	1.0	1.5	A	612	612

FB 2034 - 90% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	25.79	D

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-8	WB - 5 SR

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB - 5 SR		PHF	✓	457	100.000
SB - RR 25		PHF	✓	470	100.000
EB - 5 SR		PHF	✓	402	100.000
NB - RR 25		PHF	✓	1205	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB - 5 SR	457	0.90	SecondQuarter
SB - RR 25	470	0.90	SecondQuarter
EB - 5 SR	402	0.90	SecondQuarter
NB - RR 25	1205	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	46	310	101
	SB - RR 25	9	0	89	372
	EB - 5 SR	128	122	0	152
	NB - RR 25	116	832	257	0

Vehicle Mix

Truck Percentages

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	18	13	27
	SB - RR 25	14	0	17	15
	EB - 5 SR	14	20	0	23
	NB - RR 25	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB - 5 SR	1.04	89.87	13.8	49.2	F	457	457
SB - RR 25	0.36	3.94	0.6	2.2	A	470	470
EB - 5 SR	0.50	8.14	1.0	1.4	A	402	402
NB - RR 25	0.87	16.20	6.0	33.0	C	1205	1205

<h1>Junctions 9</h1>
<h2>ARCADY 9 - Roundabout Module</h2>
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Filename: 2034 FB RR25-5SR_100int.j9

Path: G:\Projects\2017\17197 - Orlando - North Portal\9. Transportation\03 TIS Update 20220916 3rd Sub\03 Analysis\05 ARCADY

Report generation date: 2023-10-19 3:01:03 PM

»FB 2034 - 100% intercept - , AM Peak

»FB 2034 - 100% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FB 2034 - 100% intercept																
WB - 5 SR	0.3	1.3	5.00	0.23	A	23.67	C	-5 % [EB - 5 SR]	3.9	20.6	27.31	0.82	D	10.80	B	3 % [WB - 5 SR]
SB - RR 25	0.9	1.4	3.58	0.47	A				0.5	1.8	3.25	0.32	A			
EB - 5 SR	14.8	66.4	65.90	1.00	F				0.8	1.5	6.37	0.44	A			
NB - RR 25	0.8	1.5	4.72	0.46	A				3.3	12.0	9.02	0.78	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	

Analyst	TYL\kyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FB 2034 - 100% intercept	✓	100.000	100.000

FB 2034 - 100% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	23.67	C

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-5	EB - 5 SR

Legs

Legs

Leg	Name	Description
WB	5 SR	
SB	RR 25	
EB	5 SR	
NB	RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB - 5 SR	3.40	7.05	12.2	35.0	58.7	37.0	
SB - RR 25	7.89	9.01	6.5	29.0	52.2	43.0	
EB - 5 SR	4.00	7.62	6.6	25.0	58.7	47.0	
NB - RR 25	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB - 5 SR	Percentage		100.00
SB - RR 25	Percentage		100.00
EB - 5 SR	Percentage		100.00

NB - RR 25	Percentage	100.00
------------	------------	--------

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB - 5 SR	0.544	1591
SB - RR 25	0.745	2531
EB - 5 SR	0.522	1530
NB - RR 25	0.705	2301

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB - 5 SR		PHF	✓	198	100.000
SB - RR 25		PHF	✓	832	100.000
EB - 5 SR		PHF	✓	798	100.000
NB - RR 25		PHF	✓	612	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB - 5 SR	198	0.94	SecondQuarter
SB - RR 25	832	0.94	SecondQuarter
EB - 5 SR	798	0.94	SecondQuarter
NB - RR 25	612	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	12	104	82
	SB - RR 25	118	0	93	621
	EB - 5 SR	373	106	0	319
	NB - RR 25	136	360	116	0

Vehicle Mix

Truck Percentages

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	22	17	36
	SB - RR 25	14	0	14	18
	EB - 5 SR	10	14	0	24
	NB - RR 25	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB - 5 SR	0.23	5.00	0.3	1.3	A	198	198
SB - RR 25	0.47	3.58	0.9	1.4	A	832	832
EB - 5 SR	1.00	65.90	14.8	66.4	F	798	798
NB - RR 25	0.46	4.72	0.8	1.5	A	612	612

FB 2034 - 100% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	10.80	B

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	3	WB - 5 SR

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB - 5 SR		PHF	✓	457	100.000
SB - RR 25		PHF	✓	470	100.000
EB - 5 SR		PHF	✓	402	100.000
NB - RR 25		PHF	✓	1205	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB - 5 SR	457	0.90	SecondQuarter
SB - RR 25	470	0.90	SecondQuarter
EB - 5 SR	402	0.90	SecondQuarter
NB - RR 25	1205	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	46	310	101
	SB - RR 25	9	0	89	372
	EB - 5 SR	128	122	0	152
	NB - RR 25	116	832	257	0

Vehicle Mix

Truck Percentages

		To			
		WB - 5 SR	SB - RR 25	EB - 5 SR	NB - RR 25
From	WB - 5 SR	0	18	13	27
	SB - RR 25	14	0	17	15
	EB - 5 SR	14	20	0	23
	NB - RR 25	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB - 5 SR	0.82	27.31	3.9	20.6	D	457	457
SB - RR 25	0.32	3.25	0.5	1.8	A	470	470
EB - 5 SR	0.44	6.37	0.8	1.5	A	402	402
NB - RR 25	0.78	9.02	3.3	12.0	A	1205	1205

Junctions 9
ARCADY 9 - Roundabout Module
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Filename: 2034 FT RR25-5SR_90int.j9
Path: \\TYLI.COM\Files\O\TYLin-TOR\Company\Projects\2017\17197 - Orlando - North Porta\9. Transportation\02 TIS Update 20220916 2nd Sub\03 Analysis\05 ARCADY
Report generation date: 2023-03-06 7:58:41 PM

- »FT 2034 - 90% intercept - , AM Peak
- »FT 2034 - 90% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FT 2034 - 90% intercept																
Leg WB	0.4	1.4	6.14	0.27	A	142.80	F	-18 % [Leg EB]	30.0	70.8	209.48	1.17	F	50.56	F	-13 [Leg
Leg SB	1.2	1.8	4.78	0.55	A				0.6	2.2	3.99	0.37	A			
Leg EB	94.7	172.4	445.69	1.23	F				1.1	1.5	8.51	0.52	A			
Leg NB	1.1	1.4	6.02	0.53	A				7.3	39.1	18.87	0.90	C			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	TYLI\kyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FT 2034 - 90% intercept	✓	100.000	100.000

FT 2034 - 90% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	142.80	F

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-18	Leg EB

Legs

Legs

Leg	Name	Description
WB	WB 5 SR	
SB	SB RR 25	
EB	EB 5 SR	
NB	NB RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB	3.40	7.05	12.2	35.0	58.7	37.0	
SB	7.89	9.01	6.5	29.0	52.2	43.0	
EB	4.00	7.62	6.6	25.0	58.7	47.0	
NB	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB	Percentage		90.00
SB	Percentage		90.00
EB	Percentage		90.00
NB	Percentage		90.00

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB	0.544	1432
SB	0.745	2278
EB	0.522	1377
NB	0.705	2071

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	208	100.000
SB		PHF	✓	862	100.000
EB		PHF	✓	812	100.000
NB		PHF	✓	628	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	208	0.94	SecondQuarter
SB	862	0.94	SecondQuarter
EB	812	0.94	SecondQuarter
NB	628	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

	To				
	WB	SB	EB	NB	
From	WB	0	17	104	87
	SB	132	0	93	637
	EB	387	106	0	319
	NB	148	364	116	0

Vehicle Mix

Truck Percentages

	To				
	WB	SB	EB	NB	
From	WB	0	22	17	36
	SB	14	0	14	18
	EB	10	14	0	24
	NB	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.27	6.14	0.4	1.4	A	208	208
SB	0.55	4.78	1.2	1.8	A	862	862
EB	1.23	445.69	94.7	172.4	F	812	812
NB	0.53	6.02	1.1	1.4	A	628	628

FT 2034 - 90% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	50.56	F

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-13	Leg WB

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	502	100.000
SB		PHF	✓	484	100.000
EB		PHF	✓	410	100.000
NB		PHF	✓	1231	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	502	0.90	SecondQuarter
SB	484	0.90	SecondQuarter
EB	410	0.90	SecondQuarter
NB	1231	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	60	326	116
	SB	14	0	89	381
	EB	136	122	0	152
	NB	121	853	257	0

Vehicle Mix

Truck Percentages

From	To			
	WB	SB	EB	NB
WB	0	18	13	27
SB	14	0	17	15
EB	14	20	0	23
NB	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	1.17	209.48	30.0	70.8	F	502	502
SB	0.37	3.99	0.6	2.2	A	484	484
EB	0.52	8.51	1.1	1.5	A	410	410
NB	0.90	18.87	7.3	39.1	C	1231	1231



Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.5.1.7462 © Copyright TRL Limited, 2019
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Filename: 2034FT RR25-5SR_100int.j9
Path: \\TYLI.COM\Files\O\TYLin-TOR\Company\Projects\2017\17197 - Orlando - North Porta\9. Transportation\02 TIS Update 20220916 2nd Sub\03 Analysis\05 ARCADY
Report generation date: 2023-03-06 7:56:44 PM

- »FT 2034 - 100% intercept - , AM Peak
- »FT 2034 - 100% intercept - , PM Peak

Summary of intersection performance

	AM Peak								PM Peak							
	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity	Queue (Veh)	95% Queue (Veh)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS	Network Residual Capacity
FT 2034 - 100% intercept																
Leg WB	0.3	1.4	5.10	0.24	A	33.86	D	-8 % [Leg EB]	7.0	29.9	42.42	0.92	E	14.36	B	-2 % [Leg W]
Leg SB	0.9	1.5	3.71	0.49	A				0.5	2.0	3.35	0.33	A			
Leg EB	21.9	77.5	98.96	1.04	F				0.8	1.5	6.64	0.46	A			
Leg NB	0.9	1.5	4.89	0.48	A				3.7	15.8	9.91	0.80	A			

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	FT 2029
Location	
Site number	
Date	2023-02-01
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	TYLI\kyla.zijlstra
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	Residual capacity criteria type	V/C Ratio Threshold	Average Delay threshold (s)	Queue threshold (PCE)
5.75	✓		✓	Delay	0.85	36.00	20.00

Demand Set Summary

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓
D2	PM Peak	PHF	17:00	18:00	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	FT 2034 - 100% intercept	✓	100.000	100.000

FT 2034 - 100% intercept - , AM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	33.86	D

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-8	Leg EB

Legs

Legs

Leg	Name	Description
WB	WB 5 SR	
SB	SB RR 25	
EB	EB 5 SR	
NB	NB RR 25	

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
WB	3.40	7.05	12.2	35.0	58.7	37.0	
SB	7.89	9.01	6.5	29.0	52.2	43.0	
EB	4.00	7.62	6.6	25.0	58.7	47.0	
NB	7.00	8.21	6.2	29.0	52.2	40.0	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Percentage intercept adjustment (%)
WB	Percentage		100.00
SB	Percentage		100.00
EB	Percentage		100.00
NB	Percentage		100.00

Roundabout Slope and Intercept used in model

Leg	Final slope	Final intercept (PCE/hr)
WB	0.544	1591
SB	0.745	2531
EB	0.522	1530
NB	0.705	2301

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	AM Peak	PHF	08:00	09:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	208	100.000
SB		PHF	✓	862	100.000
EB		PHF	✓	812	100.000
NB		PHF	✓	628	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	208	0.94	SecondQuarter
SB	862	0.94	SecondQuarter
EB	812	0.94	SecondQuarter
NB	628	0.94	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	17	104	87
	SB	132	0	93	637
	EB	387	106	0	319
	NB	148	364	116	0

Vehicle Mix

Truck Percentages

		To			
		WB	SB	EB	NB
From	WB	0	22	17	36
	SB	14	0	14	18
	EB	10	14	0	24
	NB	22	25	49	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.24	5.10	0.3	1.4	A	208	208
SB	0.49	3.71	0.9	1.5	A	862	862
EB	1.04	98.96	21.9	77.5	F	812	812
NB	0.48	4.89	0.9	1.5	A	628	628

FT 2034 - 100% intercept - , PM Peak

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

Intersection Network

Intersections

Intersection	Name	Intersection type	Use circulating lanes	Leg order	Intersection Delay (s)	Intersection LOS
1	RR25 and 5 Side Road	Standard Roundabout		WB, SB, EB, NB	14.36	B

Intersection Network Options

Driving side	Lighting	Network residual capacity (%)	First leg reaching threshold
Right	Normal/unknown	-2	Leg WB

Traffic Demand

Demand Set Details

ID	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	PM Peak	PHF	17:00	18:00	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCE Factor for a Truck (PCE)
✓	✓	Truck Percentages	2.00

Demand overview (Traffic)

Leg	Linked leg	Profile type	Use O-D data	Average Demand (Veh/hr)	Scaling Factor (%)
WB		PHF	✓	502	100.000
SB		PHF	✓	484	100.000
EB		PHF	✓	410	100.000
NB		PHF	✓	1231	100.000

Peak Hour Factor Data (Traffic)

Leg	Hourly volume (Veh/hr)	Peak hour factor	Peak time segment
WB	502	0.90	SecondQuarter
SB	484	0.90	SecondQuarter
EB	410	0.90	SecondQuarter
NB	1231	0.90	SecondQuarter

Origin-Destination Data

Demand (Veh/hr)

		To			
		WB	SB	EB	NB
From	WB	0	60	326	116
	SB	14	0	89	381
	EB	136	122	0	152
	NB	121	853	257	0

Vehicle Mix

Truck Percentages

		To			
		WB	SB	EB	NB
From	WB	0	18	13	27
	SB	14	0	17	15
	EB	14	20	0	23
	NB	27	17	25	0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Intersection Arrivals (Veh)
WB	0.92	42.42	7.0	29.9	E	502	502
SB	0.33	3.35	0.5	2.0	A	484	484
EB	0.46	6.64	0.8	1.5	A	410	410
NB	0.80	9.91	3.7	15.8	A	1231	1231



Appendix J SimTraffic Queueing Analysis

Queuing and Blocking Report
Existing AM

2021 Existing AM Peak Hour
02/05/2023

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	179.9	534.6	42.5	34.2	57.6	46.3	45.9	34.0	40.3	82.4	71.3
Average Queue (m)	112.7	444.5	15.3	11.8	21.9	14.0	17.5	10.0	15.4	44.7	30.5
95th Queue (m)	247.1	703.3	32.3	27.0	45.7	33.1	37.4	23.8	33.0	73.1	60.1
Link Distance (m)		561.6		516.8		961.6	961.6			194.5	194.5
Upstream Blk Time (%)		39									
Queuing Penalty (veh)		0									
Storage Bay Dist (m)	80.0		70.0		75.0			70.0	35.0		
Storage Blk Time (%)		70			0				1	15	
Queuing Penalty (veh)		57			0				3	14	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	20.0	30.8	22.4	27.8	44.4	23.8	28.4	30.8	55.1	59.2	52.8	56.0
Average Queue (m)	3.3	10.3	2.5	9.9	16.4	6.7	12.2	11.1	22.9	28.6	24.4	22.9
95th Queue (m)	13.0	24.8	11.8	22.4	35.5	17.6	24.2	24.6	42.5	51.2	46.0	42.0
Link Distance (m)		439.6	439.6			1046.6	1046.6			576.0	576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)							0	0	3	7		
Queuing Penalty (veh)							0	0	8	13		

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	67.6	45.4	52.9
Average Queue (m)	28.6	17.8	24.8
95th Queue (m)	54.6	37.6	44.1
Link Distance (m)		961.6	961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Queuing and Blocking Report
Existing AM

2021 Existing AM Peak Hour
02/05/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T
Maximum Queue (m)	17.9	42.1	52.7	12.4	22.3	27.0	23.4	5.1	14.4	16.3	9.8
Average Queue (m)	3.0	15.5	22.7	2.5	5.0	6.4	7.0	0.3	2.5	4.4	0.8
95th Queue (m)	11.3	34.7	44.5	9.6	15.5	18.6	19.2	2.5	8.9	12.2	5.8
Link Distance (m)		337.6	337.6		1424.1	1424.1		776.6		176.9	176.9
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	70.0			70.0			60.0		60.0		
Storage Blk Time (%)											0
Queuing Penalty (veh)											0

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T
Maximum Queue (m)	19.3	61.8	62.3	25.4	29.4	36.5	31.5	46.3	19.9	80.2
Average Queue (m)	3.7	26.0	30.3	7.7	7.9	15.5	11.4	19.0	6.1	38.5
95th Queue (m)	12.4	50.5	52.7	19.8	21.3	30.5	24.4	37.2	16.1	66.4
Link Distance (m)		1424.1	1424.1		1392.0	1392.0		279.6		1974.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	85.0			70.0			40.0		25.0	
Storage Blk Time (%)		0					0	3	0	16
Queuing Penalty (veh)		0					0	3	1	9

Queuing and Blocking Report
Existing AM

2021 Existing AM Peak Hour
02/05/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	3.7	70.8	72.1	46.3	53.4	54.2	42.6	46.0	23.7	76.3	87.5	37.4
Average Queue (m)	0.1	41.6	41.5	20.2	16.8	23.2	19.2	17.3	7.0	43.9	56.9	15.5
95th Queue (m)	1.9	62.8	65.6	36.5	38.2	42.7	36.0	35.8	18.0	72.7	81.9	31.5
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0									0
Queuing Penalty (veh)			1									0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	33.8	88.0	86.5	27.6	32.1
Average Queue (m)	11.2	43.9	31.7	10.2	12.7
95th Queue (m)	25.5	77.3	63.5	22.2	26.2
Link Distance (m)	324.5		1392.0	1392.0	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	50.6	31.9	19.0	20.0
Average Queue (m)	27.9	15.7	5.6	10.4
95th Queue (m)	41.7	26.0	14.4	17.1
Link Distance (m)	529.6	1328.5	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
Existing AM

2021 Existing AM Peak Hour
02/05/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	85.9	40.6	53.6	78.2
Average Queue (m)	41.6	20.2	23.8	34.3
95th Queue (m)	70.6	34.1	41.6	67.6
Link Distance (m)	1328.5	638.0	1974.3	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 109

Queuing and Blocking Report
2021 Existing PM Peak Hour

2021 Existing PM Peak Hour
02/05/2023

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	48.0	81.4	41.7	75.6	72.8	70.2	72.1	24.8	12.2	55.8	47.9
Average Queue (m)	20.1	39.5	15.4	34.9	30.0	29.0	33.9	7.4	1.3	28.6	15.3
95th Queue (m)	40.0	68.9	33.2	62.0	57.2	61.2	64.1	18.6	6.7	48.9	36.1
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0		
Storage Blk Time (%)	0		0		0		1		5		
Queuing Penalty (veh)	0		0		1		0		0		

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	24.2	40.0	30.2	42.9	66.8	23.5	33.2	60.5	47.6	93.4	88.2	30.9
Average Queue (m)	6.5	17.8	9.0	17.7	31.0	6.5	10.2	24.8	15.8	49.1	44.8	10.6
95th Queue (m)	17.4	31.8	22.0	32.4	57.1	17.5	24.6	46.2	34.4	76.3	73.0	22.0
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)	0		0		0		3		1		21	
Queuing Penalty (veh)	0		0		0		1		5		17	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	50.0	54.8	52.6
Average Queue (m)	19.7	21.9	23.1
95th Queue (m)	38.4	43.8	44.7
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
2021 Existing PM Peak Hour

2021 Existing PM Peak Hour
02/05/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	34.6	31.5	48.8	22.7	32.8	42.5	42.5	25.0	10.8	10.4	15.2	12.0
Average Queue (m)	11.6	10.8	18.4	5.5	13.4	17.0	18.2	7.3	0.7	1.4	4.1	1.4
95th Queue (m)	24.8	25.0	37.6	16.5	28.0	34.1	35.9	19.0	5.8	6.1	11.3	7.1
Link Distance (m)	337.6		337.6		1424.1		1424.1		776.6		776.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		60.0		60.0		0	
Storage Blk Time (%)	0		0		0		0		0		0	
Queuing Penalty (veh)	0		0		0		0		0		0	

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	
Maximum Queue (m)	14.4	39.7	43.8	11.1	31.9	41.5	44.7	66.9	7.5	18.6	40.0	
Average Queue (m)	1.4	14.9	16.0	1.9	13.3	20.1	16.3	28.9	0.2	4.7	14.4	
95th Queue (m)	7.1	31.3	32.0	7.5	27.5	35.7	33.4	51.7	7.4	13.8	30.3	
Link Distance (m)	1424.1		1424.1		1392.0		1392.0		279.6		1974.3	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0		70.0		40.0		25.0		25.0		0	
Storage Blk Time (%)	0		9		0		2		0		2	
Queuing Penalty (veh)	2		12		0		1		0		1	

Queuing and Blocking Report
2021 Existing PM Peak Hour

2021 Existing PM Peak Hour
02/05/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	11.2	57.4	61.6	105.2	72.4	78.7	61.9	67.8	28.6	72.7	84.1	36.2
Average Queue (m)	2.2	31.3	31.7	44.2	42.0	44.6	33.4	35.6	10.2	44.0	56.3	16.4
95th Queue (m)	8.1	50.4	53.0	81.6	65.8	68.3	55.4	59.2	23.1	70.5	79.6	30.7
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0	2								0
Queuing Penalty (veh)			0	4								0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	34.8	43.4	63.6	306.3	170.5
Average Queue (m)	14.5	19.3	22.9	25.0	20.5
95th Queue (m)	28.4	33.8	48.6	210.1	152.6
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	37.0	37.0	31.7	19.4
Average Queue (m)	20.0	22.0	14.3	7.3
95th Queue (m)	32.2	32.1	24.1	15.9
Link Distance (m)	529.6	1328.5	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
2021 Existing PM Peak Hour

2021 Existing PM Peak Hour
02/05/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	50.5	50.6	74.8	33.2
Average Queue (m)	24.1	24.1	34.3	14.2
95th Queue (m)	41.1	40.2	58.8	25.0
Link Distance (m)	1328.5	638.0	1974.3	458.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 45

Queuing and Blocking Report

2024 Future Background AM Peak Hour
08/30/2023

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	121.4	255.4	43.5	37.7	60.9	55.4	59.9	35.7	54.3	110.2	91.1
Average Queue (m)	25.4	131.5	16.4	11.0	28.0	22.7	27.9	12.0	21.4	58.6	47.0
95th Queue (m)	93.6	244.7	34.3	27.7	52.0	44.6	50.4	26.9	43.7	91.0	79.7
Link Distance (m)		561.6		516.8		961.6	961.6			194.5	194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0			70.0	35.0		
Storage Blk Time (%)		28			0	0	0		4	28	
Queuing Penalty (veh)		24			0	0	0		10	28	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	23.8	34.0	16.9	25.5	47.8	24.3	26.3	29.9	59.6	71.0	62.5	58.3
Average Queue (m)	3.9	11.4	2.7	10.2	18.3	7.6	11.6	11.5	25.3	31.7	27.5	26.0
95th Queue (m)	15.2	26.2	10.9	23.0	38.1	19.2	23.4	24.2	45.9	56.2	51.2	46.8
Link Distance (m)		439.6	439.6			1046.6	1046.6			576.0	576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)							0	0	4	8		
Queuing Penalty (veh)							0	0	10	18		

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	74.1	57.1	62.8
Average Queue (m)	31.6	20.5	28.0
95th Queue (m)	58.9	43.4	51.4
Link Distance (m)		961.6	961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0	0	
Queuing Penalty (veh)	1	0	

Queuing and Blocking Report

2024 Future Background AM Peak Hour
08/30/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T	R
Maximum Queue (m)	19.0	42.5	50.2	14.0	22.2	29.1	29.1	5.2	15.9	18.0	12.4	4.1
Average Queue (m)	3.9	16.9	23.3	2.1	5.4	7.3	8.0	0.4	3.5	4.7	1.0	0.1
95th Queue (m)	12.8	36.4	43.2	8.3	15.9	20.0	21.9	2.9	11.3	12.9	6.2	2.9
Link Distance (m)		337.6	337.6		544.6	544.6		776.5		176.9	176.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0			70.0			60.0		60.0			25.0
Storage Blk Time (%)												0
Queuing Penalty (veh)												0

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R
Maximum Queue (m)	17.0	62.5	67.4	23.7	30.6	41.8	34.0	47.2	25.0	96.4	30.0
Average Queue (m)	3.1	28.1	32.5	8.4	9.3	17.0	12.3	19.8	6.9	40.9	1.0
95th Queue (m)	11.0	52.2	57.4	19.3	24.0	34.1	25.6	38.5	17.9	80.6	15.2
Link Distance (m)		329.4	329.4		1392.0	1392.0		279.6		1972.0	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	85.0			70.0			40.0		25.0		25.0
Storage Blk Time (%)		0					0	4	0	15	
Queuing Penalty (veh)		0					0	3	1	9	

Queuing and Blocking Report

2024 Future Background AM Peak Hour
08/30/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	3.0	79.7	79.3	54.4	49.5	50.1	45.6	48.4	22.9	85.0	99.2	37.7
Average Queue (m)	0.2	45.0	45.5	23.9	18.8	25.8	20.3	19.5	7.7	48.6	60.9	16.1
95th Queue (m)	1.8	69.8	70.8	43.4	39.0	44.6	37.6	38.8	18.8	76.7	87.5	32.2
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			1	0						0	0	
Queuing Penalty (veh)			2	0						0	0	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	34.3	110.2	96.2	28.3	31.4
Average Queue (m)	12.5	47.8	36.6	10.6	12.8
95th Queue (m)	27.3	87.6	73.2	23.6	27.3
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	64.8	37.8	20.0	23.5
Average Queue (m)	32.3	18.2	6.5	11.2
95th Queue (m)	53.4	29.8	15.2	19.5
Link Distance (m)	155.5	1328.4	207.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2024 Future Background AM Peak Hour
08/30/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	109.6	33.3	39.0	82.6	31.6	98.3
Average Queue (m)	55.2	12.6	14.9	37.2	13.2	49.4
95th Queue (m)	94.2	25.5	32.0	69.3	27.3	84.0
Link Distance (m)	1328.4		637.7	1972.0		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	0			5
Queuing Penalty (veh)		0	0			4

Network Summary

Network wide Queuing Penalty: 111

Queuing and Blocking Report

2024 Future Background PM Peak Hour
08/30/2023

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	58.9	92.8	39.4	92.2	71.5	76.6	82.2	24.1	11.7	72.3	60.9
Average Queue (m)	24.0	46.1	16.7	45.5	31.4	32.8	36.6	7.2	1.4	34.0	20.9
95th Queue (m)	46.3	80.2	33.1	79.0	58.5	68.9	69.9	18.4	6.6	58.6	47.8
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0		
Storage Blk Time (%)	0	1		2	0	0	1			8	
Queuing Penalty (veh)	0	1		2	1	1	1			1	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	26.2	40.0	31.0	45.5	70.8	25.6	36.5	57.5	47.6	91.8	86.4	32.8
Average Queue (m)	7.1	18.7	9.2	19.3	33.8	6.8	12.2	25.3	16.8	55.4	50.6	11.7
95th Queue (m)	19.1	32.8	22.3	34.6	60.2	19.9	28.0	48.2	36.6	84.8	81.3	23.9
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)					0		0	4	2	27		
Queuing Penalty (veh)					0		1	2	9	23		

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	64.7	52.4	57.7
Average Queue (m)	24.9	22.2	25.4
95th Queue (m)	49.7	43.9	49.0
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Queuing and Blocking Report

2024 Future Background PM Peak Hour
08/30/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	R	L	T
Maximum Queue (m)	34.8	36.5	47.1	24.7	37.3	44.8	44.4	21.4	9.2	4.8	9.8	13.4
Average Queue (m)	12.0	12.3	18.6	5.5	14.5	17.3	19.9	6.7	0.4	0.2	1.4	4.5
95th Queue (m)	25.9	28.5	37.4	17.0	31.1	34.9	38.8	17.2	4.7	4.0	5.7	10.7
Link Distance (m)	337.6		337.6		544.6		544.6		776.5		776.5	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		25.0		60.0			
Storage Blk Time (%)								0	0			
Queuing Penalty (veh)								0	0			

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB
Directions Served	T
Maximum Queue (m)	14.3
Average Queue (m)	1.8
95th Queue (m)	8.4
Link Distance (m)	176.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	R
Maximum Queue (m)	13.3	38.1	46.7	9.8	45.2	44.0	44.8	65.1	31.3	24.7	148.6	10.1
Average Queue (m)	2.1	16.5	17.7	2.0	14.6	20.9	16.9	32.6	2.6	5.5	58.3	1.2
95th Queue (m)	8.9	33.4	36.9	7.8	32.4	37.4	35.1	56.5	17.5	16.7	335.9	8.4
Link Distance (m)	329.4		329.4		1392.0		1392.0		279.6		1972.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0		70.0		40.0		25.0		25.0		25.0	
Storage Blk Time (%)					0	1	10	0	1	10		
Queuing Penalty (veh)					0	2	15	0	1	4		

Queuing and Blocking Report

2024 Future Background PM Peak Hour
08/30/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	11.3	59.1	58.0	93.9	75.0	75.9	67.1	73.5	30.7	89.1	102.6	38.0
Average Queue (m)	2.5	32.2	31.6	44.9	42.1	45.3	34.7	37.7	9.9	52.0	63.9	17.7
95th Queue (m)	8.9	50.1	51.3	77.7	67.4	69.7	56.8	63.5	22.2	81.4	92.8	32.8
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0	1						0	1	
Queuing Penalty (veh)			0	3						0	1	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	33.4	51.0	68.6	36.7	42.5
Average Queue (m)	15.6	21.8	28.6	17.5	18.8
95th Queue (m)	28.9	38.8	57.2	32.6	35.7
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	44.5	57.2	28.1	19.3
Average Queue (m)	20.6	26.6	14.2	7.6
95th Queue (m)	34.8	44.4	23.0	15.6
Link Distance (m)	155.5	1328.4	207.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2024 Future Background PM Peak Hour
08/30/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	74.7	23.4	60.9	127.0	12.1	50.3
Average Queue (m)	29.6	8.5	23.9	68.8	1.0	21.2
95th Queue (m)	58.9	19.4	49.1	111.5	6.3	41.1
Link Distance (m)	1328.4		637.7	1972.0		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0		60.0		
Storage Blk Time (%)			2			0
Queuing Penalty (veh)			1			0

Network Summary

Network wide Queuing Penalty: 68

Queuing and Blocking Report

2029 FB AM Peak Hour
08/30/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	23.5	31.6	19.4	25.8	48.6	25.4	31.0	26.4	56.8	57.2	55.1	50.3
Average Queue (m)	5.7	11.6	3.0	10.1	19.6	7.0	12.5	10.9	25.2	30.8	25.1	10.8
95th Queue (m)	18.0	26.6	12.4	21.7	40.2	18.5	25.5	23.0	46.0	50.5	46.3	32.2
Link Distance (m)		434.9	434.9		1042.8	1042.8			575.6	575.6	575.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)							0	0	5	8		0
Queuing Penalty (veh)							0	0	8	19		2

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (m)	67.2	67.7	41.3	42.8	36.9	17.8
Average Queue (m)	28.1	33.0	17.6	18.9	9.7	3.1
95th Queue (m)	51.5	58.5	33.0	35.7	26.8	11.4
Link Distance (m)		480.0	480.0	480.0		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	30.0	75.0			75.0	
Storage Blk Time (%)	5	0				
Queuing Penalty (veh)	8	0				

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T
Maximum Queue (m)	18.8	54.2	60.6	18.8	30.4	31.3	30.2	6.3	17.9	15.9	11.7
Average Queue (m)	3.7	21.1	27.9	3.5	7.0	8.3	8.8	0.5	3.5	5.2	1.1
95th Queue (m)	12.0	44.3	51.7	12.4	20.9	21.8	22.9	3.0	11.6	13.4	6.3
Link Distance (m)		337.6	337.6	1424.6	1424.6		776.7		176.9	176.9	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	70.0			70.0			60.0	60.0			
Storage Blk Time (%)		0									0
Queuing Penalty (veh)		0									0

Queuing and Blocking Report

2029 FB AM Peak Hour
08/30/2023

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R
Maximum Queue (m)	18.0	74.1	79.6	27.8	31.0	40.4	34.5	49.4	30.1	98.8	29.5
Average Queue (m)	3.4	32.8	38.2	8.7	9.4	18.1	13.7	22.3	8.2	47.8	1.0
95th Queue (m)	11.6	61.1	66.9	20.6	23.8	34.8	28.1	40.6	21.5	87.1	14.9
Link Distance (m)		1424.6	1424.6		1388.2	1388.2		279.6		1972.0	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	85.0			70.0			40.0		25.0		25.0
Storage Blk Time (%)		0					0	5	1	18	
Queuing Penalty (veh)		0					1	5	3	12	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (m)	0.7	65.5	65.2	57.8	54.7	55.2	54.0	38.3	37.3	26.8	28.2	103.6
Average Queue (m)	0.0	42.5	41.9	26.5	27.0	20.6	27.2	18.3	15.8	5.9	7.7	57.9
95th Queue (m)	0.7	61.8	61.9	55.0	46.4	43.5	48.0	32.8	30.5	18.0	20.1	93.2
Link Distance (m)		714.6	714.6	714.6				859.4	859.4	859.4		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0				72.0	170.0	170.0				130.0	105.0
Storage Blk Time (%)				0	0							0
Queuing Penalty (veh)				0	0							0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR
Maximum Queue (m)	110.1	37.2	32.0	95.5	89.2	34.0	38.7
Average Queue (m)	69.6	17.4	12.6	42.6	40.6	13.4	15.6
95th Queue (m)	103.5	32.9	26.9	74.2	78.3	27.7	31.5
Link Distance (m)		320.8	320.8		1388.2	1388.2	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	105.0			260.0	160.0		
Storage Blk Time (%)	1						
Queuing Penalty (veh)	1						

Queuing and Blocking Report

2029 FB AM Peak Hour
08/30/2023

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	60.4	36.4	20.6	27.5
Average Queue (m)	30.8	19.3	7.3	11.9
95th Queue (m)	48.6	30.3	16.1	21.7
Link Distance (m)	529.6	1328.4	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB	SB	
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	107.4	33.1	43.6	100.9	52.2	106.3
Average Queue (m)	62.1	14.2	16.0	45.5	14.8	51.7
95th Queue (m)	99.4	26.8	34.8	87.8	34.6	88.5
Link Distance (m)	1328.4		637.7	1972.0		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	1			6
Queuing Penalty (veh)		0	1			5

Network Summary

Network wide Queuing Penalty: 64

Queuing and Blocking Report

2029 FB PM Peak Hour
08/30/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (m)	26.3	40.6	36.0	34.6	71.8	31.0	34.6	51.3	42.1	84.1	78.8	64.1
Average Queue (m)	7.8	21.0	11.2	17.6	35.1	8.0	12.0	22.3	18.0	48.9	44.2	25.9
95th Queue (m)	19.9	34.9	25.7	29.6	61.7	21.7	27.4	40.3	34.9	72.9	69.1	55.8
Link Distance (m)		434.9	434.9		1042.8	1042.8			575.6	575.6	575.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)				0		0	2	2	23			3
Queuing Penalty (veh)				0		1	1	7	22			5

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (m)	29.2	64.8	43.5	48.2	35.8	10.2
Average Queue (m)	11.5	27.3	21.5	23.1	12.1	0.7
95th Queue (m)	23.2	53.2	37.4	40.5	29.6	4.8
Link Distance (m)			484.1	484.1	484.1	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	30.0	75.0			75.0	
Storage Blk Time (%)	0	0				
Queuing Penalty (veh)	1	0				

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	33.8	41.9	49.4	26.3	42.0	50.8	51.3	26.8	11.8	14.8	18.9	14.2
Average Queue (m)	13.1	13.7	20.5	7.7	16.9	19.7	22.1	7.8	0.7	1.9	4.9	2.3
95th Queue (m)	26.7	31.2	40.1	20.8	34.3	39.8	43.0	20.1	5.2	8.3	13.4	9.1
Link Distance (m)		337.6	337.6		1424.6	1424.6		776.7	776.7		176.9	176.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0			70.0			60.0			60.0		
Storage Blk Time (%)							0		0			0
Queuing Penalty (veh)							0		0			0

Queuing and Blocking Report

2029 FB PM Peak Hour
08/30/2023

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	
Maximum Queue (m)	18.5	52.7	48.6	10.4	48.3	49.0	43.7	79.6	7.5	23.2	53.8	
Average Queue (m)	2.8	17.7	19.4	2.2	17.6	22.9	19.1	34.9	0.5	6.2	19.6	
95th Queue (m)	11.1	39.4	38.3	7.9	37.1	40.3	36.5	64.9	10.5	16.9	41.0	
Link Distance (m)		1424.6	1424.6		1388.2	1388.2		279.6			1972.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0			70.0			40.0		25.0	25.0		
Storage Blk Time (%)							1	12		0	4	
Queuing Penalty (veh)							3	19		1	2	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	WB	NB	
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L	L	
Maximum Queue (m)	12.5	55.3	54.0	46.0	113.8	106.6	110.8	51.5	52.7	47.8	34.2	113.6		
Average Queue (m)	2.9	32.6	30.2	12.4	59.8	62.5	65.7	28.3	30.0	22.6	10.6	68.1		
95th Queue (m)	9.5	48.8	47.9	33.4	102.1	102.3	105.9	48.1	48.8	43.4	25.6	103.5		
Link Distance (m)		714.6	714.6	714.6				859.4	859.4	859.4				
Upstream Blk Time (%)														
Queuing Penalty (veh)														
Storage Bay Dist (m)	122.0				72.0	170.0	170.0					130.0	105.0	
Storage Blk Time (%)					5								0	
Queuing Penalty (veh)					8								0	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR
Maximum Queue (m)	125.0	50.6	36.5	40.5	68.0	46.1	49.8
Average Queue (m)	79.4	19.2	17.2	19.7	28.8	19.9	21.1
95th Queue (m)	115.3	38.3	31.9	33.5	56.4	36.8	39.0
Link Distance (m)		320.8	320.8		1388.2	1388.2	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	105.0			260.0	160.0		
Storage Blk Time (%)	3						
Queuing Penalty (veh)	3						

Queuing and Blocking Report

2029 FB PM Peak Hour
08/30/2023

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	37.0	59.2	30.8	20.9
Average Queue (m)	18.9	30.0	15.6	8.1
95th Queue (m)	31.1	47.7	26.2	17.0
Link Distance (m)	529.6	1328.4	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	NB	SB	SB	
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	83.7	34.0	63.4	153.4	9.2	53.6
Average Queue (m)	36.3	11.7	32.3	74.9	1.0	23.4
95th Queue (m)	67.3	24.5	55.7	129.0	5.5	44.4
Link Distance (m)	1328.4		637.7	1972.0		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	4			0
Queuing Penalty (veh)		0	3			0

Network Summary

Network wide Queuing Penalty: 75

Queuing and Blocking Report

2034 FB AM Peak Hour
08/30/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (m)	25.9	30.3	21.2	2.3	24.1	62.0	20.0	23.5	30.6	36.6	61.9	63.4
Average Queue (m)	6.6	12.4	4.7	0.1	11.4	25.0	5.0	7.9	12.8	14.1	30.8	36.5
95th Queue (m)	20.1	27.0	15.2	1.8	22.3	49.9	15.2	18.9	25.3	29.0	52.7	57.8
Link Distance (m)		435.2	435.2	435.2		1043.2	1043.2	1043.2			571.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0				115.0	85.0				35.0	30.0	
Storage Blk Time (%)					0			0	0	8	13	
Queuing Penalty (veh)					0			0	0	17	34	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	T	R
Maximum Queue (m)	59.2	58.6	78.3	96.2	41.3	46.2	39.9	14.8
Average Queue (m)	31.0	16.2	35.8	45.4	21.2	22.7	14.4	3.5
95th Queue (m)	52.6	44.3	66.3	81.7	37.8	40.0	33.1	11.4
Link Distance (m)	571.9	571.9		460.4	460.4	460.4		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			30.0	75.0			75.0	
Storage Blk Time (%)		1	10	3				
Queuing Penalty (veh)		5	21	5				

Queuing and Blocking Report

2034 FB AM Peak Hour
08/30/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	L	T
Maximum Queue (m)	16.1	31.6	34.4	50.4	17.5	19.6	21.1	24.2	34.0	5.9	20.2	16.5
Average Queue (m)	3.3	9.2	14.2	23.3	3.1	4.3	3.5	5.1	9.4	0.7	4.3	5.2
95th Queue (m)	11.0	23.2	30.3	44.0	11.4	13.7	12.9	16.5	25.2	3.8	13.2	12.8
Link Distance (m)		335.9	335.9	335.9		1421.2	1421.2	1421.2		772.6		172.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0				70.0				60.0		60.0	
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB
Directions Served	T
Maximum Queue (m)	11.8
Average Queue (m)	1.5
95th Queue (m)	7.2
Link Distance (m)	172.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Queuing and Blocking Report

2034 FB AM Peak Hour
08/30/2023

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	L	T
Maximum Queue (m)	16.1	59.3	53.1	81.4	29.0	23.9	32.9	43.6	47.7	60.9	37.4	110.1
Average Queue (m)	3.2	25.0	21.2	32.1	9.7	7.0	10.1	17.3	17.5	25.4	8.7	51.1
95th Queue (m)	10.6	49.6	43.4	62.0	22.4	18.3	24.5	36.1	37.1	48.4	25.3	96.0
Link Distance (m)		1421.2	1421.2	1421.2		1387.0	1387.0	1387.0		275.8		1967.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0				70.0				40.0		25.0	
Storage Blk Time (%)		0							1	8	1	19
Queuing Penalty (veh)		0							3	8	3	14

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	SB
Directions Served	R
Maximum Queue (m)	22.0
Average Queue (m)	1.0
95th Queue (m)	14.9
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	25.0
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2034 FB AM Peak Hour
08/30/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (m)	2.7	70.2	65.9	59.1	48.4	57.9	60.6	42.6	45.1	32.3	26.5	101.2
Average Queue (m)	0.2	43.2	43.0	27.1	20.4	20.8	30.9	21.6	21.1	6.7	8.9	61.3
95th Queue (m)	1.6	61.9	62.7	55.7	37.5	46.7	53.3	38.1	38.2	21.0	20.4	93.0
Link Distance (m)		707.2	707.2	707.2				855.6	855.6	855.6		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0				72.0	170.0	170.0				130.0	105.0
Storage Blk Time (%)				0	0							0
Queuing Penalty (veh)				0	0							0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R	L	T	T	T	R
Maximum Queue (m)	116.4	39.7	37.4	19.0	127.1	100.8	20.5	26.3	31.6	13.0
Average Queue (m)	73.6	16.6	14.1	3.5	59.2	45.5	6.2	9.4	11.7	1.6
95th Queue (m)	103.8	32.9	29.6	12.9	105.0	85.6	15.5	21.4	25.3	7.1
Link Distance (m)		320.2	320.2	320.2			1387.0	1387.0	1387.0	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	105.0				260.0	160.0			70.0	
Storage Blk Time (%)		1								
Queuing Penalty (veh)		1								

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	87.9	41.1	19.4	26.1
Average Queue (m)	38.5	19.6	7.7	12.4
95th Queue (m)	72.4	32.2	15.8	21.2
Link Distance (m)	529.6	1328.4	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2034 FB AM Peak Hour
08/30/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	131.1	37.5	42.6	135.2	61.5	117.6
Average Queue (m)	73.1	15.5	16.4	58.8	16.7	62.8
95th Queue (m)	116.9	29.5	34.6	116.3	42.0	107.7
Link Distance (m)	1328.4		637.7	1967.9		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	0		0	11
Queuing Penalty (veh)		0	0		0	9

Network Summary

Network wide Queuing Penalty: 121

Queuing and Blocking Report

2034 FB PM Peak Hour
08/30/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (m)	31.6	43.2	33.3	13.6	44.8	88.4	25.3	25.9	48.2	70.5	67.1	94.0
Average Queue (m)	9.9	23.5	13.5	1.7	20.8	44.3	6.3	8.4	10.8	31.4	24.3	58.9
95th Queue (m)	23.7	38.7	29.0	8.1	36.1	75.6	18.6	20.7	30.2	56.8	49.4	84.0
Link Distance (m)		435.2	435.2	435.2		1043.2	1043.2	1043.2				571.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0				115.0	85.0				35.0	30.0	
Storage Blk Time (%)					1			0	7	6	32	
Queuing Penalty (veh)					0			1	3	18	35	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	T	R
Maximum Queue (m)	88.4	77.7	32.8	86.6	66.8	56.2	45.9	10.7
Average Queue (m)	53.9	39.7	13.4	37.7	27.8	29.0	19.0	1.1
95th Queue (m)	79.6	70.3	26.0	77.4	52.0	49.1	40.4	6.1
Link Distance (m)	571.9	571.9		480.5	480.5	480.5		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			30.0	75.0			75.0	
Storage Blk Time (%)		8	0	3	0			
Queuing Penalty (veh)		16	1	5	0			

Queuing and Blocking Report

2034 FB PM Peak Hour
08/30/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	L
Maximum Queue (m)	34.9	27.0	28.2	44.5	27.1	36.0	33.6	41.7	56.8	29.6	15.0	11.9
Average Queue (m)	13.2	7.4	8.5	16.6	7.0	12.6	10.9	15.3	24.8	8.0	1.0	1.5
95th Queue (m)	28.3	19.8	21.5	35.1	19.6	27.7	25.5	33.0	46.1	21.4	7.7	6.3
Link Distance (m)		335.9	335.9	335.9		1421.2	1421.2	1421.2		772.6	772.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0				70.0				60.0			60.0
Storage Blk Time (%)									0		0	
Queuing Penalty (veh)									0		0	

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB	SB
Directions Served	T	T
Maximum Queue (m)	15.2	13.0
Average Queue (m)	4.9	2.5
95th Queue (m)	11.6	9.3
Link Distance (m)	172.8	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report

2034 FB PM Peak Hour
08/30/2023

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB		
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	L		
Maximum Queue (m)	12.7	42.7	31.4	179.4	9.5	34.2	35.8	45.0	47.4	87.6	7.5	22.1		
Average Queue (m)	2.1	13.2	10.5	19.0	2.0	11.0	14.1	22.1	20.4	39.9	0.2	6.9		
95th Queue (m)	8.6	31.8	25.4	154.8	7.4	25.9	29.9	39.4	38.1	70.5	7.4	17.6		
Link Distance (m)	1421.2			1421.2	1387.0			1387.0	275.8					
Upstream Blk Time (%)														
Queuing Penalty (veh)														
Storage Bay Dist (m)	85.0				70.0				40.0				25.0	25.0
Storage Blk Time (%)														
Queuing Penalty (veh)									4				26	1

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	SB
Directions Served	T
Maximum Queue (m)	53.8
Average Queue (m)	20.5
95th Queue (m)	42.0
Link Distance (m)	1967.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	5
Queuing Penalty (veh)	2

Queuing and Blocking Report

2034 FB PM Peak Hour
08/30/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB			
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L			
Maximum Queue (m)	8.5	54.6	54.5	46.2	118.8	176.7	192.5	187.5	142.2	50.7	31.4	144.9			
Average Queue (m)	1.8	32.6	30.3	12.8	54.2	125.4	131.0	52.7	46.9	25.7	10.9	118.9			
95th Queue (m)	6.3	49.4	49.3	35.0	99.9	203.0	215.7	170.7	145.2	46.8	23.3	168.3			
Link Distance (m)	707.2		707.2	707.2				855.6	855.6	855.6					
Upstream Blk Time (%)															
Queuing Penalty (veh)															
Storage Bay Dist (m)	122.0				72.0				170.0	170.0	130.0				105.0
Storage Blk Time (%)															
Queuing Penalty (veh)					7				28	38	1				

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	SB		
Directions Served	L	T	T	T	R	L	T	T	T	R		
Maximum Queue (m)	180.2	227.9	175.6	81.3	51.3	78.5	28.7	37.5	39.5	11.1		
Average Queue (m)	141.1	102.8	69.2	11.6	23.7	32.7	11.1	15.6	15.7	1.2		
95th Queue (m)	207.5	317.1	236.5	71.5	43.6	64.1	22.6	29.1	31.6	5.6		
Link Distance (m)	320.2		320.2	320.2	1387.0			1387.0	1387.0			
Upstream Blk Time (%)	12										1	0
Queuing Penalty (veh)	0										0	0
Storage Bay Dist (m)	105.0				260.0				160.0	70.0		
Storage Blk Time (%)	53											
Queuing Penalty (veh)	41											

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	38.9	65.8	32.6	19.4
Average Queue (m)	20.0	33.1	16.7	8.1
95th Queue (m)	31.7	54.3	26.5	16.4
Link Distance (m)	529.6	1328.4	1039.2	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2034 FB PM Peak Hour
08/30/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	92.4	43.2	77.4	131.2	10.6	48.5
Average Queue (m)	43.5	12.9	36.7	56.0	0.9	20.2
95th Queue (m)	77.1	28.5	65.9	102.9	5.4	41.7
Link Distance (m)	1328.4		637.7	1967.9		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	6			0
Queuing Penalty (veh)		0	5			0

Network Summary

Network wide Queuing Penalty: 260

Queuing and Blocking Report
2024 FT AM Peak Hour

11/28/2023

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	150.6	258.6	47.5	34.8	62.8	59.9	56.7	40.0	65.2	112.7	97.4
Average Queue (m)	26.3	127.5	15.6	12.2	26.9	23.1	28.2	14.0	22.6	62.5	49.5
95th Queue (m)	102.5	230.9	34.4	28.6	53.1	48.0	50.7	29.7	46.8	97.5	83.0
Link Distance (m)		561.6		516.8		961.6	961.6			194.5	194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0			70.0	35.0		
Storage Blk Time (%)		27	0		0	0	0		4	31	
Queuing Penalty (veh)		24	0		0	0	0		10	34	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	24.1	35.7	25.4	28.0	66.6	27.8	32.1	36.8	55.9	67.7	66.0	83.2
Average Queue (m)	4.7	13.2	4.4	10.6	28.4	8.6	13.6	12.1	24.7	35.3	30.8	37.3
95th Queue (m)	16.7	28.1	16.0	23.8	52.7	21.4	26.4	26.7	45.3	58.1	56.6	68.3
Link Distance (m)		439.6	439.6			1046.6	1046.6			576.0	576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)							0	0	5	10		
Queuing Penalty (veh)							0	0	11	21		

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	79.9	60.1	60.3
Average Queue (m)	35.4	22.1	29.6
95th Queue (m)	66.6	48.2	54.0
Link Distance (m)		961.6	961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	1	0	
Queuing Penalty (veh)	2	0	

Queuing and Blocking Report
2024 FT AM Peak Hour

11/28/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T
Maximum Queue (m)	26.9	52.8	57.8	17.0	40.2	55.1	31.4	6.6	36.8	16.0	13.7
Average Queue (m)	8.5	22.8	29.5	2.7	12.2	19.3	8.5	0.4	12.0	4.1	1.3
95th Queue (m)	20.3	44.0	52.5	10.2	30.0	42.7	22.3	3.1	28.2	11.6	7.0
Link Distance (m)		337.6	337.6		523.2	523.2		776.5		176.9	176.9
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	70.0			70.0			60.0		60.0		
Storage Blk Time (%)											0
Queuing Penalty (veh)											0

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R
Maximum Queue (m)	17.5	76.8	75.1	31.5	94.7	97.6	33.4	49.1	29.6	101.9	59.9
Average Queue (m)	3.5	33.5	38.4	9.0	38.3	44.6	13.6	21.5	7.9	43.5	2.5
95th Queue (m)	12.0	60.5	65.5	22.8	75.9	79.3	27.9	40.2	20.5	82.3	24.6
Link Distance (m)		324.4	324.4		1392.0	1392.0		279.6		1972.0	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	85.0			70.0			40.0		25.0	25.0	
Storage Blk Time (%)		0			2		0	5	1	18	
Queuing Penalty (veh)		0			1		0	4	2	16	

Queuing and Blocking Report
2024 FT AM Peak Hour

11/28/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	3.0	81.8	84.7	58.5	50.5	55.4	44.2	41.1	31.5	89.5	102.7	86.8
Average Queue (m)	0.1	50.1	50.4	24.8	19.1	25.9	20.6	18.9	8.9	54.4	65.4	48.3
95th Queue (m)	1.5	73.0	75.3	45.2	40.2	46.4	37.6	36.9	22.3	81.1	91.0	76.1
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			1	0						0	0	
Queuing Penalty (veh)			4	0						0	0	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	81.2	111.6	94.6	41.5	49.7
Average Queue (m)	45.4	49.7	38.8	19.7	21.6
95th Queue (m)	72.4	88.3	76.4	36.2	40.5
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	76.1	41.4	21.3	22.2
Average Queue (m)	34.8	19.8	9.8	11.2
95th Queue (m)	57.8	33.3	17.9	18.9
Link Distance (m)	156.8	1328.4	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
2024 FT AM Peak Hour

11/28/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	97.9	30.8	43.3	80.9	41.0	104.1
Average Queue (m)	54.6	13.8	15.5	35.2	13.8	51.8
95th Queue (m)	89.7	26.3	34.2	66.5	32.0	88.2
Link Distance (m)	1328.4		637.7	1972.0		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	1			6
Queuing Penalty (veh)		0	1			4

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (m)	11.2	8.5	12.7
Average Queue (m)	5.5	1.3	1.5
95th Queue (m)	12.6	6.3	7.5
Link Distance (m)		167.3	172.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	30.0		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	25.1	37.0	42.8	31.1	36.7	19.5	35.7	20.0
Average Queue (m)	7.6	9.5	13.6	6.2	8.8	4.7	11.9	5.6
95th Queue (m)	19.4	27.7	33.8	21.1	26.8	14.5	27.9	15.9
Link Distance (m)		523.2	523.2	540.6	540.6		133.1	133.1
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	136.0						136.0	
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
2024 FT AM Peak Hour

11/28/2023

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	18.6	32.9	39.0	38.6	102.5	20.2	22.2	11.9
Average Queue (m)	4.3	6.9	10.6	6.3	11.1	3.1	7.2	2.2
95th Queue (m)	13.2	22.7	30.1	24.5	58.9	11.9	18.2	8.3
Link Distance (m)		540.6	540.6	324.4	324.4		138.6	138.6
Upstream Blk Time (%)					0			
Queuing Penalty (veh)					0			
Storage Bay Dist (m)	136.0					136.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	13.0	9.2
Average Queue (m)	3.5	2.7
95th Queue (m)	10.9	9.4
Link Distance (m)		82.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 202: West Access 2 & 5 Sideroad

Movement	NB
Directions Served	LR
Maximum Queue (m)	9.1
Average Queue (m)	1.3
95th Queue (m)	6.5
Link Distance (m)	83.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
2024 FT AM Peak Hour

11/28/2023

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	20.7	15.3
Average Queue (m)	5.3	1.4
95th Queue (m)	18.0	8.2
Link Distance (m)	94.0	196.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	11.2	15.6
Average Queue (m)	4.9	3.5
95th Queue (m)	12.4	11.4
Link Distance (m)	96.2	160.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	18.1	9.6
Average Queue (m)	1.5	0.4
95th Queue (m)	9.4	4.4
Link Distance (m)	95.0	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 135

Queuing and Blocking Report

2024 FT PM Peak Hour
11/29/2023

Intersection: 1: Regional Road 25 & 5 Sideroad

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (m)	60.8	93.6	47.7	98.3	72.5	85.0	90.4	28.8	16.6	64.8	58.6
Average Queue (m)	25.3	46.8	20.7	46.3	33.5	34.3	38.6	8.2	3.1	36.3	22.6
95th Queue (m)	49.5	79.4	40.1	80.4	61.7	72.4	75.4	20.6	11.3	59.7	49.0
Link Distance (m)	561.6		516.8		961.6		961.6		194.5		194.5
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	80.0		70.0		75.0		70.0		35.0		
Storage Blk Time (%)	0	1		2	0	1	1			9	
Queuing Penalty (veh)	0	1		2	1	1	1			1	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	24.6	40.9	31.4	47.1	104.1	39.7	40.2	64.7	69.5	106.2	103.3	53.6
Average Queue (m)	7.1	21.4	12.0	19.8	53.2	7.8	13.2	28.6	18.6	60.4	56.0	16.5
95th Queue (m)	19.5	36.8	26.7	35.5	91.7	24.5	30.6	53.6	42.9	91.2	88.3	36.9
Link Distance (m)	439.6		439.6		1046.6		1046.6		576.0		576.0	576.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0		115.0		85.0		35.0		30.0			
Storage Blk Time (%)					2	0	1	5	2	31		
Queuing Penalty (veh)					1	0	1	3	9	26		

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (m)	67.6	60.9	62.9
Average Queue (m)	29.1	27.8	30.1
95th Queue (m)	56.8	50.4	53.5
Link Distance (m)	961.6		961.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	75.0		
Storage Blk Time (%)	0	0	
Queuing Penalty (veh)	1	0	

Queuing and Blocking Report

2024 FT PM Peak Hour
11/29/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	36.2	42.2	54.3	28.6	61.6	65.5	60.8	29.2	13.7	72.4	21.6	12.2
Average Queue (m)	16.0	16.4	22.4	6.3	27.1	31.4	21.7	9.3	0.8	32.9	4.7	2.4
95th Queue (m)	30.2	35.0	43.1	19.0	53.3	57.5	44.3	21.8	6.6	60.6	15.0	8.7
Link Distance (m)	337.6		337.6		524.0		524.0		776.6		776.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0		70.0		60.0		60.0		60.0			
Storage Blk Time (%)				0			0	0	1	0	0	0
Queuing Penalty (veh)				0			0	0	0	0	0	0

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	
Maximum Queue (m)	26.8	80.3	77.1	12.6	68.2	73.2	42.8	75.2	7.2	25.0	52.8	
Average Queue (m)	7.9	36.0	37.9	2.4	25.9	34.3	18.5	37.4	0.2	6.0	18.6	
95th Queue (m)	20.1	64.0	63.6	8.7	51.9	60.6	36.1	63.9	7.1	17.4	40.5	
Link Distance (m)	324.4		324.4		1392.0		1392.0		279.6		1972.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0		70.0		40.0		25.0		25.0			
Storage Blk Time (%)		0		0			1	15		1	5	
Queuing Penalty (veh)		0		0			3	22		1	2	

Queuing and Blocking Report

2024 FT PM Peak Hour
11/29/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	T	R	L	L	T
Maximum Queue (m)	11.8	73.5	74.4	137.5	118.8	117.4	93.4	91.4	35.6	107.9	124.1	92.1
Average Queue (m)	2.2	38.0	37.5	68.8	67.4	70.1	47.2	49.8	11.4	74.5	87.2	47.5
95th Queue (m)	8.2	59.6	59.5	118.8	110.1	113.6	77.1	78.0	26.1	123.6	144.1	150.1
Link Distance (m)		714.5	714.5				859.9	859.9				324.5
Upstream Blk Time (%)	2											
Queuing Penalty (veh)	0											
Storage Bay Dist (m)	122.0			72.0	170.0	170.0			130.0	105.0	105.0	
Storage Blk Time (%)			0	10			0			7	11	0
Queuing Penalty (veh)			0	19			0			12	18	0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	SB	SB	SB
Directions Served	T	R	L	T	TR
Maximum Queue (m)	83.8	46.1	65.4	91.7	95.0
Average Queue (m)	40.3	20.5	25.6	53.7	55.9
95th Queue (m)	129.3	37.6	52.4	80.2	83.9
Link Distance (m)	324.5			1392.0	1392.0
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (m)		260.0	160.0		
Storage Blk Time (%)	0				
Queuing Penalty (veh)	0				

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	40.7	56.6	36.9	17.4
Average Queue (m)	21.5	28.8	17.1	7.1
95th Queue (m)	34.1	47.3	28.4	14.5
Link Distance (m)	156.8	1328.4	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2024 FT PM Peak Hour
11/29/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	71.2	24.3	62.7	142.8	10.8	49.5
Average Queue (m)	32.7	9.4	26.3	79.5	0.8	22.7
95th Queue (m)	61.3	20.3	51.2	127.8	5.2	43.8
Link Distance (m)	1328.4		637.7	1972.0		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)			2			0
Queuing Penalty (veh)			2			0

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (m)	20.2	9.3	6.3
Average Queue (m)	10.0	4.5	0.4
95th Queue (m)	16.6	10.8	3.5
Link Distance (m)	163.1		173.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		30.0	
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	22.5	86.6	90.2	45.2	36.3	21.2	55.8	25.4
Average Queue (m)	6.2	14.9	19.0	10.4	12.5	4.6	25.2	9.6
95th Queue (m)	18.1	66.2	70.2	30.2	29.4	15.3	46.1	20.3
Link Distance (m)		524.0	524.0	540.0	540.0		133.2	133.2
Upstream Blk Time (%)	0							
Queuing Penalty (veh)	0							
Storage Bay Dist (m)	136.0						136.0	
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report

2024 FT PM Peak Hour
11/29/2023

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	13.7	41.1	47.1	42.3	101.2	15.8	48.2	16.2
Average Queue (m)	2.6	14.3	16.7	11.4	15.5	2.2	19.1	5.0
95th Queue (m)	9.7	32.9	36.0	30.7	62.4	10.2	36.4	12.1
Link Distance (m)		540.0	540.0	324.4	324.4		138.6	138.6
Upstream Blk Time (%)					0			
Queuing Penalty (veh)					0			
Storage Bay Dist (m)	136.0					136.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	7.0	14.4
Average Queue (m)	0.6	7.2
95th Queue (m)	4.4	13.7
Link Distance (m)		82.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 202: West Access 2 & 5 Sideroad

Movement	NB
Directions Served	LR
Maximum Queue (m)	9.2
Average Queue (m)	4.7
95th Queue (m)	11.8
Link Distance (m)	83.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2024 FT PM Peak Hour
11/29/2023

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	24.9	15.6
Average Queue (m)	9.0	1.1
95th Queue (m)	22.7	7.9
Link Distance (m)	94.0	196.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	18.9	12.5
Average Queue (m)	9.8	0.8
95th Queue (m)	15.8	6.4
Link Distance (m)	96.2	160.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	19.4	6.0
Average Queue (m)	2.9	0.3
95th Queue (m)	13.1	3.9
Link Distance (m)	95.0	173.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 130

Queuing and Blocking Report
2029 FT AM Peak Hour

11/28/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (m)	21.7	42.4	28.5	23.8	79.4	29.3	36.1	33.1	57.6	61.2	50.4	68.7
Average Queue (m)	4.7	15.1	4.8	9.8	32.0	8.9	12.7	11.7	25.8	33.1	26.6	14.0
95th Queue (m)	16.4	30.9	18.3	21.2	61.9	21.4	27.0	25.6	46.3	53.5	47.0	52.0
Link Distance (m)		434.9	434.9		1042.8	1042.8			575.6	575.6	575.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)					0		0	0	5	10		0
Queuing Penalty (veh)				0	0	0	0	9	23			3

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (m)	90.5	81.2	44.2	43.9	37.0	18.0
Average Queue (m)	41.6	38.3	19.5	20.9	11.0	3.0
95th Queue (m)	74.8	72.8	36.2	38.1	28.1	11.2
Link Distance (m)		480.0	480.0	480.0		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	30.0	75.0			75.0	
Storage Blk Time (%)	15	1	0			
Queuing Penalty (veh)	27	2	0			

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	T
Maximum Queue (m)	29.2	69.4	76.0	16.7	44.7	54.8	30.3	6.6	33.8	18.0	12.0
Average Queue (m)	9.2	28.1	34.2	2.9	13.1	19.3	8.5	0.7	10.2	4.6	1.3
95th Queue (m)	22.0	55.2	61.0	10.6	33.1	43.1	23.4	4.0	24.7	13.2	6.7
Link Distance (m)		337.6	337.6		522.4	522.4		776.7		176.9	176.9
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	70.0			70.0			60.0		60.0		
Storage Blk Time (%)		0		0			0			0	
Queuing Penalty (veh)		0		0			0			0	

Queuing and Blocking Report
2029 FT AM Peak Hour

11/28/2023

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	L	T	R
Maximum Queue (m)	20.6	96.4	93.7	28.7	100.1	103.7	37.7	52.9	24.2	99.2	66.4
Average Queue (m)	4.4	42.5	46.1	9.5	44.6	52.7	14.5	24.5	7.9	47.2	3.7
95th Queue (m)	14.4	76.6	78.5	22.1	84.3	93.1	30.2	44.2	18.8	86.8	30.1
Link Distance (m)		324.4	324.4		1388.2	1388.2		279.6		1972.0	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	85.0			70.0			40.0		25.0		25.0
Storage Blk Time (%)		1		3			0	7	1	20	
Queuing Penalty (veh)		0		1			1	6	3	19	

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (m)	2.1	69.8	69.1	60.7	62.5	52.7	58.5	42.1	38.0	28.5	35.9	101.5
Average Queue (m)	0.1	44.6	44.8	29.1	30.5	21.5	28.0	19.3	17.3	6.3	9.9	63.4
95th Queue (m)	1.5	62.8	63.3	58.7	54.5	44.4	50.5	34.7	32.9	19.4	26.4	95.0
Link Distance (m)		714.6	714.6	714.6				859.4	859.4	859.4		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0				72.0	170.0	170.0				130.0	105.0
Storage Blk Time (%)				0	0							0
Queuing Penalty (veh)				0	0							0

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR
Maximum Queue (m)	114.8	99.7	118.4	95.8	126.8	56.6	59.0
Average Queue (m)	74.5	53.3	51.3	43.8	49.5	23.1	25.8
95th Queue (m)	105.5	82.3	89.1	78.1	100.9	43.4	47.2
Link Distance (m)		320.8	320.8		1388.2	1388.2	
Upstream Blk Time (%)				0			
Queuing Penalty (veh)				0			
Storage Bay Dist (m)	105.0			260.0	160.0		
Storage Blk Time (%)	1	0		0			
Queuing Penalty (veh)	2	0		0			

Queuing and Blocking Report
2029 FT AM Peak Hour

11/28/2023

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	84.8	46.6	21.6	25.7
Average Queue (m)	35.9	21.3	10.1	11.8
95th Queue (m)	65.5	36.2	18.6	21.0
Link Distance (m)	156.8	1328.4	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	105.8	35.3	45.1	124.8	50.3	112.5
Average Queue (m)	62.3	15.3	17.5	50.4	14.9	60.6
95th Queue (m)	96.2	28.7	36.9	103.2	36.4	102.2
Link Distance (m)	1328.4		637.7	1972.0		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	0			10
Queuing Penalty (veh)		0	0			8

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	B20	SB
Directions Served	L	R	T	LT
Maximum Queue (m)	12.2	8.6	4.0	13.7
Average Queue (m)	5.0	1.0	0.1	1.6
95th Queue (m)	12.6	5.6	3.9	7.7
Link Distance (m)		163.2	176.9	172.8
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	30.0			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
2029 FT AM Peak Hour

11/28/2023

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	26.3	47.8	49.3	35.3	43.9	25.6	27.3	19.3
Average Queue (m)	10.5	17.7	22.7	11.5	16.6	10.1	9.1	5.0
95th Queue (m)	22.6	35.9	41.2	26.5	34.8	21.1	22.4	15.4
Link Distance (m)		522.4	522.4	541.8	541.8		133.3	133.3
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	136.0					136.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	18.1	42.7	41.8	45.0	51.5	19.5	21.0	15.0
Average Queue (m)	4.5	8.6	12.0	8.2	10.4	2.6	6.4	2.8
95th Queue (m)	13.6	28.7	34.0	29.6	34.2	11.2	17.3	9.8
Link Distance (m)		541.8	541.8	324.4	324.4		138.6	138.6
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	136.0					136.0		
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	14.0	10.4
Average Queue (m)	4.6	2.7
95th Queue (m)	12.3	9.5
Link Distance (m)		82.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report
2029 FT AM Peak Hour

11/28/2023

Intersection: 202: West Access 2 & 5 Sideroad

Movement	NB
Directions Served	LR
Maximum Queue (m)	9.0
Average Queue (m)	1.3
95th Queue (m)	6.3
Link Distance (m)	83.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	20.1	14.7
Average Queue (m)	4.6	1.1
95th Queue (m)	16.5	7.4
Link Distance (m)	94.0	196.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	11.7	16.8
Average Queue (m)	5.6	3.7
95th Queue (m)	12.9	11.9
Link Distance (m)	96.2	160.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
2029 FT AM Peak Hour

11/28/2023

Intersection: 205: Boston Church Road & West Access5

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	18.8	13.3
Average Queue (m)	2.1	0.7
95th Queue (m)	11.3	6.2
Link Distance (m)	95.0	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 105

Queuing and Blocking Report

2029 FT PM Peak Hour
11/28/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	T
Maximum Queue (m)	27.6	43.3	38.6	39.4	119.5	31.5	35.0	62.7	63.1	94.9	83.1	64.4
Average Queue (m)	8.1	21.7	11.5	17.6	59.8	8.5	13.6	26.5	20.7	53.0	48.4	30.2
95th Queue (m)	20.9	37.8	27.0	30.8	104.3	23.3	28.6	49.3	44.5	79.8	74.3	60.6
Link Distance (m)		434.9	434.9		1042.8	1042.8			575.6	575.6	575.6	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0			115.0	85.0			35.0	30.0			
Storage Blk Time (%)				5		0	3	3	29			4
Queuing Penalty (veh)				3		1	2	8	27			8

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	SB	SB	SB	SB	SB
Directions Served	R	L	T	T	T	R
Maximum Queue (m)	36.2	73.3	50.0	50.1	41.8	9.0
Average Queue (m)	15.4	32.6	23.9	25.7	15.5	0.6
95th Queue (m)	28.4	62.9	41.4	44.7	36.4	4.0
Link Distance (m)			484.1	484.1	484.1	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	30.0	75.0			75.0	
Storage Blk Time (%)	0	1				
Queuing Penalty (veh)	1	2				

Queuing and Blocking Report

2029 FT PM Peak Hour
11/28/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	T	L	T	T
Maximum Queue (m)	45.7	49.6	60.3	28.2	70.6	120.2	54.6	32.9	15.6	65.9	16.8	12.6
Average Queue (m)	18.7	20.3	26.9	7.0	31.5	37.0	23.9	10.2	1.3	30.9	4.2	2.7
95th Queue (m)	35.8	40.7	50.2	19.5	60.1	93.1	45.4	23.8	8.3	55.5	12.2	9.5
Link Distance (m)		337.6	337.6		522.4	522.4		776.7	776.7		176.9	176.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0			70.0			60.0			60.0		
Storage Blk Time (%)				0		0	0	0	1			0
Queuing Penalty (veh)				0		0	0	0	0			0

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB
Directions Served	R
Maximum Queue (m)	4.2
Average Queue (m)	0.1
95th Queue (m)	4.1
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	25.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	
Directions Served	L	T	TR	L	T	TR	L	T	R	L	T	
Maximum Queue (m)	31.0	91.7	90.1	12.6	69.4	72.3	51.3	82.1	14.6	25.3	59.2	
Average Queue (m)	9.8	42.6	43.8	2.7	29.6	37.8	19.9	39.4	0.5	6.6	22.6	
95th Queue (m)	24.5	75.0	75.0	9.2	55.8	64.9	38.9	67.7	10.3	18.7	47.0	
Link Distance (m)		324.4	324.4		1388.2	1388.2		279.6			1972.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0			70.0			40.0		25.0	25.0		
Storage Blk Time (%)		0		0		0	1	16		1	6	
Queuing Penalty (veh)		0		0		0	4	27		1	3	

Queuing and Blocking Report

2029 FT PM Peak Hour
11/28/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB	
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L	
Maximum Queue (m)	12.0	60.3	95.6	168.7	168.4	202.2	236.0	446.5	436.5	285.5	42.4	143.2	
Average Queue (m)	2.6	37.8	38.8	45.1	105.4	172.7	191.3	215.7	199.8	61.3	14.3	119.5	
95th Queue (m)	8.9	55.4	74.1	159.0	176.8	242.9	280.5	502.2	477.3	188.2	33.0	171.4	
Link Distance (m)		714.6	714.6	714.6			859.4	859.4	859.4				
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	122.0					72.0	170.0	170.0				130.0	105.0
Storage Blk Time (%)					33	45	53	2				0	43
Queuing Penalty (veh)					47	115	136	10				0	75

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	T	T	R	L	T	TR	
Maximum Queue (m)	178.6	243.7	220.4	112.5	63.3	108.1	238.6	
Average Queue (m)	142.8	145.5	124.6	25.1	26.6	61.3	68.9	
95th Queue (m)	212.4	355.1	329.8	85.9	52.0	95.0	199.6	
Link Distance (m)	320.8		320.8	1388.2		1388.2		
Upstream Blk Time (%)	17		4					0
Queuing Penalty (veh)	0		0					0
Storage Bay Dist (m)	105.0			260.0	160.0			
Storage Blk Time (%)	57	1	1					
Queuing Penalty (veh)	99	2	3					

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	46.3	68.7	32.3	20.2
Average Queue (m)	21.5	33.4	17.3	8.0
95th Queue (m)	36.1	55.2	27.5	16.3
Link Distance (m)	156.8	1328.4	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report

2029 FT PM Peak Hour
11/28/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB	
Directions Served	LTR	L	TR	LTR	L	TR	
Maximum Queue (m)	92.2	28.3	69.2	177.6	11.0	52.1	
Average Queue (m)	41.3	10.2	34.0	89.1	1.3	22.4	
95th Queue (m)	76.4	21.1	60.7	154.3	6.7	43.9	
Link Distance (m)	1328.4	637.7		1972.0	456.3		
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)	40.0		60.0				
Storage Blk Time (%)			4				0
Queuing Penalty (veh)			3				0

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (m)	21.4	10.3	7.1
Average Queue (m)	10.5	4.8	0.3
95th Queue (m)	17.0	11.9	3.0
Link Distance (m)	163.2		172.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)	30.0		
Storage Blk Time (%)	0		
Queuing Penalty (veh)	0		

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	R	L	R
Maximum Queue (m)	22.8	34.0	35.4	42.5	41.8	23.6	45.8	24.4
Average Queue (m)	8.0	12.1	16.6	14.0	14.6	5.6	18.6	8.5
95th Queue (m)	19.8	26.2	29.9	32.0	31.3	17.1	35.8	19.2
Link Distance (m)	522.4		522.4	541.8	541.8	133.3		133.3
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	136.0				136.0			
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report

2029 FT PM Peak Hour
11/28/2023

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	WB	WB	WB	SB	SB	
Directions Served	L	T	T	T	T	R	L	R	
Maximum Queue (m)	16.1	49.2	50.6	44.8	45.2	20.2	41.9	16.6	
Average Queue (m)	2.8	16.1	17.8	12.6	14.2	2.6	18.7	5.8	
95th Queue (m)	10.7	37.5	37.5	33.1	36.3	11.9	34.5	13.8	
Link Distance (m)		541.8	541.8	324.4	324.4		138.6	138.6	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	136.0						136.0		
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	7.8	13.9
Average Queue (m)	0.5	7.2
95th Queue (m)	3.7	14.0
Link Distance (m)		82.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 202: West Access 2 & 5 Sideroad

Movement	NB
Directions Served	LR
Maximum Queue (m)	10.5
Average Queue (m)	5.2
95th Queue (m)	12.5
Link Distance (m)	83.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report

2029 FT PM Peak Hour
11/28/2023

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	21.8	20.5
Average Queue (m)	8.1	1.4
95th Queue (m)	21.1	9.5
Link Distance (m)	94.0	196.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	18.2	11.0
Average Queue (m)	10.0	0.9
95th Queue (m)	15.6	5.9
Link Distance (m)	96.2	160.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 205: Boston Church Road & West Access5

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	19.7	15.0
Average Queue (m)	2.4	0.6
95th Queue (m)	12.5	6.0
Link Distance (m)	95.0	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 578

Queuing and Blocking Report
2034 FT AM Peak Hour

11/28/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (m)	29.2	36.7	27.8	6.2	31.5	84.0	23.8	25.6	35.1	35.5	77.8	75.8
Average Queue (m)	6.9	16.1	6.8	0.3	12.1	39.1	5.9	9.6	13.5	14.6	36.7	40.0
95th Queue (m)	20.6	32.0	20.6	5.5	24.8	73.3	17.5	20.6	26.1	28.4	65.0	64.8
Link Distance (m)		435.2	435.2	435.2		1043.2	1043.2	1043.2			571.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0				115.0	85.0				35.0	30.0	
Storage Blk Time (%)					1			0	0		13	16
Queuing Penalty (veh)					0			0	0		29	45

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	T	R
Maximum Queue (m)	75.0	134.7	98.4	124.2	82.4	78.4	47.3	16.8
Average Queue (m)	36.2	28.5	56.0	58.6	29.0	30.3	18.2	3.8
95th Queue (m)	61.2	87.2	97.8	111.7	92.2	89.8	40.0	12.0
Link Distance (m)	571.9	571.9		460.4	460.4	460.4		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			30.0	75.0			75.0	
Storage Blk Time (%)		2	26	8				
Queuing Penalty (veh)		12	57	15				

Queuing and Blocking Report
2034 FT AM Peak Hour

11/28/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	L
Maximum Queue (m)	32.1	48.9	57.0	65.1	20.9	32.8	42.3	60.0	35.0	6.6	1.6	39.4
Average Queue (m)	8.7	15.1	20.1	26.9	3.5	8.3	8.7	18.0	10.4	0.8	0.1	11.8
95th Queue (m)	22.0	36.0	42.3	52.2	12.5	23.0	26.2	44.7	27.0	4.3	1.1	28.0
Link Distance (m)		335.9	335.9	335.9		519.3	519.3	519.3		772.4	772.4	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0				70.0				60.0			60.0
Storage Blk Time (%)									0			
Queuing Penalty (veh)									0			

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB	SB
Directions Served	T	T
Maximum Queue (m)	16.7	15.7
Average Queue (m)	4.8	2.4
95th Queue (m)	12.4	9.9
Link Distance (m)	172.8	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report
2034 FT AM Peak Hour

11/28/2023

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	L	T
Maximum Queue (m)	16.7	76.5	69.2	88.4	32.0	70.6	83.0	95.8	40.1	66.9	67.6	129.0
Average Queue (m)	3.9	35.9	34.2	44.0	11.4	29.2	35.4	47.3	18.9	30.5	11.3	64.0
95th Queue (m)	11.6	64.7	60.9	76.3	25.4	61.8	74.0	88.2	36.4	55.5	36.8	114.0
Link Distance (m)		323.0	323.0	323.0		1387.0	1387.0	1387.0		275.8		1967.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0				70.0				40.0		25.0	
Storage Blk Time (%)		0				0			2	11	2	28
Queuing Penalty (veh)		0				0			4	10	10	28

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	SB
Directions Served	R
Maximum Queue (m)	74.9
Average Queue (m)	5.7
95th Queue (m)	38.2
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	25.0
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Queuing and Blocking Report
2034 FT AM Peak Hour

11/28/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	R	L
Maximum Queue (m)	2.6	78.7	79.8	73.0	65.7	78.8	81.9	47.5	50.0	37.5	29.9	130.7
Average Queue (m)	0.1	50.1	50.3	38.0	26.6	37.4	45.2	25.1	24.2	10.8	9.3	83.3
95th Queue (m)	1.4	70.8	71.4	65.9	51.8	76.7	80.3	42.1	43.3	28.8	22.7	128.3
Link Distance (m)		707.2	707.2	707.2				855.6	855.6	855.6		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	122.0				72.0	170.0	170.0				130.0	105.0
Storage Blk Time (%)					0	0						3
Queuing Penalty (veh)					0	1						6

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R	L	T	T	T	R
Maximum Queue (m)	143.9	104.1	116.8	65.7	145.7	183.7	116.7	58.2	178.2	14.1
Average Queue (m)	97.2	49.3	47.3	30.7	72.8	90.7	21.2	19.9	25.4	1.5
95th Queue (m)	142.7	91.7	88.4	57.5	130.2	173.1	84.4	43.0	157.0	7.9
Link Distance (m)		320.2	320.2	320.2		1387.0	1387.0	1387.0		
Upstream Blk Time (%)			0						0	
Queuing Penalty (veh)			0						0	
Storage Bay Dist (m)	105.0				260.0	160.0				70.0
Storage Blk Time (%)	9	0				5	0			
Queuing Penalty (veh)	19	0				6	0			

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	99.5	43.0	22.2	25.6
Average Queue (m)	45.2	21.9	10.5	12.4
95th Queue (m)	82.4	35.3	18.8	20.9
Link Distance (m)	156.8	1328.4	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
2034 FT AM Peak Hour

11/28/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	127.9	33.1	47.2	159.0	85.9	146.4
Average Queue (m)	68.5	16.6	19.6	69.4	19.1	76.1
95th Queue (m)	110.9	29.5	39.0	142.7	53.1	128.5
Link Distance (m)	1328.4		637.7	1967.9		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)		0	1		0	18
Queuing Penalty (veh)		0	1		0	15

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	B20	SB
Directions Served	L	R	T	LT
Maximum Queue (m)	15.5	9.1	20.5	13.4
Average Queue (m)	5.2	0.9	0.8	1.5
95th Queue (m)	13.1	5.2	17.3	8.0
Link Distance (m)		111.7	172.8	172.8
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (m)	30.0			
Storage Blk Time (%)	0			
Queuing Penalty (veh)	0			

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	28.5	33.0	33.6	36.2	28.7	33.3	47.0	22.3	36.2	20.6
Average Queue (m)	9.1	6.4	8.4	10.6	5.0	5.8	10.0	5.6	12.9	5.5
95th Queue (m)	21.8	21.5	24.9	29.5	18.3	21.5	31.0	16.4	29.0	15.9
Link Distance (m)		519.3	519.3	519.3	542.6	542.6	542.6		129.4	129.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	136.0								136.0	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Queuing and Blocking Report
2034 FT AM Peak Hour

11/28/2023

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	18.3	26.6	28.3	38.9	35.5	38.3	46.6	17.2	25.7	14.0
Average Queue (m)	4.8	5.0	6.3	9.0	5.0	5.8	8.4	3.1	8.0	3.3
95th Queue (m)	13.9	17.9	21.1	26.8	20.3	23.2	28.8	11.6	20.2	10.9
Link Distance (m)		542.6	542.6	542.6	323.0	323.0	323.0		134.9	134.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	136.0								136.0	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	11.0	9.2
Average Queue (m)	3.8	2.3
95th Queue (m)	11.0	8.7
Link Distance (m)		82.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 202: West Access 2 & 5 Sideroad

Movement	NB
Directions Served	LR
Maximum Queue (m)	9.8
Average Queue (m)	1.6
95th Queue (m)	7.2
Link Distance (m)	83.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
2034 FT AM Peak Hour

11/28/2023

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	20.9	15.5
Average Queue (m)	5.1	1.4
95th Queue (m)	17.6	8.4
Link Distance (m)	94.0	196.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	11.9	15.6	0.7
Average Queue (m)	5.7	3.5	0.0
95th Queue (m)	13.0	11.5	0.7
Link Distance (m)	96.2	160.4	196.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	18.6	13.1
Average Queue (m)	1.8	0.6
95th Queue (m)	10.8	6.2
Link Distance (m)	95.0	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 259

Queuing and Blocking Report
2034 FT PM Peak Hour

11/28/2023

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB
Directions Served	L	T	T	T	R	L	T	T	T	R	L	T
Maximum Queue (m)	33.1	48.5	42.5	20.5	54.1	175.0	473.3	392.6	77.6	85.5	92.0	119.4
Average Queue (m)	10.2	28.3	19.2	2.4	25.6	143.3	210.2	52.1	16.8	40.3	29.1	72.9
95th Queue (m)	23.6	44.7	36.2	11.0	44.9	216.1	520.4	239.5	44.7	72.7	63.9	105.8
Link Distance (m)		435.2	435.2	435.2		1043.2	1043.2	1043.2				571.9
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	80.0				115.0	85.0			35.0	30.0		
Storage Blk Time (%)					64	0		1	12	7	42	
Queuing Penalty (veh)					31	1		4	6	24	50	

Intersection: 2: Regional Road 25 & James Snow Parkway N

Movement	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	T	T	R	L	T	T	T	R
Maximum Queue (m)	112.2	93.4	41.5	124.7	96.3	85.3	59.9	12.1
Average Queue (m)	69.2	54.5	18.1	70.8	44.6	42.8	27.2	1.2
95th Queue (m)	101.0	85.0	33.2	134.1	112.1	97.9	51.7	6.5
Link Distance (m)	571.9	571.9		480.5	480.5	480.5		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)			30.0	75.0			75.0	
Storage Blk Time (%)		17	1	22	0		0	
Queuing Penalty (veh)		48	4	47	0		0	

Queuing and Blocking Report
2034 FT PM Peak Hour

11/28/2023

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	T	L
Maximum Queue (m)	53.5	43.3	39.3	57.9	28.9	52.1	59.6	64.1	64.6	40.0	13.5	65.6
Average Queue (m)	20.8	13.4	15.1	23.9	7.8	21.6	21.6	27.7	28.5	12.5	1.1	31.3
95th Queue (m)	40.8	31.7	31.8	48.1	21.4	44.7	46.6	54.8	53.7	30.2	6.8	55.8
Link Distance (m)		335.9	335.9	335.9		519.8	519.8	519.8		772.4	772.4	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	70.0				70.0				60.0			60.0
Storage Blk Time (%)					0				0	0		1
Queuing Penalty (veh)					0				0	0		0

Intersection: 3: Boston Church Road & James Snow Parkway N

Movement	SB	SB
Directions Served	T	T
Maximum Queue (m)	32.9	13.9
Average Queue (m)	5.2	2.9
95th Queue (m)	18.2	10.6
Link Distance (m)	172.8	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Queuing and Blocking Report
2034 FT PM Peak Hour

11/28/2023

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	T	T	TR	L	T	T	TR	L	T	R	L
Maximum Queue (m)	30.0	75.8	68.8	69.8	11.2	49.0	59.6	71.7	74.2	104.6	37.0	29.5
Average Queue (m)	8.2	31.8	30.2	31.7	2.2	19.1	24.4	33.1	25.4	50.5	1.5	8.1
95th Queue (m)	22.1	61.5	58.1	57.6	8.1	40.5	49.4	59.8	50.7	87.3	18.6	21.0
Link Distance (m)		323.0	323.0	323.0		1387.0	1387.0	1387.0		275.8		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	85.0				70.0				40.0		25.0	25.0
Storage Blk Time (%)		0							2	22		1
Queuing Penalty (veh)		0							11	40		2

Intersection: 4: Esquesing Line & James Snow Parkway N

Movement	SB
Directions Served	T
Maximum Queue (m)	56.4
Average Queue (m)	23.5
95th Queue (m)	47.3
Link Distance (m)	1967.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	7
Queuing Penalty (veh)	4

Queuing and Blocking Report
2034 FT PM Peak Hour

11/28/2023

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	EB	EB	EB	EB	EB	WB	WB	WB	WB	WB	WB	WB	NB
Directions Served	L	T	T	T	R	L	L	T	T	T	T	R	L
Maximum Queue (m)	12.6	66.1	144.1	232.8	162.3	205.0	240.0	781.9	772.3	661.7	35.3	145.0	
Average Queue (m)	2.8	39.2	41.9	82.0	117.8	189.3	218.5	499.4	483.5	264.1	12.3	139.6	
95th Queue (m)	8.9	58.5	95.8	245.9	196.2	243.9	290.2	996.2	983.0	808.1	27.3	163.7	
Link Distance (m)		707.2	707.2	707.2				855.6	855.6	855.6			
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)	122.0				72.0	170.0	170.0					130.0	105.0
Storage Blk Time (%)					44	63	77	2			0		76
Queuing Penalty (veh)					70	180	221	11			0		105

Intersection: 5: James Snow Parkway N & Steeles Avenue East

Movement	NB	NB	NB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	T	T	T	R	L	T	T	T	R
Maximum Queue (m)	185.0	336.2	327.6	316.3	81.4	102.7	69.6	75.1	212.1	15.5
Average Queue (m)	176.7	282.9	201.5	69.7	33.2	40.0	41.4	46.2	52.5	1.7
95th Queue (m)	213.8	443.3	422.4	239.6	64.1	81.7	63.3	68.1	182.5	7.9
Link Distance (m)		320.2	320.2	320.2			1387.0	1387.0	1387.0	
Upstream Blk Time (%)		62	8	0					0	
Queuing Penalty (veh)		0	0	0					0	
Storage Bay Dist (m)	105.0				260.0	160.0			70.0	
Storage Blk Time (%)	84	0		0					1	
Queuing Penalty (veh)	116	0		0					0	

Intersection: 6: Boston Church Road/3 Line & 5 Sideroad

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	44.7	73.5	42.1	20.7
Average Queue (m)	22.5	33.9	18.8	8.6
95th Queue (m)	36.3	58.4	32.1	17.1
Link Distance (m)	156.8	1328.4	205.8	489.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
2034 FT PM Peak Hour

11/28/2023

Intersection: 7: Esquesing Line/Fourth Line & 5 Sideroad

Movement	EB	WB	WB	NB	SB	SB
Directions Served	LTR	L	TR	LTR	L	TR
Maximum Queue (m)	100.9	34.4	85.8	147.2	10.7	56.3
Average Queue (m)	48.1	11.9	36.6	68.3	1.1	20.2
95th Queue (m)	83.1	26.3	66.1	124.4	6.1	41.4
Link Distance (m)	1328.4		637.7	1967.9		456.3
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		40.0			60.0	
Storage Blk Time (%)			6			0
Queuing Penalty (veh)			5			0

Intersection: 101: Boston Church Road & East Access 1

Movement	WB	WB	B20	SB
Directions Served	L	R	T	LT
Maximum Queue (m)	21.1	11.6	5.8	6.3
Average Queue (m)	10.9	5.3	0.2	0.4
95th Queue (m)	17.5	12.5	4.2	3.4
Link Distance (m)	111.9		172.8	172.8
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)		30.0		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 102: James Snow Parkway N & East Access 2

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	36.2	33.9	91.0	90.4	40.7	46.1	43.8	22.8	64.5	23.0
Average Queue (m)	8.4	10.3	15.3	17.2	11.0	11.6	14.1	4.6	30.4	9.8
95th Queue (m)	24.3	26.4	66.0	68.0	29.9	32.7	34.2	16.2	53.8	19.6
Link Distance (m)		519.8	519.8	519.8	542.0	542.0	542.0		129.5	129.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	136.0								136.0	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Queuing and Blocking Report
2034 FT PM Peak Hour

11/28/2023

Intersection: 103: James Snow Parkway N & East Access 3

Movement	EB	EB	EB	EB	WB	WB	WB	WB	SB	SB
Directions Served	L	T	T	T	T	T	T	R	L	R
Maximum Queue (m)	16.7	36.2	43.6	41.6	37.2	41.3	49.4	18.2	50.8	16.1
Average Queue (m)	3.3	11.6	12.4	13.8	9.6	9.5	13.7	2.6	23.0	5.5
95th Queue (m)	11.9	28.9	30.8	33.0	26.8	27.9	37.2	11.3	42.7	12.7
Link Distance (m)		542.0	542.0	542.0	323.0	323.0	323.0		134.9	134.9
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	136.0								136.0	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 201: West Access 1 & 5 Sideroad

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (m)	7.8	15.2
Average Queue (m)	0.8	6.9
95th Queue (m)	4.9	14.0
Link Distance (m)		82.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)	15.0	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 202: West Access 2 & 5 Sideroad

Movement	NB
Directions Served	LR
Maximum Queue (m)	10.6
Average Queue (m)	5.0
95th Queue (m)	12.4
Link Distance (m)	83.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Queuing and Blocking Report
2034 FT PM Peak Hour

11/28/2023

Intersection: 203: Boston Church Road & West Access 3

Movement	EB	NB	SB
Directions Served	LR	LT	TR
Maximum Queue (m)	23.5	20.3	0.7
Average Queue (m)	7.8	1.8	0.0
95th Queue (m)	21.1	10.9	0.7
Link Distance (m)	94.0	196.4	205.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 204: Boston Church Road & West Access 4

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	19.9	9.0
Average Queue (m)	9.8	0.6
95th Queue (m)	15.3	4.4
Link Distance (m)	96.2	160.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 205: Boston Church Road & West Access 5

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	19.0	13.9
Average Queue (m)	2.3	0.6
95th Queue (m)	11.6	5.8
Link Distance (m)	95.0	172.8
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 980
